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Correction Notice

Correction to Islam and Zelenkovska Leshkova, and Demir (2023)

In the article titled "Music in the Bektashi Order in RN Macedonia: Aspects of Performance" by Aida Islam, Stefanija Leshkova Zelenkovska, and Mehtap Demir Güven, published in the Musicologist - International Journal of Music Studies in 2023, Vol 7, No. 2, pp 238–268, the institution of the second author, Stefanija Leshkova Zelenkovska, is incorrectly written with a typing error as Goce Delchev University. The correct spelling should be Goce Delcev University.

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Fiddlers and Their Music in the Romanian Principalities from the Beginnings until the Nineteenth Century: Artistic Aspects

ABSTRACT

Fiddlers and their music were a very important component of the music of Moldavia, Wallachia, and Transylvania. Mentioned in documents since the 16th century, fiddlers were indispensable at the princely court, where they participated in most of the ceremonies in which the ruler played the principal role. The fiddle music varied depending on the characteristic music of the regions in which they settled, as well as on various foreign influences, especially the Ottoman classical music practised in those areas bordering the two Romanian Principalities. Thus, it gradually became possible for the fiddle music to acquire an individual identity and a specific social profile. The present study by no means exhausts the documentary sources regarding general aspects of this category of 'fiddlers', nor of their music, but it should be said that comparable research is largely absent in Romanian scholarly literature. The main focus rather is on general aspects of the tradition, and less on the particular. This paper outlines the general framework in which fiddlers appeared, but also highlights their placement in Romanian musical culture. It also tries to promote some awareness of the foreign and domestic influences that have been imprinted on their music, as well as of the musical instruments they have used. One aspect of the study is represented by comparative analysis of different written sources to indicate how the fiddlers have been referenced over time. All these aspects captured in this first article represent a contextualization of the fiddlers' practice, and at the same time serve as a broad introduction to a second article, which is unprecedented in its scope, and adopts an original historical approach to the entire 'phenomenon' of fiddle music and fiddlers. Both parts of the study should be considered complementary, and together they constitute a seminal contribution to the subject.

Musician Gypsies – General Aspects

The primary focus of this study is on clarifying the notion of fiddler music and its performers, the fiddlers. The aim is a more satisfactory systematization and clarification of everything that has been either confusing or insufficiently researched in existing Romanian and international scholarly literature. At the same time new information will be introduced from various categories of source that have not been properly researched up to now, including official documents and the testimonies of foreign travelers. On the other hand, it is also important to reposition some of the information that is already known but that has been neither contextualized nor fully understood.

Thus, I will explain the context in which the Gypsies appeared in the Romanian Principalities, always using the information provided by the official documents issued by the Chancelleries of the two countries. Afterwards I will analyze and comment on the earliest such documents to talk about fiddlers. Clarifying the terminology used in various historical sources and standardizing it so that it can be fully understood is another objective of this research, as is a presentation of the repertoire of the fiddlers, referring here not to the specific songs they have performed, but to the source of their musical specificity, and to the various influences acting on their music, whether from neighboring territories or from the local populations where Gypsy communities settled. Finally, I will refer to the musical instruments used by fiddlers, observing for each one of them the terminology that has been used over time in certain documents and clarifying aspects that have not been fully described so far.

The reason for choosing the theme of the fiddlers across the more than four centuries of their existence is that my literature review exposed the lack of a global perspective on this subject, and a general failure to present the fiddlers in a historically sound and coherent way. That is why it seems necessary to provide a historical perspective and to contextualize the fiddlers adequately, showing also their evolution. This research strategy has led me to 'remove' the fiddlers from the complex musical context of the princely court and to present them as a distinct entity, observing their history, their musical characteristics and the role they have played within Romanian society.

In the Romanian Principalities, between the 16th and 19th centuries (the period covered here), the fiddlers represented a category of musicians considered 'good at everything',

primarily because of their status as slaves, but also because of their musical versatility, so that they were able to approach a very wide repertoire comprising multiple musical genres. But as musicians they transformed these genres by often passing them through their own distinctive musical filter, resulting in the highly valued genre of fiddle music. One example of this occurred during the reign of Nicolae Mavrogheni (1786-1790), when the role of Gypsies in general – and of the fiddlers, in particular – was seen as a very important one. A certain Anastase the Greek states: "all the arts and crafts in the country are practised exclusively by the Gypsies, so that when they get on their carts and emigrate from the country, it is deprived of singers, dancers, musicians and craftsmen" (Urechiă, 1893: 79).

The importance of this music has several aspects. It was present mainly at the various public manifestations at the princely court, such as the princely feasts or walks, but it was also found in more official contexts such as the embassies, where the music bands (*taraf*) of the fiddlers formed part of the princely entourage.

The first documentary mention of the Gypsies in Wallachia dates back to 1385, when Dan I gave to the Tismana Monastery some estates, together with forty Gypsy dwellings. In Moldavia, their first mention appears in 1428, when Alexandru cel Bun (the Good) donated to the Bistriţa Monastery thirty-one Gypsy dwellings (Achim, 2004: 13-14). The first references to this social category used the term Gypsy (*aţigan*, the oldest form of the term), a term coming from the Greek language – *αθίγγανος* (athínganos) or *ατσίγγανος* (atsíganos) and deriving from the name of a Christian sect dating back to the 7th century in Phrygia. Byzantine sources contain several references regarding this term, associating it with newcomers, and signalling the migration of the Gypsies (Dieaconu, 2009: 17-19). That they ended up as slaves in the Romanian Principalities is considered to be due to the Mongol invasions during which they have supposedly arrived in Europe. The Gypsies were already slaves of the Mongols and after the battles with the Romanians they were taken as prisoners of war and became slaves of the victors. Their slavery is mentioned across the Byzantine Empire and also in the Balkan states prior to any mentions in the Romanian Principalities. From this information we can safely conclude that these people were customarily in captivity, and that this extended to the Romanian Principalities which captured them and treated them as slaves (Achim, 2004: 28-29).

In the Romanian Principalities, depending on which owner they belonged to, there were three categories of Gypsies: those owned by the rulers, those belonging to the boyars and those employed in the monasteries; the last two categories were called hearth Gypsies because they were responsible only to their owners (Potra, 2001: 30). The Gipsies were used in a wide range of occupations, from work in the fields to the various crafts. Among the hearth Gypsies, who were divided into 'Gypsies of the house' and 'field Gypsies' were some of the best musicians of Moldavia and Wallachia, with no grasp of musical notation, but with an ability to reproduce very well any musical phrase even if they had only listened to it once (Kogălniceanu, 1946: 576; Potra, 2001: 62, 64; Zăloagă, 2015: 359, 364).

There is no objective data regarding the beginnings of the musical activity of the fiddlers. Romeo Ghircoiaşiu (1963: 106) states something very interesting about their early appearance: "with social developments, the musical culture became diversified. Along with the village bagpipers appeared the Gypsy fiddlers, slaves of the estates, so musicians first and foremost of the boyar courts. While the common people continued to use their bagpipers, their own whistlers, the nobility had their fiddlers, even though they often also played at peasant horas and weddings". George Breazul (1966: 158-159) also states that the fiddlers were the direct descendants of mime artists, jugglers, minstrels, clowns and bagpipers, whom they successfully replaced at the princely courts, being always present at the important events.

One of the first documentary references (maybe even the first) about the fiddlers and their fate is found in the copy of a document issued by Alexandru IV Lăpuşneanu of Moldavia in 1560. The document registers to Dinga the *vornic* (a political dignitary) the ownership of certain Gypsy dwellings. Among those mentioned are: Stoica the fiddler with his wife Neacşa and their children, Rusim the fiddler with his wife Alba and children, about whom the document mentions that they were given by Mircea Voivode, the ruler of Wallachia, when he was "in the diplomatic mission", as well as Tămna the fiddler (Caproşu, 2008: 502-503). In 1569, on 14 April, the ruler Bogdan IV Lăpuşneanu of Moldavia registers to the same Dinga the Gypsy dwellings mentioned in the previous document, referencing the same fiddlers: Stoica with his wife Leneşa (probably his second wife) and their children; Rusim and his wife Anca (probably his second wife) with children. We need to keep in mind the fact that these fiddlers were mentioned in the

context of their participation in the embassy of Mircea Voivode. Also mentioned was Tâmpa the fiddler (*lăutar*), bought from Wallachia by Barcan the *comis* (political dignitary), certainly the same character mentioned before (Caproşu, 2008: 628-631; Ionaşcu et al., 1951a: 223-226; Codrescu, 1888: 137-138). The embassy here refers to diplomatic exchanges between Alexandru IV Lăpuşneanu and Mircea Ciobanu, ruler of Wallachia, through the *vornic* Dinga from Moldavia. In this context, Dinga received from the Wallachian ruler, probably as a gift, some Gypsies (Codrescu, 1892: 189), among whom were the same Stoica the fiddler, Rusim the fiddler and Tămna the fiddler, and he bought Tâmpa the fiddler, together with his family, from the Wallachian Barcan for the sum of 4000 *akçe*s (Ottoman currency). All these donations and purchases were registered in Moldavia by Alexandru IV Lăpuşneanu and Bogdan IV Lăpuşneanu in the cited documents.

From a document issued in the same period, in 1568, by the ruler Peter the Younger, we find out that he gives to Dinga the *postelnic* (political dignitary) some Gypsy villages, along with Stoica the fiddler and his children and Vişan *highidişul*, or the fiddler (the Romanian term *highidiş* comes from the Hungarian *hegedű* meaning violin), with his family (Ionaşcu et al., 1951b: 257-258; Ştefănescu and Diaconescu, 1985: 73). In these three cited documents, two issued in Moldavia and one in Wallachia, which state that the beneficiary is Dinga, *vornic* in Moldavia and *postelnic* in Wallachia, there is a common name present, that of Stoica the fiddler. The documents issued by the Chancellery of Moldavia refer to the same person; regarding the Wallachian one, we believe that it is just a coincidence of names, Stoica being one of the most common names of fiddlers mentioned in official documents.

The Names with which the Fiddlers Appear in Documents

In the Romanian language this category of musicians assigns names after the musician's primary instrument, namely the lute; hence the name of the profession, the player on lute, *lăutar* in Romanian. But in English, the term used to designate the Gypsy musicians is 'fiddler', a word that translates into Romanian as 'player on a *skripka* or violin', so in this paper, every time the terms 'fiddle' or 'fiddler' are used it refers to the players of the lute and to the instrument itself that is called 'lute'.

A very important issue that needs to be mentioned here is the terminology used in

Romanian to name these musicians. The category of "fiddlers" (or lute players) can be found in sources under multiple names such as: *balaur* (dragon), *carcalete* (sweetened wine), *muzicuş* (musician), *viorar* (violinist), *zicaş* (sayinger) and others[1] (Ghenea, 1965: 95). When the fiddlers were mentioned in official documents issued by the Princely Chancellery, as well as in documents with legal value that were concluded between different persons, their names were always connected to the instrument they played. Thus, when the phrase "Gypsy fiddler" is encountered in this category of source, we must bear in mind that the phrase refers primarily to the instrument that the musician played, but also to his ethnicity. Later on the phrase was used to designate the entire category of these musicians, regardless of the instrument they played. It is a plausible explanation because the Chancellery documents kept a strict record of these musicians in order to capitalize on them and prevent confusions arising that might enable some of them to avoid their respective responsibilities. It is also important to add that the names of Gypsies in general and of the Gypsy fiddlers in particular may often be duplicated, so that a strict distinction depending on their occupation seems logical. Regarding this terminological aspect, C. Bobulescu (1940: 70) states: "our ancestors under the name of the lute – which remained common to fiddlers as well as to those who played wind instruments – understood also all those instruments which by plucking the strings with their fingers, gave chords, including the cimbalum, the *kobza* and the cittern (*cetera*)".

In much the same sense, Viorel Cosma states: "the term *fiddler* (*author's emphasis*) has had different meanings over the centuries. Derived from the word *lute* (*lăută* in the Romanian language), the term became entrenched with the penetration of the first Western influences in our country. [...] Much older than the term *lute* is one that expresses the same thing and seems to come from the Russian *skripka*. Therefore, in the terminology of the seventeenth and eighteenth centuries, both terms coexist: fiddler (*lăutar*) and violinist (*scripcar*). [...] At first, 'fiddler' meant any musician who played a stringed instrument. In the 18th century, its meaning expanded. All the musicians of a *taraf* (band) – regardless of the instrument practiced – began to bear the name *fiddlers*" (Cosma, 1970: 5-7). However, it should be emphasized that the first documentary record of fiddlers dates back to the first mention of the *skripka* in these territories. Therefore, I

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[1] All these terms from the Romanian language are old terms that are very little used today, some of them being used in a pejorative sense.

believe that the *skripka*, in the broad sense of the term, was a musical instrument used by the original people from whom the practice was later taken over by Gypsy musicians. Moreover, Titus Cerne states in the *Romanian Encyclopedia* the following: "fiddler, [was] a name given of course at the beginning to the instrumentalists who accompanied travelling singers with the lute. The Turkish lute has long since disappeared from the Romanian Principalities, replaced by the Russian *kobza*; the name of fiddler still persisted, generalizing its meaning and applying to all itinerant musicians, either singers or instrumentalists with *kobza*, *skripka*, panpipes or any other instrument, always executing music without notation, relying on memory and listening. Thus, in this word we find concentrated all the professional music of our countries in the past centuries" (Cerne, 1904: 65). We can observe that the Gypsy musicians were generically called fiddlers (*lăutari*), although not all of them played the lute, and the differences that appeared in documentation were intended to differentiate the musicians from one another. An explanation for the differences between the official documents and the other categories of source is that the Gypsies are named in the documents strictly according to the instrument they played in order to have a stricter record of them, since they are mentioned, in most cases, in various categories of transactions. Being highly valued by their owners, the fiddlers had to be strictly supervised on an individual level, so as to not lose track of them.

In addition to the names already mentioned, there are other names used for fiddlers, depending on the instruments they played. From a document issued on 29 October 1634-1635 we find that Ionaşco Tăbîrţă exchanged some Gypsies with the abbot of Probota Monastery and that among those exchanged was *Ştefan ţigan cimpoiaş* ('Ştefan the Gypsy bagpiper') (Cihodaru et al., 1974: 309). Another document is the one issued by Vasile Lupu on 14 January 1641, which registers to the wife and successor of the *vornic* Bucium the properties and Gypsy dwellings they had from Ieremia Movilă; included among the Gypsies is also Stoica the fiddler (Caproşu, 2003: 5). In 1774, Field Marshal P. A. Rumiantsev asked the ruler of Wallachia for two brothers named Ivăniţă, who were both *kobzars*, but also for Stancu, a whistle player, to be taken to the court of Catherine II of Russia (Vianu, 1956: 242-243). The mention of fiddlers and *kobzars* in two distinct categories can also be seen in the *Census Register*[2] (Giurescu, 1962: 462, 464, 465-466);

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[2]This document represents a census of the population of the city of Iași for the year 1808.

shortly after the episode of 1774 we have a new mention of kobzars in domestic official documents. Thus, Alexandru Ipsilanti issued a document on 13 December 1777, in which *Ivaşco* the *kobza* player (Cronţ et al., 1973: 496) was mentioned in the context of a trial concerning the right of dominion over some Gypsies, noting here that there were also Gypsies playing the *kobza*.

Statistical documents are other sources where there is a clear delimitation of the fiddlers according to the instrument they played. In the *Chart of the burg of Iaşi and the slums, 5 June 1774, from the population census of Moldavia from 1774* (Caproşu and Ungureanu, 1997a: 95, 106, 109, 122), we find the mention by name and occupation (the instruments they played: *skripka*, *kobza*, panpipes and sometimes lute) of many Gypsy musicians, and also name of the boyar to whom they belonged. It is notable that these musicians were not called fiddlers, but each one of them named according to the instrument he specialized in.

The same situation is to be found in the *Register of souls and families from the bottom of the social hierarchy of Iaşi burg, 5 July 1808* (Caproşu and Ungureanu, 1997b: 179, 269-274, 277), which constitutes further proof that these Gypsy musicians were named and identified in official documents by the instrument they played. An interesting aspect here is that these people were considered as part of the lower social hierarchy; hence we can safely conclude that they did not have a very good material situation.

The Repertoire

A very concise definition of fiddlers comes from Octavian Lazăr Cosma (1973: 96-97), who states that "fiddlers are great interpreters; and also creators. They show an enormous receptivity to everything new. They know how to comply with immediate requirements, so that they do not confine themselves to endless clichés, but adopt a flexible attitude. Despite imitating others, they are still consistent carriers of the tradition they follow, meaning that they adopt innovations only on the condition that these can be assimilated by the ancient tradition".

With the growing tendency to migrate to the cities, where there were more possibilities for a better life, a gradual musical separation began, distinguishing 'folk music' from a new developing genre with different origins. This musical transition was made by

fiddlers, due to their ability to appropriate new sounds and enrich the repertoire, quickly integrating the new influences. In this connection, O.L. Cosma (1974: 28) states: "the fiddler excels in his ability to adopt the new, which has led to the (often covert) appropriation of various influences from the musical environment of the cities [...]. Through its interchange of divergent social layers, the city facilitates a strong and continuous syncretic culture based on circulating musical streams derived from, or mixed with, national traditions, and professionalizing in various ways the music brought in from the villages. Thus, urban music is based on a harmonious synthesis made from a contact between Romanian village music and Oriental as well as European music [...]. Through their talent and love for music, their devotion to the career of instrumentalist, albeit often shared with other occupations, the Gypsies identified themselves so much with the music of the natives that their takeover was total. Along with the Romanian folk musicians, instrumentalists and singers, Gypsy musicians contributed to the preservation of a folklore heritage, sometimes intervening in the profile of rhythmic or melodic characteristics drawn from traditional music".

The importance of this category of musician is also emphasized by earlier authors, some of them contemporary with the 'golden age' of this music, the second part of the 18th century, such as Dionisie Fotino, who stated: "especially they [fiddlers] are very good at music and play the violin, *kobza* and *muskal* (panpipes, *author's emphasis*); in these they surpass any other nation, including even the Persians [...]. They also sing excellently and without having any systematic teaching they also compose very beautiful songs that European musicians admire" (Fotino, 2008: 639).

Another very suggestive account of the importance of fiddlers was given by Daniel Philipide, who remarked that "'the fiddlers in Wallachia and Moldavia are exclusively the Gypsies'. Very skilful in playing string instruments and flutes, it is they alone who delight people at feasts, weddings and parties, for 'Gypsy is somewhat synonymous with musician'. And in Constantinople 'the best *skripka* players are the Gypsies from Romania'" (Bănescu, 1923: 164). Another important aspect of this account is that only the Gypsies were considered fiddlers, and not the Turks who performed Serai music, nor indeed performers from other traditions.

The fiddlers played an important role in preserving elements of Turkish music within

Romanian music (Garfias, 1981: 98). Gheorghe Ciobanu states that "fiddlers have always performed what was fashionable, what was asked of them" (Ciobanu, 1974*a*: 96), while George Potra says that Gypsies are intuitive/instinctive musicians (Potra, 2001: 36, 121).

Regarding the repertoire of fiddle music and the transformations at its heart, we find that it depended on the way of life of the Gypsies, which was quite volatile due to their separation into small groups, their economic dependence on the surrounding population, and the specificity of each region. Research on fiddle music has found that the basis of their repertoire has consisted of the songs of local people. By comparing the songs of fiddlers collected from a large group of Gypsies from the Danube plain with those from the Banat and Transylvania regions, it has been possible to show a number of characteristics common to Romanian folk songs, with the lyrics having the same meter, the same syllables of support or the same syllables of 'completion': *măi*, *mă*, *mo*. From a stylistic point of view, these characteristics are similar to those of folk music. It has also been established that there is no single special Gypsy musical territory, for their repertoire is composed of songs characteristic of the respective areas they inhabit, with major differences separating the songs of fiddlers from Romania, Hungary, Bulgaria or Russia. The Gypsy fiddlers have adapted to the way of life of the people with whom they lived, adopting their language, dress, customs and musical repertoire (Ciobanu, 1974a: 91). The same idea is advanced by Ion Chelcea, who stated that the Gypsies from Wallachia, Dobruja and Moldavia sing differently from those in Transylvania, who also differ in happily playing instrumental music on demand without using their voices like the others, intent on reaching deeper into the listener's heart (Chelcea, 1944: 112). In this sense, we can see that the Transylvanian fiddlers focused on instrumental music due to the European rural environment they have embraced, where the focus was on instrumental and not vocal music, in contrast with Oriental tendencies. As they depended on their music for a living, Transylvanian fiddlers adopted this specificity because instrumental music was more sought after and, implicitly, better paid. Another possible cause may have been the wilful avoidance of vocal singing in order not to engage (through the lyrics of the songs) with the cultural disputes that characterized Transylvanian society, especially in the 19th century, since this could have risked limiting their audience (Zăloagă, 2015: 362-363).

Nicolae Filimon identifies two very important directions followed by fiddle music as it

evolved. The first refers to the influence of church music, which was a source of inspiration not least because influences from pastoral folklore and nature did not provide enough variety to the repertoire. It is worth mentioning that the fiddlers were inspired by religious folklore such as carols and sacred songs rather than by the liturgical repertoire. The second direction appears with the penetration of Ottoman music into the Romanian Principalities, providing a good source of inspiration for fiddlers. Thus, according to the same author, the music became more complex, changed its character and was even distorted or damaged (Filimon, 1978: 265-266; Bilciurescu, 1898: 982-983). An example suggesting that the popularity of Ottoman classical music, deeply rooted in the collective consciousness, reached saturation point, is a remark by the priest Isaia Teodorescu (*Popa Duhu*), who scolded his faithful in one of the sermons, reprimanding them for the hasty way they cross themselves: "it is as if we sing to the *kobza* in Iaşi or to the tanbûr in Constantinople, from where such a custom came to us" (Bobulescu, 1940: 30).

Ottoman rule left its mark on much of the folklore of the South-East European peoples, and, through an interpenetration with indigenous cultural elements, a common layer was formed of Turkish melodies that circulated among the Romanians, Bulgarians, Serbians and Greeks. Setting aside the circulation of some songs, the greatest influence was at the level of the modal (or *makam*) system, and especially the chromatic modes. In this sense, elements of Oriental music are most often found in the music of fiddlers, who took over most of these influences. They created a new category of repertoire, the so-called 'Romanian folk song' (*doine*[3]) or rather 'songs of the world', in which they adapted Romanian folk lyrics to Oriental modes (*makam*s), creating strong similarities with the *peşrev*s and *taksım*s belonging to Oriental music (Ciobanu, 1974b: 57-58).

In our opinion, the 'song of the world' performed by fiddlers represents probably most closely the interpenetration of Romanian folk music and Oriental music. This musical genre is a historical phenomenon because it appeared under specific conditions and at a specific stage of social development. It evolved in parallel with the flourishing of cities and became a point of connection, but also a transition between different environments or from one type of thinking to another (Papadima, 2009: 31). The themes of these songs

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[3] It is a specific name given to a certain vocal Romanian musical genre, the correspondent of Turkish *beste*.

are the anacreontic praise of wine, the lamentations of unhappy love, the glorification of the beloved one and the dissatisfaction with her indifference. The circulation of these songs was through fiddlers and amateur singers, but also through manuscripts, and their period of maximum popularity was during the first decades of the 19th century (Papadima, 2009: 36-37). An important part of the lyrics of these songs belonged to the Văcăreşti poets (Boldea, 2009: 37-45) or to Costachi Conachi (Papadima, 2009: 41, *passim*), who represented the first generation of Romanian poets in the true meaning of the word.

Referring to the mixture of musical influences and styles that is characteristic of the art of fiddlers, but also indicates their technical abilities, Sulzer states that they "are remarkable in Turkish, Greek, Wallachian and Hungarian-style music; their skill in improvising a text on any song they play, no matter how ludicrous and clumsy these lyrics and their content may seem sometimes amazes everyone" (Zinveliu, 1995: 92). From another source we discover that when the peasants dance, the dance music is sung by fiddlers and most of the time it is copied from Turkish traditions (Holban et al., 1997: 68). The Gypsies mastered very well the technique of improvisation, singing and reciting spontaneously, mostly verses of a low intellectual level, and often quite obscene. The repertoire of the fiddlers generally included the folklore of traditions, instrumental pieces, ballads (*balade*), doinas (*doine*), party songs, lyrical songs and dancing songs (Brâncuşi, 1969: 86). The specialization of the Gypsies in secular music seems to be due to the fact that, during the Middle Ages, the Church forbade the practice of non-religious music because it was seen as a tool of the devil; as the Gypsies were pagans, they did not fall under these canons and could therefore specialize in this music (Ghircoiaşiu, 1963: 95). In fact, they could not easily pursue church music as they did not have contact with it, for such music was not made widely popular, and was heard in most cases within the church.

The Gypsies learned to play from one another using stringed or wind instruments, dressed in German or Hungarian clothes (those from Transylvania), and they performed in many different places to earn a living (Holban et al., 2000: 385). In general, the music of fiddlers consisted of dance music of different genres and for diverse occasions. When they performed this music, the Gypsies stood in the middle of the circle of dancers and "performed with strings and voices all kinds of lively songs, and they danced as usual, so

that the earth shook" (Holban et al., 983: 360). The fiddle bands (*tarafuri*) intiially consisted of three instruments: violin, panpipes and *kobza* (lute); later the cimbalum was included. Their music included a large number of dance pieces, such as *hora*, *sârba*, *țiitura*[4] with vocal music added later, including genres such as the *doina* (Garfias, 1981: 101).

Some foreign travellers did not have much appreciation for this music; "their music [the Moldavians] is as monotonous as the dance. The Gypsies are the ones who are meant to enchant their ears. The German violin and guitar, like the panpipe, with eight whistles in which one blows constantly moving them across the lips, are the musical instruments of this country. The profession of fiddler and actor is considered degrading in Moldavia and nothing could reproduce the astonishment shown by the locals when they saw Russian officers giving concerts or performing a tragic play themselves" (Holban et al., 2001: 938-939). Elsewhere it is said that "the music of the Gypsies has ruined our ears"; this is the impression left on a foreigner present in Bucharest who goes to visit the public baths of the city (Holban et al., 2000: 436).

Although the fiddlers took over the local music, according to Sulzer, there was also a 'gypsy' dance, known as the "Hungarian dance", which no longer exists in the two extra-Carpathian countries, but only in Transylvania and Hungary (Zinveliu, 1995: 126). This is probably due to the influence of fiddle music that penetrated from the Romanian Principalities through the Gypsy musicians that crossed the mountains towards Transylvania and from there to Hungary, where this music is much developed and has influenced Hungarian folklore. The influence of Oriental music that crystallized in some Hungarian songs also penetrated Hungary through the Gypsies; either they travelled longer distances to practise their art or their specific musical tradition gradually spread orally until it reaching that region (Győry, 1902: 10-12). We note in this case the importance of the fiddlers in the process of cultural and musical development. If through the medium of Moldavia and Wallachia, Oriental musical influences penetrated Hungary, then through the medium of Transylvanian fiddlers, Western music arrived in the two extra-Carpathian countries.

Returning to dances, according to Mihail Kogălniceanu, the most famous dance of the

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[4] These are the names of specific Romanian dances.

Gypsies is called the *tanana.* It consists of jumps and lascivious gestures made with the arms and legs, as well as hitting of the buttocks with the heel (Kogălniceanu, 1946: 581). These dances are also common in the Transylvanian territory, and are a mark of the 'culture' of the Gypsies. They were performed by women and were defined as improper and immoral (Zăloagă, 2015: 535-536). The same name *tanana* is also used for the dance of the trained bears with which the bear trainers walked through villages and burgs entertaining the world to make a profit (Potra, 1936: 302). The whole repertoire of the Gypsy musicians was initially learned by heart, in the same manner as Ottoman music. Then, at the end of the Renaissance, the music of Romanian fiddlers was written down using the neumatic notation of Byzantine music (Cosma, 1977: 39)[5]. In modern times Western staff notation is used to notate this music.

Instruments

According to official documents the most frequently mentioned instruments used by fiddlers were the lute, the *kobza* and the *skripka* (violin). In addition to them, there are other instruments less often referenced, such as the bagpipe, drums of various shapes, whistles etc. Also from various narrative sources we find that the panpipe was one of the component instruments as well. The reason it does not appear in official documents until later, during the second half of the 18th century (Caproşu and Ungureanu, 1997b: 269-271), is not clear. Various accounts of panpipes and their use were given by Ion Neculce, who mentions it on various occasions in the context of the reign of Gregory II Ghica (Neculce, 1982: 695, 725), but also by Franz Joseph Sulzer and Dionisie Fotino. William Wilkinson also states that the instruments used by fiddlers were the violin, the panpipe and a country-specific guitar or lute species (Wilkinson, 1821: 122-123), namely the *kobza.* It should also be mentioned here that all the musicologists referenced in this chapter say that the panpipe was an instrument of the *taraf* of fiddlers, without necessarily providing documentary support for their statements. Most likely, the fiddlers started to use panpipes later than the other instruments, probably at the beginning of the 18th century, as the Oriental influence grew in the Romanian Principalities.

Other instruments said to have been used by fiddlers are the daire (a species of drums), the castanets (*geamparale*) and the *kobza* (Şaineanu, 1900a: CXVIII). According to a

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[5] This information however cannot be verified from other sources.

foreign traveller, the musical instruments of the fiddlers were rudimentary: ordinary drums, violins, whistles. The violin was made of half a pumpkin, covered with parchment paper, the drum was an ordinary sieve, also covered with parchment paper, and the whistles were made of wood (Holban et al., 1997: 68). As mentioned before, there were probably some cases in which the fiddlers also used drums, castanets or various whistles. However, the *taraf* of the fiddlers comprised three members and the main instruments they used were the *skripka* (violin), the lute (*kobza*) and the panpipe (Șaineanu, 1900a: CXVIII).

The lute was the most important musical instrument for the Arabs living on the wide territories separating the Atlantic Ocean and Persia, which later, in the pre-modern period, reached Iran, Central Asia and Muslim India. It was also a very important musical instrument for Europeans, being introduced before the 10th century by the Arabs and reaching its culmination in the Renaissance period when whole compositions were written for the lute. The Arabic term *'ūd* has become in European languages: *alaude*, *liuto*, *luth*, *lute*, *laute* (Farmer, 2000: 768). The lute is similar to another instrument used by the Persians and called *barbaț*. The Arabs did not differentiate between *barbaț* and *'ūd*, but it seems that there was a fundamental distinction. The *barbaț* had both the body, the resonator box, and the fingerboard built from a single piece of wood while the lute was built from two distinct parts, having thus different sonorities. Later the Persians had an instrument identical to the *barbaț* but with its resonant box covered with leather (Farmer, 2000: 768). Two other well-known instruments from the same family are: *pīpā*, used in China, and *ḳabūs*, about which Evliya Çelebi says it was invented by Ahmed Pasha Hersek Oglu, vizier of Sultan Mehmed II. Celebi also describes it as a hollowed-out (wooden) instrument with three strings and Ibn Ghaybi says that it has five double strings. The *ḳabūs* was not used for a long time by the Turks and it survived under the name of *kobza* or *koboz* in Poland, Russia and the Balkans (certainly also in Romania), where it was considered a kind of lute and not a type of *barbaț* as it was perceived by the Turks (Farmer, 2000: 769). Most likely, the lute used in the Romanian territory did not came from the Ottoman Empire, but from the West, if we consider that the term 'German guitar' (Holban, et al., 2001: 938) refers to a larger lute used by the Germans (Ghenea, 1965: 99). This is also proven by the fresco paintings of some Romanian churches such as Pătrăuți, Arbore, Humor, Voroneț, Râșca, Probota and others; on their walls we can see

today lutes depicted during the 15th century.

