

Architectural Evaluation Analysis by Using GIS, Case Study: Kaleiçi, Antalya

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Abstract

Throughout history, Antalya has been the home of various civilizations. The Kaleiçi region is a protected area with significant historical value, containing relics from numerous civilizations. The historical texture of the region has been shaped by the presence of different civilizations at different times. Geographic Information System provides data collection, storage, processing, management, spatial analysis, query, and presentation functions to assist users in location-based decision-making processes for solving social, economic, and environmental problems. The purpose of this research is to explain the architectural evaluation of Kaleiçi, Antalya using Geographical Information Systems and the ArcMap program. The purpose of this study is to explain the architectural evaluation analysis and interpret the results.

Keywords: Architectural evaluation, geographical informational systems, GIS.

CBS ile Mimari Değerlendirme Analizi: Kaleiçi, Antalya Örneği

Özet

Antalya tarih boyunca farklı medeniyetlere ev sahipliği yapmıştır. Kaleiçi bölgesi, tarihi değeri yüksek, birçok medeniyetin izlerini taşıyan koruma altındaki bir bölgedir. Farklı zamanlarda farklı uygarlıkların var olması nedeniyle bölgenin tarihi dokusu şekillenmiştir. Coğrafi Bilgi Sistemi, sosyal, ekonomik ve çevresel sorunların çözümüne yönelik lokasyon bazlı karar verme süreçlerinde kullanıcılara yardımcı olmak amacıyla veri sağlar; toplama, depolama, işleme, yönetim, mekansal analiz, sorgulama ve sunum fonksiyonları. Bu çalışmanın amacı, Antalya Kaleiçi'nin mimari değerlendirmesini Coğrafi Bilgi Sistemleri ve ArcMap programı ile yapılan analizleri yorumlamaktır.

Anahtar Kelimeler: Mimari analiz, coğrafi bilgi sistemleri, CBS.

1. INTRODUCTION

Geographic Information Systems (GIS) is a decision support system that allows operations such as collecting earthly information for a specific purpose, storing, updating, controlling, analyzing, and displaying in a computer environment (Burrough, 2007). GIS components; hardware, software, people, data, and purpose. Data types are divided into three in GIS. These are vector data, raster data, and non-geographic attribute data. A vector data model stores objects consisting of points, lines, and areas with x and y values according to a specific coordinate system. It is very easy to locate spatial objects by finding coordinate information.

A raster data model is formed by dividing images into small pieces and grouping adjacent cells together. Each cell is called a pixel. Cell size determines resolution. The smaller the cell size, the higher the map resolution. Geographical Information Systems (GIS) is a tool used to explain the spatial relationships of events in any situation involving space, as well as to reach conclusions, make decisions, and make architectural evaluations, as in this study.

Throughout history, Antalya has been home to a variety of civilizations. Antalya was once the ancient city of Attalia, which was established during the Hellenistic period and later became part of the Roman Empire before becoming one of Turkey's most famous towns. The Kaleiçi region is a protected area with significant historical value, containing relics from numerous civilizations.

For this reason, the Antalya Kaleiçi region is an important cultural point that remained in the city center but preserved its historical structure. The historical texture of the region has been shaped by the presence of different civilizations at different times. Aside from its historical significance, Kaleiçi, which is an important part of Antalya's city center, is a very interesting tourist area. With the decision made in 1972, the region's historical and cultural identity was safeguarded. The goal of this research is to use geographical information systems to analyze the Antalya Kaleiçi region.

1.1. Aim and Scope

In this study, simple architectural evaluation of Kaleiçi, Antalya will be examined by using GIS. This study aims to explain analysis and interpret the results. Additionally, literature review about Antalya Kaleiçi district is discussed within this framework as given follows.

1.2. Literature Review

This study seeks to employ the use of secondary data sources. The sources will comprise articles sourced from different articles, thesis', books that are related to the Geographical Informational Systems and Kaleiçi, Antalya. These sources used to analyze the architectural evaluation of Kaleiçi, Antalya.

Table 1: Literature Review (Authors).

