

# Social Media Content Review of MMORPG Games: Reddit Comment Scraping and Sentiment Analysis

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**Abstract** — Social media is a system that provides access from one-way information sharing to two-way and simultaneous information sharing, introducing Web 2.0 as a service to users. Social media is a set of dialogues and exchanges that people have with each other on the Internet. Reddit is which can call an important audience in these environments. Popular topics and content are available, such as science, sports, gaming, music, food and drink, and photography. After the release of MOBA games, there has been a serious decrease in playing time of the MMORPG genre. The research aims to sentiment analysis of content created on the MMORPG subreddit channel on Reddit. In my study, I focused on sentiment analysis of MMORPG games, which have been very popular for years. Possible reasons for that were tried to be evaluated relative to players' opinions. Sentiment analysis was performed based on posts from the 'MMORPG' subreddit on Reddit. Negative, positive, and neural structures are explained. Frequency analysis of often used words is also included.

**Keywords** — MMORPG games, Reddit, sentiment analysis, social media

## I. INTRODUCTION

The concept of the game has taken its place in the literature with different definitions of scientists working in fields such as philosophy, history, and sociology. It has done a lot of work to understand and explain the content of games and how they can relate to each other. It is difficult to come up with a precise definition of a process or structure in constant change. Because of its game structure, it is an activity that appeals to different audiences in different periods [1]–[11]. The aim here is to find the common elements of the definitions, distinguish the problems, and then present the basic definition of the game, considering the previous definitions.

Different scholars from psychology, physiology, philosophy, history, sociology, and cultural studies have tried to define the change and structure of the concept of plain game definition. Johan Huizinga, a philosopher and history professor who contributed to the studies of games, mentions that "human society" has been familiar with the game since ancient times and has been based on extensive primitive activities [12]. It also emphasizes that the game contains some elements, that it is based on integrity and voluntariness, and that it must occur within the framework of certain rules. A game is an activity that happens in a certain place, within limits of time and will, under an order, in line with an individual's consent and away from the reality of contemporary life, and is an activity that directs social and cultural activities [6], [12] [13].

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## A. Digital Game Trend

Devices such as computers, tablets, smartphones, and PDAs offer a different innovations to our lives every day. We often need and actively use these devices while shopping, having fun, communicating, and in our daily life. These devices affect our lives. Along with developing technology, more time is allocated to the use of technology compared with previous generations. Also, the definition of individuals born and raised as "Digital Natives" are at a higher level to have technology competence compared to their predecessors [14]. Games and the development of technology have become an indispensable part of our lives and are playable on different platforms. Undoubtedly, in this dimension, mostly devoted to technology is spent on digital games, considering the number of players and time played [15].

Digital games, which are in constant change and development, have become a domain of study that gathers together different disciplines. Digital games are an interdisciplinary study with science fields such as computer science, film, art, animation, new media, business and management sciences, semiotics, and psychology [16]. According to these digital games A new type of expression such as drama, opera, or film is described as a new form of collective behavior according to the social science approach, and as an invention according to computer scientists, engineers, and industrial designers [17]. Newman who carried out research on game science and computer games at Bath Spa University in the United Kingdom stated that academic studies on game theory were insufficient and ignored [18]. Likewise, Wolf and Perron [16] stated that a clear working group has not emerged because of the sterility of academic studies in digital games. Along with the continuation of academic studies, technology has also developed and taken an important place in our lives. Digital games, which include video and computer games with their new definition, appear as a cultural form, but continue to boom as a media technology and a global industry. Digital games are text-based or image-based entertainment software that uses an electronic platform, such as personal computers or consoles, and plays one or more players in a physical or networked environment [19]–[24]. According to [24], a digital game is any game that can be played on digital devices and an interactive program for one or more players, developed to increase the fun as much as possible at the simplest level. It is an activity similar to a normal game with intense interest and competition, but performed through a device with its own unique rules [25].

A digital game is an electronic game played with images on a video screen, often involving fast-paced action. These are software systems that interact with a user interface to create visual feedback on a computer or video device, using many elements such as entertainment, games, win/lose, and competition [21]. It is a particular type of digital entertainment in which the player interacts with a digital interface and encounters different types of difficulties, depending on the game [26]. The digital game is an activity that arises from the recreational activities of a certain community in their spare time and has become one of the major structures of the culture of modern societies [27]. In its most basic form, digital game is interactive digital entertainment that can be played via computer, console, smartphone, or tablet [28]. Again, with a different definition, digital game is the general name of software code designed to entertain or educate the individual [29].