With the growing Ottoman influence in Europe, the Romanian Gypsy musicians started to use the *kobza*, most likely taking it from Ukrainian musicians. At the beginning it was used simultaneously with the lute but after a while the *kobza* took its place. We must keep in mind that there are differences between these two instruments, both in terms of physical body and sound; the distinction made between them in official documents is correct and eloquent. However, lute representations in murals or illuminations are very often categorized as *kobzas*.

The *kobza* is an instrument with plucked strings integrated within the lute family, and has a pear-shaped form. It has a wide and short fingerboard, with a pegbox tilted towards the back. The Romanian version of the instrument is built out of sycamore or walnut wood and has various ornamentations and small perforations with an acoustic role. It has eight to twelve strings of gut and metal, grouped in twos or threes and attached by nails directly to the face of the instrument. Today in Romania there are several types of *kobza*, with different sonorities: soprano *kobza*, alto, tenor and bass, catalogued by analogy with the human voice (Bărbuceanu, 2014: 94-95; Demian, 1968: 322). An older definition of the *kobza* shows that it had ten strings, nine of which were made of cat gut and one of silk, covered with a thin layer of wire. A version of this *kobza,* but with eight strings, corresponds to an old Russian folk instrument, also used by the Poles who called it a *kobza* (Engel, 1874: 219).

About the kobza, N. Filimon notes: "it has ten strings, some of which are made of wire and others out of lamb gut. Four of these are the principal strings and are called Rast, Saba, Neva and again Rast, while the others are secondary and are designed only to give a more vigorous resonance to the tone of the principal ones. On this instrument, which is really only an altered guitar, the most complicated melodies can be performed, but the fiddlers use it to accompany the melody" (Filimon, 1978: 270).

Lazăr Şaineanu defines the *kobza* as "a kind of short guitar with neck and three strings (pear-shaped, *author's emphasis*) that makes some melancholic sounds" (Şaineanu, 1900b: 140). It is also stated here that the term *kopuz* or *kobuz* (the Tatar version) defines a kind of pumpkin-shaped, single-string guitar. In Croatian, *kopuz* translates to 'lute', while the Hungarian *kohoz* means 'bass violin'. *Kobuz*, *kobiza* and *kobza* are all terms used

by Russians, Ukrainians, Czechs and Poles (Şaineanu, 1900b: 140). There is no doubt that the Romanians acquired this same instrument either directly or through Slavic peoples who took it from the Ottomans or the Tatars.

The violin, in its current form, dates from the middle of the 16th century, and was first created in Italy. However, the origin of the instrument is very old, its first form being the *revaston* used in Asia and considered to be the first instrument with strings and a bow. It evolved over time in the form of various other instruments such as the *redab* in the Persian and Arab areas or later, the *keman* (Paşcanu, 1980: 13-14), but also the vielle and its variants used mainly in the West and it was from these latter that the first violins started to develop (Sachs, 1940: 274-278). From this general area, the instrument also penetrated the Romanian Principalities, most probably by way of the Hungarians and then the Transylvanians, because the term used in Romania is *highidea*, which relates to *hegedű* in Hungarian, translated as 'violin' (Falvy, 1987: 104; de Paula Bizonfy, 1886: 201). The first mention of this instrument using the term *highidiş* dates back to 1568 with a reference to Vişan *highidişul* (Ionaşcu et al., 1951b: 257-258). However, if both the name *Heghetiş* (Cihodaru et al., 1974*a*: 159) meaning 'owner of a land' is mentioned in a document dating from 1432-1433 and the toponym *Heghetişani* (Costăchescu, 1933: 72) appears in a document from 1468, implying that the two terms are part of the same semantic field, this means that the term and, by default, its significance date from before the 15th century.

The first modern violin was made in Brescia by Gasparo da Salo (1542-1609) and, in the same period Gio Paolo Maggnini finalized the instrument (Paşcanu, 1980: 14). This musical instrument began appear in the Romanian Principalities in the 17th century, being known under various and sometimes inaccurate names: 'cittern', 'gusla', 'lute', '*skripka*' or 'dibla' (Bobulescu, 1922: 12-13). However, evidence of the *skripka* dates from much earlier than this period, which leads us to believe that variants of the violin were already known to Romanians. The first exact mention of a violin and not a *skripka* player in the two Romanian Principalities is that of Stan *viorarul* (the violinist), which appears in a Wallachian document from 1634 (Mioc et al., 1974: 382-385). At the same time, in Moldavia Niccoló Barsi states that the people of the country play their dance music on violins, bagpipes, drums and a lute with three strings (Holban et al., 1973: 76-77). According to another foreign traveller, the first variants of the violin were made "of a stick

with three strings and a dreadful board", with the performers simultaneously playing that violin, singing and dancing (Holban et al., 1983: 359). The violin, with the German guitar and the panpipe, were the musical instruments of the country according to the 1790 testimony of another foreign traveller (Holban et al., 2001: 938-939).

The popularity of this instrument is also indicated by a number of patronyms. In a document of property issued by Stephen the Great in 1468, the boyar Pavel *Scripcă* (*skripka*) is mentioned (Costăchescu, 1933: 72). The same name appears in several other documents. We mention here only a few: two issued by the ruler Peter Rareş, one in 1531 in Vaslui, and the other in 1532 in Hârlău, where Peter Rareş is mentioned as a witness, along with some boyars, including boyar *Scripcă* (Székely and Gorovei, 1997: 509, 512); a third issued by Jeremiah Movilă on October 25, 1593, where Theodor Movilă, the brother of the ruler and the great-grandson of 'Scripca', is mentioned (Iorga, 1904: 414). The last document issued on February 20, 1709, mentions Alexei *Vioară* (violin) as a witness of a transaction (Sava, 1944: 163).

The panpipe (*nai*) is a musical instrument also known as *muskal*, 'whistle' or 'the flute of Pan'. This is a wooden wind instrument, with a terminal abutment consisting of a number of wooden tubes of unequal lengths made of bamboo, cane, elder tree or beech (Bărbuceanu, 2014: 261). The oldest European name of the instrument is 'Pan's flute' (Holban et al., 2001: 1208), but the name used most frequently in the Eastern part of Europe and in Asia is the Persian variant *nai*, after the name of the reed from which it was originally made (Babii, 2012: 89; Sinclair, 1908: 211-213), just as the *ney*. The panpipe is a very old musical instrument, with representations found in different ancient populations from the Middle East area (Can, 2004: 194-195; Sinclair, 1908: 212-213). It was also used by the Ottomans under the name of *miskal* in their classical (*Sanat*) music, especially associated with the Harem (Can, 2004: 194).

This instrument is mentioned in various chronicles or testimonies of foreign travellers, but it appears quite late in the official documents we have researched. It is believed that the panpipe started being used by fiddlers around the second half of the 18th century, being taken from the local peasants or, more likely, from the Balkan peoples. A certain influence has come through the Turks who also used this instrument. We have seen that it was the case with numerous other musical instruments used by the Romanians.

However, a terminological confusion continues between *miskal*, which is the Turkish panpipe, and *muskal*, the panpipe used by the Romanians.

Conclusions

The fiddlers and their music are the main subject of one of the most beautiful episodes in the musical field of medieval, modern and even contemporary times. Although of modest resources and status, they have imposed themselves over time through their art, gaining the sympathy of all social classes and even building a bridge between them. The fiddlers are the ones who massively contributed to the preservation of our folk repertoire and to the development of the Romanian musical specificity. They absorbed and then transformed those external Oriental and Western musical influences they found on the territory of the Romanian Principalities or in the surrounding areas. They created fiddle music that was defining for our musical history, which illustrates the eclectic combination of several different elements.

As announced at the beginning of this study, we were able to find out who these Gypsies were, how they arrived in the Romanian Principalities and what was their musical role. In order to highlight all these aspects, already existing historiography was used to form the main framework for the research. It was particularly interesting to use a category of sources that had not been previously explored by other researchers. The testimonies of foreign travellers to the Romanian Principalities were of particular interest, namely those records of various people who passed through this geographical area and wrote about what they saw. More than that, the information contained in the documents issued by the ruler's Chancellery, by the nobles and the monasteries, and even those attesting to different interactions between simple people (*hrisoave*, *zapise*, *urice* and others) were also used. Although this category of documents does not directly relate to fiddlers, the documents still contain valuable information for this subject and their careful research uncovers new and important aspects that offer a better understanding of the subject.

It was also important to follow the terminology related to this musical category, both in terms of the various names under which the fiddlers can be found in the sources that were consulted, as well as how the instruments they played were described. Thus, in the first documents dating from the 16th century they are called *lăutari*, namely lute players, but starting with the 17th century until the 18th century, the names became more and

more varied due to the growing importance of this category of musicians that more and more wanted to perform their art. This interest can also be observed in the frequency with which they are mentioned in different sources and especially in the diversification of their name; from the 17th century, names such as: *scripcar*, *cobzar*, *viorar*, *fluierar*, *cimpoiaș*[6] and others start to appear with the purpose of distinguishing the fiddlers as a whole by the instrument they played.

Following these aspects, some even more important ones were discovered, such as the relationship between the fiddler's name and the instrument he played. This differentiation was very strict in the official documents precisely because the Gypsy fiddlers were slaves and brought profit to their masters through their performances. Thus, their strict identification helped to better keep them under observation, especially since many names would coincide, creating the possibility for confusion and opportunities to evade certain responsibilities. This particular aspect emerges only from official documents; in all other categories of sources the generic term 'fiddler' includes all of them, without making any difference according to the instrument they played.

Closely related to this previous question is the attempt in this study to clarify the musical instruments the fiddlers used, explaining each one of them and highlighting something of their local as well as their universal 'history'.

This first part of the research on this category of musicians aimed to be firstly a clarification of the subject in a well-structured argument. Secondly, this study focused on enriching already existing information by adding and critically analysing previously unknown or less well-known facts about the fiddlers that have a very important role in the musical history of Romania and also of other countries where there was a similar 'phenomenon' and where there may even have been connections with Romanian music. This research has attempted to offer a more objective perspective, trying to get as close as possible to the reality of the timeframe between the 16th and the 18th centuries.

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[6] All these terms represent the names found in documents for the same musical category, the fiddlers.

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On the Classification of Traditional Georgian Vocal Music by Computer-Assisted Score Analysis

ABSTRACT

This paper describes a feasibility study for the computational classification of traditional three-voiced Georgian vocal music, based on characteristic chord sequences extracted from digital scores. We demonstrate that for this purpose the differences between Western 5-line staff notation and a more appropriate heptatonic system for traditional Georgian music can be adjusted for by a simple transformation. A corpus of about 500 digital scores, consisting of labeled 'song classes', i.e. subsets of folk songs from different regions and of liturgical songs in different styles, served as a testbed for the development of a classification procedure based on a higher-order Markov model that - in addition to the classification - yields chord progression sequences for each 'song class'. Their capacity for interpretation was tested by one hundred cross-validation runs, in which randomly selected subsets of ¾ of the size of each song class were used to train classifiers, which were then applied to the remaining ¼ subsets. The sizes of the intersections of the successfully classified songs in all cross-validations are interpreted as direct measures of the degree of representativeness of the songs for their respective 'song classes'. Based on a second validation experiment, in which we split up the datasets into equally sized subsets of ½ and ¼ of the original subsets, respectively, we estimate that the smallest subset size for an interpretation of the observed chord progression patterns as properties of a 'song class' is of the order of 50 songs. Currently, in our corpus, this requirement is only met by the subsets from Svaneti and Shemokmedi.

Introduction

More than a decade ago, Arom and Vallejo undertook a first attempt to investigate the chord syntax of traditional three-voiced[1] Georgian vocal music through the manual analysis of a small number of scores (Arom and Vallejo, 2008; 2010). Since then, computational methods have revolutionized the way we do research in general and have led to a wealth of new tools and the emergence of the new research field of 'computational ethnomusicology'. As a consequence, we can now approach the still open key questions posed by Arom and Vallejo (2008) with new tools and a hugely enlarged dataset. Specifically, the present paper describes the computer-assisted extraction of the harmonic chord sequences of traditional Georgian vocal music from transcription-based digital scores in Western 5-line staff notation and the derivation of a workflow for the subsequent analysis of building blocks of their harmonic syntax using a classification algorithm from the field of machine learning (Bernard, 2021). In this context, we have collected a corpus of roughly 500 digital scores consisting of subsets of (folk) songs from different regions and of liturgical songs in different styles. These subsets will be neutrally referred to as 'song classes'. We will illustrate that the characteristic patterns implicitly encoded in the chord progression sequence of a song can be used for its classification, in other words for the identification of its associated 'song class'. For this purpose, we employ the popular n-gram method, a Markov-model-based approach that is commonly used to classify texts, e. g. to identify a language from a snippet of text (Bernard, 2021).

The classification of traditional Georgian music on the basis of symbolic representations in Western 5-line notation seems at first glance to be a contradiction in terms since this notation is based on a 12-tone equal temperament (12-TET) tuning system, which is well known to be inadequate for Georgian traditional music. In addition, the use of 12-TET notation means that these transcriptions have to let key signatures appear, as if this were tonal music. Since all recent acoustical analyses of recordings of traditional Georgian vocal music (Scherbaum et al., 2020; 2022; Tsereteli and Veshapidze, 2014; 2015) indicate a clear heptatonic tuning system, we demonstrate that for the purpose of classification, the differences between the notation of a traditional Georgian song in a diatonic scale derived from the 12-TET system (which in this case is also heptatonic) and what one believes to be a more appropriate heptatonic system for traditional Georgian music can be adjusted

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[1] Since all the music in this work is in three voices, we will omit this attribute in what follows.

for by an appropriate transformation. This notwithstanding, we are aware that the task remains very challenging, since we also face the problem that - compared to Western classical music - the corpus available for analysis is rather small (about digital 500 scores) and is not very balanced in terms of regions of origin and/or song styles. To complicate matters further, the durations of the songs also differ substantially. All of these, however, are not uncommon problems in computational ethnomusicological research and can be accounted for by the choice of a Bayesian framework for analysis.

Overall, we view the present work as a feasibility study with the long-term goal of developing building blocks for an optimal workflow for decoding and better understanding the rules underlying the harmonic syntax of traditional Georgian vocal music.

Data Processing

The starting point for our analyses is a corpus of about 500 pieces for three voices, the majority of which (with the exception of the composed songs from urban regions), were created from transcriptions made by ear by various Georgian scholars (cf. Section 3, Dataset).

Cleaning and reduction of scores

Our current processing workflow starts with 'cleaning' the digital scores. This consists of separating the three voices of a song onto different staves, removing extra notes (such as passing and escape tones), *ossias*, or *appoggiaturas*, so that the cleaned scores contain only the notes from the three voices, one per stave, and nothing else. This is a purely technical preprocessing step to simplify the subsequent analysis, which, however, requires great care and can become rather time-consuming.

A particular long-term aspect of our study is to investigate the effect of the reduction of the scores to their presumably essential parts. This way we seek to separate structural aspects from purely ornamental aspects of chord progression sequences: in other words from aspects that are - grammatically speaking - not essential. The motivation for doing so was that we wanted to test if this increases the relative amount of class-specific feature information as compared to the full original score, which usually contains non-specific and purely ornamental, as well as 'essential', traits. Deciding what are ornamental traits, however, is at least partially dependent on the cultural context in which the music has

developed and is usually performed. For this reason, we abstained from performing the reduction of the scores only algorithmically. Instead, this work was done by Ana Lolashvili, a graduate of the Chant University, currently studying at the Tbilisi Conservatory. An example is shown in Fig. 1.

Figure 1. Example of the 'manual' reduction of a score to its harmonic pillars.

Since the 'manual' score reduction is very labor intensive, it was only done on a subset of the complete corpus, consisting of a total of 182 songs. This subset is intended to serve as a reference point for future analysis.

Tuning system transformation

The next step in the processing chain consists of modifying the digital score for the 'distortions' of its tonal content caused by its representation in a fundamentally inappropriate western staff notation. In this context, it should be emphasized that the question of the characteristics of the tonal organization of Georgian traditional music has been one of the most controversial issues in scholarly discussions in recent decades. A review of the related discourse, a considerable part of which has been conducted detached from reproducible observational evidence, can be found in Jordania, 2022.

Starting with the pioneering work of Tsereteli and Veshapidze (2014; 2015) followed by the study of Scherbaum et al. (2020), and most recently by Scherbaum et al. (2022), this

discourse is now becoming more and more evidence-based since it shifts to the interpretation of increasingly large and openly accessible data sets of objectively verifiable pitch determinations (in total, an estimate of more than 1 million pitch and interval samples). All acoustical studies show that the melodic pitch inventories used in traditional Georgian vocal music differ significantly from those based on the major and minor systems, in which the melodic scales[2] consist of intervals of half- or whole-note steps. These studies agree that the melodic scale(s) of traditional Georgian music are, in a first approximation, composed of roughly equally spaced intervals. For the larger datasets, in particular the Erkomaishvili dataset (Scherbaum et al., 2020), the interval between the fourth and fifth (scale) degree above the last bass note of a song often corresponds to a whole tone step (200 cents), while the size of the remaining intervals is of the order of 5/6 of a whole tone (167 cents). The size of the melodic 2nd as the most frequent melodic step size of the songs is not fixed, however, but varies significantly around a mean value of approximately 170 cents, whereas the mean value of the harmonic 2nd is significantly larger (Fig. 1). This can possibly be explained, among other reasons, as a consequence of the 1-4-5 chord, very popular in Georgian music, in which a fourth and a fifth are simultaneously intoned as pure intervals above a fundamental. The differences between the results of Tsereteli and Veshapidze (2014; 2015), whose observations suggest a pure unitonic scale with a step size of 6/7 of a whole tone (171 cents), and the results of Scherbaum et al. (2020; 2022) whose synoptic scale model suggests a combination of a whole tone step and six equal sized intervals with a step size of approximately 5/6 of a whole tone (167 cents) are probably due to the different sizes of the analyzed datasets and are irrelevant to the purpose of the present study, especially against the backdrop of the wide spread of the observed melodic 2nds.

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[2] The plural is used here to differentiate the different church modes as individual scales.
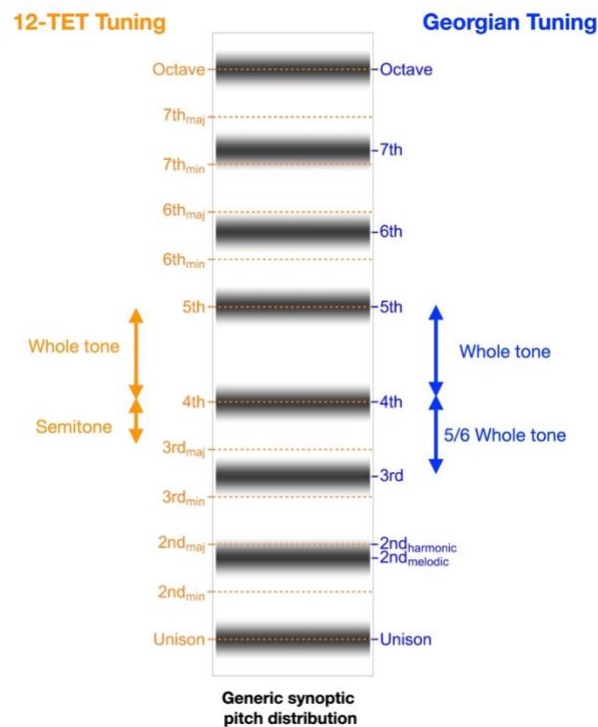
Figure 2. Comparison of the key elements of the 12-TET tuning system (orange labels) with the essential characteristics of the observed tuning systems in traditional Georgian vocal music (blue labels). The generic synoptic pitch distribution shown as a density plot in the middle was generated by combining the key elements of the average scale models derived from the Erkomaishvili dataset (Scherbaum et al., 2020) with the average tuning systems obtained for all Svan ensembles (Scherbaum et al., 2022).

Note that Fig. 2 sketches the key properties of the tuning of traditional Georgian vocal music only in a rough conceptual way, and is not meant to be interpreted as representing an individual dataset. The orange and blue interval labels in Fig. 2 illustrate the interval sizes of the 12-tone equal temperament (12-TET) and the Georgian tuning system, respectively.

What is relevant for the purpose of our present work is that the melodic scale of traditional Georgian vocal music is heptatonic, in other words consists of seven tones per octave. Since this is also the case for all diatonic scales[3], any diatonic scale, even if it is represented in western five-line score notation, can be mapped onto any of the heptatonic tuning systems that have been suggested for Georgian traditional music (Scherbaum et al., 2020; 2022; Tsereteli and Veshapidze, 2014; 2015). In this context it does not matter if one assumes a pure or an approximately equidistant scale with individual larger

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[3] A diatonic scale is any heptatonic scale that includes five whole steps (whole tones) and two half steps (semitones) in each octave.

intervals.

Fig. 3 illustrates how the pitches determined from an actual recording of a traditional Georgian song and displayed as pitch and note trajectories in its original tuning (Fig. 3a) and the corresponding transcribed values (Fig. 3d and 3e) are related through the pitch distribution in Fig. 3c.
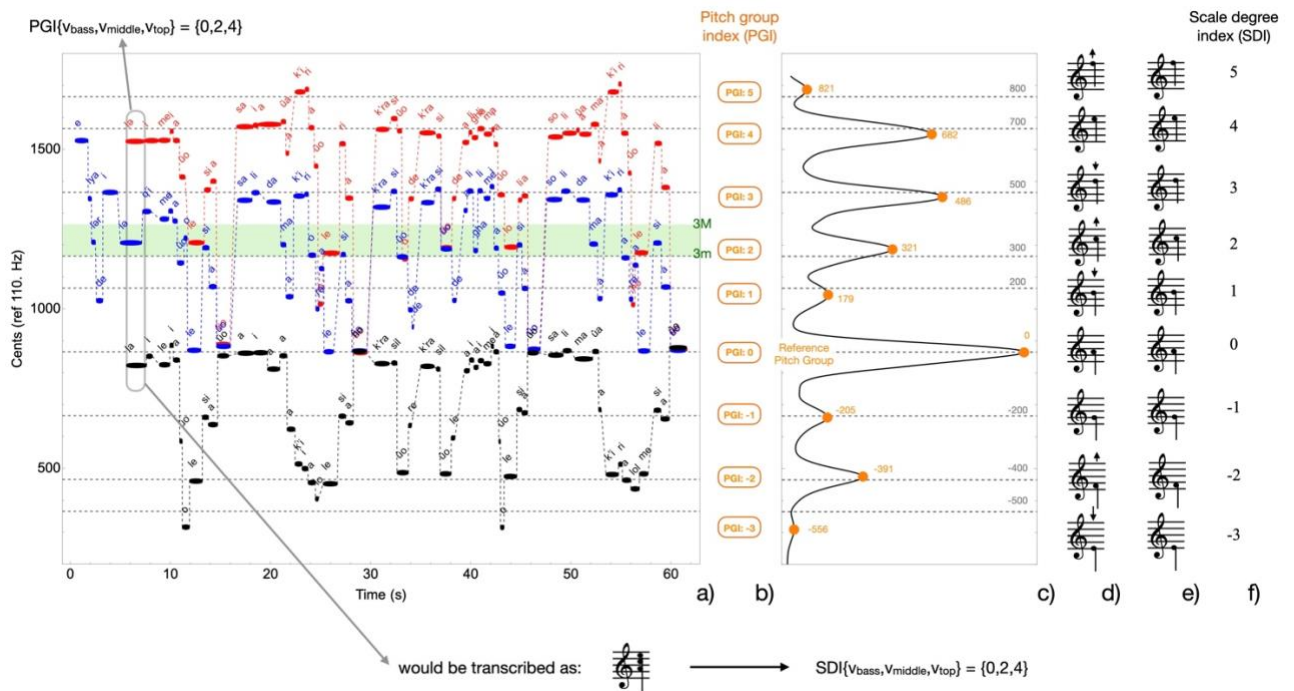
Figure 3. The conceptual relationship between pitch and note trajectories of audio recordings and the tuning system used in transcriptions into to 5-line staff notation. For details, see text.

The voices of all three singers fluctuate visibly in Fig. 3a, but all notes (horizontal red, blue and black blobs for the top, middle and bass voice, respectively) can still be seen to belong to discrete pitch groups, identifiable by the peaks of the pitch distribution shown in Fig. 3c. In this example we chose the most salient pitch group (the one with the highest peak), which also happens to be the final note for all three voices, as a reference point and assigned positive pitch group indices to the pitch groups above and negative ones to the pitch groups below, respectively (Fig. 3b). The horizontal dashed gridlines (in Fig. 3c) correspond to the pitches of a minor scale anchored at the pitch of the reference pitch group. One can see that the pitch values for some of the pitch groups of the tuning used in this song (shown by the orange labeled numbers close to the solid orange circles indicating the mean value of a pitch group) come very close to pitches of the minor scale, while others show a larger deviation. What is important, however, is that in all cases there

exists a unique 1-to-1 match of a note of the minor scale (in our case A-minor, chosen for the convenience of an accidental-free scale) and a pitch group of the tuning system used by the singers. Therefore, if we index (count) the notes of the A-minor scale from the lowest to the highest by integer numbers and choose A as the reference note to which we assign the scale degree index of 0, we can unambiguously transcribe the whole song simply by setting the pitch group index (PGI) (Fig. 3b) of a sung note equal to the scale degree index (SDI) (Fig. 3f) of our chosen A-minor scale. Hence the pitch groups in Fig. 3b would be mapped to the notes in Fig. 3d or Fig. 3e, depending if one cares to indicate the deviations from the 12-TET tunings system by little arrows or not. The former used to be common practice in ethnomusicological transcriptions, but is nowadays rarely seen in digital scores. Since all the notes necessary for the transcription are part of the A-minor scale, one can also proceed in the inverse direction. Knowing the scale degree index of a note, one also knows which pitch group the note actually belongs to. By representing a note through its pitch group index, we lose the precision of the exact cent value but gain in accuracy by being able to correct for the bias of the 12-TET tuning system with respect to the tuning system actually used.

So far so good. But what about a situation in which a score also contains notes from a non-diatonic scale? In this case, the score would still contain accidentals, even if we transpose it to the C-Maj/A-min key, because we have not yet left the 12-TET tuning system. In this case, the properties of the generic pitch distribution shown in Fig. 2, namely that the tuning system is approximately equidistant, suggest a solution. Since in terms of pitch, the pitch groups making up the Georgian sound scale generally lie between the minor and major variants (in the 12-TET system) of the same scale degree, ignoring the accidentals will map all minor and major intervals onto 'neutral' ones and the corresponding scale becomes heptatonic, even if their interval structure is not yet correct.

In the following, we illustrate some of the problems that might arise from trying to represent actual recordings of traditional Georgian songs in a major/minor-based tuning system. The individual pitches belonging to the pitch group with PGI= 3 (in Fig. 3a) fluctuate within the green shaded rectangle indicating the pitch band between a minor and a major 3rd (above the reference pitch). Looking at the first 3-voiced chord in the song (highlighted by the vertical rectangle with rounded edges), one can see that the pitch of the middle voice lies pretty much between the pitch for the minor 3rd and the major 3rd. Hence it would not be surprising if this chord were to be perceived by some transcribers

as an A-minor chord {A, C, E} and by others as an A-major chord {A, C#, E}. However, from Fig. 2a it can be seen that is actually neither of the two because the whole concept of minor and major 3rd is inappropriate. In order to resolve this ambiguity we need to interpret both transcribed triads {A, C, E} and {A, C#, E} simply as indicating a chordal build-up of notes from the pitch groups {0, 2, 4}. Technically, this can be achieved by simply dropping the accidental from C# and determining the scale degree indices (Fig. 3f) of the three elements of the triad {A, C, E}, which would result in the list {0, 2, 4}.

Generalizing this idea and dropping all the accidentals of a score, but interpreting the resulting notes simply as indicators of their scale degree indices, allows us unambiguously to map any score in western 5-line staff notation onto a heptatonic tuning system, without having to make any assumptions regarding the details of the interval structure. One can think of the effect of removing all accidentals as combining all pairs of major/minor variants of non-pure intervals into single (neutral) versions. As a consequence, the pair (3rd-min/3rd-maj) will result in a single 3rd, and the same for 2nd, 6th, and 7th. Therefore, removing all the accidentals of a score results in a diatonic tuning system and therefore a heptatonic scale that can be mapped onto the Georgian tuning system by setting the scale degree indices equal to the pitch group indices. Furthermore, because the pitch groups of the generic Georgian tuning for the non-pure intervals (2nd, 3rd, 6th, 7th) are located between their minor and major variants, removing the accidentals results in exactly the mapping that inverts the note assignment during the transcription process.

Therefore, the tuning system modification for the differences between the 12-TET tuning system and any of the suggested Georgian heptatonic tuning systems consists simply of two components. First, the removal of all accidentals from the score and second, the choice of a reference note and the calculation of the scale degree indices for all notes with respect to the chosen reference note. The only assumption that we make in this context is that the 1:1 mapping of the scale degree indices in the accidental-free score to the pitch group indices in the actual Georgian tuning system used makes sense, which seems pretty obvious from Fig. 2.

The choice of the reference note is somewhat arbitrary but very important as to how the different songs of a corpus are quantitatively represented relative to each other. For our study, we chose the final bass note of a song as the reference note, which means that for each song a pitch group index of 1 refers to the first pitch group above the final bass note,

a pitch group index of -1 to the first pitch group below the final bass note, and so forth. Choosing the final bass note (the *finalis*) as reference note does not mean that one has to attach a functional meaning to the *finalis*, but it facilitates for example the quantitative comparison of the final cadences of different songs by simply comparing the numerical values of the last few pitch group indices.