Author(s)	Publication Name	Focus of the Study
Açalya Alpan	Urban Restructuring Process Of Antalya Walled-Town And The Roles Of Stakeholders	Antalya Walled City
Aynur Uluç	A Framework for Sustainable Urban Mobility in Historic Urban Landscape: A Proposal for Antalya Kaleiçi	Examination and Proposal for Antalya Kaleiçi
Eser Gültekin, Hacer Mutlu Danacı	Ecological Problems Of Restorated Traditional Settlements: A Case Study In Kaleiçi, Antalya	Restoration, Antalya
Gülşah Çelik Başok	Conservation History of Cultural Heritage in Kaleiçi District in Antalya, Middle East Technical University	Conservation, Antalya
Orhun Soydan	Examination of Urban Values of Kaleiçi Old Town in Terms of Landscape Architecture and Suggestions for Effective Use of Historical Sites	Urban Values
R. S. Baxter	Some Methodological Issues in Computer Drawn Maps	Mapping
P. A. Burrough	Development Of Intelligent Geographical Information Systems	Geographical Informational Systems
Felix Kienast	Analysis of historic landscape patterns with a Geographical Information System — a methodological outline	Historical Places, Geographical Informational Systems
G.Saygi, F.Remondino	Management of Architectural Heritage Information in BIM and GIS: State-of-the-Art and Future Perspectives	Architectural Heritage, Geographical Information Systems

2. STUDY AREA

Antalya, in southern Turkey, is a city, center on the Mediterranean coast. Antalya Kaleiçi; is the preserved old city center of Antalya city. Kaleiçi, was founded as the Attaleia city and the Roman, Byzantine, Seljuk, Ottoman, and Republic of Turkey were below the border and sovereignty. Kaleiçi is located within the borders of Antalya province and in the middle of today's trade center. Kaleiçi settlement located around the harbor is an inner castle located between the inner and outer walls. Most of the buildings in the region are historical buildings.



Figure 1: Antalya Kaleiçi Aerial Photo (*Google Earth*).

In 1972, Antalya port and Kaleiçi district were protected as a protected area by the Real Estate Antiquities and Monuments High Council due to its unique texture. The Ministry of Tourism was awarded the Golden Apple Tourism Oscar by the International Tourism Writers Association on April 28, 1984, for the restoration work of the Antalya-Kaleiçi Complex (*Url-1*). Kaleiçi houses have been preserved until today. Although restoration applications are occasionally made within the borders of Kaleiçi, it is not allowed to construct new buildings. In this way, its historical texture has been preserved.

Today the region; has become one of the most important touristic spots of the city without spoiling its historical structure. With its restaurants, cafes, bars, accommodation facilities, shops, bazaars, and marina life, it is the most important destination for locals as well as tourists.



Figure 2: Kaleiçi Streets (*URL-2; URL-3*).

Antalya-Kaleiçi historical houses have conventional settlement characteristics in terms of being in harmony with the topography. The houses are appropriate for the land slope and built above the sea level since the city is at a hot-humid climate region. Most of the streets harmonious with the topography spread in the northwest- southeast direction which is the prevailing wind direction and since the houses are built in a way that they could make use of prevailing breeze as much as possible they are acceptable for ecological design criteria. (Gültekin and Danacı, 2011).

3. GIS ANALYSIS

In this section, the transportation, height, functional and development period analyzes of the study area are realized by using GIS. Within the scope of the study, 418 buildings in Antalya, Kaleiçi region were examined. The Antalya Kaleiçi maps used in this section are taken from Google Earth. The drawings on the maps were drawn as a result of the authors' research, on-site observations, and analysis.