### B. Evolution of Digital Games from the '90s

In 1990, Microsoft introduced the classic card game, Solitaire, into the operating system with the Windows 3.0 version as a package. Based on the period, Solitaire [30], which used an easy-to-play and ordinary game model in its period, was among the most popular games for players. In 1991, SEGA company took a big step in the game industry and released a game console called GENESIS, known as MEGA DRIVE in Japan, which was produced for playing at home with 16-bit memory. He developed a game called SONIC for this console. In 1992, Dune II, which was developed by Westwood Studios, inspired by the movie Dune, which met with the audience in 1984, and Frank Herbert's sci-fi novel with the same name, has become another popular game played by actors [31]. In the same year, "Mortal Kombat" was released as a fighting game by Midway Games. About 3 years after the game's release, the movie was shot in 1995 and the game became known by everyone.



FIG. 1. SCENE OF WARCRRAFT: ORCS & HUMANS

In 1993, Doom, which is very common in the game's history, appears as an FPS computer game by the company "id Software". Doom was presented to the players with different versions in the following years and has become one of the popular games still played by some players today. In 1994, the game WarCraft Orcs & Humans [32] by Blizzard Entertainment, which is a game still influencing today and is a developer company of many popular games, made a lot of noise. Although WoW is not the first game of its kind to be released, it has become popular much faster because players love its mechanics and dynamics.

### C. Digital Game Platforms

Digital games have undergone a substantial change and development since the release of their predecessors, both in terms of content and gameplay. The diversity of digital gaming platforms is increasing every year. While these platforms offer unique experiences to players, they engage players in a fictional world virtually. Interaction between players in digital games can be with personal computers or mobile phones, as well as on coin-operated machines or consoles specially developed for certain games. Digital games can range from relatively simple and text-based games to graphically rich virtual environments developed by a large team. While some games are played in small groups as a single player, others can be played in multiplayer by masses that are not geographically close to each other [33].

The first game in the electronic games category was developed in 1947 on a cathode ray tube amusement device. In the digital game industry, various consoles have been offered to players since the 1960s. While games were played on analog system electronic devices in the 1960s, they were now divided into different categories as computers, consoles, and mobile devices with the development of technology. While computers and consoles were used until the 1990s, today mobile devices are included in this genre. While expressing the type of digital games, the "platform" category refers to the hardware and systems in which the game is played. Personal computers, consoles, and smart mobile devices can also be added to the group [34]. On the personal computer platform, Windows and Linux are grouped as PlayStation, XBOX, Nintendo Switch, and Wii in the console category, and Android and IOS on the mobile platform. A detailed visual diagram of the platforms is given in Figure 2.

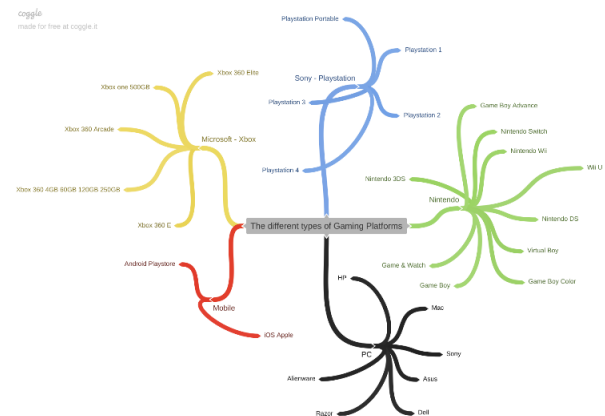


FIG. 2. DIGITAL GAMING PLATFORMS AND SUB-BRANCHES

Categorizing game genres is an important aspect of understanding games in a particular order and providing easy access to them. Video game genres are evaluated under different categories. Categorization is based on the playing styles and camera angles of the games [35]. When categorizing a video game, the basic nature of the interaction within the game itself is considered, rather than asking whether the game is played in a single-player, multiplayer, or over a network. A game is based on the platform on which it is played (PC, mobile, or console), the style of play it provides (multiplayer, networked, or single

player), the game world (first person or third person), the rules and objectives that make up the style of play (racing game or action-adventure, etc.) or representational aspects (science fiction, fantasy or action). All of these classifications are closely related to each other [36]. These species are; action/adventure, board, combat, platforming, simulation, racing, role-playing, and strategy. Below are detailed definitions according to the gameplay (gameplay) and camera angle (perspective and viewpoint) factor. Definitions and categorization of game genres below were developed by [34] and [16] and included in literature by [37] in the future. These game types are given below, and sample games have been added to each genre by the researcher.