Representations for subsequent processing

As a result of the tuning system modification, for each of the three voices in a song we obtain a sequence of 'notes', each represented by a pitch group index and a duration, from which it is a straightforward matter to calculate the corresponding harmonic states, each defined by a concommitance of three pitch group indices and a duration. For the purpose of the subsequent analysis, we ignore the duration of the notes and analyze (for now) only the sequences of pitch group indices. Fig. 4 shows the score (a) and the result of tuning system modification (b) for the song *Kriste Aghdga*.
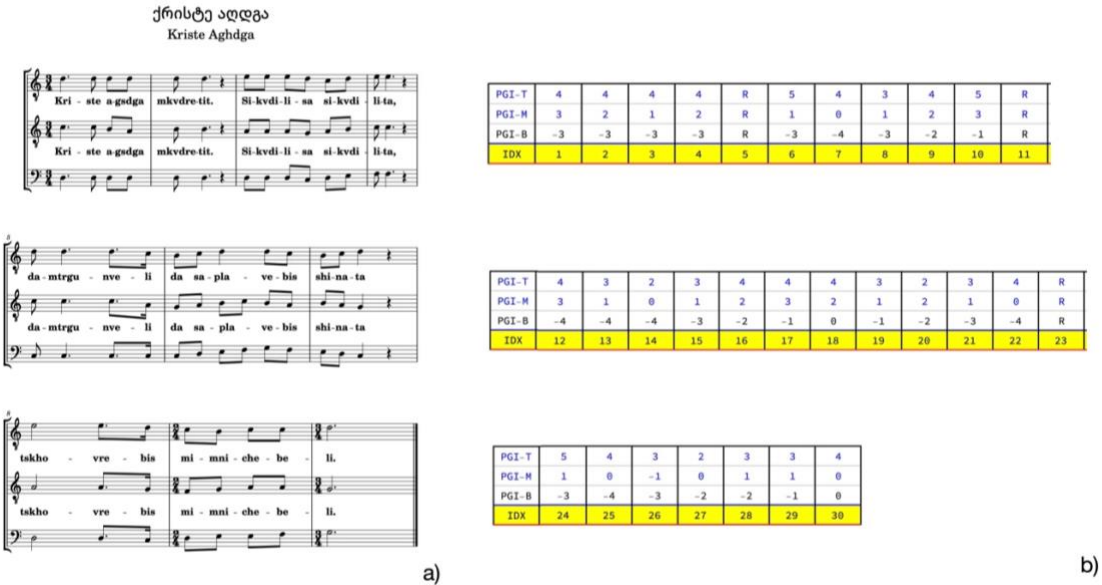
Figure 4. Score of the song *Kriste Aghdga* (a) and the corresponding sequence of harmonic states (chord sequence) expressed by the pitch group indices of the three voices (b). Note that the duration of the notes is ignored and if successive chords have identical pitch values, they are joined into a single harmonic state.

For the subsequent analysis, it turned out to be advantageous to transform the sequence of pitch group indices of the three voices shown in Fig. 4b into different representations. These are shown in Fig. 5.

Voice table

PGI-T	4	4	4	4	8	4	4	4	4	5	8	4	4	3	2
PGI-M	3	2	1	2	8	1	8	1	2	3	8	3	3	1	1
PGI-B	-3	-3	-3	-3	8	-3	-4	-3	-2	-1	8	-4	-4	-4	-3
IDX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

PGI-T	4	4	4	4	3	4	8	4	4	3	2	3	4
PGI-M	2	3	2	1	2	8	1	8	-1	1	1	-1	0
PGI-B	-2	-1	8	-1	-1	8	-3	-4	-3	-2	-2	-1	8
IDX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

a)

Harmonic state table

H-M	2	3	3	0	5	3	3	3	0	2	3	3
M-L	7	6	8	8	5	4	8	-3	-2	-1	8	5	5	5
L-Deg	-3	-3	-3	-3	8	-3	-4	-3	-2	-1	8	-4	-4	-4	-3
IDX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

H-M	3	1	3	3	5	5	5	5	3	2	3	3
M-L	5	5	3	3	5	5	8	-3	4	-3	4	-1	5
L-Deg	-2	-1	8	-1	-2	8	-3	-4	-3	-2	-2	-1	8
IDX	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

b)

Harmonic state list

{{-3,7,8},{-3,6,8},{-3,5,8},{-3,6,8},{-3,5,9},{-4,5,9},{-3,5,7},{-2,5,7},{-1,5,7},
{-4,8,9},{-4,6,8},{-4,5,7},{-3,5,7},{-2,5,7},{-1,5,6},{0,3,5},{-1,3,5},{-2,5,5},
{-3,5,7},{-4,5,9},{-3,5,9},{-4,5,9},{-3,3,7},{-2,3,5},{-2,4,6},{-1,3,5},{0,1,5}}

c)

Harmonic state symbol list

$\{-3_7^8, -3_6^8, -3_5^8, -3_6^8, -3_5^9, -4_5^9, -3_5^7, -2_5^7, -1_5^7,$
$-4_8^9, -4_6^8, -4_6^7, -3_5^7, -2_5^7, -1_5^6, 0_3^5, -1_3^5, -2_5^5,$
$-3_5^7, -4_5^9, -3_5^9, -4_5^9, -3_3^7, -2_3^5, -2_4^6, -1_3^5, 0_1^5\}$

d)

Harmonic state token list

{-3_7_8,-3_6_8,-3_5_8,-3_6_8,-3_5_9,-4_5_9,-3_5_7,-2_5_7,-1_5_7
,-4_8_9,-4_6_8,-4_5_7,-3_5_7,-2_5_7,-1_5_6,0_3_5,-1_3_5,-2_5_5,
-3_5_7,-4_5_9,-3_5_9,-4_5_9,-3_3_7,-2_3_5,-2_4_6,-1_3_5,0_1_5}

e)

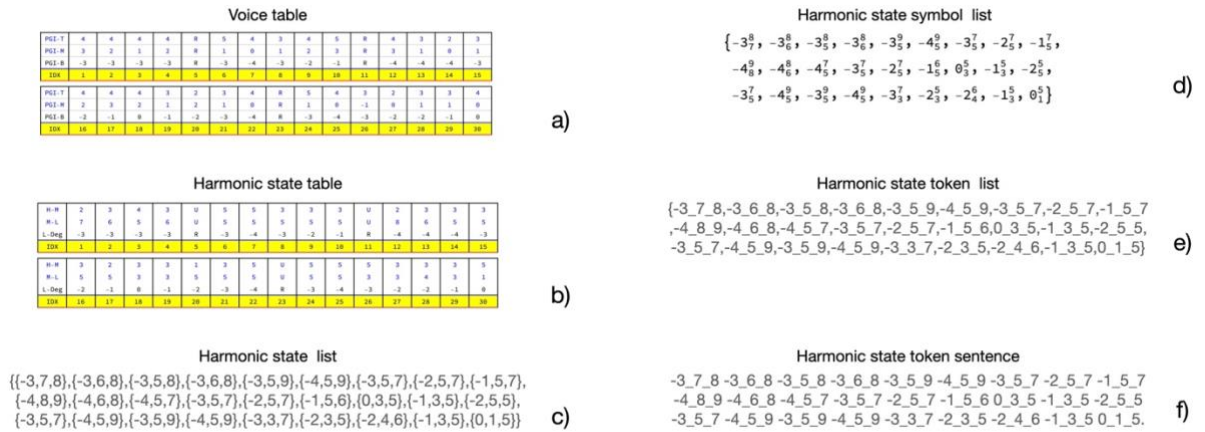## Harmonic state token sentence

-3_7_8 -3_6_8 -3_5_8 -3_6_8 -3_5_9 -4_5_9 -3_5_7 -2_5_7 -1_5_7
-4_8_9 -4_6_8 -4_5_7 -3_5_7 -2_5_7 -1_5_6 0_3_5 -1_3_5 -2_5_5
-3_5_7 -4_5_9 -3_5_9 -4_5_9 -3_3_7 -2_3_5 -2_4_6 -1_3_5 0_1_5.

f)

Figure 5. Different representation forms of the sequence of pitch group indices of the three voices shown in Fig. 4b as used in the subsequent analysis. a) as voice table (same as Fig. 4b). b) as harmonic state table. c) as harmonic state list. d) as harmonic state symbol list. e) as harmonic state token list. f) as harmonic state token sentence.

In the representation of 'harmonic state' shown in Fig. 5b, the two top elements in each column contain the intervals between the highest and the intermediate (H-M) and the intermediate and the lowest voice (M-L), respectively. In this context voice crossings, which happen in particular in Gurian songs, were accommodated through correction. The H, M, and L labels in the chord assignments always refer to the highest, the intermediate, and the lowest voice, independent of who sings them. In the case of voice crossings, these will not always correspond to the top, middle, and bass voices. The application of this correction is admittedly a subjective choice. From the structural perspective, one could argue that voice crossings contain information regarding the type of a song or the region of origin. From the acoustic perspective, however, it is only the interval that matters, not who sings a particular voice. This perspective (which is the one we chose) also simplifies the processing because one does not have to deal with signed intervals. The lowest entry in each column (L-Deg) shows the scale degree of the lowest voice with 0 representing the reference scale degree *(in our case the finalis)*. The 'harmonic state list' representation in Fig. 5c is simply a representation of the 'harmonic state table' as a list (indicated by the curly brackets {}). This is the computer readable numerical input form used for all our algorithms. The 'harmonic state symbol list' in Fig. 5d, on the other hand, is used to facilitate the 'human' perception of the 'harmonic state list'. The central value of each symbol contains the lowest voice scale degree, while the subscript and superscript contain the intervals between the lowest and the intermediate (M-L) and the lowest and the highest voice (H-L), respectively.

In our analysis we make heavy use of the conceptual similarity of words in a sentence and chords in a chord sequence. To be able to exploit this similarity quantitatively, we transform each numerical element in a harmony into a text string and connect these strings via underscores. This results in the transformation of the numerical representation of a harmonic state into a representation as a character string which is called 'harmonic state token', as shown in Fig. 5e. The benefit of this representation is that it allows the use of algorithms from computer linguistics. Conceptually in this representation a chord becomes the equivalent of a word in an 'unknown language'. The representation as 'harmonic state token sentence', shown in Fig. 5f, completes this transformation conceptually. It allows us to treat a whole song as a sentence of an unknown language. As a final remark on the different types of representation we want to point out that in addition to the representation of a chord as a complete chord in the form of a numerical triplet {L-Deg, M-L, H-L} we have also explored the effect of dropping the bass voice information and only considering the interval pair {M-L, H-L}. The potential advantage of this representation is that it does not depend on the choice of the reference note. The disadvantage, on the other hand, is that we ignore all the melodic information contained in the melody of the lowest voice.

Dataset

For the actual analysis, we have used a set of 493 digital scores, obtained from available song collections (Akhobadze, 1957; Chokhonelidze, 2003; Jordania, 2004; Shugliashvili, 2014) and from the Center of Church Chants of the Patriarchate (2006a; 2006b; 2008); Folklore state Centre of Georgia (2018a; 2018c; 2018b; 2020a; 2020b; 2020c; 2020d); Patarava (2003); Tarkhnishvili (2008); Tbilisi State Conservatoire (2005); Veshapidze (2006); Veshapidze and Kotrikadze (2016). The collections by Shugliashvili (2014) and Jordania (2004) were already in digital form, while the rest had to be manually converted. The original corpus contains liturgical chants from different monasteries and folk songs from different regions of Georgia, some of which, however, were only represented by a few examples. In order to generate a more balanced dataset, we reduced it to only those regions that contributed at least 15 songs. Fig. 6 shows the distributions of songs according to their locations. Fig. 6a shows the breakup of the complete corpus in terms of songs, while Fig. 6b shows the corresponding distribution of harmonic states (chords). The difference in the two pie charts in Fig. 6a and 6b is due to the fact that the lengths of the songs are strongly region-dependent. Fig. 6 shows, for example, that Svan songs are

generally shorter than songs from Samegrelo. The imbalance of the distributions will be taken care of in the context of the final analysis processing, as will be described in more detail in that context.
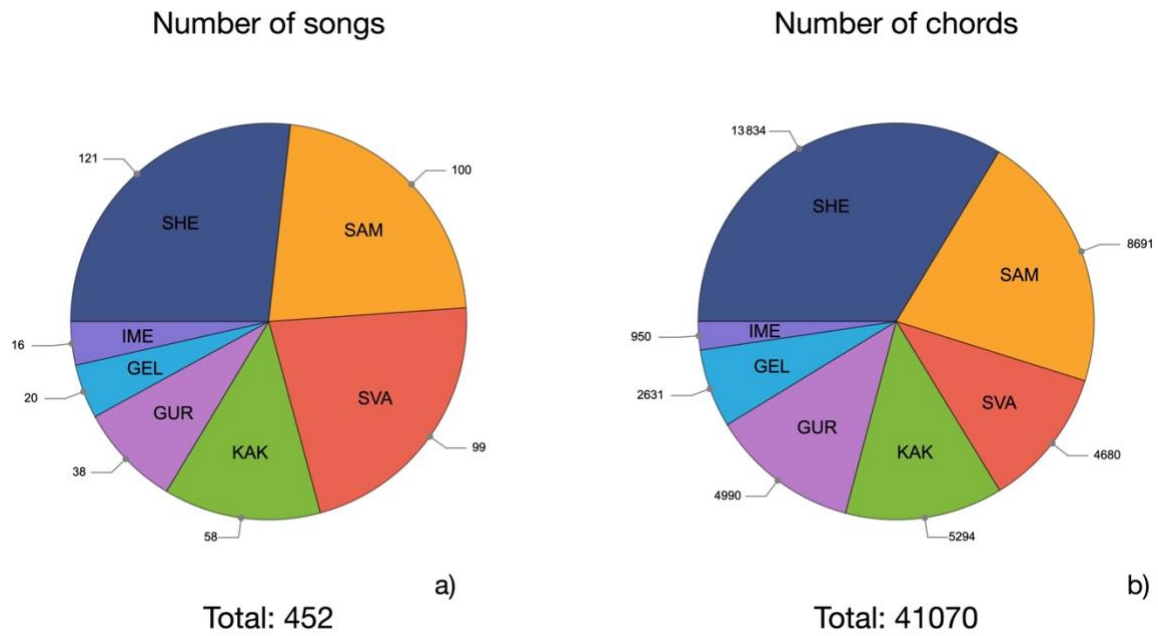
Figure 6. Composition of the corpus by place of origin. a) With reference to the number of songs. b) With reference to the number of chords. The acronyms SAM, SVA, KAK, GUR, GEL, IME correspond to Samegrelo, Svaneti, Kartli-Kakheti, Guria, Gelati, and Imereti, respectively.

Fig. 7, which shows the distribution of the most frequently occurring chords in the different song classes, illustrates that the differences in the composition of the individual subsets are continued at the level of the chord inventories.

Figure 7. Distribution of most frequently occurring chords in the different song classes, representing 40% of the total likelihood. The numbers in the callouts represent likelihoods in %.
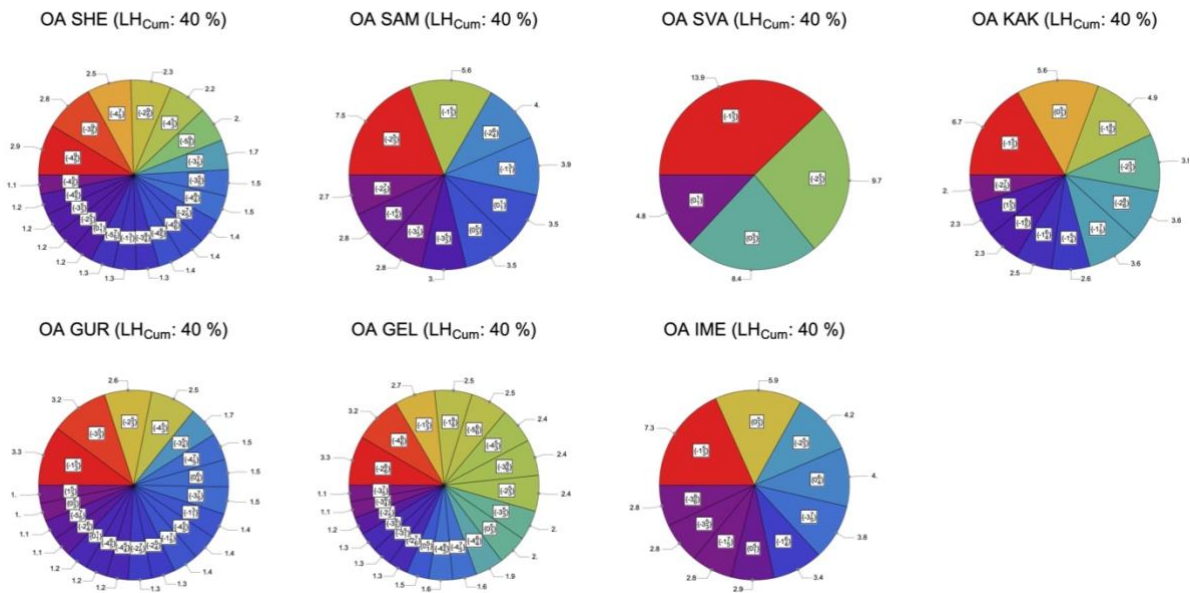
Each of the pie charts covers 40% of the cumulative likelihood (LH). For example, for all the songs from the class SVA (Svaneti) a single, randomly drawn chord has a likelihood of 13.9% to be {-1, 3, 5}, a likelihood of 9.7% to be {-2, 3, 5}, a likelihood of 8.4% to be {0, 3, 5}, and a likelihood of 4.8% to be {0, 1 , 1}. In mathematical terms, which we will need later, this would be written as P({1, 3, 5}| SVA) = .139.

Even without performing quantitative analysis, Fig. 7 already visually indicates significant differences between the individual song classes, as expressed in the occupancy density of the pie charts, namely the number of chords within the top 40% of the likelihood. In the next chapter, we will describe how this information, together with the information contained in Fig. 6b, can be used quantitatively to classify the entire corpus.

Analysis

Theoretical background

The question which we want to address in this section is the following: Given a collection of songs that originate from different song classes, how can we teach a computer to recognize the correct class? Since one cannot expect a definite answer to this question, we weaken it a bit and ask instead about the class that is most likely to be the origin of the song under consideration. This question has a definite answer which fortunately can be obtained by making use of Bayes' theorem, which follows directly from the basic rules of

probability theory. The idea behind what is now called Bayesian inference is that one can express the probability for a model M to have produced a set of observations d, which is *posterior probability*, written as $P_{post}(M|d)$, by a very simple formula:

$$P_{post}(M|d) = P(d|M) \, P_{prior}(M)/\text{Factor}_{norm}. \qquad (1)$$

In this context, $P(d|M)$ is the so-called *likelihood* which states the conditional probability for a model M to produce the data d. In our situation, this is essentially what is shown in Fig. 7. The models are the individual song classes, while the data (observations) are the individual chords. The sizes of the individual pieces in the pie charts quantitatively describe the conditional probabilities for a song from a particular song class to have produced a particular chord. As derived above, the probability for a chord from a song from Svaneti to be $\{1, 3, 5\}$ is $P(\{1, 3, 5\}| SVA) = 0.139$. Hence its likelihood is 0.139.[4]

The second term, the so-called *prior probability* of the model under consideration $P_{prior}(M)$ is the probability to observe any of the chords from the model (song class) M if we randomly draw a chord from the complete corpus. This, however, is exactly what is expressed by the sizes of the different pieces (one for each song class) in Fig. 6b, which illustrates one of the major benefits of the Bayesian framework, namely that - via the prior probability term - it can deal with imbalanced data sets like ours. To conclude the example from Svaneti, the prior probability for Svaneti, which would be written as $P_{prior}(SVA)$, is given by 4680 (the number of chords from Svaneti), divided by the total number of chords in the whole corpus, which is 41070, which results in $P_{prior}(SVA) = 0.114$.

Hence, the 'posterior probability' for Svaneti to have generated the chord $\{1,3,5\}$, which is written as $P(SVA| \{1, 3, 5\})$, becomes $0.139 \times 0.114 = 0.01584$ divided by Factor_{norm}. For the solution of the classification problem, it would actually suffice to determine the maximum value of the product of prior probability and likelihood, $P(d|M) \, P_{prior}(M)$. However, the determination of Factor_{norm} is also straightforward, since the sum of the probabilities for all possible models (all seven song classes) has to be 1. Hence, the normalization factor Factor_{norm} is simply obtained by the sum of all $P(d|M_i) \, P_{prior}(M_i)$ for i

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[4] In a general situation, the determination of the likelihood term can become technically more challenging since it involves the learning of a probability distribution on categorical data which can contain missing values and/or outliers. This is intrinsically taken care of in the Classify algorithm of Mathematica (Wolfram Research, 2020).

= 1,...N, with N being the number of models (in our case song classes)[5].

Instead of individual chords as above, the 'data' could of course also be chord sequences, which leads directly to the n-gram method (aka Markov model) in which one is interested in the posterior probabilities for a model to have produced a chord sequence of a particular length (n) (Bernard, 2021). For n=1 (unigrams), one is interested in a list of single chords {$chord_1$, $chord_2$, $chord_3$,... }. For n=2 (bigrams) one considers a list of lists of two successive chords, e.g. {{$chord_1$, $chord_2$}, {$chord_2$, $chord_3$}, {$chord_3$, $chord_4$}, ... }, etc.

For the determination of the posterior probability of a song class to have produced a whole song (instead of a single chord), one has to simply multiply the posterior probabilities for all the chords of the song. In the context of classifying text this is known as the *bag-of-words assumption* (Bernard 2021). In this context, it is worth emphasizing that *text classification* is conceptually identical to what we are trying to do in the present study if we make use of the transformation of a sequence of chords into a sequence of words, as illustrated in Fig. 5.

Song class identification (classification)

From a practical perspective, the identification of the most likely song class for a given song (or chord sequence) boils down to the determination of the song class with the highest posterior probability. In the present study, we have used the Classify algorithm of Mathematica (Wolfram Research, 2020) for this purpose. Fig. 8 illustrates the quality of the resulting classification in the form of the associated confusion matrices for n-grams with n = 1 to 4. The accuracy values on top of each panel indicate the percentage of the songs which are correctly classified. The implicitly encoded song-class-specific patterns within the chord inventories and the chord-transition-inventories contain enough song-class-specific information to result in accuracies more than three times better than the accuracy baseline (26.8%), namely 80.3 % and 98.9%.

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[5] This can be seen, if one divides each P($d|M_i$) $P_{prior}(M_i)$ by the sum of P($d|M_i$) $P_{prior}(M_i)$ for all i, the sum of all P($d|M_i$) $P_{prior}(M_i)$ will become 1.In other words the sum of the posterior probabilities $P_{post}(M|d)$ for all models becomes 1, as it should be.
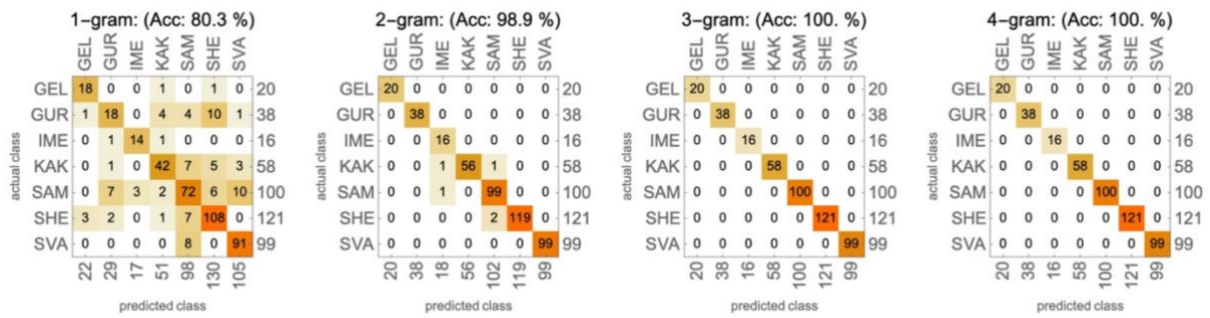
Figure 8. Confusion matrices, which illustrate which and how many actual song classes are mispredicted and how, for n-grams with n=1-4. The accuracy baseline (accuracy if predicting the commonest class) is 26.8%.

For n=3 and beyond, the classification accuracy becomes 100%. This also means that it does not need the reduced versions to achieve a very good classification accuracy[6]. In other words, all it takes to uniquely identify the song class of a song is to know a sufficient number of sequences of three subsequent chords (3-grams). In contrast, the information contained in the chord inventories (1-grams) and the chord transition inventories (2-grams) is obviously not specific enough to allow a unique identification of a song class. Different song classes can obviously share the same chords and chord transitions, but do so rarely if ever with n-grams of lengths larger than three. This is illustrated in Fig. 9 for the chant *Holy is the Lord our God* from the Gelati (GEL) subset of our corpus.

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[6] For the determination of the chord syntax, the differences of the results between the original and the reduced version are expected to be much stronger.

Holy is the Lord our God (GEL)

Resulting song class: KAK

1-gram

Resulting song class: GEL

2-gram

Resulting song class: GEL

3-gram

Legend:
- SHE
- SAM
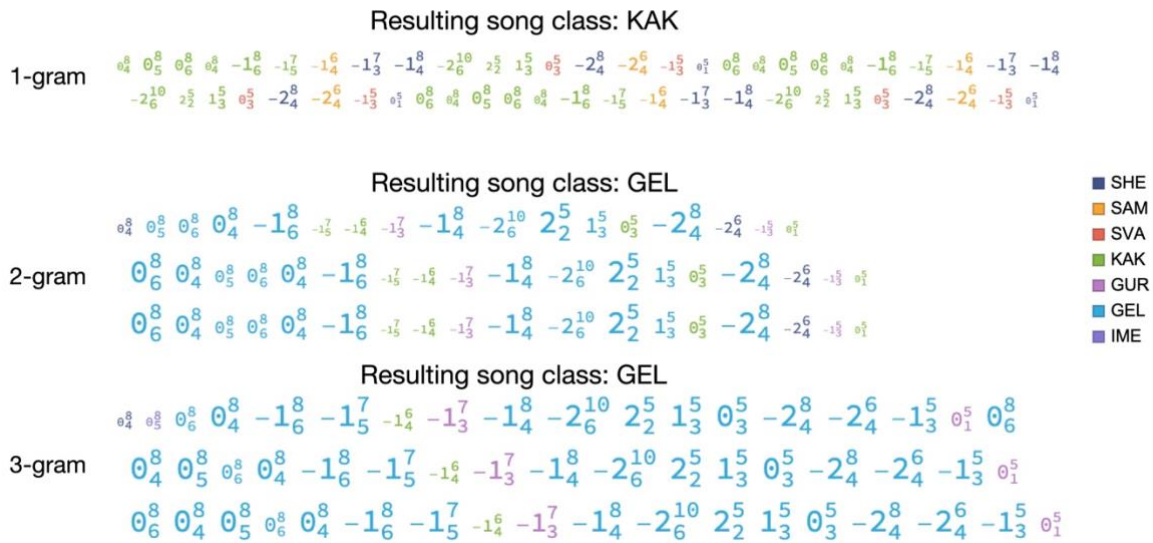- SVA
- KAK
- GUR
- GEL
- IME

Figure 9. Visualization of the change in posterior probabilities in the course of a song for different n-gram lengths.

The visualization type was inspired by Bernard (2021), who used it in the context of language classification. The color of the last element of each n-gram indicates the song class for which the posterior probability for the n-gram has the maximum value of all the song classes. The sizes of the chord symbols correspond to the actual probability values. The larger the size, the more certain is the algorithm about the n-gram's song class. The assumed song class for the whole song is the product of all n-gram probabilities. The uppermost panel in Fig. 9 shows that from the 1-gram perspective (the chord inventory), the song contains characteristic chords from a variety of song classes, with the majority of the chords color-coded in green (KAK). In terms of the chord transitions (2-grams), however, the situation changes, and the algorithm becomes more confident (indicated by the larger symbol sizes) that the assigned song class should be GEL. As to the 3-grams, the choice of GEL as suggested song class is further emphasized, as indicated by the still increasing symbol sizes and the reduction in the number of n-grams which suggest a song class other than GEL.

It must be emphasized that we do not consider the solution to the classification problem as an end in itself. Our main long-term goal is to obtain a better understanding of the harmonic syntax of the music. However, in this context, the components of the classification algorithm described above provide important information, e.g., if we apply equation (1) not to the n-grams in a song, but to all n-grams in a given song class. To make

this more precise, in Tables 1-3 we show the 20 most likely 1-grams, 2-grams, and 3-grams, respectively, for each song class together with the corresponding likelihood values.

If one would extend these tables to all n-grams for each song class, one could perform the classification of a song as a simple bookkeeping exercise, which simply would involve:

For each song class: multiplying the posterior probabilities for all n-grams in the song (which can be derived from the corresponding likelihood table and the prior probability value), and finally choosing the song class with the largest resulting value.

Table 1. Twenty most likely 1-grams for each song class together with the corresponding likelihood values in %.