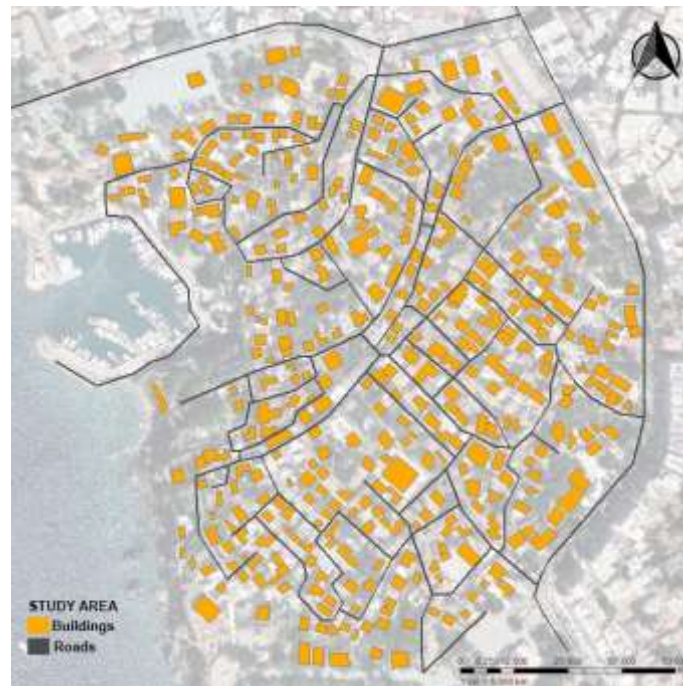


Figure 3: Study Area, Kaleiçi, Antalya.

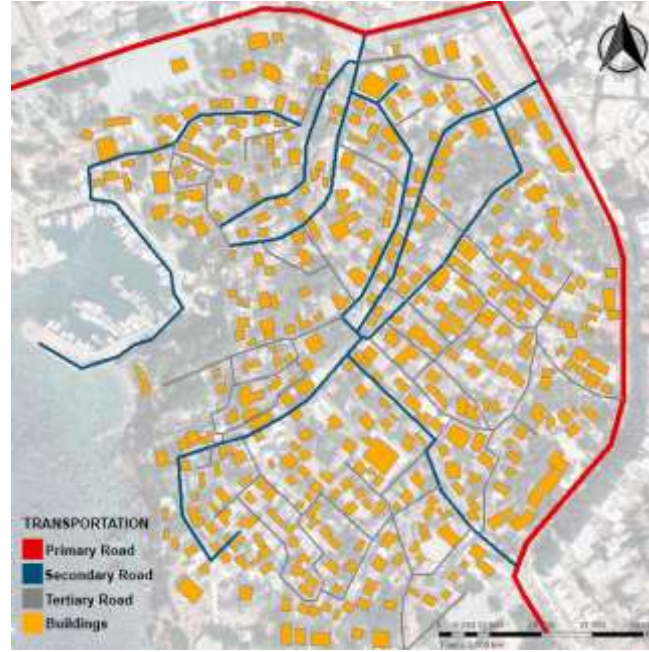


Figure 4: Transportation Analysis

Primary roads surround the borders of Kaleiçi. Secondary roads in the region where vehicle entrances are controlled by time limitation are predominant. Some dead-end streets and roads without vehicle access are considered tertiary roads.

Transportation to study area is provided by the main roads coming from the Kaleiçi and the Republic Square. People also go to the region by sea transportation. The dominant transportation circulation within the boundaries of the study area is provided by pedestrian route. (Soydan, 2020).

The regulation for the vehicles serving to businesses is that the vehicles servicing to the businesses as distributor, marketing, fuel, services as food, drink, cleaning materials could enter the area between 06:00 and 12:00 and they will be out of until 12:30. (Uluç, 2014).