#### D. Game Genre



FIG. 3. SCENE OF ALBION: ONLINE



FIG. 4. TYPES OF DIGITAL GAMES BY GAMEPLAY AND CAMERA ANGLES

- **RPG (Role Playing Game):** It is a type of digital game in which players assume the role of characters in a fictional environment and learn a story from beginning to end and accomplish it [38]. Actors take on the responsibility of portraying these roles within a narrative, along with a structured decision-making process regarding actual roles or character development. Games such as The Witcher series, Undertale and Dark Souls are in this category.
- **MMORPG (Massively multiplayer online role-playing game):** It is the name given to the online role-playing game genre played by gamers. Also, type of game in which players from different geographical locations actively get on a character and direct with an internet connection. Blade

and Soul, WoW, Albion Online, and EVE online are examples of MMORPGs.

- **MOBA (Multiplayer Online Battle Arena):** Online multiplayer battle arena, or MOBA, is a genre of real-time strategy war game. League of Legends, DOTA II, and Heroes of the Storm Fall could include in this category.

## II. SOCIAL MEDIA AND REDDIT

Social media is a system that enables access from one-way information sharing to two-way and simultaneous information sharing, putting Web 2.0 at the service of users [39]. Social media is actively used by many individuals and institutions. In this way, quick access is facilitated, users can view content, articles, news, thoughts, daily events, and photos through social media and reflect their views on this social network. If we are to define the social media that is widely used by people today, the first term that comes to mind is "sharing"[40].

It is a human communication that focuses on sharing and discussion, without time and place constraints (mobile-based). On social media platforms, you meet people and communicate with them. You also help people, get help, answer their questions, and ask questions. In this regard, social media is also one of the ways of informal education. Technology has a structure in which telecommunication and social communication are mediated through words, images, and sound files. People also have a framework in which they share their stories and experiences in this context [41].

Social media has some features of "user-sourced media" based on many-to-many paradigms in terms of communication, rather than broadcasting to many people from a single point, as in traditional media. Social media has also revealed concepts of "Content Produced by Users" and "Media Produced by Customers", and with this structure, it has gained meaning in the commercial plan.

Data scraping is done through different social media platforms. After data is obtained, sentiment analysis is performed with different natural language processing techniques. Access to data is provided by using different topics and keywords. It's frequently used in the entertainment industry such as finance, news, banking, automotive, movies, and games. In this study, the studies carried out in the field of gaming are highlighted. By scraping Youtube comments, trend model definition and sentiment analysis of game channels were carried out [42]. On the other hand, by accessing the data via Twitter, another popular social media platform, research was conducted according to the game preferences of the players during the COVID 19 period [43]. Another study included the toxicity analysis of players in online communities [44]. Finally, there is a study on the analysis of sexist approaches to games on gender, masculinity, and video game keywords with the data scraped on Reddit [45].

#### A. Reddit

Reddit is an American social news discussion site. Users registered to site can share posts that contain links, texts, photos, surveys, and videos, and other users can vote on these posts so that the post goes up or down on the page. Users create posts on Reddit; it's shared in sub-groups called "subreddit", which

cover different topics such as sports, games, music, food, photography, and news [46]. If a post shared on a subreddit gets enough votes, that post will appear on Reddit's home page. Every user registered on the site can create their subreddit. Users create posts on Reddit; it's shared in sub-groups called "subreddit" that deal with different topics such as sports, games, music, food, photography. Users can comment on posts and upvote (upvote) or downvote the post. Users can also vote on comments and reply to them as well. Users get the so-called "karma" score based on the votes they receive. This score appears on their profile and can drop to a negative number.