SHE		SAM		SVA		KAK		GUR		GEL		IME	
$\{-2_2^2, -1_3^3, 0_1^1\}$	0.86	$\{-2_3^5, -1_3^3, 0_1^1\}$	1.13	$\{0_3^5, -1_3^5, -2_3^5\}$	2.03	$\{-1_3^5, -1_3^5, 0_1^5\}$	0.75	$\{-2_1^4, -1_3^3, 0_1^1\}$	0.85	$\{-4_4^8, -4_5^5, -4_6^8\}$	0.54	$\{0_3^6, 0_3^5, -1_3^5\}$	1.63
$\{-2_1^1, -2_2^2, -1_1^1\}$	0.40	$\{-2_5^5, -2_4^6, -2_3^5\}$	0.75	$\{0_4^2, 0_3^5, -1_3^5\}$	1.07	$\{-1_4^8, -1_5^8, -1_6^8\}$	0.75	$\{-2_3^5, -2_2^4, -1_1^3\}$	0.33	$\{-2_6^8, -2_6^7, -1_5^5\}$	0.50	$\{0_1^7, 0_3^6, 0_3^5\}$	1.53
$\{-4_5^7, -4_5^6, -4_5^5\}$	0.31	$\{0_3^5, -1_3^5, -2_3^5\}$	0.69	$\{0_4^6, 0_3^5, -1_5^5\}$	1.00	$\{-1_4^7, -1_4^6, -1_3^5\}$	0.58	$\{-2_3^5, -2_2^4, -1_1^3\}$	0.26	$\{-2_2^2, -1_3^3, 0_1^1\}$	0.39	$\{-1_5^6, -1_3^5, 0_1^5\}$	1.09
$\{-3_2^4, -2_2^2, -1_1^3\}$	0.29	$\{-2_5^4, -1_3^3, 0_1^1\}$	0.68	$\{-2_3^5, -1_4^3, 0_1^1\}$	0.89	$\{-1_6^8, -1_7^9, -1_6^8\}$	0.54	$\{2_1^4, 3_1^3, 4_1^1\}$	0.24	$\{-1_6^8, -1_6^5, -1_6^8\}$	0.39	$\{-1_5^7, -1_4^6, -1_3^5\}$	0.98
$\{-3_2^4, -2_1^3, -2_2^2\}$	0.28	$\{-2_4^4, -2_3^5, -1_1^3\}$	0.53	$\{-2_3^5, -1_4^2, -1_3^5\}$	0.89	$\{-2_4^8, -2_5^8, -2_6^8\}$	0.54	$\{-4_5^5, -4_4^7, -4_3^5\}$	0.22	$\{0_4^7, 0_3^5, 0_6^8\}$	0.35	$\{0_4^8, 0_3^7, 0_4^8\}$	0.87
$\{-5_4^7, -4_5^5, -3_1^5\}$	0.27	$\{-1_5^7, -1_4^6, -1_3^5\}$	0.49	$\{-1_3^5, -2_3^5, -1_1^3\}$	0.65	$\{0_3^7, 0_4^6, 0_3^5\}$	0.52	$\{1_1^5, 2_3^4, 2_2^4\}$	0.22	$\{-3_4^8, -3_5^5, -3_6^8\}$	0.35	$\{3_1^3, 3_1^4, 3_3^5\}$	0.87
$\{-2_4^7, -1_3^5, 0_1^5\}$	0.26	$\{-2_4^5, -2_3^5, -1_1^3\}$	0.42	$\{0_4^2, 0_4^6, 0_3^5\}$	0.65	$\{-2_6^8, -2_7^9, -2_6^8\}$	0.46	$\{2_1^4, 2_1^5, 3_1^3\}$	0.22	$\{-1_3^5, 0_1^5, -1_6^8\}$	0.31	$\{0_3^5, -1_3^5, -2_3^5\}$	0.87
$\{-3_1^7, -2_3^3, -1_1^5\}$	0.26	$\{0_4^6, 0_3^7, 0_4^6\}$	0.41	$\{-3_5^7, -2_3^5, -1_1^3\}$	0.56	$\{-1_4^6, -1_3^5, 0_1^5\}$	0.44	$\{-4_6^5, -4_5^5, -4_4^7\}$	0.20	$\{-2_6^8, -1_3^5, 0_1^5\}$	0.31	$\{3_4^4, 3_3^3, 2_3^5\}$	0.76
$\{-5_3^5, -4_1^3, -3_1^5\}$	0.26	$\{-1_6^6, -1_7^7, -1_4^5\}$	0.38	$\{-3_5^7, -2_3^5, -1_1^3\}$	0.51	$\{-1_6^8, -1_5^7, -1_4^5\}$	0.42	$\{0_4^5, 0_6^8, 0_4^7\}$	0.20	$\{-2_6^8, -2_6^9, -2_6^8\}$	0.31	$\{-3_6^8, -3_5^7, -3_4^6\}$	0.76
$\{-2_5^9, -3_5^9, -4_5^9\}$	0.25	$\{0_4^6, 0_3^5, -1_3^5\}$	0.37	$\{0_3^5, 0_4^6, 0_3^5\}$	0.49	$\{0_3^5, 0_4^5, -1_3^5\}$	0.41	$\{0_4^7, 0_4^6, 0_4^5\}$	0.20	$\{-2_4^5, -1_3^5, 0_1^5\}$	0.31	$\{-3_7^9, -3_6^8, -3_5^7\}$	0.76
$\{-2_5^7, -2_5^6, -2_5^8\}$	0.24	$\{-1_3^5, 0_1^5, -1_3^5\}$	0.34	$\{-1_3^5, -1_1^3, 0_1^1\}$	0.47	$\{0_4^5, -1_3^4, -1_3^5\}$	0.41	$\{-2_4^4, -2_3^5, -2_4^5\}$	0.20	$\{-2_6^7, -1_5^5, 0_4^5\}$	0.31	$\{-2_3^5, -1_3^5, -1_4^6\}$	0.65
$\{-3_5^5, -3_4^4, -3_3^5\}$	0.24	$\{-2_6^8, -2_5^7, -2_4^6\}$	0.33	$\{-2_3^5, -1_4^6, -1_3^5\}$	0.45	$\{-1_5^5, -1_4^4, -1_3^5\}$	0.41	$\{0_4^5, 1_4^8, 2_3^4\}$	0.20	$\{-5_4^5, -4_3^5, -3_1^5\}$	0.27	$\{3_3^5, 2_3^5, 1_3^5\}$	0.65
$\{-6_8^9, -6_8^8, -5_6^7\}$	0.24	$\{0_3^5, 0_4^6, 0_5^7\}$	0.31	$\{-2_4^6, -2_3^5, -1_3^5\}$	0.45	$\{-1_4^6, -1_5^7, -1_4^8\}$	0.41	$\{-4_3^7, -4_5^9, -3_4^4\}$	0.18	$\{-5_6^{10}, -5_7^{10}, -5_8^{10}\}$	0.27	$\{-1_3^5, -2_3^5, -3_3^5\}$	0.65
$\{-6_6^8, -5_6^8, -5_4^7\}$	0.24	$\{-2_3^5, -2_3^5, -1_1^3\}$	0.29	$\{-1_3^5, 0_4^4, 0_3^5\}$	0.40	$\{-1_3^7, -1_4^6, -1_3^5\}$	0.41	$\{-4_5^7, -4_5^9, -4_4^5\}$	0.18	$\{-2_5^5, -2_4^4, -1_3^5\}$	0.27	$\{-3_5^9, -3_5^6, -3_5^7\}$	0.65
$\{-5_6^7, -5_5^7, -4_4^4\}$	0.24	$\{-3_5^7, -2_3^5, -1_1^3\}$	0.29	$\{-3_5^5, -2_3^5, -2_3^5\}$	0.40	$\{-2_8^{10}, -1_6^8, -1_7^9\}$	0.39	$\{-1_5^5, 0_4^5, 0_4^6\}$	0.18	$\{-1_6^8, -2_6^8, -2_6^7\}$	0.27	$\{0_3^5, 0_4^6, 0_3^5\}$	0.54
$\{-5_3^9, -4_3^9, -3_3^9\}$	0.24	$\{-2_3^5, -2_5^6, -2_3^5\}$	0.28	$\{-2_5^5, -2_3^5, -1_4^5\}$	0.40	$\{-1_3^5, 0_3^5, -1_3^5\}$	0.39	$\{-4_3^5, -3_3^5, -3_4^5\}$	0.18	$\{-1_5^5, 0_4^5, -2_6^8\}$	0.27	$\{-2_3^5, -3_5^9, -3_4^7\}$	0.54
$\{-1_3^9, -2_3^9, -3_1^9\}$	0.23	$\{0_3^5, 0_4^6, 0_2^7\}$	0.28	$\{0_3^5, 0_4^2, 0_3^5\}$	0.40	$\{0_4^5, -1_3^5, 0_3^5\}$	0.39	$\{-5_7^9, -5_6^8, -5_7^9\}$	0.18	$\{0_4^7, -2_6^8, -4_8^{10}\}$	0.27	$\{-3_5^7, -3_4^6, -3_3^5\}$	0.54
$\{-5_4^4, -5_3^5, -4_1^3\}$	0.21	$\{0_5^7, 0_4^6, 0_3^5\}$	0.28	$\{-2_4^4, -2_3^5, -1_4^5\}$	0.40	$\{-2_3^5, -2_4^5, -2_3^5\}$	0.37	$\{-3_3^7, -3_4^4, -2_4^5\}$	0.18	$\{-2_6^8, -4_8^{10}, -3_6^{10}\}$	0.27	$\{-3_5^7, -2_3^5, -1_1^3\}$	0.54
$\{-2_5^9, -1_5^9, -2_5^5\}$	0.19	$\{-2_6^4, -2_5^7, -2_4^6\}$	0.27	$\{-2_3^5, -2_5^5, -1_4^5\}$	0.40	$\{-1_6^8, -2_8^{10}, -1_6^8\}$	0.37	$\{-3_4^7, -2_4^4, -2_3^5\}$	0.18	$\{-2_6^9, -2_6^8, -2_6^7\}$	0.27	$\{-1_4^5, -1_3^5, 0_1^5\}$	0.54
$\{-4_5^9, -3_5^9, -2_5^5\}$	0.19	$\{-3_6^8, -3_7^7, -2_3^5\}$	0.27	$\{0_4^5, 0_3^5, 0_4^5\}$	0.40	$\{0_3^5, -1_3^5, -1_4^5\}$	0.37	$\{-2_5^5, -2_5^6, -2_5^5\}$	0.18	$\{-1_3^7, 0_1^5, -1_5^8\}$	0.23	$\{-3_5^8, -3_7^7, -3_6^8\}$	0.54

Table 2. Twenty most likely 2-grams for each song class together with the corresponding likelihood values in %.

SHE		SAM		SVA		KAK		GUR		GEL		IME	
$\{-1_1^3, 0_1^1\}$	1.25	$\{-1_1^3, 0_1^1\}$	2.54	$\{0_3^5, -1_3^5\}$	4.10	$\{-1_4^5, -1_3^5\}$	1.59	$\{-1_1^3, 0_1^1\}$	1.07	$\{-1_3^5, 0_1^5\}$	0.96	$\{-1_3^5, 0_1^5\}$	2.89
$\{-2_2^2, -1_1^3\}$	0.85	$\{-2_4^6, -2_3^5\}$	1.98	$\{-1_3^5, -2_3^5\}$	3.60	$\{0_3^5, -1_3^5\}$	1.47	$\{-2_4^2, -1_1^3\}$	0.93	$\{-4_3^5, -3_1^5\}$	0.96	$\{0_4^6, 0_3^5\}$	2.46
$\{-4_3^5, -3_1^5\}$	0.81	$\{-2_3^5, -1_1^3\}$	1.72	$\{0_4^6, 0_3^5\}$	2.38	$\{-1_3^5, 0_1^5\}$	1.36	$\{-4_3^5, -3_3^5\}$	0.69	$\{-2_6^8, -2_6^7\}$	0.88	$\{0_3^5, -1_3^5\}$	2.14
$\{-4_5^9, -3_5^9\}$	0.69	$\{0_3^5, -1_3^5\}$	1.29	$\{-1_1^3, 0_1^1\}$	2.27	$\{-1_5^7, -1_4^6\}$	1.18	$\{-1_3^5, 0_1^5\}$	0.65	$\{-1_1^3, 0_1^1\}$	0.77	$\{0_5^7, 0_4^6\}$	1.82
$\{-2_5^9, -3_5^9\}$	0.63	$\{-1_4^6, -1_3^5\}$	1.26	$\{-1_3^5, -1_3^5\}$	2.27	$\{-1_5^8, -1_6^8\}$	1.09	$\{-4_4^5, -4_3^5\}$	0.46	$\{-4_4^8, -4_5^8\}$	0.69	$\{-2_3^5, -1_3^5\}$	1.82
$\{-2_3^5, -1_1^5\}$	0.62	$\{-1_3^5, -2_3^5\}$	1.22	$\{-2_3^5, -1_1^3\}$	1.99	$\{-1_3^5, -1_4^5\}$	1.07	$\{-3_3^5, -2_3^5\}$	0.44	$\{-4_5^5, -4_6^5\}$	0.65	$\{0_3^5, 0_4^6\}$	1.18
$\{-3_5^9, -2_5^9\}$	0.57	$\{-2_5^7, -2_4^6\}$	1.12	$\{0_4^6, 0_3^5\}$	1.83	$\{-1_6^8, -1_5^7\}$	1.05	$\{-2_3^5, -1_3^5\}$	0.44	$\{-3_3^5, -2_1^5\}$	0.61	$\{-3_6^8, -3_5^7\}$	1.18
$\{-1_3^5, 0_1^5\}$	0.56	$\{-2_4^5, -2_3^5\}$	1.08	$\{-2_3^5, -1_3^5\}$	1.66	$\{-1_4^5, -1_3^5\}$	1.03	$\{-1_3^5, 0_4^5\}$	0.42	$\{-2_3^5, -1_3^5\}$	0.54	$\{-1_5^5, -1_4^5\}$	1.07
$\{-3_5^6, -3_5^5\}$	0.49	$\{-2_3^5, -1_3^5\}$	0.95	$\{-1_6^5, -1_3^5\}$	1.62	$\{-1_7^8, -1_6^8\}$	1.01	$\{-3_3^5, -3_4^5\}$	0.40	$\{-2_6^8, -2_5^7\}$	0.54	$\{-1_4^6, -1_3^5\}$	1.07
$\{-5_5^9, -4_5^9\}$	0.48	$\{-1_4^7, -1_4^6\}$	0.94	$\{-2_3^6, -2_3^5\}$	1.55	$\{-1_6^8, -1_8^8\}$	0.94	$\{-3_3^5, -3_4^5\}$	0.40	$\{-1_5^8, -1_5^7\}$	0.50	$\{3_3^5, 2_3^5\}$	1.07
$\{-3_5^9, -4_5^9\}$	0.48	$\{0_4^6, 0_3^5\}$	0.92	$\{-2_3^5, -1_4^5\}$	1.42	$\{0_3^5, 0_4^5\}$	0.94	$\{-4_5^6, -4_5^5\}$	0.38	$\{-3_3^5, -2_3^5\}$	0.50	$\{-1_3^5, -2_3^5\}$	0.96
$\{-4_5^8, -4_5^7\}$	0.46	$\{-1_3^5, 0_3^5\}$	0.78	$\{-2_4^5, -2_3^5\}$	1.29	$\{-1_3^5, 0_3^5\}$	0.94	$\{-4_5^5, -3_3^5\}$	0.36	$\{-2_6^7, -1_5^5\}$	0.50	$\{-3_5^7, -2_3^5\}$	0.96
$\{-4_5^9, -5_5^9\}$	0.45	$\{-2_2^4, -1_1^3\}$	0.73	$\{-3_5^7, -2_3^5\}$	1.00	$\{-2_4^5, -2_3^5\}$	0.92	$\{-5_7^9, -5_6^8\}$	0.36	$\{-1_6^9, -1_6^8\}$	0.50	$\{0_4^6, 0_5^7\}$	0.86
$\{-4_5^7, -4_5^6\}$	0.44	$\{0_5^9, 0_4^7\}$	0.73	$\{0_4^6, 0_4^6\}$	0.94	$\{0_4^5, 0_3^5\}$	0.86	$\{-4_5^8, -4_5^7\}$	0.36	$\{0_4^5, -2_6^8\}$	0.46	$\{3_1^5, 3_2^4\}$	0.86
$\{-2_2^3, -2_2^2\}$	0.43	$\{-3_5^7, -2_3^5\}$	0.71	$\{-1_3^5, -1_3^5\}$	0.94	$\{-1_4^8, -1_3^8\}$	0.86	$\{-2_4^6, -1_3^5\}$	0.34	$\{-1_7^7, 0_1^5\}$	0.42	$\{3_2^4, 3_3^5\}$	0.86
$\{-5_5^9, -4_5^7\}$	0.42	$\{-2_6^8, -2_5^7\}$	0.62	$\{0_3^5, 0_4^6\}$	0.94	$\{-2_5^8, -2_6^8\}$	0.86	$\{-2_5^7, -2_5^6\}$	0.34	$\{0_4^8, 0_5^8\}$	0.42	$\{-2_3^5, -3_3^5\}$	0.86
$\{-6_5^9, -5_5^9\}$	0.40	$\{0_4^6, 0_5^7\}$	0.59	$\{-1_3^5, 0_1^1\}$	0.92	$\{-2_6^8, -2_7^8\}$	0.86	$\{-4_3^5, -3_4^5\}$	0.32	$\{-5_6^8, -4_4^8\}$	0.42	$\{-3_5^7, -3_4^6\}$	0.86
$\{-2_5^7, -2_5^6\}$	0.39	$\{-4_3^5, -3_3^5\}$	0.59	$\{-1_3^5, 0_1^1\}$	0.79	$\{0_6^5, 0_3^5\}$	0.84	$\{-2_3^5, -2_2^4\}$	0.32	$\{-3_5^8, -3_6^8\}$	0.42	$\{-1_3^5, -1_4^6\}$	0.75
$\{-4_5^6, -4_5^5\}$	0.39	$\{0_3^5, 0_4^6\}$	0.58	$\{0_1^5, 0_3^5\}$	0.79	$\{-2_8^{10}, -1_6^8\}$	0.80	$\{-4_3^5, -4_4^5\}$	0.30	$\{-2_5^7, -2_4^6\}$	0.42	$\{-1_4^6, -1_5^7\}$	0.75
$\{-6_8^9, -6_8^8\}$	0.38	$\{-1_3^5, 0_1^5\}$	0.58	$\{-1_4^5, -1_4^6\}$	0.74	$\{-1_3^5, -2_3^5\}$	0.80	$\{-4_5^7, -4_5^6\}$	0.30	$\{-2_4^6, -1_3^5\}$	0.42	$\{3_4^6, 3_3^5\}$	0.75

Table 3. Twenty most likely 3-grams for each song class together with the corresponding likelihood values in %.

SHE		SAM		SVA		KAK		GUR		GEL		IME	
$\{-2_2^2, -1_1^3, 0_1^1\}$	0.86	$\{-2_3^5, -1_1^3, 0_1^1\}$	1.13	$\{0_3^5, -1_3^5, -2_3^5\}$	2.03	$\{-1_5^5, -1_3^5, 0_1^5\}$	0.75	$\{-2_4^2, -1_1^3, 0_1^1\}$	0.85	$\{-4_4^8, -4_5^8, -4_6^8\}$	0.54	$\{0_4^6, 0_3^5, -1_3^5\}$	1.63
$\{-2_1^3, -2_2^2, -1_1^3\}$	0.40	$\{-2_5^7, -2_6^8, -2_5^5\}$	0.75	$\{0_4^6, 0_3^5, -1_3^5\}$	1.07	$\{-1_4^5, -1_8^8, -1_6^8\}$	0.75	$\{-2_3^5, -2_2^4, -1_1^3\}$	0.33	$\{-2_6^8, -2_6^7, -1_5^5\}$	0.50	$\{0_4^7, 0_4^6, 0_3^5\}$	1.53
$\{-4_5^7, -4_5^6, -4_5^5\}$	0.31	$\{0_3^5, -1_3^5, -2_3^5\}$	0.69	$\{0_4^6, 0_3^5, -1_3^5\}$	1.00	$\{-1_3^5, -1_4^5, -1_3^5\}$	0.58	$\{-2_3^5, -2_2^4, -1_1^3\}$	0.26	$\{-2_2^4, -1_1^3, 0_1^1\}$	0.39	$\{-1_4^6, -1_3^5, 0_1^5\}$	1.09
$\{-3_2^4, -2_2^2, -1_1^3\}$	0.29	$\{-2_2^4, -1_1^3, 0_1^1\}$	0.68	$\{-2_3^5, -1_1^3, 0_1^1\}$	0.89	$\{-1_6^8, -1_7^8, -1_6^8\}$	0.54	$\{2_2^4, 3_1^3, 4_1^1\}$	0.24	$\{-1_6^8, -1_6^9, -1_6^8\}$	0.39	$\{-1_5^7, -1_4^6, -1_3^5\}$	0.98
$\{-3_2^4, -2_1^5, -2_2^2\}$	0.28	$\{-2_4^6, -2_3^5, -1_1^3\}$	0.53	$\{-2_3^5, -1_4^5, -1_3^5\}$	0.89	$\{-2_4^5, -2_5^8, -2_6^8\}$	0.54	$\{-4_5^5, -4_4^5, -4_3^5\}$	0.22	$\{0_4^5, 0_5^8, 0_6^8\}$	0.35	$\{0_4^6, 0_5^9, 0_4^4\}$	0.87
$\{-5_5^7, -4_5^5, -3_5^1\}$	0.27	$\{-1_5^7, -1_4^6, -1_3^5\}$	0.49	$\{-1_3^5, -2_3^5, -1_3^5\}$	0.65	$\{0_3^7, 0_4^6, 0_3^5\}$	0.52	$\{1_4^5, 2_3^5, 2_2^4\}$	0.22	$\{-3_4^4, -3_5^5, -3_6^8\}$	0.35	$\{3_1^3, 3_2^4, 3_3^5\}$	0.87
$\{-2_4^7, -1_3^5, 0_1^5\}$	0.26	$\{-2_5^7, -2_3^5, -1_1^3\}$	0.42	$\{0_4^6, 0_6^5, 0_3^5\}$	0.65	$\{-2_8^8, -2_5^9, -2_6^8\}$	0.46	$\{2_3^5, 2_2^4, 3_3^5\}$	0.22	$\{-1_5^5, 0_1^5, -1_8^8\}$	0.31	$\{0_3^5, -1_3^5, -2_3^5\}$	0.76
$\{-3_4^7, -2_3^5, -1_1^5\}$	0.26	$\{0_6^5, 0_7^6, 0_6^6\}$	0.41	$\{-1_3^5, -2_3^5, -1_3^5\}$	0.56	$\{-1_6^8, -1_3^5, 0_1^5\}$	0.44	$\{-4_5^6, -4_5^5, -4_4^5\}$	0.20	$\{-2_6^8, -1_5^5, 0_1^5\}$	0.31	$\{3_6^8, 3_5^7, 3_3^5\}$	0.76
$\{-5_3^4, -4_3^5, -3_1^5\}$	0.26	$\{-1_4^6, -1_5^7, -1_4^6\}$	0.38	$\{-3_5^7, -2_3^5, -1_3^5\}$	0.51	$\{-1_4^8, -1_7^5, -1_6^8\}$	0.42	$\{0_4^5, 0_6^5, 0_4^7\}$	0.20	$\{-2_6^8, -2_5^9, -2_6^8\}$	0.31	$\{-3_6^8, -3_5^7, -3_4^6\}$	0.76
$\{-2_5^9, -3_5^9, -4_5^9\}$	0.25	$\{0_4^6, 0_5^9, -1_3^5\}$	0.37	$\{0_5^7, 0_6^5, 0_3^5\}$	0.49	$\{0_3^5, 0_4^5, -1_4^5\}$	0.41	$\{0_4^5, 0_4^6, 0_4^4\}$	0.20	$\{-2_5^7, -1_5^5, 0_1^5\}$	0.31	$\{-3_7^9, -3_8^6, -3_5^7\}$	0.76
$\{-2_5^7, -2_5^5, -2_5^2\}$	0.24	$\{-1_3^5, 0_3^5, -1_3^5\}$	0.34	$\{-1_3^5, -1_1^3, 0_1^1\}$	0.47	$\{0_3^5, -1_4^5, -1_3^5\}$	0.41	$\{-2_4^5, -2_3^5, -2_2^4\}$	0.20	$\{-2_5^7, -1_5^5, 0_4^5\}$	0.31	$\{-2_3^5, -1_3^5, -1_4^6\}$	0.65
$\{-3_5^5, -3_5^4, -3_3^5\}$	0.24	$\{-2_6^8, -2_5^7, -2_6^4\}$	0.33	$\{-2_3^5, -1_4^5, -1_3^5\}$	0.45	$\{-1_3^5, -1_4^5, -1_3^5\}$	0.41	$\{0_5^5, 1_4^3, 2_2^4\}$	0.20	$\{-5_4^5, -4_3^5, -3_1^5\}$	0.27	$\{3_3^5, 2_3^5, 1_3^5\}$	0.65
$\{-6_8^9, -6_8^8, -5_6^8\}$	0.24	$\{0_7^5, 0_6^4, 0_5^5\}$	0.31	$\{-2_6^5, -2_3^5, -1_3^5\}$	0.45	$\{-1_4^5, -1_5^7, -1_4^6\}$	0.41	$\{-4_3^5, -4_4^5, -3_4^5\}$	0.18	$\{-5_6^{10}, -5_7^{10}, -5_8^{10}\}$	0.27	$\{-1_3^5, -2_3^5, -3_3^5\}$	0.65
$\{-6_8^8, -5_6^7, -5_6^4\}$	0.24	$\{-2_5^7, -2_2^4, -1_1^3\}$	0.29	$\{-1_3^5, 0_4^5, 0_3^5\}$	0.40	$\{-1_5^7, -1_4^6, -1_5^7\}$	0.41	$\{-4_5^7, -4_5^6, -4_5^5\}$	0.18	$\{-2_5^7, -2_4^6, -1_3^5\}$	0.27	$\{-3_3^5, -3_4^6, -3_5^7\}$	0.65
$\{-5_5^7, -5_5^4, -4_5^1\}$	0.24	$\{-3_5^5, -2_3^5, -1_1^3\}$	0.29	$\{-3_5^7, -2_4^5, -1_3^5\}$	0.40	$\{-2_8^{10}, -1_6^8, -1_7^8\}$	0.39	$\{-1_5^5, 0_4^5, 0_6^5\}$	0.18	$\{-1_6^8, -2_5^8, -2_6^8\}$	0.27	$\{0_3^5, 0_4^6, 0_3^5\}$	0.54
$\{-5_5^9, -4_5^5, -3_3^5\}$	0.24	$\{-2_5^5, -2_4^6, -2_2^5\}$	0.28	$\{-2_4^5, -2_3^5, -1_4^5\}$	0.40	$\{-1_3^5, 0_3^5, -1_3^5\}$	0.39	$\{-4_5^5, -3_3^5, -3_4^5\}$	0.18	$\{-1_5^5, 0_4^5, -2_6^8\}$	0.27	$\{-2_3^5, -3_3^5, -3_4^6\}$	0.54
$\{-1_5^9, -2_5^5, -3_5^5\}$	0.23	$\{0_5^5, 0_6^4, 0_7^5\}$	0.28	$\{0_3^5, 0_4^5, 0_3^5\}$	0.40	$\{0_3^5, -1_3^5, 0_1^5\}$	0.39	$\{-5_7^7, -5_8^5, -5_5^7\}$	0.18	$\{0_5^5, -2_6^8, -4_4^{10}\}$	0.27	$\{-3_7^7, -3_6^5, -3_5^7\}$	0.54
$\{-5_5^4, -5_5^5, -4_5^1\}$	0.21	$\{0_7^5, 0_6^4, 0_5^5\}$	0.28	$\{-2_6^5, -2_3^5, -1_4^5\}$	0.40	$\{-2_5^5, -2_5^5, -2_5^5\}$	0.37	$\{-3_5^5, -3_3^5, -2_4^5\}$	0.18	$\{-2_6^8, -4_4^8, -3_6^{10}\}$	0.27	$\{-3_7^7, -2_3^5, -1_1^3\}$	0.54
$\{-2_5^9, -1_5^5, -2_5^5\}$	0.19	$\{-2_6^4, -2_7^5, -2_6^6\}$	0.27	$\{-2_3^5, -2_5^5, -1_5^5\}$	0.40	$\{-1_8^5, -2_8^{10}, -1_6^8\}$	0.37	$\{-3_5^5, -2_4^5, -2_3^5\}$	0.18	$\{-2_6^9, -2_6^8, -2_6^7\}$	0.27	$\{-1_5^5, -1_4^5, 0_1^5\}$	0.54
$\{-4_5^9, -3_5^5, -2_5^5\}$	0.19	$\{-3_6^8, -3_5^7, -2_3^5\}$	0.27	$\{0_4^6, 0_3^5, 0_4^6\}$	0.40	$\{0_3^5, -1_3^5, -1_4^5\}$	0.37	$\{-2_7^5, -2_5^5, -2_5^5\}$	0.18	$\{-1_3^5, 0_1^1, -1_8^5\}$	0.23	$\{-3_5^5, -3_7^7, -3_6^8\}$	0.54

Model validation

Statistically, Tables 1-3, together with the prior probability values shown in Fig. 7, contain all that the corpus can tell us about the characteristic features of each *song class* from the perspective of the twenty most likely n-grams. However, it remains to be clarified whether the chord progression patterns shown in Tables 1-3 can be interpreted as general characteristics for the different 'song classes' or only for the collected data sets. Following

machine learning protocol, this needs to be tested by model validation experiments.

In the first validation experiment, we randomly divided the complete dataset into two subsets. For each 'song class', ¾ of the songs were randomly selected for the training of a classification algorithm, which was then applied to the remaining ¼ of the songs. This approach is called cross-validation and is commonly applied (in a variety of different versions) to evaluate the performance of machine learning models. In our case, the process was repeated one hundred times. Since the test data subsets were not used in the model training, this process actually tests the predictive power of the classifiers, in other words their generalizability to unseen data. The way we applied it in the present context was that in each of the 100 cross-validation runs and for each 'song class', we kept track of which of the songs were 'always' properly classified. Since a song might also contain patterns (n-grams) characteristic of different 'song classes', keeping only the intersection of those songs which were always classified properly (which we refer to as 'winner songs' or 'winner n-grams'), has two interesting effects.

First, it reduces the data subsets to those songs which can be considered most characteristic for the assigned 'song classes'. Because of the random selection of the subsets of songs used for the training, each of the trained classifiers for a 'song class' will capture slightly different aspects. Taking the intersections of those songs which are always classified correctly will therefore capture the most representative (pure) features of each 'song class', while those songs which contain a lot of mixed features (from different song classes) will be thrown out. In other words, this process can help to focus on the observed patterns of those songs for which we can be most confident that they represent actual features of the assigned 'song classes' and are not the results of non-specific features of individual songs or the results of mixing features from different 'song classes'.

Second, the sizes of the intersections of the successfully classified songs in all cross-validations, i.e. the sizes of the 'winner subsets', are direct measures of the numbers of songs which can be considered representative of each 'song class'. Fig. 10, which shows the confusion matrices for those 'winner songs' for n-grams with n=1-3, illustrates for example that for the *song classes* GEL, GUR, and IME, the sizes of the datasets are clearly too small to warrant meaningful interpretation. In terms of 1-grams, there is not a single song that is always classified correctly in any of these three song classes and only a few remain for the 2-grams and 3-grams for GEL and GUR. Therefore, we refrain from further
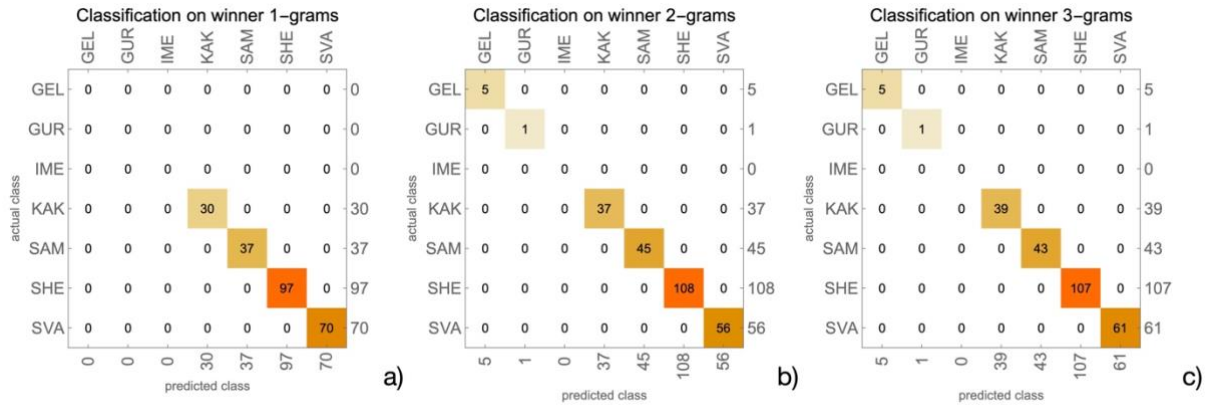
interpretation of these song classes at this time.

Classification on winner 1–grams / Classification on winner 2–grams / Classification on winner 3–grams

Figure 10. Confusion matrices for those songs, which are always classified correctly in all 100 cross-validation runs ('winner songs'), for n-grams with n=1-3.