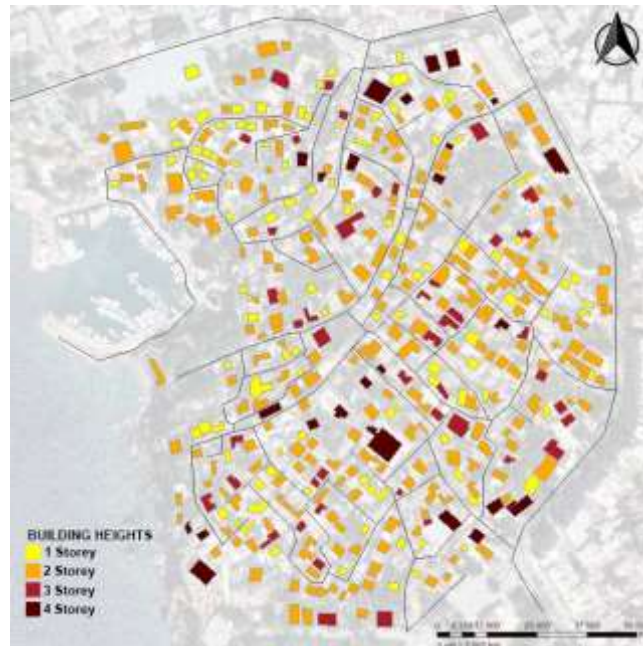


Figure 5: Building Heights

Traditional Kaleiçi houses are usually 2-storey buildings, as seen in Fig.5. When the floor height analysis is made in the region, it is seen that most of them are 2-storey buildings. 235 of the 418 structures analyzed are 2-storey buildings. While 111 buildings are single-storey, 46 buildings are 3-storey and 26 buildings are 4-storey. These analyzes are shown with a pie chart with percentages in Fig. 9.

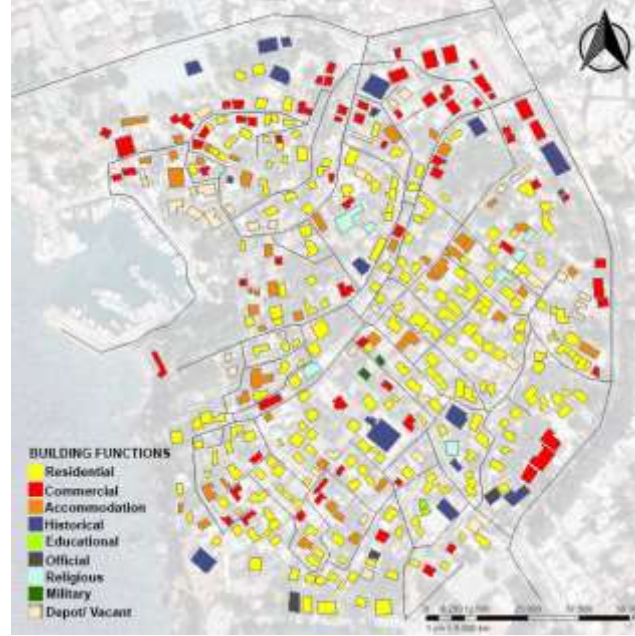


Figure 6: Building Functions

Kaleiçi bears the traces of many civilizations such as Roman, Byzantine, Seljuk, and Ottomans. Kaleiçi streets and structures bring traces of Antalya's history to the present day. The Kaleiçi is a totality of an urban environment, thus it is an interrelated complex of urban functions coexisting in the town. Therefore, the Kaleiçi involves urban functions such as residential uses tourism-based accommodation units, commercial activities, cultural or administrative units, entertainment units, art galleries or art centers, public or private office buildings, public administrative buildings, educational units. (Alpan, 2013). The function analysis made in Fig.6, these functions are gathered under main titles such as residential, commercial, accommodation, and historical.

Although it is a region that contains many different functions, it has been observed that 226 of the 418 buildings examined consist of residential. Parks and green areas, whether active or passive area, are the open spaces designed for pleasure of people and everyone have a right to use them whenever they want. In this context, Kaleiçi with its unique landscape bordered with Karaaliođlan and Tophane Park and registered gardens with orange trees, pomegranate trees, and colourful flowers put visual and aesthetic values to the streets of Kaleiçi. (Uluç,2014).

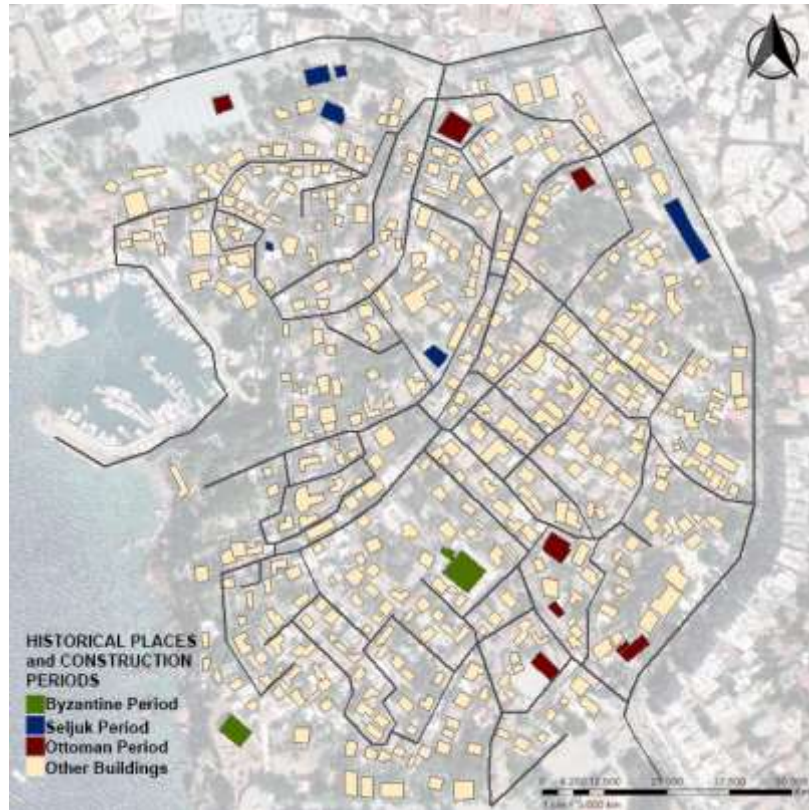


Figure 7: Some Historical Places and Construction Periods

Antalya is one of the oldest settlements in Anatolia. In 2000 BC Antalya and its surroundings was called “Arzava lands” by the Hittites. (Başok, 2016). All structures in the Kaleici region have historical value. Some historical buildings are shown in Fig.7 and Fig.8. There are monumental structures belonging to the Byzantine, Seljuk, and Ottoman periods in the region.

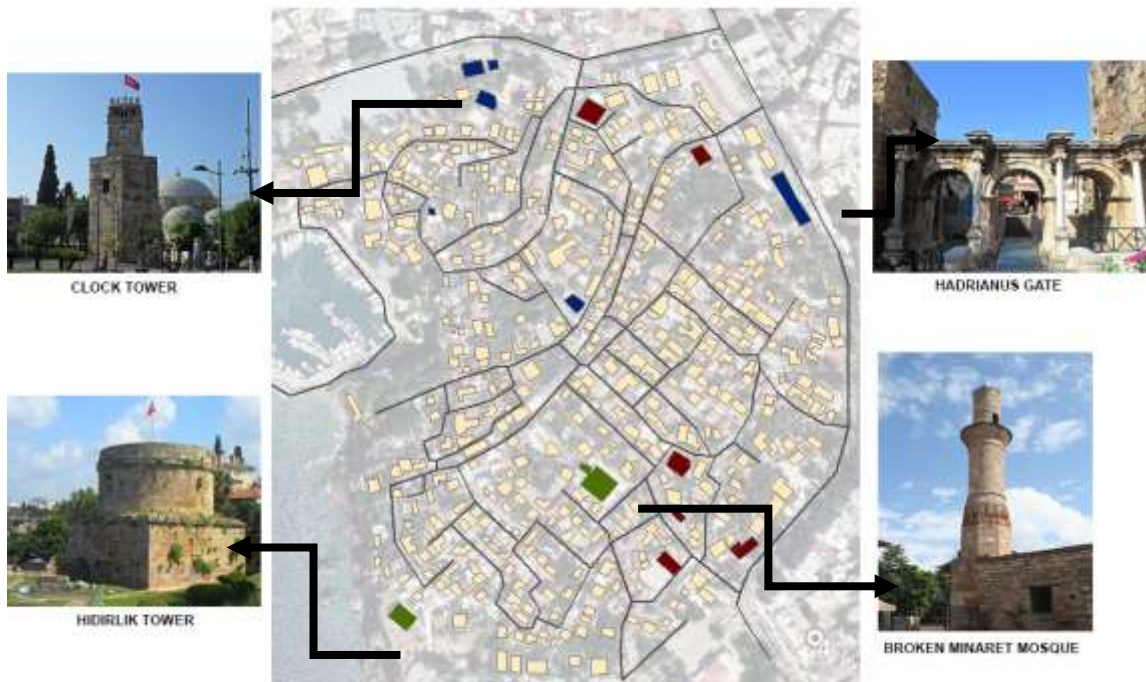


Figure 8: Some Historical Places

4. CONCLUSION and RECOMMENDATIONS

Antalya Kaleiçi has many different architectural values. 418 buildings in the region were examined. The findings obtained as a result of the analyzes made are explained in this section.