The song class with the largest number of representative songs in Fig. 10 is SHE. In terms of 2-grams its size (108) is only slightly reduced with respect to the original dataset (121). Fig. 11a shows the corresponding twenty most likely 2-grams together with their likelihoods in %.
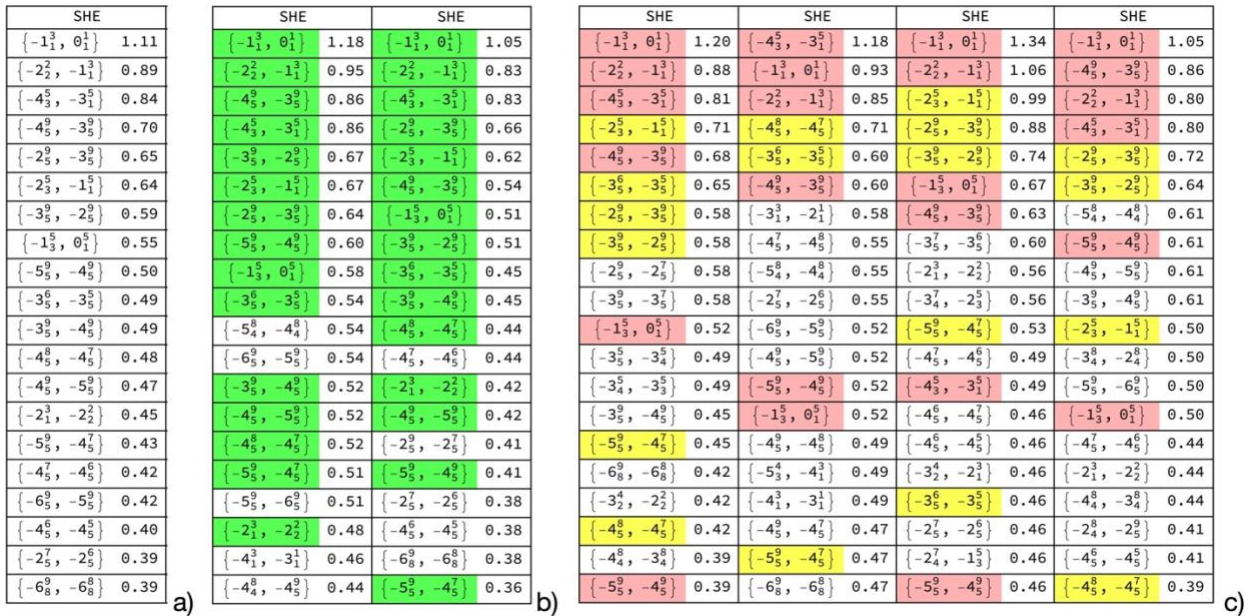
Figure 11. Twenty most likely 2-grams for the 'song class' SHE and the dataset built from the 'winner songs' of the cross-validation experiment described above, for the 2-grams split up into different equally sized subsets. Fig. 11a-c show the results for the original dataset, the original dataset split up into two equally subsets, and 4 equally sized subsets, respectively.

Finally, to test the extent to which the likelihoods shown in Fig. 11a can be trusted as

expressing the harmonic structure of the song class SHE, we conducted another validation experiment. For this purpose, we split the original data set into two and four equally sized sub-data sets, respectively, to check whether the essential properties of the n-gram distributions are preserved in this process. If they are so preserved, we see this as an indication that they are indeed properties of the song class because they are present in each of the subdivisions. To visualize the n-grams that remain as the most frequently occurring ones during splitting, we have chosen a simple color code. The fields coded green in Fig. 11b mark n-grams contained in both halves of the original dataset. The fields coded red and yellow in Fig. 11c are the n-grams that are retained in all 4 or 3 of the four 1/4 subsets, respectively. What we can see in Fig. 11 is that the majority of the chord progressions in Fig. 11a appear also in both halves of Fig. 11b, each containing 54 songs. However, when split into four sub-datasets, each still containing 27 songs, the representational power of the individual sub-datasets decreases significantly. Only the 3-4 most frequent chord sequences still represent the entire data set, as can be seen from the red color coding.

The conclusion we draw from this experiment is that for a corpus size of approximately 50 songs, which would correspond to the two subsets shown in Fig. 11b, we can expect the 10 to 15 most frequently observed chord progression patterns (n-grams) to reflect the syntactic structure of their corresponding 'song class', but that this is not guaranteed for smaller corpus sizes. In our case, this leaves only the song classes SHE and SVA available for interpretation. Their twenty most likely n-grams for n =1-3 is shown in Fig. 12.

SHE

1-gram		2-gram		3-gram	
$\{-4_5^9\}$	3.19	$\{-1_1^3, 0_1^1\}$	1.11	$\{-2_2^2, -1_1^3, 0_1^1\}$	0.90
$\{-3_5^9\}$	2.90	$\{-2_2^2, -1_1^3\}$	0.89	$\{-2_1^3, -2_2^2, -1_1^3\}$	0.42
$\{-4_5^7\}$	2.68	$\{-4_3^5, -3_1^5\}$	0.84	$\{-4_5^5, -4_5^6, -4_5^5\}$	0.32
$\{-5_5^9\}$	2.29	$\{-4_5^9, -3_5^9\}$	0.70	$\{-3_2^4, -2_2^2, -1_1^3\}$	0.30
$\{-4_3^5\}$	2.24	$\{-2_5^9, -3_5^9\}$	0.65	$\{-3_2^4, -2_1^3, -2_2^2\}$	0.29
$\{-2_5^9\}$	2.07	$\{-2_3^5, -1_1^5\}$	0.64	$\{-5_4^7, -4_3^5, -3_1^5\}$	0.29
$\{-3_5^7\}$	1.65	$\{-3_5^9, -2_5^9\}$	0.59	$\{-2_1^7, -1_3^5, 0_1^5\}$	0.27
$\{-4_4^8\}$	1.65	$\{-1_3^5, 0_1^5\}$	0.55	$\{-5_3^4, -4_1^3, -3_1^1\}$	0.27
$\{-3_5^5\}$	1.55	$\{-5_5^9, -4_5^9\}$	0.50	$\{-2_5^9, -3_5^9, -4_5^9\}$	0.26
$\{-5_5^7\}$	1.48	$\{-3_5^6, -3_5^5\}$	0.49	$\{-3_5^5, -3_5^4, -3_5^3\}$	0.26
$\{-4_6^8\}$	1.44	$\{-3_5^9, -4_5^9\}$	0.49	$\{-2_5^5, -2_5^6, -2_5^5\}$	0.25
$\{-4_5^8\}$	1.42	$\{-4_5^8, -4_5^7\}$	0.48	$\{-6_8^9, -6_5^8, -5_7^6\}$	0.25
$\{-3_4^8\}$	1.39	$\{-4_5^9, -5_5^9\}$	0.47	$\{-6_8^8, -5_6^8, -5_4^7\}$	0.25
$\{-3_3^5\}$	1.24	$\{-2_1^3, -2_2^2\}$	0.45	$\{-5_6^7, -5_4^7, -4_4^6\}$	0.25
$\{-6_5^9\}$	1.23	$\{-5_5^9, -4_5^7\}$	0.43	$\{-1_5^5, -2_5^9, -3_5^9\}$	0.24
$\{-4_5^6\}$	1.21	$\{-4_5^7, -4_5^6\}$	0.42	$\{-5_5^9, -4_5^9, -3_5^9\}$	0.24
$\{-2_5^7\}$	1.19	$\{-6_5^9, -5_5^9\}$	0.42	$\{-3_4^7, -2_3^5, -1_1^5\}$	0.24
$\{-1_1^3\}$	1.18	$\{-4_5^6, -4_5^5\}$	0.40	$\{-5_4^4, -5_4^5, -4_3^1\}$	0.22
$\{-4_5^5\}$	1.17	$\{-2_5^7, -2_5^6\}$	0.39	$\{-2_5^9, -1_5^9, -2_5^9\}$	0.20
$\{-3_5^8\}$	1.15	$\{-6_8^9, -6_8^8\}$	0.39	$\{-4_5^9, -3_5^9, -2_5^9\}$	0.20

a)

SVA

1-gram		2-gram		3-gram	
$\{-1_3^5\}$	16.30	$\{0_3^5, -1_3^5\}$	4.53	$\{0_3^5, -1_3^5, -2_3^5\}$	2.20
$\{0_3^5\}$	9.76	$\{-1_3^5, -2_3^5\}$	4.40	$\{-2_3^5, -1_4^4, -1_3^5\}$	1.14
$\{-2_3^5\}$	9.04	$\{-1_4^5, -1_3^5\}$	3.37	$\{-1_3^5, -2_3^5, -1_3^1\}$	0.98
$\{0_1^1\}$	5.42	$\{-1_1^3, 0_1^1\}$	2.43	$\{0_4^5, 0_3^5, -1_3^5\}$	0.91
$\{-1_4^5\}$	5.18	$\{0_4^5, 0_3^5\}$	2.18	$\{0_4^6, 0_3^5, -1_3^5\}$	0.91
$\{-1_1^3\}$	4.97	$\{0_4^6, 0_3^5\}$	1.85	$\{0_4^5, 0_4^6, 0_3^5\}$	0.87
$\{0_4^5\}$	4.73	$\{-2_3^5, -1_1^3\}$	1.56	$\{-1_3^5, -1_1^3, 0_1^1\}$	0.79
$\{0_4^6\}$	3.70	$\{-1_3^5, -1_4^5\}$	1.44	$\{-1_4^5, -1_4^6, -1_3^5\}$	0.64
$\{0_3^3\}$	3.25	$\{-2_3^5, -1_3^5\}$	1.44	$\{-2_5^5, -1_4^5, -1_3^5\}$	0.61
$\{-1_4^6\}$	2.68	$\{-1_4^6, -1_3^5\}$	1.44	$\{-1_3^5, -1_4^5, -1_3^5\}$	0.57
$\{0_1^4\}$	2.65	$\{-2_3^5, -1_4^5\}$	1.40	$\{-1_3^5, -2_3^5, -1_3^5\}$	0.57
$\{-1_3^3\}$	2.41	$\{-1_3^5, -1_1^3\}$	1.32	$\{-1_4^5, -1_3^5, -2_3^5\}$	0.57
$\{-2_5^5\}$	2.26	$\{0_1^1, 0_3^5\}$	1.15	$\{0_1^4, 0_1^3, 0_1^4\}$	0.57
$\{-2_4^6\}$	1.96	$\{0_1^4, 0_3^3\}$	1.15	$\{-2_3^5, -1_1^3, 0_1^1\}$	0.53
$\{-1_1^5\}$	1.72	$\{-1_3^5, 0_1^1\}$	1.11	$\{-1_4^5, -1_3^5, -1_1^3\}$	0.53
$\{1_1^3\}$	1.63	$\{0_4^3, 0_4^6\}$	1.03	$\{0_1^3, 0_1^4, 0_1^3\}$	0.53
$\{-3_1^7\}$	1.51	$\{-2_4^6, -2_3^5\}$	0.99	$\{-1_3^5, -1_2^4, -1_1^3\}$	0.49
$\{-2_5^7\}$	1.27	$\{0_1^3, 0_1^4\}$	0.95	$\{-2_3^5, -2_5^5, -1_4^5\}$	0.49
$\{0_1^5\}$	1.23	$\{-1_3^3, 0_1^1\}$	0.95	$\{0_3^5, 0_4^6, 0_3^5\}$	0.42
$\{1_1^1\}$	1.20	$\{-2_3^5, -2_5^5\}$	0.95	$\{0_3^5, 0_4^3, 0_3^3\}$	0.42

b)

Figure 12. Twenty most likely n-grams for n =1-3 for the 'winner songs' of song classes SHE (a) and SVA (b), together with the corresponding likelihood values in %.

Even at first glance, Fig. 12a and 12b show strong differences in the chord inventories but also the chord progression structures between the two subsets for SHE and SVA. However, we refrain from a more detailed musicological interpretation of the observed patterns in the probability distributions for the individual n-grams and leave this to our follow-up study.

Discussion

The present study demonstrates how the components of a Markov-model-based classification algorithm can be used as a key component of a workflow to analyze the syntactical harmonic structure of traditional Georgian music from digital scores. Our analysis represents a delayed follow-up study to the work of Arom and Vallejo (2008, 2010). Their key questions are still open, and a specific answer is yet beyond the scope of the present work. However, by showing that – for the extraction of chord sequences - the differences between the notation of a traditional Georgian song in Western notation and a more appropriate heptatonic tuning system can be accounted for, we believe that we have demonstrated that in principle all the required information can be extracted from transcribed traditional Georgian music by computational analysis. We are aware that the size of the data set used in our study, which is already hugely enlarged in comparison to the original dataset of (Arom and Vallejo, 2008; 2010), needs to be further increased in

order to establish stronger confidence in the generalizability of the observed features and we are also aware that trying to understand the syntax of the songs needs more than n-gram frequencies. However, since the entire procedure used in this paper was implemented as a scalable workflow in Mathematica (Wolfram Research, 2020), it will be straightforward to extend the analysis to arbitrarily large data sets once these become available in digital form.

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Music in Mevlevi Rituals in the Mevlevi Tekke (Lodge) in Nuremberg / Germany

ABSTRACT

The Mevlevi Order, which emerged in Konya towards the end of the 13th century, is a religious order that arouses the curiosity of, and is followed quite closely by, many people from all around the world, both for its philosophy and for its performance rituals Although 750 years have passed since the death of Mevlana, the culture and traditions of the Mevlevis are kept alive not only in Turkey but in different countries of the world. In Germany, Mevlevism attracts the interest of people of Turkish origin, but also people of other ethnic origins, and its traditions continue in both traditional and modern interpretations. The Mevlevi Association in Nuremberg, which is one of the two Mevlevi centers in Germany, has been operating since 1990 with the aim of preserving the Mevlevi tradition, while at the same time establishing dialogues between different cultures.

The purpose of this article is to examine the Nuremberg Mevlevi *Tekke* (lodge) in Germany from historical, cultural and artistic perspectives. I will provide information about the establishment and development of the Nuremberg Mevlevi *Tekke*. And I will also try to provide information about the Mevlevi Sema ritual and about the music performed both in the lodge and in public places, referring to established published scholarship, as well as to my own field research.

Introduction

Mevlânâ Celâleddin Rumî, the founder of the Mevlevi Order, is an important religious figure in the Islamic-Sufi tradition. He was a thirteenth-century Islamic scholar, a Sufi sheikh, and a poet. Based on the teachings of Rumi, and with the aim of bringing people closer to *Allah* through the religious principles of Islam, the Mevlevi Order is a sect that emerged in Anatolia in the 13th century as a mystical interpretation of Islam.

Mevlevi is the name of a belief and tradition that has influenced and inspired millions of people living in many parts of the world, especially in Turkey, with its philosophy, its ritual 'whirling', which is a type of dhikr called *sema*, and its music, which forms the most important element of the ritual. With its unique rules, ceremonies and dhikr practice, the Mevlevi order initially spread to important centers within Anatolia, before it was disseminated to Rumelia and other Islamic countries under the auspices of the Ottoman Empire.

The decision, made on November 30, 1925, to ban all dervish lodges, resulted in the closure of all dervish lodges of the Mevlevi order. However, despite this decision, the Mevlevi culture and tradition has survived until today through private initiatives and the special privilege granted by the state to the Mevlevis. Especially during the last century, interest in the Mevlevis from Muslim and other societies has increased considerably, and today the they are known all over the world. During this period, Mevlana Celaledin Rumi became the focus of attention of European and American researchers as well as those in pursuit of the spiritual life. After the translations of the Mevlana texts made by important researchers and writers of the last century, such as Reynold A. Nicholson (1868-1945), Annemarie Schimmel (1922-2003), Eva de Vitray-Meyerovitch (1909-1999), Coleman Bryan Barks (1937-) and Robert Bly (1926-2021), the fame of Mevlana and Mevlevism spread widely across the world. In addition, Sufis who emigrated to other countries contributed greatly to the interest in Mevlana, who is widely regarded as a key figure in Islamic discourse (Sağlam, 2017: 87).

In Europe and America, Mevlevi beliefs have been adopted not only in religious circles, but also as a culture and philosophy. This is why New Age followers and those with other religious or mystical tendencies, as well as those who devote themselves to Sufism, have had a significant interest in Mevlana (Lewis, 2000: 7, 527).

The Mevlevi Order became more widely recognized in the world following the UNESCO designation of the '*Sema* ceremony and Sufi music' as a Representative of the Oral and Intangible Heritage of Humanity in 2005, as well as the Year of Rumi in 2007, which marked the 800th anniversary of the birth of Rumi. During that year, *Mevlevi Ayini* and conferences, panels, and workshops about the Mevlevi order were held in European countries and the United States, resulting in the establishments of new Mevlevi lodges. Today, Mevlevi associations, foundations and centers organize various activities designed to preserve and disseminate Mevlevi culture in both Europe and America.

Until the 1990s, the Mevlevi Order could only be studied through publications in Germany. Shortly thereafter, it was organized for the first time under the aegis of a foundation, and Mevlevi rules and practices were brought into action in dervish lodges that were opened in two different regions. Today in Germany, there are two different Mevlevi groups in Trebbus and Nuremberg. The Nuremberg Branch is part of the International Mevlana Foundation, with headquarters in Istanbul, and is represented by Sheikh Süleyman Wolf Bahn.[1] The Trebbus Mevlevis are represented by Sheikh Abdullah Halis, who claims to belong to the Kubrevi sect as well as the Mevlevi Order. Mevlevis living in different regions of Germany such as Munich, Frankfurt, Berlin, and Köln are all followers of these two sheikhs. Thus, the two different Mevlevi *tekke*s in Trebbus and Nuremberg are represented today by two German sheikhs, who grew up in a culture outside that of the Mevlevi Order's homeland in Turkey (Öksüzoğlu, 2019: 78, 79).

The Mevlevi *Tekke* in Nuremberg

The Nuremberg Mevlevi *Tekke* was founded by Süleyman Wolf Bahn and a group of his friends under the name of the Mevlana Foundation (Mevlanâ Verein e. V.) in 1991. They rented a two-story private building on Peyerstrasse 30, which they thought at the time would be an appropriate building for the lodge. They held their meetings, devoted both

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[1] The purpose of this foundation founded on March 14, 1996 in Istanbul, is to investigate the works and ideas of Jalāl ad-Dīn Rūmī, to pass on his ideas to future generations and to facilitate domestic and international studies in this field (http://mevlanafoundation.com/about_tr.html). Especially *the International Mevlana Foundation,* as a social organization, makes serious efforts to protect and maintain the traditions of the Mevlevi Order with the representatives of the Celebi family today. The foundation keeps the rules and conventions of the Mevlevi Order alive and makes every effort to keep its progress on traditional lines. It aims to gather all Mevlevi lodges around the world into one center, keeping the communication between the people in charge of the lodges alive and disallowing non-loyal people to be Mevlevi Sheikhs in the rites (International Mevlana Foundation, n.d.).

to conversation and to the performance of dhikr, initially in Bahn's house and then in the newly acquired building on Friday evenings. Actually, the decision to establish such a lodge was taken in the course of a dhikr meeting. The idea of moving these regular dhikr meetings, which a number of German and Turkish people had held in Bahn's house, to a private place and maintaining it under the name of a foundation also ensured that followers of Bahn could easily and comfortably reach him (Kavaklı, 2013: 23).

Süleyman Wolf Bahn is the sheikh and president of the foundation of the Nuremberg lodge. Bahn aims at teaching, adopting and practicing Islam in workshops and seminars held in the Mevlevi lodge. He has stated that he continues his Masnavi talks based on the philosophy and teachings of Rumi, educates people about the Sema and tries to explain what Mevlevi rules and conventions mean (Osman Öksüzoğlu, personal communication, February 23, 2018). And he believes that they are followers of Mevlevi traditions which had been kept alive for more than seven centuries along the path illuminated by Rumi himself (Mevlana Verein e.V., n.d.-b). In this lodge, being a Muslim is the only condition of becoming a follower of Bahn and becoming a member of the foundation. In 2001, the Nuremberg Mevlana Foundation came under the aegis of the International Mevlana Foundation headquartered in Istanbul, and since then it has continued its activities both as a local foundation and as a branch of the international foundation.

The Nuremberg Lodge is located on a rectangular area of approximately 40 square meters (See Figure 1, 2). The upper story of the building is furnished with carpets, and with floor and bench cushions in mostly traditional Ottoman patterns (See in Figure 3, 4). The floor consists of bright and large wooden areas that are suitable for the Sema. During the Sema, the carpets on the floor are removed and the performance takes place on this wooden floor. The sheikh's maqam is located right opposite the door to the room, at one corner of the rectangle. During conversations, dhikr and sema, Süleyman Efendi sits there.

Figure 1, 2. Nuremberg Mevlevi *Tekke* (Individual archive, 2017)

Figure 3, 4. Nuremberg Mevlevi *Tekke* Prayer Room (Individual archive, 2017)

The downstairs consists of two parts. The small part on the right of the entrance is for ablutions and changing clothes. The left part is used as a kitchen, and in some meetings meals are cooked and eaten here (See in Figure 5, 6).

In Mevlevi culture, the kitchen is a sacred place, and it was partly an analogy between cooking a meal and a spiritual journey that allowed rituals to emerge (Gölpınarlı, 1963: 126) (İyiyol, 2014: 591). In the Mevlevi lodges called *Âsitâne* (central Sufi house), the kitchen is the place dedicated to dervishes to undergo a period of spiritual hardship and endurance, where they continue their Mevlevi education and learn relevant rules and conventions (Arpaguş, 2009: 130). Just like the preparation of food and cooking, a dervish is also spiritually 'cooked' and 'matured' here. That is why, according to the Mevlevis, the kitchen is the soul of the Mevlevi lodges (Gölpınarlı, 1983: 396). The Mevlevis use the expressions *matbah* or *matbah-i serif* for the kitchen where they are physically and spiritually fed, as well as the term *somat* for food (Aksoy, Akbulut, & Nurhayat, 2016: 97).

In the Nuremberg Mevlevi *tekke* it is not possible to enact fully this analogy between kitchen culture and spiritual education associated with the *Âsitâne*. The kitchen here is only for cooking and eating. Yet although these traditional rituals practiced in the past are not valid here today, the followers of Bahn state that they know the importance of *matbah* in Mevlevi culture, and accordingly give special importance to the kitchen. They carry out a number of tasks such as preparation of the food, cooking, laying the table and clearing it in cooperation and solidarity.

Figure 5, 6. The Kitchen of the Nuremberg Mevlevi *Tekke* (Individual archive, 2017)

Since the building was not purpose-designed as a Mevlevi *tekke*, there are not rooms such as a harem for the sheikh and his family to stay, rooms for male visitors, sheikh and dervish cells, and a hardship and endurance room. Besides, since the lodge is used only for meetings, neither the sheikh and his family nor the followers live here permanently. Only those followers coming from other cities are accommodated here for a few nights after the meetings, depending on the situation. 1001-day hardship and endurance training, which is a Mevlevi education method, is not practiced here.

Sheikh Süleyman Wolf Bahn

Figure 7. Süleyman Wolf Bahn (Mevlana Verein e.V., n.d.-a)

Süleyman Wolf Bahn has a very interesting life story. He was born into a Catholic family in Austria in 1944 and was named Wolf by his family. Due to the conservative nature of his family, he had a strict religious education on Catholic principles from a very young age. According to him, he had a more religious background than most of his friends due to this education. In 1964 he came to Munich to study at the Academy of Fine Arts (*Akademie der Bildenden Künste*) and studied there with Professor Franz Nagel until his graduation in 1968. During this period, he started moving away from his native religion and began to pose existential questions, and to explore the meaning of *Allah* (Kavaklı, 2013: 12). During this questioning period, he encountered Rumi and interested himself in the Mevlevi order and in the form of Islam promoted by the order. In 1973, he went to Mevlana Museum in Konya both to have a holiday and to find a Sufi teacher. However, Bahn did not know that the Mevlevi *tekke* had been closed and converted to a museum. Yet although he was disappointed to find the *tekke* closed, he met with Süleyman Hayati Dede, who tried to preserve Mevlevi culture and tradition in Konya, during his visit to the Mevlana museum, and with the help of a translator received an education on Mevlevi rules and conventions from him. In 1981, he was ordained by Süleyman Hayati Dede, and in 1995 he received a further Mevlevi ordination from Huseyin Top. He established the Mevlevi lodge (Mevlânâ Verein e.V.) in Nuremberg, Germany in 1991, and initiated teachings based on the Mevlevi order. In 1997, the Masnavi by Rumi, which Bahn translated into German, was published by the O.W. Barth publishing house. This book, published as *Dschalaloddin Rumi – Das Mesnevi*, is the first complete German translation of the *Masnavi*. In 2001, he was appointed as a Mevlevi ambassador of sheikhdom to Germany by Faruk Hemden Celebi Efendi, the president of International Mevlevi

Foundation.

Followers of Sheikh Süleyman Wolf Bahn

Süleyman Wolf Bahn is followed by a group of approximately 40 people, consisting of doctors, engineers, physiotherapists, teachers, and students. The majority of this educated group of women and men are university graduates and they are mostly young or middle-aged. The German population are in the majority in the group, but it also includes Turks and Spaniards. Some of them live in Nuremberg, while some live in other German cities such as Munich, Frankfurt, Hamburg, and Stuttgart. Most of them learned about the Mevlevi order from books, documentaries, conferences, and panels, and then become followers of Bahn and members of the foundation.

Ritual and Music in the Regular Meetings of the Nuremberg Mevlevi *Tekke*

There are two separate cycles for regular meetings in the Nuremberg Mevlevi *Tekke*, one weekly and the other every six weeks. Friday nights are dedicated to the weekly meetings of followers living in Nuremberg. Bahn has two reasons for choosing Friday nights. The first is that Fridays are sacred to Muslims and the other is that Saturdays are holidays, so that people can stay in the lodge until the late hours and follow the ritual. These meetings occur every week with few exceptions. During the summer months, the meetings are held once a month or there may be a break for a while. Followers gather in the lodge for the Friday meetings after five in the evening. The rituals in these meetings are *Masnavi* readings, prayers, dhikr, and *sema*, respectively.

In the Masnavi readings, a four-volume Masnavi *(Dschalaloddin Rumi - Das Mesnevi)*, translated to German by Bahn, is used. A couple of pages from the book are read at each meeting and discussed. The entire conversation based on this four-volume Masnavi took 10 years to complete, at which point Bahn started over again from the first volume.

Figure 8. Masnavi conversations (Mevlana Verein e.V., n.d.-a)

After the Masnavi conversations, the group prays in congregation under the imamate of Bahn in the lodge. And following that they begin the dhikr as a group. The dhikr is performed sometimes in a sitting position and sometimes vocally in a standing position. A specific order including *Estagfirullah*, Word Tawhid (*La Ilaha Illallah*) and 'naming of God' from *Asma-ul Husna* (the 99 names of *Allah*) is followed during the dhikr performed in the lodge. Bahn states that he decides which wordings and names will be in the dhikr and how many times to repeat them. He follows the same order during the dhikr in the meetings and this order very rarely changes. The order of the wordings and 'naming of God' in the dhikr performed in the lodge is as follows: *Estagfirullah*, *La Ilaha Illallah*, *Allah*, *Hay* and *Hu.* Sometimes, *Sema* is also performed at the same time with the dhikr.

After the dhikr, the ritual *Sema* continues. Since there is no musician in the lodge, the *Sema* is performed with the *Mevlevi Âyini* played from a CD. Due to limitations of time, only some parts of the *âyin*, not the whole *âyin*, are played from the recordings, and the *Sema* is performed with these. Bahn also decides which maqam the *Mevlevi Âyin* will use for the *Sema* ceremony. Weekly meetings end with the *Sema* which is a part of the ritual.

The general plan is to gather with the followers from the other cities such as Stuttgart, Frankfurt, Munich, and Dortmund in meetings held on Saturdays every six weeks.[2] The followers living in Nuremberg also attend these meetings. We can see how the ritual proceeds in the meetings held every six weeks from these two e-mails that Bahn sent to his followers:

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[2] These meetings sometimes occur once in two months.

November 11, 2017

10.30 Certain helpers arrive earlier and are scheduled for specific services

11.30 Beginning *Semâ* training (compulsory for all seminaries)

13.00 Eat soup

14.00 Beginning of the meeting

16.00 *Sohbet*

18.00 *Sema*

19.30 Dinner together

20:30 Washing, cleaning the *Dergâh* then night prayer

February 10, 2018

11:00 The Nuremberg Dervishes meet earlier, to prepare the rooms

12:00 *Sema* training for everyone who wants to learn the *sema* better

13:00 last preparations and lunch

14:00 Start of the general meeting: Welcome, Dhikr,

15:00 *Sohbet*

16:00 Annual General Meeting

17:30 dhikr with *Sema*

19:00 Dinner together

21:00 Washing, cleaning the *Dergâh* together, Finally Night prayer.

Ritual and Music in the Day of *Şeb-i Arus*

The death of Rumi is considered not a separation but a reunion. According to the Mevlevi followers, the day he passed away is named *Şeb-i Arus* which means the reunion of two lovers, and it has become a tradition to gather and perform *Mevlevi Âyini* (Gölpınarlı, 1983: 424). This tradition could not be performed for a long time due to prohibition in Turkey, but it started to be performed again in the 1960s. The *Şeb-i Arus* ceremonies held in Konya between 7-17 December every year, together with events such as panels, symposiums and exhibitions held during this week, have been under a conservation order from the State for many years. Besides Konya, in the Istanbul Galata and Yenikapı Mevlevi *tekke*s, with the support of municipalities, charities, foundations and some

private groups, Rumi is commemorated and the shining light of his love and toleration for the world is remembered.

Along with the regular meetings held weekly and every six weeks, The Nuremberg Mevlevi followers get together once a year on this important date of the Mevlevi order. In the past Süleyman Wolf Bahn spent this commemoration week in Konya, but after the Nuremberg Mevlevi *tekke* became active, the followers and visitors in the *tekke* spend the *Şeb-i Arus* week together with some activities there.

The Nuremberg Mevlevi association usually organizes two events during the week of *Şeb-i Arus*. The first of these is the Mevlevi *Sema* Ceremony, which is open to the public in Nuremberg, and is usually held in the concert hall of the AEG cultural center with a capacity of 200 people. A musical group for the performance of the *Mevlevi Âyini* is invited for this event. This group performs the Mevlevi Ayini together with the Whirling Dervishes, consisting of Sheikh Bahn, his followers and visitors. The other event is the program that Bahn makes with his followers in the Nuremberg Mevlevi *Tekke*.

The *Şeb-i Arus* program at the Mevlevi *Tekke* that I attended in 2017 progressed as follows: Süleyman Wolf Bahn and his 25 followers assembled at the Nuremberg Mevlevi *tekke* on 17 December 2017 *Şeb-i Arus* night. Süleyman Wolf Bahn summarized the ritual that would be performed at the commemoration night dedicated to Rumi in his e-mail to the followers:

> *Between 13.00-15.00, we will gather at the Mevlevi lodge and the preparations will start. It is necessary to finish the preparations by 14.30 and to be seated quietly at the place of the ceremony at 15.00. Those arriving after 15.00 will be seated silently after receiving permission. After 15.30, there will not be a tea service and the meditation will start. The meditation will be performed until 16.15 in seated position and silently. Then, dhikr will start. Firstly, it will be silent dhikr, followed by audible dhikr and finally ecstatic dhikr. There will be a break at 17.00 and during the break, there will be tea service with cookies and chocolate. We will have conversations with our friends but taking the importance of the night into account, we should behave discreetly so as not to disturb anybody and not to lose the atmosphere. We will start dhikr again at 18.00. Whirling dervishes must wear the appropriate clothes because we will perform Sema and dhikr at the same time as we have done previously. After completing the dhikr, there will be dinner (Tekke Pilaf) between 19.00 and 19.30.*

The *Şeb-i Arus* night continued in line with the schedule Bahn shared with his followers. I noted here that the ritual included two principal dhikr-based parts. In the first part, meditation and dhikr were performed, and in the second part, without Mevlevi music, *Sema* was performed at the same time with the dhikr.

In the first part, meditation and dhikr were practiced with the transitions from Süleyman Yardım's *Ney Taksimleri & Dervished Music*. The group waited silently with eyes shut in seated position, and with no physical movement during the Meditation which lasted about 45 minutes. No special sitting style like a circle was created for meditation and dhikr either at this time or at the other times when the dhikr was performed. People sat randomly around the four sides of the rectangular room without any limitations or classification. After the meditation, the 'naming of God', using the names *Allah*, *Hay*, and *Hu*, took place with a soft tone of voice in the dhikr, while listening to the *ney* transitions. After the dhikr, a woman whirling dervish read *Aşr-ı Şerif*, ten surahs from the Quran. And then surah *Al-Fatihah* was given by the sheikh. The *Salawat* was read loud by a group but *Fatiha* was read silently. This part ended with the Mevlevi *Gülbank*[3] read by Bahn. The dhikr here was performed on a single voice within syllable-timed rhythm.

During the break, the carpet on the floor was removed to create space for the *Sema*. Sheepskin rugs were put right opposite the sheikh, and three women and one man (whirling dervishes), all with their *sema* costumes, took their places on the rugs. This part consisted of dhikr, *sema* and the congregational night prayer.

The *Sema* and dhikr performed in this part of the ritual occurred in two different ways. Firstly, the group accompanied the dhikr and hymns played from the CD called *Orunç Güvenç & Tümata: Ocean of Remembrance Sufi Improvisations and Zhikrs.* The *Sema* and dhikr were performed at the same time that night when no Mevlevi music was played either live or on tape (See in Figure 9-12). The whirling dervishes performed the *Sema* in groups of two on sheikh Bahn's signal since the area was not spacious. First, these four

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[3] *Gülbank* is the name of the arranged prayers. These are the prayer texts written for wishing goodness and auspiciousness of work, health, well-being, and success, and also for begging and pleading with *Allah* with stereotyped expressions. There are different *Gülbank*s in the Mevlevi order. *Gülbank* read by Süleyman Wolf Bahn is as follows: *Allah, Allah, Allah, Allah, Allah, Allah vakti şerifler hayrola, hayırlar feth ola, şerler def ola. Allah-ı Azim-i şanın ismi ile kalbimiz tahir, mütahir pak ola. Demler sefalar müjdat ola, Kulübü aşıkan baki şadu handan ola. dem-i hazret-i Mevlana, sırrı cenab-ı şemsi tebrizi keremi imam-ı Ali şefaati Muhammedin resulullahi nebi huuu…* See (Uzun, 1996).

whirling dervishes, complete with *Sema* costumes, started performing the *Sema*, followed by 8 followers from the group which Bahn signaled during the dhikr. The other eight dervishes in the Sema were not in Mevlevi costumes (*tennure*, *hırka* or *sikke*), but instead in their everyday clothes. In the dhikr, following the recording, *Bismillahirrahmanirrahim* (Basmala), *La ilahaillallah* (the word of Tawhid/*shahada,* "there is no God but God"), *Allah* (Name of the God) and *Elhamdulillah* were named.

Figure 9, 10. Sema in Nuremberg Mevlevi *Tekke* (Individual archive, 2017)

Figure 11, 12. Sema in Nuremberg Mevlevi *Tekke* (Individual archive, 2017)

After the dhikr, the CD player was stopped and the group continued the dhikr aloud with the guidance of sheikh Bahn. In this part, the wordings and naming of God, *Elhamdülillah*, *Allah, Hay*, *Hayyul Kayyum Allah* and *Hu*, were mentioned in the dhikr. Following that, *Aşr-ı Şerif*, *Fatiha*, *Takbir*, *Salawat*, *Surah Al-Fatihah*, *Surah Al-Ikhlas* (3 times) were read and after that sheikh Bahn read the Mevlevi *Gülbank*.[4] Finally, the group performed the Night

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[4] *Gülbank* (Sheikh Efendi reads)
Vakt-i şerifler hayrola, Hayırlar fethola, Şerler defola
Kulüb-ı âşıkan güşâd ola. Demler, safâlar ziyâde ola,
Dem-i Hazret-i Mevlâna, sırr-ı cenâb-ı Şems-i Tebrizi ,
kerem-i İmâm-ı Ali Şefaâti Muhammed-i nebi
hu diyelim!

prayer together. After the prayer, the group ate traditional *Tekke Pilaf* in the kitchen and the night ended there.[5] Note transcription of the Salawat read with the wordings and Names of *Allah* in the dhikr is as follows:

Yürük Semai

♩ = 64

Bis mil lah⸺ hir rah ma⸺ nir ra⸺ him

Figure 13. Transcription of Dhikr- *Basmala* (Transcribed by Osman Öksüzoğlu)

Sofyan

♩ = 70

La i la he il lal lah La i la he il lal lah

Figure 14. Transcription of Dhikr- *Word Tawhid* (Transcribed by Osman Öksüzoğlu)

Nim Sofyan

Al lah Al lah Al lah Al lah
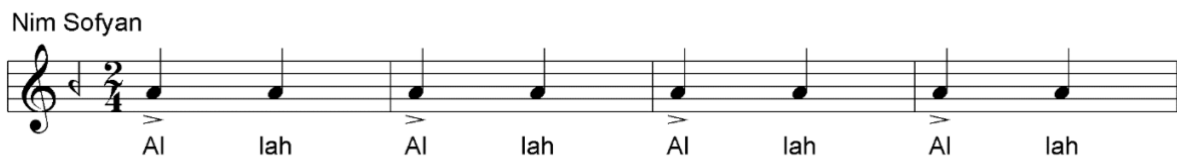
Figure 15. Transcription of Dhikr- *Allah* (Transcribed by Osman Öksüzoğlu)

El ham dü lil lah El ham dü lil lah

Figure 16. Transcription of Dhikr- *Elhamdülillah* (Transcribed by Osman Öksüzoğlu)

Nim Sofyan

Hay Hay Hay Hay

Figure 17. Transcription of Dhikr- *Hay* (Transcribed by Osman Öksüzoğlu)

(Altogether) huuuuuu.

[5] Gölpınarlı stated that this pilaf, made of chickpeas, onions, carrots, chestnuts and fatty meat, was originally Belh - Uzbek pilaf and has become a tradition since Rumi's time (Gölpınarlı, 1983: 416-417).

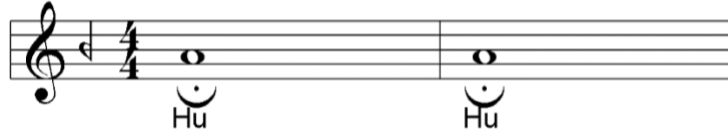**Figure 18.** Transcription of Dhikr- *Hayyul Kayyum Allah* (Transcribed by Osman Öksüzoğlu)

Figure 19. Transcription of Dhikr- *Hu* (Transcribed by Osman Öksüzoğlu)

Figure 20. Transcription of Salawat (Transcribed by Osman Öksüzoğlu)

Music and Musicians in the Nuremberg Mevlevi *Tekke*

Despite the fact that there is a very intense training in Sema in Nuremberg, there is no training or activity in terms of Mevlevi music, which is an inseparable part of Sema. Here, it is not possible to see the performers of the traditional instruments such as *ney*, *kudum*, and *rebab*, which are identified with the Mevlevi order and are considered indispensable instruments of Mevlevi music. There are scarcely any musicians among the regular visitors of the *tekke*. I saw only one person with musical connections in the meetings I followed. This woman, a regular attendant of the *tekke* and both a singer and guitarist, is a music teacher, and has a professional interest in music. As well as being a whirling dervish, she sometimes accompanies the dhikr and hymns with the dhikr on *bendir* at the meetings here. However, as there is no training in Mevlevi music no one performs this music. In addition, Bahn has stated that there is a follower living in Munich who is a *ney* performer, and sometimes accompanies them on *Ney* when they perform the Sema by listening to the Mevlevi *Âyin* from the tape. These are the only two musicians.

There is an important question here: how do they perform the *Sema* if there is no musician in the *tekke*? And how do they prepare for these ceremonies? At this point, the

Nuremberg Mevlevi followers make use of technology and they provide the ritual music on a CD player. Thus, they try to fill the musical deficiency by making use of current records during Sema and dhikr. Before public Sema ceremonies at the cultural centers, the Mevlevi *Âyin* to be performed is played on the CD player and they rehearse for the ceremony by practicing Sema with this recording. In the past Sema ceremonies without musicians were performed with the Mevlevi *Âyin* records played from a CD player. Today, musicians are invited to these ceremonies to perform Mevlevi *Âyin* for a fee. They rehearse the Mevlevi *Âyin* in the *makam* to be performed among themselves separate from the whirling dervishes. Later on, the dervishes and musicians come together in the concert hall and perform the ceremony together. Although these musicians perform Mevlevi music, they are not members of Nuremberg Mevlana Association or any Mevlevi group.

It is a major concern for the group that they do not have musicians in the *tekke*; because of this, they cannot create their own music group and have to invite musicians to perform in Sema ceremonies for a fee! Süleyman Wolf Bahn states this situation in his article called *The Mevlevi Order in Germany Today* as follows:

> *[...]In the meantime, we have a big Sema group now. Sometimes we perform Sema in official places. This usually happens in dialogue meetings. Unfortunately, we are in need of musicians who perform for a fee and do not belong to our organization. We hope to have our own music group (Mutrib Committee) soon* (Şimşekler *& Bayru, 2012: 72*).

Although as of the time of writing it has been 11 years since this statement, there is still no music group here. There may be different reasons for this, such as the absence of the Turkish musicians in this area, or the fact that musicians do not want to participate in such religious groups.

In addition to this, the Nuremberg Mevlevi followers perform some of the *Sema* ceremonies in several places in Germany which have a Turkish music association. These performances are either the common activity of two different associations or an activity to which the Nuremberg Mevlevi association has been invited. In these common ceremonies, the Sema is performed by the Nuremberg Mevlevi followers but the Mevlevi *Âyin*/music is performed by the choir of the other association. Professional musicians from Turkey are sometimes invited to these common ceremonies of the associations.

Again, the whirling dervishes make their preparations in the lodge before the ceremony with the CD recording of the *Âyin* to be performed.

For instance, in 2018, the Nuremberg Mevlevi *Tekke* organized two events with other associations. Three different groups united for the Sema ceremony performed in the first part of the concerts named *Aşka Davet*, organized by the Stuttgart Turkuaz association in Stuttgart and Augsburg on February 23 and 25. The event included six professional instrumentalists from the Ministry of Culture and Tourism of the Republic of Turkey, the amateur choir of Germany Turkuaz Foundation consisting of ten women and eight men, and two instrumentalists and seven whirling dervishes from the Nuremberg Mevlana Association under the leadership of Süleyman Wolf Bahn. The Nuremberg Mevlevi *tekke* followers performed a Sema ceremony in the first part of the concert, which included the *Hüzzam Mevlevi Âyin* (See in Figure 20, 21).

Figure 20, 21: *Sema* Ceremony, Stutgart (Individual archive, 2018)

In this part were performed the *Hüzzam* Mevlevi *Âyin* of *Naat*, the first *Taksim*, *Peshrev*, Salute to the Post, the First *Selam*, the Second *Selam*, the Third *Selam*, the Fourth *Selam*, the *Niyaz Ilahisi*, the Last *Taksim*, *Aşr-ı Şerif* (Quran recitation) and the Post prayer, in accordance with the tradition.

In the archives of the *tekke*, there are the *Mevlevi Âyin of Ferahfeza, Hüzzam*, and *Suzidilara* which they listen to during the *Sema* ceremonies. The recordings of the *Mevlevi Âyins of Ferahfeza* by Ismail Dede Efendi and *Suzidilara* by Selim III were made by the Konya Turkish Sufi Music Choir, sponsored by the Ministry of Culture and Tourism. The *Hüzzam Mevlevi Âyin* composed by Ismail Dede Efendi and performed by Kani Karaca was produced by Uluçınar Music under the artistic direction of Gürsel Koçak in 2000. Besides

these *Âyin* albums, the CDs they listen to during the *Sema*, dhikr, and therapy at the *tekke* are: *Ney Taksimleri & Dervished Music* by Süleyman Yardım, an anonymous album consisting of ney transitions by Sadreddin Özçimi, the CD named *Orunç Güvenç & Tümata Ocean of Remembrance Sufi Improvisations and Zhikrs* and *Zikir İlahileri* Sufi Music Concert recording performed at the 9th Konya Mystic Music Festival by the Ministry of Culture Konya Turkish Sufi Music Ensemble.

Conclusion

Mevlevi *Sema* and Mevlevi music are considered the most important elements of the ritual in Mevlevism. As a result of this study, it was understood that although an intense *Sema* training is given in the Nuremberg Mevlevi *tekke*, there is no musical training, since there is nobody to perform a *Mevlevi Âyin*. The music during the Sema is played from a *Mevlevi Âyin* CD recorded in Turkey. For the Sema organizations in other places, a music group is invited to perform *Mevlevi Âyin* for a fee.

Apart from Sema there is another type of dhikr in Mevlevi tradition that is the 'naming of God' (*Allah*) ritual. Traditionally this usually took place after morning prayers (Gölpınarlı, 1983: 411). Although there is no other type of dhikr apart from these two, the Nuremberg *Tekke* uses also the words of Tawhid (*La ilahe illallah*), *Estagfirullah* and other names of God (*Hay, Hu, Hayyul Kayyum Allah*) for dhikr. This kind of dhikr you can usually find in other tariqas, such as the Qadiri or Rifai and Jarrahi, but not in traditional Mevlevism (Feldman, 1992: 196).

It has to be pointed out that in the Nuremberg lodge the Sema is also performed during the dhikr (*La ilahe illallah, Hay, Hu, Hayyul Kayyum Allah*, etc.). In the Mevlevi tradition, Sema is performed only with Mevlevi music, so this dhikr and *sema* are never performed at the same time. It is not customary in the Mevlevi tradition to combine a loud dhikr with *sema*. Moreover, dhikr as a separate mystical performance is not a general practice. This is a new type of dhikr together with *sema* for Mevlevism, which can be found not only in the Nuremberg lodge but also in Turkey (to my knowledge only in Yalova with the Orunç Güvenç *Tümata* group). It is understood from this that when the Mevlevi tradition is followed in the culture of a different country, it may have such additions, changes and transformations, and other departures from tradition.

In the end, I understood that there is no training on Mevlevi music for several reasons.

Sheikh Süleyman wants to encourage musicians to perform Mevlevi music during *Sema*, but is not able to do it mainly because of the lack of musicians capable of playing Mevlevi music. Therefore, he either uses CDs or invites external music groups for the ritual.

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Artificial Intelligence and the Integration of Industrial Revolution 6.0 in Ethnomusicology: Demands, Interventions, and Implications

ABSTRACT

This paper focuses on the integration of Artificial Intelligence (AI) and Industrial Revolution 6.0 in ethnomusicology, which is the study of music from diverse cultures. The challenges facing researchers in ethnomusicology necessitate the use of AI, which can aid in analyzing, transcribing, and preserving musical traditions. Furthermore, AI can be utilized to generate new musical compositions that integrate elements from various musical traditions. Meanwhile, the Industrial Revolution 6.0 technologies, such as AI, can facilitate the preservation and distribution of musical traditions, cross-cultural understanding, and new forms of music education through virtual reality and immersive experiences. However, the integration of these technologies also raises concerns about cultural exploitation and the authenticity of musical traditions. This study aims to examine the demands, interventions, and implications of AI and Industrial Revolution 6.0 in ethnomusicology, emphasizing the need for a collaborative and culturally sensitive approach that addresses ethical considerations, handles bias and accuracy, and balances AI with traditional methods of music analysis and interpretation. Ultimately, the study suggests that practitioners and researchers must approach the demands of AI and Industrial Revolution 6.0 with caution, consideration, and a spirit of collaboration in order to realize their potential advantages for ethnomusicology while avoiding ethical and cultural pitfalls.

Introduction

Ethnomusicology is the study of music from different cultures, with a focus on understanding the cultural and social context in which the music is created, performed, and consumed. With the rise of the fourth industrial revolution, the integration of Artificial Intelligence (AI) into various fields has become a crucial aspect of research and development (Al Momani et al., 2021; Joshi et al., 2023). In the context of ethnomusicology, the integration of AI can facilitate the analysis and interpretation of music from different cultures, providing new insights and opportunities for cross-cultural understanding (Seeger, 2004). This paper will explore the demands, interventions, and implications of AI and the integration of Industrial Revolution 6.0 in ethnomusicology. The demands for AI in ethnomusicology can be understood in the context of the challenges faced by researchers in the field. Ethnomusicology involves the analysis of music from different cultures, which often have unique characteristics and structures that may be difficult to interpret and understand. Additionally, many musical traditions are oral and do not have a notated form, making it challenging to preserve and study them. Therefore, there is a demand for AI to assist in the analysis, transcription, and preservation of musical traditions (Seeger, 2004).

One intervention that AI can make in ethnomusicology is the development of software and tools that can analyze and transcribe music automatically. For example, AI-based software can analyze the acoustic properties of a musical recording and automatically identify pitches, rhythms, and other musical features. This can facilitate the analysis and interpretation of the music and provide new insights into the structure and 'meaning' of the music (Trinity College Dublin, 2021; Zhang et al., 2022). Additionally, AI can be used to transcribe oral musical traditions, which can be challenging to reproduce using traditional music notation. Another intervention that AI can make is the development of virtual reality, enabling users to have an immersive experience of music from different cultures (Magnimind, 2019). Virtual reality can provide a more interactive experience, allowing users to explore the cultural and social context in which the music is created and performed (Mahmoud, 2023). This can facilitate cross-cultural understanding and provide a new way of experiencing music that is not possible with traditional media (Marr, 2021).

The integration of Industrial Revolution 6.0 in ethnomusicology has several implications for the field. Industrial Revolution 6.0, also known as Industry 4.0, refers to the integration of new technologies such as AI, robotics, and the Internet of Things into the manufacturing process. In the context of ethnomusicology, the integration of Industry 4.0 technologies can facilitate the preservation and dissemination of musical traditions. One implication of Industry 4.0 in ethnomusicology is the potential it creates for new forms of music production and dissemination. For example, AI can be used to generate new musical compositions that incorporate elements from different musical traditions. This can facilitate cross-cultural collaboration and provide new opportunities for musical innovation. Additionally, Industry 4.0 technologies can facilitate the distribution of music to a global audience, allowing for the preservation and dissemination of musical traditions that might otherwise have been lost.

Another implication of Industry 4.0 in ethnomusicology is its potential for the development of new forms of music education. Virtual reality and immersive experiences can provide a more engaging and interactive way to teach music from different cultures. Additionally, AI-based software can provide personalized music instruction, allowing students to learn at their own pace and with directly targeted feedback. This can facilitate the dissemination of musical traditions and provide new opportunities for cross-cultural understanding. However, the integration of Industry 4.0 technologies in ethnomusicology also raises concerns about the potential for cultural appropriation and exploitation (Cassar, 2023). For example, the use of AI to generate new musical compositions or to transcribe oral musical traditions can raise questions about ownership and authenticity. Additionally, the use of virtual reality and immersive experiences to teach music from different cultures can raise concerns about the commodification of culture and the potential for cultural exploitation (American University, 2019).

Theoretical Frameworks

This study is anchored by five theories on the demands, interventions, and implications of artificial intelligence and the integration of Industrial Revolution 6.0 in ethnomusicology, as follows:

Technological Determinism

This theory suggests that technology shapes and influences social, cultural, and economic

systems (Magnusson, 2019). It could be applied to the integration of AI and Industry 4.0 technologies in ethnomusicology by exploring how these technologies shape the way music is created, produced, and disseminated.

Cultural Appropriation

This theory addresses the power dynamics between dominant and marginalized cultures, and the ways in which dominant cultures often appropriate and exploit cultural practices from marginalized cultures (Cuncic, 2022; Roche & Burridge, 2022). It could be used to explore how far such appropriation and exploitation might be furthered by the capacity of AI and Industry 4.0 technologies to transcribe and generate music from different cultures.

Cross-Cultural Communication

This theory focuses on the challenges and opportunities of communication between individuals and groups from different cultures (Merkin, 2017). It could be applied to the use of virtual reality and immersive experiences to facilitate cross-cultural understanding and communication in ethnomusicology.

Postcolonial Theory

This theory examines the legacies of colonialism and imperialism and their ongoing impact on cultural practices, identities, and power structures (Lahiri-Roy & Belford, 2021). It could be used to explore the ways in which the integration of AI and Industry 4.0 technologies in ethnomusicology may reproduce or challenge colonial power dynamics and hierarchies.

Actor-Network Theory

This theory emphasizes the interconnectedness and agency of both human and non-human actors in shaping social and technological systems (Bartels & Bencherki, 2020; Nickerson, 2023). It could be applied to the integration of AI and Industry 4.0 technologies in ethnomusicology by examining the ways in which different actors (such as researchers, musicians, software developers, and AI algorithms) interact and shape the use and impact of these technologies.

Statement of the Problem

This study set out to examine the demands, interventions, and implications of artificial intelligence and the integration of Industrial Revolution 6.0 in ethnomusicology. More specifically, it sought to answer the following questions:

1. What are the demands and interventions of artificial intelligence in ethnomusicology?

2. What are the demands and interventions of Industrial Revolution 6.0 in ethnomusicology?

3. What are the difficulties posed by using artificial intelligence to integrate the Industrial Revolution 6.0 in ethnomusicology?

4. How can the demands of artificial intelligence be nurtured to address the demands of Industrial Revolution 6.0 in ethnomusicology?

5. What are the implications of the demands of artificial intelligence and Industrial Revolution 6.0 in ethnomusicology?

The Demands and Interventions of Artificial Intelligence in Ethnomusicology

The demands of artificial intelligence (AI) in ethnomusicology can be broadly categorized into three areas: (a) music transcription, (b) music analysis, and (c) music generation.

Music Transcription

One of the key demands of AI in ethnomusicology is its capacity to transcribe music from different cultures quickly and accurately (Bates, 2016). Traditional methods of music transcription can be time-consuming and labor-intensive, requiring a high level of expertise and specialized knowledge. AI tools can be used to make automatic transcriptions of audio recordings into sheet music or MIDI files, making it easier for researchers to study and analyze different musical traditions. This can include transcribing music that is complex, polyphonic, or makes use of non-Western scales and tonalities.

Music transcription, which is the process of converting audio recordings of music into written form, can be a useful tool in ethnomusicology. As one of the demands of artificial

intelligence, music transcription can be addressed in ethnomusicology in several ways, including (Benetos et al., 2018; Roads, 1980): (a) Developing transcription tools: Ethnomusicologists can work with computer scientists and engineers to develop transcription tools that are specifically designed to transcribe music from different cultures and traditions. These tools can be developed using machine learning algorithms to recognize and transcribe different types of music. (b) Improving accuracy: Ethnomusicologists can use AI-based transcription tools to improve the accuracy of their transcriptions. AI-based tools can recognize patterns and structures in music that may be difficult for humans to detect, resulting in more accurate transcriptions. (c) Standardizing notation: Ethnomusicologists can work to develop a standardized notation system that can be used to transcribe music from different cultures and traditions. This can help to facilitate communication and analysis across different cultures and traditions. (d) Collaborating with musicians: Ethnomusicologists can collaborate with musicians from different cultures and traditions to develop transcription tools that are tailored to their specific needs. This can help to ensure that the tools are accurate and culturally sensitive. (e) Building databases: Ethnomusicologists can build databases of transcribed music that can be used for analysis and comparison across different cultures and traditions. These databases can be used to study musical patterns and structures and to develop new insights into the ways in which music is created and performed.

For example, in Figure 1 and 2, an ethnomusicologist is studying the traditional polyphonic vocal music of the Aka people in Central Africa, which is known for its complex interlocking vocal patterns and its use of non-Western scales. Transcribing this music manually is extremely challenging due to its polyphonic nature and unique tonalities. This concrete example demonstrates how AI can revolutionize music transcription in ethnomusicology by automating the transcription process, improving accuracy, and creating standardized notations. By developing specialized tools, collaborating with musicians, and building comprehensive databases, ethnomusicologists can gain deeper insights into complex musical traditions like those of the Aka people. AI not only makes the transcription process more efficient but also enhances the ability to study and preserve diverse musical cultures.
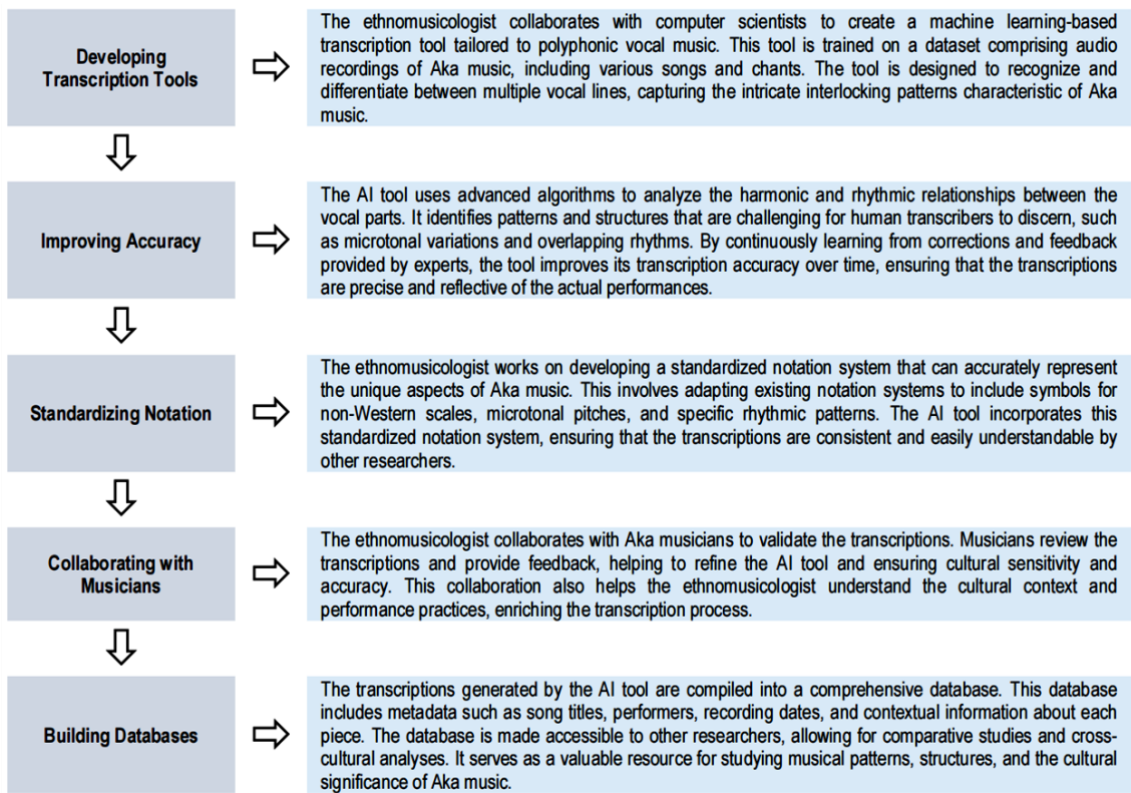
Figure 1. Music Transcription Step-by-Step AI Application

Figure 2. Music Transcription Concrete Example

Ethnomusicologists can address the demand for music transcription in AI by developing tools, improving accuracy, standardizing notation, collaborating with musicians, and building databases. These approaches can facilitate the study of music from different cultures and traditions and gain a deeper understanding of the ways in which music is created and performed.

Music Analysis

AI can also be used to analyze and categorize different types of music from around the world (Hong et al., 2022). For example, machine learning algorithms can be trained to recognize different rhythmic patterns or melodic structures, allowing researchers to understand better how different musical traditions are constructed and how they relate to each other. This can include analyzing music that is traditionally aurally transmitted rather than notated, or music that uses unique tuning systems.

Music analysis is a critical dimension of ethnomusicology, which is the study of music in its cultural context. The following are some methods by which music analysis can be addressed in ethnomusicology (Ajibade et al., 2022; Panteli et al., 2018): (a) Feature Extraction: The first step in music analysis is to extract relevant features from the audio signal. Ethnomusicologists can use machine learning algorithms to identify and extract features that are relevant to their research questions. These features could include rhythmic patterns, melodic contours, harmonic structures, and other aspects of the music. (b) Pattern Recognition: Once the relevant features have been extracted, ethnomusicologists can use machine learning algorithms to identify patterns in the music. For example, they could use clustering algorithms to group similar pieces of music together based on their rhythmic patterns or melodic contours. (c) Cross-Cultural Comparison: Ethnomusicologists often study music from different cultures and regions. Machine learning algorithms can be used to compare and contrast different musical styles and traditions. For example, they could use classification algorithms to identify the differences between different types of music from different regions. (d) Visualization: Machine learning algorithms can be used to generate visualizations of musical data. Ethnomusicologists can use these visualizations to explore patterns in the music and to communicate their findings to others.