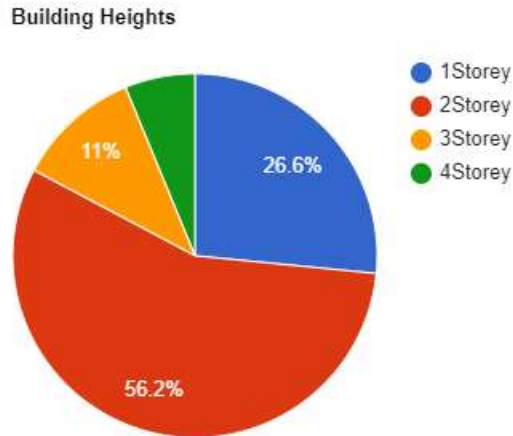


Figure 9: Pie-Chart of Building Heights

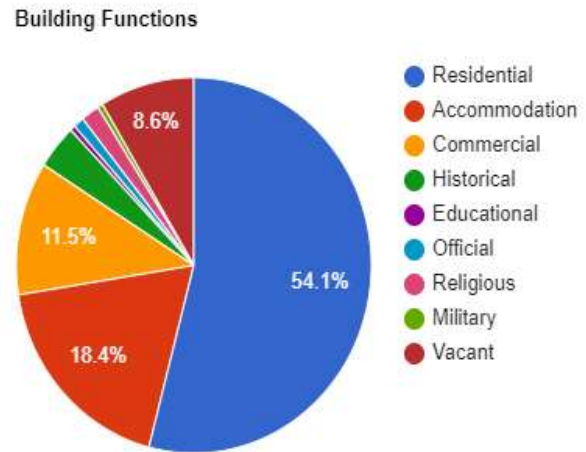


Figure 10: Pie-Chart of Building Functions

As a result of observations, researches and GIS analyzes, some findings about Antalya Kaleiçi region were obtained. There are different properties within the study area. Traditional Kaleiçi houses are usually 2-storey. When the floor height analysis was made, it was seen that 235 of the 418 buildings examined consist of 2-storey buildings. Based on building height analysis, as shown in Fig.9, 26.6% of the total buildings is 1, 56.2%, 2, 11%, 3% and 6.2% on 4 floor.

In this region, which has both historical and touristic features, vehicle traffic is restricted to ensure the comfort and safety of pedestrian flow. In the region, besides the buildings used for functions such as residential, commercial, historical, educational, official, religious, and military, it has been observed that there are structures that are used as depots or abandoned because of their poor structural condition. 226 of the 418 buildings examined are used for accommodation purposes.

As explained, there are many different historical textures in the Kaleiçi region of Antalya, one of the oldest settlements in Anatolia. There are buildings from Byzantine, Seljuk, Roman, and Ottoman periods that still exist in the Kaleiçi region. The monuments include the Clock Tower, the Hidirlik Tower, the Hadrianus Gate, a broken mosque of minarets, churches and hammam. They are all very important. In addition to these structures, the majority of residential buildings in the region are. Fig.6 shows structures with different regional functions. As shown in Fig.10, 54,1 percent of the total buildings are residential according to the share of these functions.

Because Kaleiçi is a protected area, the structural conditions analysis has shown that the buildings are strong. No new buildings are constructed in the area. All buildings are ancient and of historical importance. Many buildings have been restored and maintained in the region.

As a result, the region of Antalya Kaleiçi has many civilisations and many historical textures. The region's history and tourism are very rich. Kaleiçi is Antalya's most central point but still has a successful conservation of its historical texture up to the present day. In future too, necessary applications should be applied to preserve this historical beauty.

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