For example, in Figure 3 and 4, imagine an ethnomusicologist researching the traditional music of the Ewe people from Ghana and the Javanese gamelan music from Indonesia. These two musical traditions are culturally rich and have distinct musical characteristics. This concrete example illustrates how AI can be applied in ethnomusicology to analyze and compare different musical traditions. AI helps researchers gain deeper insights into the structural and cultural aspects of music from around the world by extracting features,

recognizing patterns, enabling cross-cultural comparisons, and creating visualizations.
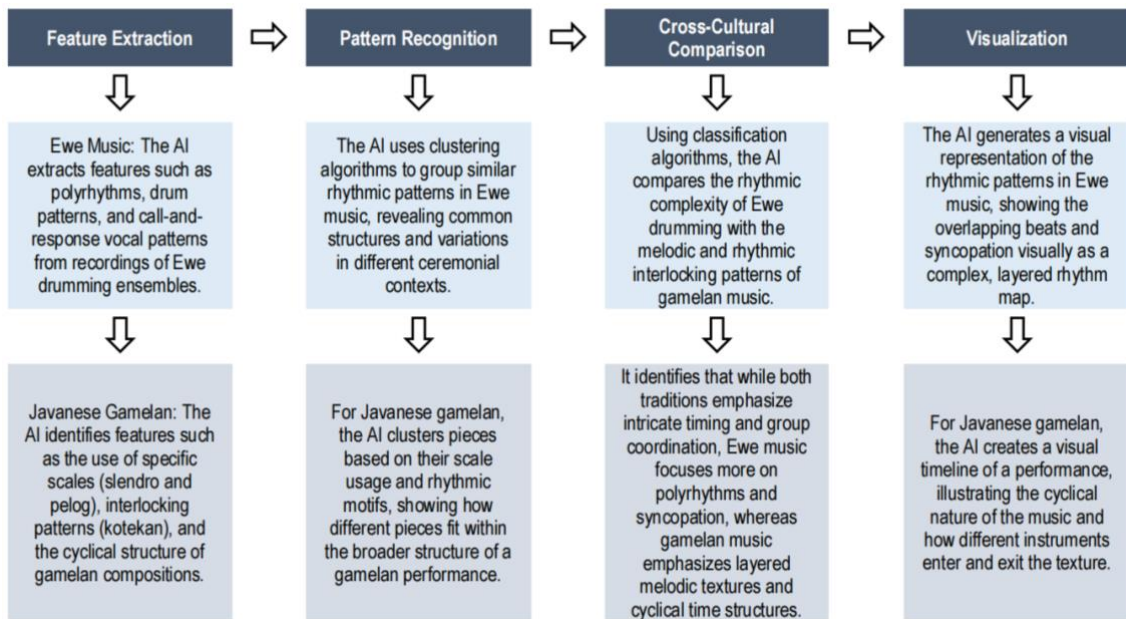
Figure 3. Music Analysis Step-by-Step AI Application

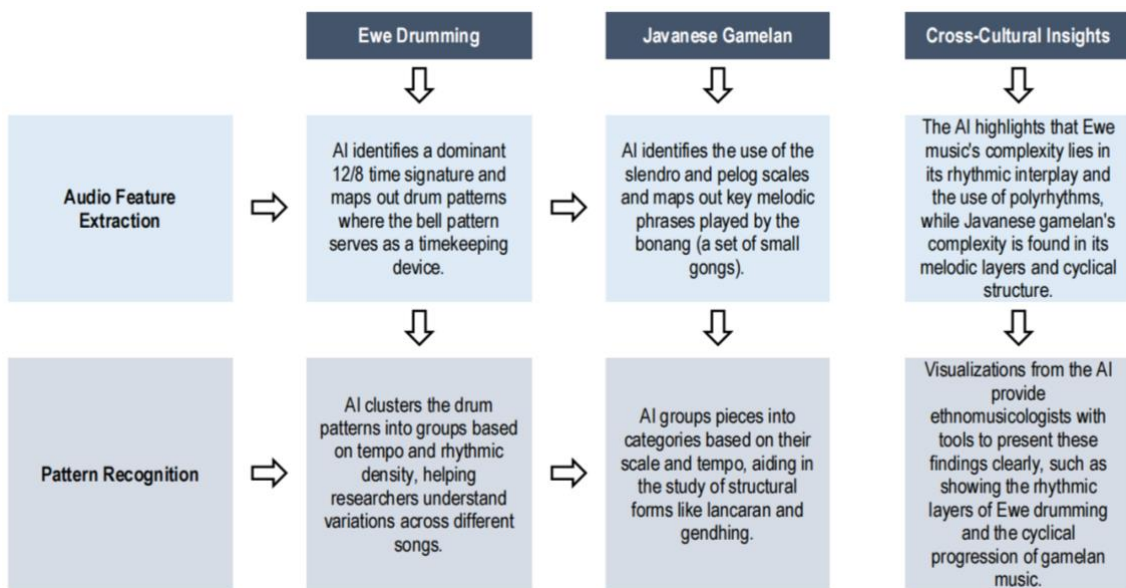**Figure 4.** Music Analysis Concrete Example

The use of artificial intelligence and machine learning techniques can provide powerful tools for music analysis in ethnomusicology. However, it is important to remember that these techniques are only as good as the data to which they are applied, and ethnomusicologists must be careful to use appropriate methods and interpret the results with care.

Music Generation

Another demand of AI in ethnomusicology is the ability to generate new music that is inspired by or incorporates elements from different musical traditions (Blackwell et al., 2012). AI algorithms can be trained on large datasets of music from different cultures and used to generate new compositions that blend elements from different styles and traditions. This can include creating music that is stylistically consistent with a particular culture or region, or generating new musical fusions that combine elements from multiple musical traditions.

Music generation is an exciting area of research in artificial intelligence that has many potential applications in ethnomusicology. The following are some interventions that music generation can make in ethnomusicology (Balato et al., 2023; Rice, 2017): (a) Data Collection: Ethnomusicologists can collect large datasets of music from different cultures and regions to train machine learning models. The data can include audio recordings, sheet music, and other relevant information. (b) Style Transfer: Machine learning algorithms can be used to generate new music that is stylistically similar to existing pieces of music. This can be used to explore the influence of different musical traditions on each other and to create new pieces of music that are inspired by different cultures. (c) Improvisation: Ethnomusicologists can use machine learning algorithms to generate musical improvisations that are inspired by different cultures and traditions. This can help us to explore the creative potential of different musical styles and to generate new ideas for musical composition. (d) Collaboration: Ethnomusicologists can work with machine learning algorithms to create new musical collaborations between different musicians from different cultures. For example, a machine learning algorithm could generate a musical accompaniment that is inspired by one tradition while a musician improvises a melody that is inspired by another tradition.

For example, in Figure 5 and 6, an ethnomusicologist is studying the musical traditions of both Indian classical music of the Carnatic tradition and traditional Irish folk music. The goal is to create new musical pieces that blend elements from both traditions, exploring the creative potential of AI in generating cross-cultural music. This concrete example illustrates how AI can be employed in ethnomusicology to generate new, cross-cultural musical compositions. By collecting extensive datasets, utilizing style transfer, enabling

improvisation, and fostering collaboration, AI helps create innovative musical pieces that blend elements from different traditions. Such endeavors not only expand the creative possibilities in music but also promote greater cross-cultural understanding and appreciation. However, it remains essential to ensure the accuracy and cultural sensitivity of the AI-generated music by carefully curating the training data and interpreting the results thoughtfully.
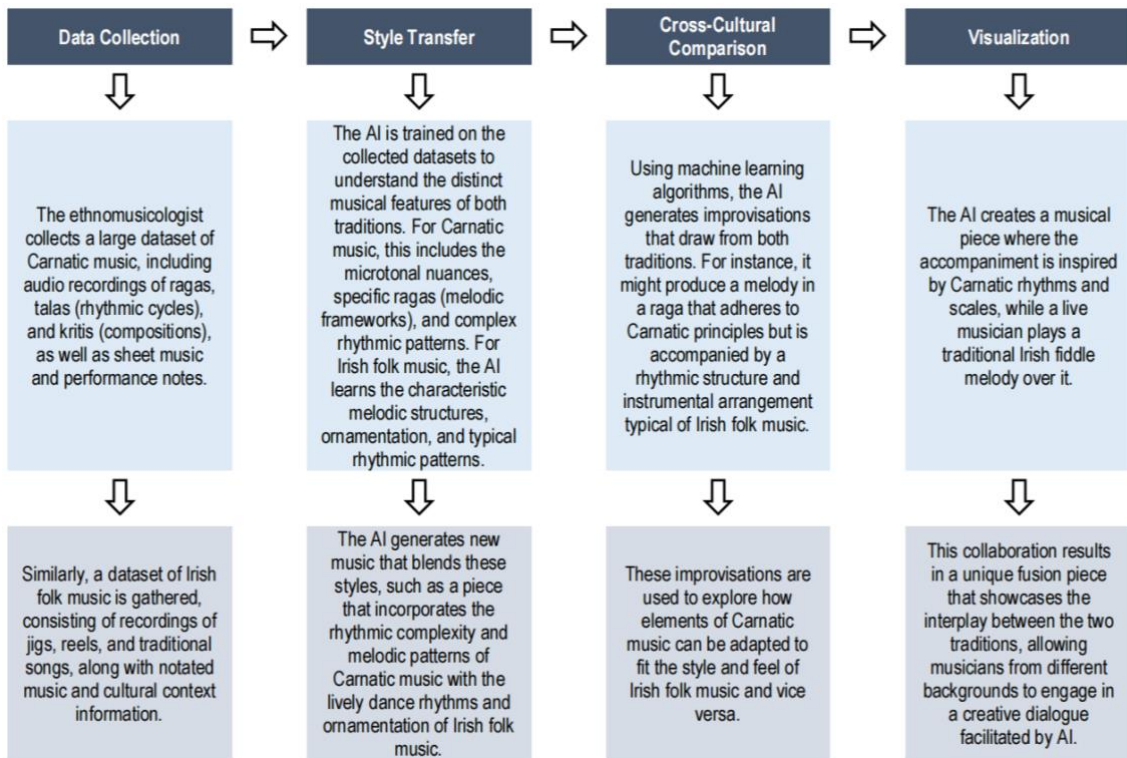

Figure 5. Music Generation Step-by-Step AI Application
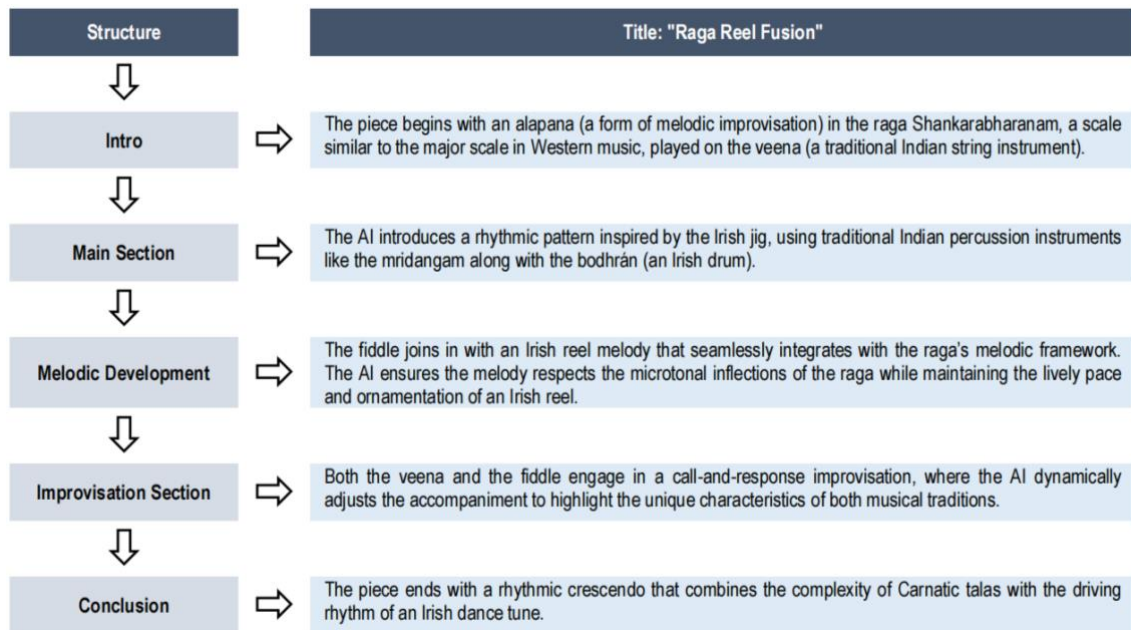
Figure 6. Music Generation Concrete Example

Music generation is a powerful tool for exploring the creative potential of different musical traditions and for generating new ideas for musical composition. However, it is important to remember that machine learning algorithms are only as good as the data to which they are applied, and ethnomusicologists must be careful to use appropriate methods and interpret the results with care. Thus, the demands of AI in ethnomusicology are focused on making music from different cultures more accessible, understandable, and engaging for researchers, musicians, and audiences around the world. While there are certainly challenges and ethical considerations that need to be addressed when using AI in this way, the potential benefits are significant and could help to promote greater cross-cultural understanding and appreciation of music from around the world.

The Demands and Interventions of Industrial Revolution 6.0 in Ethnomusicology

The demands of Industrial Revolution 6.0 in ethnomusicology are focused on the integration of new technologies and digital platforms to promote cross-cultural understanding, preserve cultural heritages, and facilitate collaboration between musicians and researchers. The following are some of the demands of Industrial Revolution 6.0 in ethnomusicology: (a) digital archiving, (b) online collaboration, (c) virtual reality and immersive experiences, (d) digital tools for music analysis, and (e) social media.

Digital archiving

The ability to create digital archives of music from different cultures is a key demand of Industrial Revolution 6.0 in ethnomusicology (Furste, 2017). This involves creating high-quality digital recordings of traditional music, as well as digitizing existing analog recordings to make them more widely accessible. Digital archiving allows researchers to access and study traditional music from different cultures and helps to preserve cultural heritage for future generations (Kantaros et al., 2023).

Digital archiving is an important aspect of preserving and promoting the cultural heritage of a community or group. In ethnomusicology, digital archiving can be addressed through various means, including (Landau & Topp Fargion, 2012; Treloyn & Emberly, 2013): (a) Building digital archives: Ethnomusicologists can collaborate with local communities to build digital archives of their music, dance, and other cultural expressions. These archives can be made accessible to scholars and the general public, thus promoting the preservation and dissemination of cultural heritage. (b) Digitizing existing collections: Many ethnomusicology collections are already in existence in various media, including audio recordings, photographs, and field notes. Ethnomusicologists can digitize these collections to make them more accessible to researchers and the public. This can involve transferring analog recordings to digital formats, or scanning photographs and field notes. (c) Developing metadata standards: Metadata standards are essential for organizing and describing digital collections, enabling users to search and retrieve relevant materials. Ethnomusicologists can develop metadata standards that are specific to their field, taking into account the particularities of musical traditions and cultural expressions. (d) Promoting open access: Ethnomusicologists can advocate for open access to digital archives, allowing scholars and the public to freely access and use these materials. This can foster collaboration, exchange, and innovation in the field of ethnomusicology.

Digital archiving can play a crucial role in ethnomusicology by helping to preserve and promote the cultural heritage of diverse communities, facilitating research and collaboration, and fostering public engagement and appreciation for musical traditions and cultural expressions.

Online collaboration

The ability to collaborate online with musicians and researchers from around the world is another demand of Industrial Revolution 6.0 in ethnomusicology (Tofalvy & Koltai, 2021). Online collaboration platforms such as Skype, Zoom, and Google Hangouts allow musicians and researchers to work together in real-time, regardless of their geographic location. This can facilitate cross-cultural collaboration and the sharing of knowledge and expertise between different communities.

Online collaboration can be addressed in ethnomusicology in various ways (Khulusi et al., 2020). One approach is through virtual research environments and digital platforms that allow for collaborative work among researchers, musicians, and other stakeholders in the field. These digital platforms can facilitate communication, data sharing, and collaboration among researchers and musicians across different geographic locations. One example of such a platform is the Smithsonian Folkways' Global Sound Archive, which provides access to more than 50,000 tracks from around the world and allows for collaborative editing, tagging, and commenting by researchers and musicians. Another example is the Collaborative Online Digital Audio Library (CODA), which allows for the collaborative creation of digital audio collections that can be used for research and teaching (Kantaros et al., 2023).

Additionally, online collaboration can be addressed through virtual conferences, workshops, and seminars that allow for researchers and musicians from different parts of the world to come together and share their work (Hacker et al., 2020). These virtual events can also incorporate interactive features such as live chat rooms, breakout sessions, and virtual performances. Furthermore, online collaboration can be addressed through the use of social media platforms such as Facebook and Twitter, which allow for researchers and musicians to connect and share information and resources. Online discussion forums and mailing lists can also facilitate collaboration among researchers and musicians with shared interests in particular topics or regions. Online collaboration can be addressed in ethnomusicology through the use of digital platforms, virtual conferences and workshops, social media, and other online communication tools that enable collaboration and information sharing among researchers, musicians, and other stakeholders in the field.

Virtual reality and immersive experiences

The use of virtual reality and immersive experiences is another demand of Industrial Revolution 6.0 in ethnomusicology (Yin et al., 2021). Virtual reality headsets can be used to create immersive environments where users can explore different cultural contexts and listen to music from around the world in a more interactive and engaging way. This can help to promote greater cross-cultural understanding and appreciation of music from different cultures.

Virtual reality and immersive experiences offer a unique opportunity for ethnomusicologists to engage with music and culture in innovative ways (Ajibade et al., 2023; Bravo et al., 2022; Prasad & Roy, 2017). The following are a few methods by means of which virtual reality and immersive experiences can be addressed in ethnomusicology: (a) Preservation and access to cultural heritage: Virtual reality technology can be used to recreate cultural heritage sites and experiences, such as traditional music performances or ceremonies. This can provide a new way for people to engage with and learn about music and culture, especially for those who may not have access to these experiences in person (Kantaros et al, 2023). (b) Enhancing research and analysis: Ethnomusicologists can use virtual reality to simulate environments and experiences related to their research, such as recreating traditional musical instruments or performances. This can provide a more immersive and interactive way for researchers to engage with their subjects, potentially leading to new insights and perspectives (Mahmoud, 2023). (c) Collaborative performance and education: Virtual reality can also facilitate collaboration and education across geographic distances. Ethnomusicologists can work with musicians and performers from around the world to create virtual musical performances or educational experiences that can be shared and accessed by anyone with a VR headset.

Virtual reality and immersive experiences offer ethnomusicologists new opportunities to engage with music and culture, to preserve and share cultural heritage, and to collaborate across distances in ways that were not possible before.

Digital tools for music analysis

The use of digital tools for music analysis is another demand of Industrial Revolution 6.0 in ethnomusicology (Yang, 2017). Software programs such as Sonic Visualiser and Ethnomusicology Toolkit allow researchers to analyze and transcribe music from

different cultures in new ways, using digital tools such as spectrograms, frequency analysis, and time-stretching. This can help to uncover new insights into traditional music and promote greater understanding of different musical traditions.

Digital tools for music analysis offer numerous possibilities for ethnomusicology, including automated transcription and analysis of audio recordings, data visualization, and statistical analysis (Chudy et al., 2020; Franke, 2019): (a) Automated transcription: Digital tools can transcribe audio recordings of music, making it easier for researchers to analyze the music in detail. For example, tools like Transcribe! and Sonic Visualiser can automatically transcribe audio recordings, making it easier for researchers to analyze the music in detail. (b) Data visualization: Digital tools can help researchers visualize and analyze large amounts of data. For example, tools like Tableau and Gephi can be used to create interactive visualizations of ethnomusicological data, making it easier to see patterns and trends. (c) Statistical analysis: Digital tools can also be used for statistical analysis, allowing researchers to identify patterns and trends in ethnomusicological data. For example, software like R and SPSS can be used to analyze large datasets and identify statistical relationships between different variables. (d) Digital archives: Digital tools can be used to create and manage digital archives of ethnomusicological materials, including audio and video recordings, photographs, and field notes. These archives can be made accessible to researchers and the public, helping to preserve and share important cultural heritage.

Digital tools for music analysis offer numerous possibilities for ethnomusicology, including automated transcription, data visualization, statistical analysis, and digital archiving. By using these tools, researchers can gain new insights into music and culture and make their research more accessible to a wider audience.

Social media

The use of social media platforms such as Facebook, Twitter, and Instagram is another demand of Industrial Revolution 6.0 in ethnomusicology (Kalaiarasi et al., 2019). Social media can be used to share information and resources, promote cross-cultural understanding, and connect musicians and researchers from around the world. This can help to build networks and communities of practice that support the study and preservation of traditional music (Mahmoud, 2023).

Social media offers a unique platform for ethnomusicologists to engage with audiences, share their research findings, and connect with other scholars in the field. The following are some of the ways social media can be used in ethnomusicology (Gubner, 2018; Harrison, 2016): (a) Sharing research: Ethnomusicologists can use social media platforms like Twitter, Facebook, and Instagram to share their research findings, articles, and other related content with a broader audience. Social media allows researchers to reach people who may not have access to academic journals or conferences, and it also provides an opportunity to engage with non-academic communities interested in music. (b) Building networks: Social media can help ethnomusicologists connect with other scholars and researchers in the field. Platforms like LinkedIn and Twitter allow for the creation of professional networks and can facilitate collaborations on research projects, conferences, and other events. (c) Public engagement: Social media can be used as a tool to engage with the public and share ethnomusicological research with a wider audience. Ethnomusicologists can use social media to post educational content, such as videos explaining different music traditions or sharing stories about particular musical practices. (d) Data collection: Social media can be used as a source of data for ethnomusicological research. Researchers can collect data on musical practices and traditions by studying social media conversations and interactions related to music.

Social media offers many opportunities for ethnomusicologists to engage with audiences, share their research, and build networks with other scholars in the field. However, it is essential to be mindful of the ethical and cultural implications of using social media for research purposes.

For example, in figure 7, an ethnomusicologist is working to preserve and promote the traditional music of the Sámi people in Northern Europe. The Sámi musical tradition, particularly the *joik*, is an integral part of their cultural heritage. The goal is to use advanced digital technologies to archive, analyze, and share this music globally, fostering greater appreciation and understanding. By leveraging the technologies of Industrial Revolution 6.0, the Sámi music preservation project illustrates how digital archiving, online collaboration, virtual reality, digital analysis tools, and social media can be effectively integrated into ethnomusicology. These interventions not only preserve cultural heritage but also enhance cross-cultural understanding and collaboration, making traditional music accessible and engaging for a global audience. This

comprehensive approach ensures that the rich musical traditions of the Sámi people are not only preserved but also celebrated and understood by future generations worldwide.
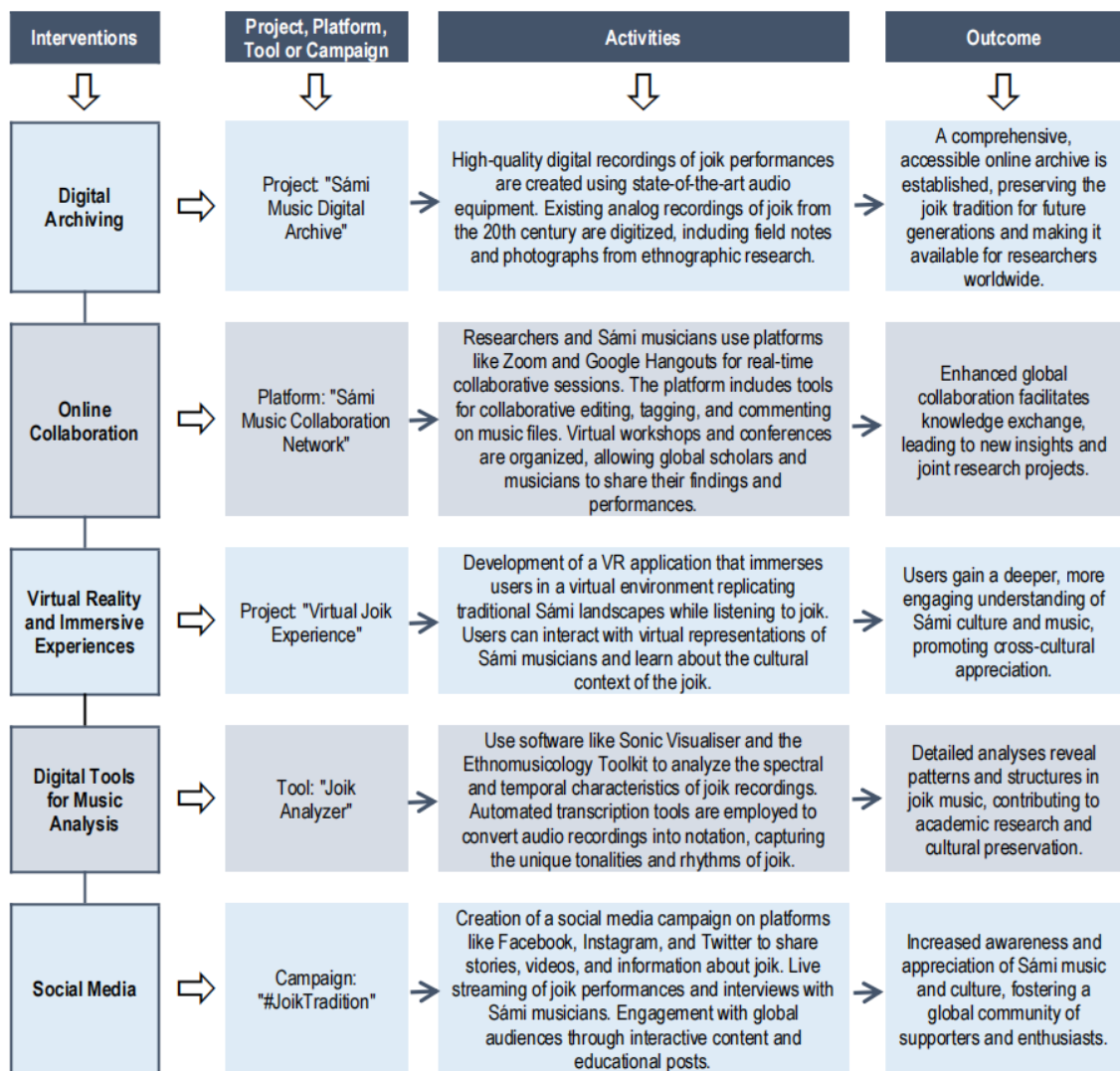

Interventions	Project, Platform, Tool or Campaign	Activities	Outcome
Digital Archiving	Project: "Sámi Music Digital Archive"	High-quality digital recordings of joik performances are created using state-of-the-art audio equipment. Existing analog recordings of joik from the 20th century are digitized, including field notes and photographs from ethnographic research.	A comprehensive, accessible online archive is established, preserving the joik tradition for future generations and making it available for researchers worldwide.
Online Collaboration	Platform: "Sámi Music Collaboration Network"	Researchers and Sámi musicians use platforms like Zoom and Google Hangouts for real-time collaborative sessions. The platform includes tools for collaborative editing, tagging, and commenting on music files. Virtual workshops and conferences are organized, allowing global scholars and musicians to share their findings and performances.	Enhanced global collaboration facilitates knowledge exchange, leading to new insights and joint research projects.
Virtual Reality and Immersive Experiences	Project: "Virtual Joik Experience"	Development of a VR application that immerses users in a virtual environment replicating traditional Sámi landscapes while listening to joik. Users can interact with virtual representations of Sámi musicians and learn about the cultural context of the joik.	Users gain a deeper, more engaging understanding of Sámi culture and music, promoting cross-cultural appreciation.
Digital Tools for Music Analysis	Tool: "Joik Analyzer"	Use software like Sonic Visualiser and the Ethnomusicology Toolkit to analyze the spectral and temporal characteristics of joik recordings. Automated transcription tools are employed to convert audio recordings into notation, capturing the unique tonalities and rhythms of joik.	Detailed analyses reveal patterns and structures in joik music, contributing to academic research and cultural preservation.
Social Media	Campaign: "#JoikTradition"	Creation of a social media campaign on platforms like Facebook, Instagram, and Twitter to share stories, videos, and information about joik. Live streaming of joik performances and interviews with Sámi musicians. Engagement with global audiences through interactive content and educational posts.	Increased awareness and appreciation of Sámi music and culture, fostering a global community of supporters and enthusiasts.

Figure 7. Example of Interventions of Industrial Revolution 6.0 in Ethnomusicology

Consequently, the demands of Industrial Revolution 6.0 in ethnomusicology are focused on the integration of new technologies and digital platforms to promote cross-cultural understanding, preserve cultural heritage, and facilitate collaboration between musicians and researchers. While there are certainly challenges and ethical considerations that need to be addressed when using new technologies in this way, the potential benefits are significant and could help to promote greater cross-cultural understanding and appreciation of music from around the world.

The Difficulties of Integrating Artificial Intelligence and Industrial Revolution 6.0 in Ethnomusicology

While the integration of artificial intelligence (AI) and Industrial Revolution 6.0 in ethnomusicology offers many potential benefits, there are also several challenges and difficulties that should be addressed. The following are some examples of the difficulties of integrating AI and Industrial Revolution 6.0 in ethnomusicology:

Lack of data

One of the primary difficulties of using AI in ethnomusicology is the lack of data available for training machine learning algorithms (Buenaflor et al., 2022; Casey et al., 2008; Holzapfel et al., 2018; Tabuena & Villareal, 2024). While there are certainly large datasets of music available online, many traditional musical styles and genres are not well-represented in these datasets. This can make it difficult to train algorithms to accurately transcribe, analyze, or generate music from different cultures.

Cultural sensitivity

Another difficulty of using AI in ethnomusicology is the need for cultural sensitivity and understanding (Born, 2020; Hesmondhalgh, 2008). Music is deeply tied to cultural identity and can be seen as a form of cultural heritage. As such, researchers and developers should be careful to approach the use of AI in ethnomusicology with cultural sensitivity and respect for the traditions and communities they are working with.

Ethical concerns

There are also ethical concerns around the use of AI in ethnomusicology (Falk, & Ingram, 2011; Grant, 2018). For example, there is a risk that AI could be used to exploit or appropriate traditional music and cultural heritage for commercial purposes. Researchers and developers should be careful to ensure that their work is respectful, transparent, and aligned with the values and priorities of the communities they are working with.

Bias and accuracy

Another difficulty of using AI in ethnomusicology is the risk of bias and inaccuracy in machine learning algorithms (Amilevičius, 2020; Widmer, 2003). For example,

algorithms trained on the basis of Western music may not accurately transcribe or analyze music from other cultures that use different scales, rhythms, and tonalities. Researchers and developers should work to ensure that their algorithms are trained on diverse datasets and are sensitive to the unique characteristics of different musical traditions.

Interpretation and meaning

Finally, there is a risk that the use of AI in ethnomusicology could lead to a loss of the interpretive and creative aspects of music analysis and interpretation (Dushniy et al., 2022; Silverman, 2008). While AI can certainly be used to transcribe, analyze, and generate music, it may struggle to capture the nuanced meanings, cultural context, and emotional depth of traditional music. Researchers and developers must be careful to balance the use of AI with more traditional methods of music analysis and interpretation.

Hence, the integration of AI and Industrial Revolution 6.0 in ethnomusicology offers many potential benefits, but also presents significant challenges and difficulties that must be carefully addressed. Researchers and developers must work to ensure that their work is culturally sensitive, ethically sound, accurate, and meaningful, and that it aligns with the values and priorities of the communities they are working with.

Nurturing the Demands of Artificial Intelligence in Addressing the Demands of Industrial Revolution 6.0 in Ethnomusicology

To nurture the demands of artificial intelligence (AI) in ethnomusicology in addressing the demands of Industrial Revolution 6.0, researchers and developers should focus on several key strategies such as follows:

Collaborative research

One effective way to nurture the demands of AI in ethnomusicology is to engage in collaborative research that involves both AI experts and ethnomusicologists (Ajibade et al., 2023; Bracknell, 2015; Negi et al., 2023). By bringing together experts from different fields, researchers can combine their knowledge and skills to develop more effective and culturally sensitive AI tools for ethnomusicology.

Diverse datasets

To address the lack of data available for training AI algorithms in ethnomusicology, researchers should work to gather more diverse and representative datasets of music from different cultures and traditions (Gómez-Cañón et al., 2021; Rabbi et al., 2022; Rochina-Chisag & Tabuena, 2022). This can be done through collaborations with ethnomusicologists and musicians from around the world, as well as through the use of online repositories and archives.

Cultural sensitivity and ethical considerations

To address the cultural sensitivity and ethical concerns around the use of AI in ethnomusicology, researchers should be transparent and consult with the communities they are working with (Martin et al., 2021). This involves taking a collaborative approach and involving community members in the design and implementation of AI tools, as well as ensuring that the data and algorithms used are respectful and aligned with community values.

Addressing bias and accuracy

To address the potential for bias and inaccuracy in AI algorithms, researchers should work to develop algorithms that are trained on diverse datasets and that are sensitive to the unique characteristics of different musical traditions (Pagano et al., 2023). This can involve the use of machine learning techniques that are designed to mitigate bias and ensure accuracy, as well as the use of traditional methods of music analysis and interpretation to complement AI tools.

Balancing AI with traditional methods

Finally, to address the risk of losing the interpretive and creative aspects of music analysis and interpretation, researchers should balance the use of AI with traditional methods of music analysis and interpretation (Dwivedi et al., 2021; Tabuena, 2021; Tabuena, 2020). This can involve using AI to automate certain aspects of music analysis and interpretation, while relying on more traditional methods for more nuanced and interpretive aspects of the analysis.

Accordingly, nurturing the demands of AI in ethnomusicology to address the demands of

the Industrial Revolution 6.0 requires a collaborative and culturally sensitive approach that involves diverse datasets, ethical considerations, addressing bias and accuracy, and balancing AI with traditional methods of music analysis and interpretation. By focusing on these strategies, researchers can develop more effective and culturally sensitive AI tools for ethnomusicology that address the demands of the Industrial Revolution 6.0.

The Implications of the Demands of Artificial Intelligence and Industrial Revolution 6.0 on Ethnomusicology

The demands of artificial intelligence (AI) and the Industrial Revolution 6.0 on ethnomusicology have significant implications for the field such as follows:

Preservation of cultural heritage

One of the most significant implications of AI in ethnomusicology is its potential to help preserve cultural heritage (Istvandity, 2021). By using AI tools to analyze and archive musical traditions from around the world, researchers can ensure that these traditions are documented and available for future generations to learn from and appreciate.

Increased access to music

Another implication of AI in ethnomusicology is its potential to increase access to music from around the world (Brusila et al., 2022; Tabuena et al., 2022a). By digitizing and analyzing musical traditions from different cultures and traditions, researchers can make this music more widely available to the public, including those who may not have had access to it previously.

New approaches to music analysis

The demands of AI and Industrial Revolution 6.0 on ethnomusicology also drive the development of new approaches to music analysis (Sleeper, 2018; Tabuena & Hilario, 2021; Tabuena et al., 2022b). By using AI to automate certain aspects of music analysis, researchers can focus their attention on more interpretive and creative aspects of analysis, leading to new insights and understandings of musical traditions.

Ethical considerations

However, the implications of AI and the Industrial Revolution 6.0 in ethnomusicology also raise ethical considerations (Price, 2017; Tabuena et al., 2021). As mentioned earlier,

researchers should take a culturally sensitive and collaborative approach to the use of AI in ethnomusicology, ensuring that the data and algorithms used are respectful and aligned with community values.

Changes in the role of the ethnomusicologist

Finally, the demands of AI and the Industrial Revolution 6.0 on ethnomusicology are likely to change the role of the ethnomusicologist (Hartley, 2022). With the increasing use of AI tools in music analysis, the role of the ethnomusicologist may shift from being the primary analyst to being a facilitator of AI tools, helping to interpret and contextualize the results generated by these tools.

Therefore, the demands of AI and Industrial Revolution 6.0 on ethnomusicology have significant implications for the field, including the preservation of cultural heritage, increased access to music, new approaches to music analysis, ethical considerations, and changes in the role of the ethnomusicologist. As with any technological innovation, it is important for researchers and practitioners to approach these demands with care, consideration, and collaboration to ensure that they benefit the field and the communities it serves.

Conclusion

The needs of artificial intelligence in ethnomusicology center on enhancing accessibility, comprehensibility, and engagement with music from diverse cultures for musicians, researchers, and audiences worldwide. Though challenges and ethical concerns should be addressed, the possible advantages are substantial and could encourage cross-cultural understanding and appreciation of music globally. On the other hand, the necessities of Industrial Revolution 6.0 in ethnomusicology concentrate on integrating new technologies and digital platforms to advance cross-cultural understanding, preserve cultural heritage, and foster cooperation among musicians and researchers. Although challenges and ethical considerations should be tackled when using novel technologies, the possible benefits are substantial and could promote cross-cultural understanding and appreciation of music worldwide.

Combining AI and Industrial Revolution 6.0 in ethnomusicology could have numerous benefits, but it also poses significant difficulties and challenges that should be carefully

addressed. Developers and researchers should ensure that their work is culturally sensitive, ethically sound, accurate, and meaningful, and that it aligns with the values and priorities of the communities they work with. To achieve this, nurturing the demands of AI in ethnomusicology to address the demands of Industrial Revolution 6.0 necessitates a collaborative and culturally sensitive approach that employs diverse datasets, addresses ethical considerations, handles bias and accuracy, and balances AI with traditional methods of music analysis and interpretation. Researchers can develop more effective and culturally sensitive AI tools for ethnomusicology that address the demands of the Industrial Revolution 6.0 by concentrating on these strategies.

Thus, the demands of AI and Industrial Revolution 6.0 on ethnomusicology have significant consequences for the field, such as preserving cultural heritage, enhancing music access, introducing novel approaches to music analysis, ethical considerations, and alterations in the role of the ethnomusicologist. As with any technological innovation, it is critical for practitioners and researchers to approach these demands with caution, consideration, and collaboration to ensure that they benefit the field and the communities it serves.

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Melodies Across Time: Exploring Connections and Context in Eastern Black Sea Popular Music

ABSTRACT

The Eastern Black Sea region of Turkey, imbued with a wealth of cultural and historical narratives, boasts a musical heritage characterized by distinctive instruments, vocal styles, and polyphonic structures. This music is a testament to the region's rich identity, intricately woven through the tapestry of time by diverse cultural influences and significant historical events. This research is grounded in the endeavor to unravel the intricate connections within this musical sphere, particularly through the perspectives of intertextuality and hypertextuality. Intertextuality highlights nuanced dialogues between various musical compositions, offering an enriched perspective on their intrinsic associations. Hypertextuality, a concept introduced by Gerard Genette and later applied to music by Serge Lacasse, broadens this dialogue, revealing the intricate networks formed through actions such as covering, remixing, and translation. The investigation delves into these dynamics, especially in the popular tunes of the Eastern Black Sea, leveraging analytical techniques from musicology, cultural studies, and media studies. The objective is to understand how intertextuality and hypertextuality amplify the vibrancy and appeal of Eastern Black Sea melodies, shaping their fundamental essence, significance, and worldwide appeal. We aspire to foster profound comprehension of these multifaceted networks, illuminating their role in characterizing the region's musical and cultural landscapes. This probe contributes a fresh perspective to ongoing debates in musicology and cultural studies, underscoring the imperative for an all-encompassing and prolonged methodology in musical enquiry, accentuating the power of intertextuality and hypertextuality in grasping the nexus between music and wider cultural, social, and historical backdrops. This meticulous scrutiny is expected not only to enrich scholarly discourse but also to unveil the myriad components steering the evolution and impact of the Eastern Black Sea's abundant musical heritage.

Introduction

Embedded in an intricate web of cultural and historical factors, the Eastern Black Sea region of Turkey is a testament to the harmonious integration of geographic and cultural elements that define its unique musical heritage. Rich in historical significance and cultural diversity, this locale has given rise to a musical culture characterized by a diverse mix of melodies, instrumental sounds, and rhythmic patterns. The intricate ways in which the music of the Eastern Black Sea region are deeply intertwined with historical and cultural narratives, a complex amalgamation of Turkish, Laz, Georgian, Rum, and Hemşin influences (Saatçi, 2016: 41). Each piece of music emerges not solely as an artistic expression but also as a narrative medium that encapsulates the rich, multifaceted tapestry of the region's historical and cultural heritage. This narrative richness is also expressed through the distinctive musical characteristics that define the genre. Specific instruments, such as the *kemençe* and *tulum*, are integral to the musical compositions (Aslan & Karahasanoğlu, 2021: 241), paired with distinctive vocal styles and polyphonic structures. These elements, often deeply rooted in traditional music, are artfully woven with modern influences (Solomon, 2017: 98), creating a harmonious blend that resonates with both the past and the present, and reflecting the diverse cultural dialogues encapsulated within each melody.

Building on the rich tapestry of sounds and influences that shape the genre, it becomes essential to delve deeper into the underlying theoretical constructs that govern Eastern Black Sea popular music. Our exploration will be guided by a comprehensive methodological framework, encompassing fieldwork, interviews, and detailed musical analyses. This methodology not only seeks to illuminate but also to weave together the intricate threads of intertextuality and hypertextuality, providing a richer understanding of this musical mosaic.

These concepts – intertextuality and hypertextuality – are pivotal in comprehending the relational dynamics among musical compositions and are instrumental in uncovering their role in enhancing the intrinsic meaning and value of the music. The study is rooted in a systematic dissection of these theoretical constructs, "contributing to a nuanced understanding of this musical tradition's complex web of connections" (Akat, 2010: 54). We focus on the central role of intertextuality and hypertextuality in sustaining the

music's vitality and expanding its popularity, both regionally and globally. "Hypertextuality, as posited by Genette (1997), is characterized by the nuanced relationships that link a subsequent text (hypertext) to its antecedent (hypotext), underscoring the transformation and contextual evolution of thematic elements. Within musical discourse, hypertextuality illuminates the complex interplay between different compositions and the iterative process by which musical themes are transposed, adapted, and reimagined" (Castonguay, 2018: 61). This phenomenon not only fosters creative innovation but also underscores thematic continuity, providing a structural grid that binds together works through shared motifs and referential echoes.

At the heart of our research question is the extent to which these concepts influence the meaning, value, and dissemination of Eastern Black Sea music. Strachan emphasizes the role of intertextuality and hypertextuality in musical creation and performance, while Born suggests that these concepts transcend geographical and cultural boundaries and promote diversity in musical studies (Born, 2005; Strachan, 2013). By exploring the multiple associations of this musical genre, we seek not only to contribute to the fields of musicology, ethnomusicology, and cultural studies, but also to illuminate the broader social, cultural, and historical forces that shape the music and contribute to its complex meanings.

Intertextuality and Hypertextuality in Popular Music

In popular music discourse, the convergence of intertextuality and hypertextuality emerges as a dynamic intersection the weaves together complex layers of textual, melodic, and thematic interactions. Intertextuality, rooted in Kristeva's foundational work, illuminates the dialogic relationships between texts and extends into the musical realm where compositions, lyrics, and melodies converse and intersect (Bakhtin, 1981; Kristeva, 1980). Hypertextuality emerges as a distinct but complementary concept. It denotes the theoretical construct in which a text, or more broadly, a musical composition, is not an isolated entity but is inextricably linked to and influenced by preceding texts or compositions. Genette's account of hypertextuality is predicated on the existence of a pre-existing text that serves as a foundational matrix from which subsequent texts are derived and into which they are inextricably woven. In the nuanced tapestry of popular music, hypertextuality is emblematic of a substantive, often structural, integration of

previous musical compositions. It transcends the peripheral boundaries of lyrical or melodic allusion, delving into a deeper, structural confluence where musical compositions are not mere standalone entities but are part of an interconnected musical narrative. Aktulum's assertion emphasizes the central role of these dual concepts in elucidating the complex dynamics of regional popular music. The dialogic interplay of intertextuality and the structural integrations underscored by hypertextuality reveal the interplay of cultural, historical, and thematic elements that shape the narrative of musical compositions (Aktulum, 2013: 9), including those emerging from the Eastern Black Sea region.

Intertextuality in Eastern Black Sea popular music

The analysis of popular music in the Eastern Black Sea region, particularly when viewed through the lens of lyrics that reflect social events, politics, and national agendas, offers significant insights into the intrinsic intertwining of music with broader socio-cultural and political landscapes. Lyrics serve a dual role; they are not just mediums for emotional expression but also instruments that reflect societal cultural values and expectations, as well as political dispositions (Varnum et. al., 2021: 1). In this narrative, intertextuality becomes a central lens. It reveals the adaptive nature of regional music in parallel to societal transformations. Semiotic and poststructuralist perspectives, based on the work of scholars such as Nattiez, Tarasti, and Khan, elucidate these complex relationships and emphasize the fluidity of meaning and the multiple dialogues embedded within musical compositions (Khan et. al., 2021; Nattiez, 1990; Tarasti, 1994). There are many examples in Black Sea music.

Audience-Influenced Intertextuality: The Case of *Mahir*

A clear example of audience-influenced intertextuality can be found in Volkan Konak's song *Mahir*, featured in his album *Pedaliza* in 1999. The song contains the lament of a mother mourning her son named Mahir. Although Konak did not explicitly attribute this piece to Mahir Çayan, founder of the People's Liberation Party-Front of Turkey, the interpretation of his leftist audience fostered a presumed connection. This is indicative of the fluidity of meaning and the active role audiences play in attributing contextual significances to musical compositions. In the dynamics of intertextuality, members of the audience emerge not only as passive recipients but also as active participants, shaping

and redefining the interpretive landscape of the music (Somuncu & Ceylan, 2015: 83). Popular music and the socio- political structure of the Eastern Black Sea region are mutually influential.

A close examination of the song's lyrical content reveals references such as:

> *Sarı iskarpinlerin kan doldu*
> (Your yellow scarpins are full of blood)
> *Baban kurban olsun kolundaki Nacar saata*
> (Your father will be sacrificed for the Nacar watch on your wrist)

These lyrics do not correspond to the known attributes or historical narratives associated with Mahir Çayan. However, since Mahir Çayan was shot and killed with a gun, the lyrics, which specifically mention blood, encourage a perception that the song was written for him. In fact, dialect songs from the Black Sea region are deeply rooted in the cultural and emotional motifs of the region. This distinction separates the regional lament presented in the song from the historical and political associations tied to prominent figures. The case of *Mahir* illustrates the potency of intertextuality, not only as a compositional device but also as a dynamic, interactive space where meanings are negotiated, contested, and co- constructed, presenting music as a vessel for social dialogues and cultural exchanges.

Dynamics of Eastern Black Sea Music

The incorporation of traditional motifs and contemporary adaptations underscores a dynamic engagement of popular music from this region with geographical and cultural factors. The relationship between music and social contexts is a tapestry of dynamic interactions in which music is both a reflection of, and a catalyst for, social phenomena. The dialogical interaction between these two spheres is palpable and forms the basis for our in- depth analysis of such intertextual occurrences and their implications. This symbiosis underscores the profound impact of music on both individual and collective levels, serving as a pivotal element that not only reflects, but actively shapes and drives numerous social actions. Every note, melody, and lyric is woven into the fabric of everyday life, echoing the complex dance of influences and reactions that defines human experience within a societal framework. Thus, the analysis goes beyond a mere exploration of musical compositions and delves into a world where music and society are

inextricably linked, each shaping and being shaped by the other in a continuous, dynamic exchange (Ayas, 2015: 27).

The rise of Eastern Black Sea music on a national scale can be attributed to a confluence of determinants, characterized by cultural migration, the rise of regional musicians to national acclaim, the intricate web of intertextuality woven into the music, and the pervasive influence of media and digital platforms. Migration from the Eastern Black Sea region to various parts of Turkey has not only resulted in a geographical dispersion of the people but has also facilitated a diffusion of their rich musical heritage. The prominence of renowned artists, including but not limited to Kazım Koyuncu and Volkan Konak, has been instrumental in catapulting Eastern Black Sea music into the national consciousness. Their songs, infused with the region's distinctive musical elements, have elicited a wider appreciation, and have embedded this genre into Turkey's eclectic musical repertoire. "Moreover, intertextuality, which is characterized by the harmonious integration of diverse musical elements, both regional and national, has increased the relatability and accessibility of this genre. The intrinsic incorporation of different motifs and styles enriches the musical tapestry and makes it resonate with a wider audience demographic" (Aktulum, 2017: 19).

In the era of digital ubiquity, the proliferation of social media and music streaming platforms has been a catalyst for increasing the visibility of Eastern Black Sea music. Providing unprecedented access, these digital channels have transformed this regional genre into an integral facet of Turkey's diverse musical landscape. The accessibility afforded by these platforms has not only introduced the music to a national audience but has also inscribed it into the nation's collective listening experience. Each of these dynamics intertwines to foster a complex, multifaceted environment in which Eastern Black Sea music is not only preserved but is also dynamically evolving, resonating with and adapting to contemporary cultural and technological landscapes.

While the digital realm has significantly amplified the reach and resonance of Eastern Black Sea music, the intrinsic thematic depth of this genre reveals itself when one dives deeper into its lyrical and compositional layers. This region's music is not just a byproduct of modern digital trends but carries the weight of historical, social, and political influences that shape its narrative. In the multifaceted realm of popular music

emanating from the region, a meticulous exploration reveals the entanglement of diverse thematic elements rooted in social events, political oscillations, environmental disasters, migrations, and wars. The manifestation of these themes is not a random occurrence but is deeply embedded in the fabric of intertextuality, which posits that texts are not isolated but exist in an intricate web of relational dynamics (Allen, 2022: 5). A poignant illustration can be found in the song of İsmail Türüt, whose composition *Can Pazarı* resonates with the traumatic experience of the 1999 earthquake in Turkey. The lyrics, powerful and evocative, describe the geographical and emotional landscapes scarred by this disaster:

> *It shook and collapsed beyond Gerede*
> *It shook and collapsed beyond Zonguldak*
> *The dead are dead, the rest are miserable*
> *Collapsed Yalova, İzmit Gölcük, Adapazarı*
> *Some without a body, some without a grave*
> *Martyrs for the dead, peace for the rest*
> *What kind of earthquake is this?*
> *We thought it was the apocalypse.*

The use of place names in the lyrics serves as a poignant reminder of the localized devastation, embedding the tragedy in the nation's collective memory. The term 'martyrs', though traditionally confined to religious or military contexts, is re-purposed to convey the magnitude the loss, underscoring the fluidity of language and its adaptability in times of collective trauma.

Another example is Volkan Konak's *Cerrahpaşa*, a lyrical story that navigates the tragic intersection of personal loss and environmental disaster. The Chernobyl disaster, though geographically distant, insinuated its radioactive tendrils into the Eastern Black Sea, escalating cancer rates. Konak's lyrics echo with the pain of a son who lost his father to this insidious enemy:

You, Cerrahpaşa! I won't drink your water anymore.

I won't cross your path next year

Do doctors know the pain of the heart?

I left half of my life in Cerrahpaşa.

The song transcends personal grief to become an indictment of systemic inadequacies and a reflection of post-Chernobyl social anxiety.

Music, in the context of the Eastern Black Sea region, thus becomes a resonant chamber where individual voices, societal sentiments, and historical events intersect, each song a repository of collective memories and narratives. "Such musical compositions, under the theoretical lens of intertextuality, can be perceived as dialogic entities, engaged in a perpetual conversation with social, political, and environmental phenomena, capturing the zeitgeist of epochs and articulating the silent but powerful dialogues between the individual, the community, and the larger socio-political matrix" (de Castro, 2021: 132).

The Intertwining of Melodies, Rhythms, and Cultural Narratives in Eastern Black Sea Popular Music

The intricate interplay of melodies, rhythms, and cultural narratives within the popular music of the Eastern Black Sea region manifests a rich tapestry of intertextuality that transcends temporal boundaries and embodies a harmonious blend of historical resonance and contemporary innovation. This dialectical relationship between traditional and modern musical elements highlights a dynamic continuum of cultural expression, illuminated through the theoretical prism of intertextuality (Miani, 2016; Middleton, 1990). Such an identity is at once anchored in a rich historical heritage and engaged in an ongoing dialogue with contemporary modalities of musical expression (Subin & Joseph, 2021). The songs of emerging ensembles embody this dialogic synthesis. These compositions, imbued with traditional musical motifs, illuminate the evolution of a distinctive Eastern Black Sea musical aesthetic. This is achieved by maintaining a strong link to established cultural traditions, and by making a conscious effort to preserve these traditions even as modern developments continue to unfold. Lyrically, the music emanating from this region transcends conventional aesthetic boundaries. Each lyric, imbued with deep cultural references, functions as an integral element within a broader unfolding narrative. This structure is inherently intertextual, serving as a nexus wherein

historical, cultural, and social dialogues converge and intertwine to construct a multifaceted narrative tableau (Daniyeva, 2020).

The reconceptualization and incorporation of traditional motifs into a contemporary musical paradigm represents a vibrant cultural dynamic. Singers such as Ayşenur Kolivar exemplify this phenomenon. Kolivar's harmonious fusion of traditional lament styles with contemporary vocal techniques underscores the fluidity of the Eastern Black Sea's musical narrative. It is a narrative characterized by the coexistence of preservation and innovation, each enriching and being enriched by the other. This scholarly investigation highlights the intricate confluence of musical, historical, and cultural narratives within the popular music of the Eastern Black Sea region. Through an intertextual lens, the various elements of this rich sonic tapestry are illuminated, each thread contributing to the construction of a complex narrative structure. This narrative is simultaneously anchored in historical resonance and dynamically engaged with contemporary innovation. The progression into hypertextuality illustrates the amplified dissemination and interpretation of the musical traditions of the Eastern Black Sea through digital media. This exploration bridges the complex dialectic between the enduring legacy of, and contemporary evolution within, the region's music, illuminating a harmony where historical preservation intertwines with modern innovation.

As we delve into the manifestations of hypertextuality, it is pivotal to recognize the continuity of traditional elements even as they undergo modern transformation. The digital age might reshape the way Eastern Black Sea music is presented, but its essence, rooted in age-old traditions, remains untouched and is merely rearticulated in contemporary forms. Hypertextuality in Eastern Black Sea popular music is also evident in the use and reinterpretation of traditional motifs and elements. Musicians often incorporate elements from local folk music, such as certain instrumental techniques, modal structures, or vocal styles, into their compositions (Ersoy, 2013: 92). These elements are then reinterpreted and recontextualized, creating new musical expressions that still maintain a strong connection to the region's musical traditions. Kazım Koyuncu's artistic repertoire, particularly characterized by compositions in the indigenous languages of the Eastern Black Sea region, transcended regional boundaries and attracted the attention of a diverse audience more widely. His linguistic versatility not only underscores a rich, multicultural engagement but also facilitates a cross-cultural

resonance, where language barriers are mitigated and a universal appreciation for his music is established. Within the framework of hypertextuality, reinterpretations and adaptive representations of Koyuncu's songs have been instrumental in increasing his visibility and broadening his audience base. A case in point is *Didou Nana* from the album *Viya!*, which, through its innovative incorporation of the Georgian *panduri* and *flute*, is transformed into a creative fusion of different musical elements while retaining its core essence.

Interaction with Digital Environments; Social Media, YouTube, and Other Platforms

In the digital realm, social media is emerging as a key platform for consumers to disseminate their musical preferences and critiques, as well as for the direct distribution of musical works. An increase in the commentary on, and visibility of, a particular musical work correlates with an increase in accessible information about it. At the same time, this increased visibility is associated with an increase in the free availability of the music, making it easily accessible to potential listeners. "This dynamic interaction highlights the complex relationship between information dissemination, public engagement, and accessibility in the digital music consumption landscape" (Dewan & Ramaprasad, 2014). Popular music in the Eastern Black Sea region has also embraced the digital age, with many artists and fans sharing their work and experiences on social media and other online platforms. As an example of one of these, Selçuk Balcı[1] is one of the most prolific disseminators of his works through social media. In 2017 he performed a cover of the song *Ayrılamam* by the singer known as Küçük Emrah on his *kemençe* and shared it on his social media accounts, receiving millions of views and making one of the biggest leaps in his career. "This creates a hypertextual network of connections, as users can easily navigate from one piece of music to another, discovering new works and interpretations along the way" (Lacasse, 2018: 11).

Social media platforms such as Facebook, Instagram, and Twitter, as well as streaming services such as YouTube and Spotify, have become central to the dissemination and consumption of Eastern Black Sea popular music. These platforms allow for the creation

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[1] Selçuk Balcı is a Turkish singer who was born in 1988, in Çayeli, Rize. He completed his primary education in Çayeli and then moved to Ankara with his family. Although he has been playing the bağlama since childhood, he became interested in the kemençe during his high school years. After developing his skills on the kemençe, he accompanied many Black Sea singers on the kemençe. (All translation by the author)

of online communities where fans and artists can interact, share music, and exchange ideas. As a result, the music is exposed to new audiences and can be shared and discussed across geographical and cultural boundaries, further expanding its influence and impact.

Reinterpretations, Remixes, and Other Interpretations

In Eastern Black Sea popular music, the proliferation of remixed and reinterpreted traditional songs introduces an extended dimension of hypertextuality. "Such adaptations resonate not only with the foundational songs on which they are based, but also with previous adaptations" (Burkholder, 2018: 1). These compositions allow musicians to incorporate contemporary stylistic nuances, ensuring a simultaneous alignment with the primary material (Aktulum, 2017: 46). This enables Eastern Black Sea popular music to evolve and adapt to changing musical landscapes while preserving its rich cultural heritage. Davut Güloğlu's integration of the techno-pop genre into Eastern Black Sea music exemplifies a pivotal moment of cross-genre innovation. Previously, this style had been relatively unknown in the region's musical repertoire. In addition to gaining international recognition, Güloğlu catalyzed a renewed interest in Eastern Black Sea music. His prominence with the songs *Nurcanım* and *Katula katula* facilitated an influx of artists who, inspired by his success, ventured into this newly synthesized genre, expanding the musical diversity and international appeal of the region's soundscape. This phenomenon underscores the dynamic interplay between traditional musical forms and contemporary global genres, illuminating the adaptive and integrative nature of Eastern Black Sea music. Overall, the examples of hypertextuality in Eastern Black Sea popular music demonstrate the dynamic and interconnected nature of the music in the digital age. "Through interaction with digital environments, connections on social media and other platforms, and the influence of reinterpretations, remixes, and different interpretations" (Tanvir & Walia, 2021: 166), Eastern Black Sea popular music continues to evolve and flourish, both within its local context and on a global scale.

Discussion and Evaluation of the basic Elements of Eastern Black Sea Music

In evaluating Eastern Black Sea music, a deep understanding of intertextuality and hypertextuality becomes crucial in deciphering the rich tapestry of connections woven between individual compositions and the broader cultural milieu. The deep embeddedness of traditional motifs and elements gives music an identity deeply rooted

in a shared heritage, while digital interactions extend its reach and influence across geographic and cultural boundaries. In light of this discussion, it is evident that the nuanced fabric of Eastern Black Sea music is as much a product of its traditional roots as it is of contemporary influences. To delve deeper into this intricate blend, it becomes paramount to unravel the tightly interwoven threads of musical composition and culture. These threads, tightly knit with intertextual and hypertextual elements, not only map the musical journey of the region but also highlight the profound impact on its semantic and cultural essence. The unfolding pages of this discourse will shed light on these aspects, delineating how past and present converge to shape the identity and resonance of the Eastern Black Sea music.

Interwoven Threads of Musical Composition and Culture

An in-depth exploration of the music of the Eastern Black Sea reveals a compelling dialogue between intertextuality and hypertextuality. The integration of traditional and cultural elements into contemporary compositions is not static or merely additive, but rather transforms into a dynamic entity that both responds to and influences the wider culture. This phenomenon illustrates a symbiotic relationship in which these elements are not only embedded but are also adaptive, contributing to, and being reshaped by, the thematic nuances of modern musical works. Each interaction signifies a continuous process of cultural and musical enrichment, underscoring the fluidity of musical narratives and the evolving identity of the genre. "The prominence of interwoven traditional and cultural elements goes beyond mere incorporation to become a dynamic, living entity that enriches and is enriched by contemporary compositions and thematic nuances" (Lacasse, 2000: 45). In the realm of hypertextuality, the emergence and proliferation of digital platforms mark a significant epoch of expanded dissemination and eclectic engagement. "Social media and streaming services are emerging as central platforms, fostering an environment of diverse, global engagement, while facilitating a complex ecosystem of musical dialogues and audience interactions" (Carboni, 2014: 150). Further emphasizing this confluence, embedded in the music are distinct intertextual imprints, where traditional motifs and cultural narratives serve as foundational pillars that reinforce communal and regional identity (Echard, 2018: 169). However, hypertextuality offers an expansive dimension where the regional specificity of Eastern Black Sea music travels beyond its native confines. Through the avenues of digital realms

and various reinterpretations, the genre exhibits a vibrant dynamism, continuously molded and remolded by multifaceted global interactions and prevailing trends.

Conclusions and Recommendations

The culmination of this analytical exploration reveals a nuanced and complex relationship between the foundational elements rooted in the deep traditions (intertextuality) and the process and derivatives emanating from the foundational compositions (hypertextuality) within the musical lexicon of the Eastern Black Sea. Each musical piece, each note, reverberates with the legacy of its intrinsic cultural heritage, while simultaneously unfolding as a contemporary narrative woven with threads of past, present, and anticipatory expressions.

Key examples identified throughout the study have underscored the foundational elements of intertextuality within a complex web of cultural, historical, and lyrical motifs that reflect the shared identity and collective memory of the Eastern Black Sea peoples. These elements serve not only as markers of a rich history but also as catalysts that ignite contemporary creativity and expression. In contrast, hypertextuality, as defined by Genette (1997), emerges as a nuanced dialogue between the foundational texts and their derivative works. The music of the Eastern Black Sea does not exist in isolation but is constantly influenced and shaped by an ongoing conversation with its sources. It is a living, dynamically evolving entity that reflects the symbiotic relationship between the parent texts and their offspring. The implications of this duality are profound. Artists are not only creators but also curators of a rich musical heritage, navigating the delicate balance between preservation and innovation. For the audience, each musical piece offers a journey into a landscape where the ancient and the contemporary coexist, where echoes of the past are heard amidst the melodies of the present. Future research could explore this dynamic with a more focused lens, unraveling the layers of influences, adaptations, and transformations that permeate each composition. How do artists negotiate this balance, and how does this duality influence the reception and interpretation of music by different audiences?

Finally, the resilience and adaptive nature of Eastern Black Sea music is linked to the complex relationship between intertextuality and hypertextuality. It is a musical genre in which the echoes of the past are not only preserved but are reinvigorated and

transformed through their interaction with derivative creations. This living, breathing tapestry of music is a testament to the power of music as a conduit for cultural preservation, adaptation, and evolution that resonates across time and space.

Future Directions

Future research avenues are rich with possibilities, including a comparative analysis of different regional musical landscapes and an examination of the role of technology in shaping contemporary musical narratives. "There is uncharted territory in assessing the impact of digital platforms on the creation, distribution, and reception of music in the 21st century" (Tepper & Hargittai, 2009: 230). Exploring the interpretive role of the audience can reveal the dynamics between artistic expression, cultural context, and diversity of reception. Each piece of music is not only a creative expression in its own right, but also subject to multiple interpretations, influenced by the diverse perspectives of its audience. Later studies will weave these insights into a cohesive narrative, highlighting the multifaceted dynamics and their consequential impact on the aesthetic, cultural, and semantic development of Eastern Black Sea music within the broad context of contemporary musicology.

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