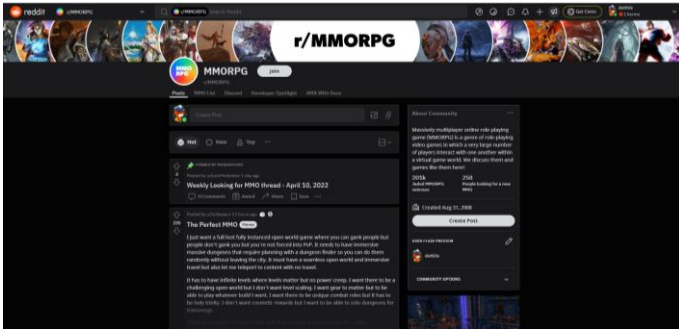


FIG. 5. REDDIT WEB PAGE

B. PRAW and Reddit Data

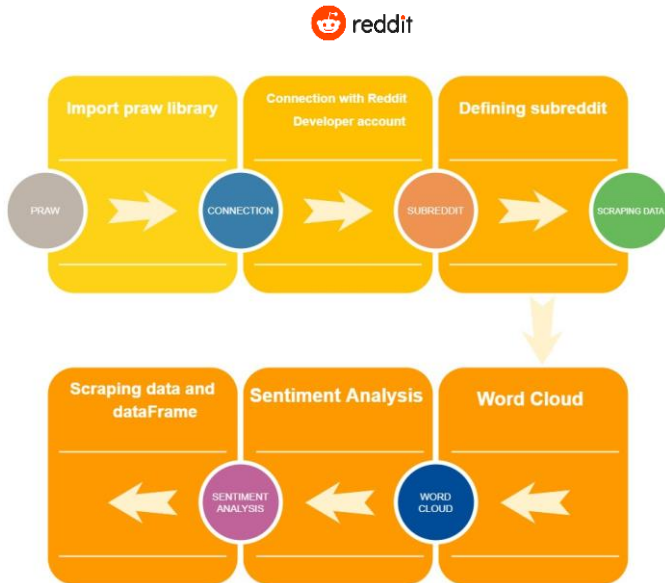


FIG. 6. PRAW AND DATA COLLECTION SCHEMA

PRAW) an acronym for "Python Reddit API Wrapper", is a Python package that allows for simple access to Reddit's API. PRAW aims to be easy to use and internally follows all of Reddit's API rules [47].

Steps of PRAW library:

- Import PRAW library,
- Connection with Reddit Developer account,
- Defining subreddit,
- Scraping data and data frame,
- Sentiment Analysis,
- Word Clouds

	title	score	id	subreddit	num_comments
0	Weekly Looking for MMO thread - April 10, 2022	6	u0g4xm	MMORPG	54
1	Ethyril, an Indie MMORPG and our take on Open...	64	u26olx	MMORPG	8
2	Fractured Online - 2022 Roadmap	68	u23m1	MMORPG	46
3	Albion Online   Rites of Spring... The Best Tr...	22	u1vp5c	MMORPG	10
4	Does time-gating benefit players in ANY way?	80	u1ncel	MMORPG	215

	body	neg	neu	pos	compound	label
	Please use this thread to post your looking fo...	0.020	0.776	0.205	0.9727	pos
	Hello fellow MMORPG fans! We just released a v...	0.029	0.869	0.102	0.7152	pos
		0.000	0.000	0.000	0.0000	neu
		0.000	0.000	0.000	0.0000	neu
	Dailies. Weeklies. Caps. Lockouts. I understan...	0.058	0.796	0.145	0.8201	pos

FIG. 7. EXAMPLE OF REDDIT SCRAPING DATA

As seen in Figure 7 title, score, id, subreddit, number of comments, body, negative, neutral, positive, compound, and label attributes are included in data retrieved from Reddit, and those are written to a .csv file. Data consists of 869 rows (comments) and 11 columns.

TABLE 1: BREAKDOWN OF DATASET

Data Collection Summary		
First Post	Last Log	Number of Post
14.06.2007	30.03.2022	5158 post

TABLE 2: DATASET INFORMATION AND ATTRIBUTES

Data Information	
Title	Title of topic
Score	Score of topics
ID	Identifier number
Subreddit	Name of subreddit
num_comments	Number of comments
Body	Topic text and comments
Neg	Negative ratio
Nue	Neutral ratio
Pos	Positive ratio
Compound	The compound ratio of text
label	Grouping positive, negative, and neutral

III. NATURAL LANGUAGE PROCESSING (NLP)

Natural language processing (NLP) is "computers can understand, process, interpret, and even produce sentences in spoken language." It is also a discipline in which computer science (especially artificial intelligence and machine learning) and linguistics are used together. Technologies such as the chatbot we use today on a bank's website, the commands we give to the assistant on our phone, the translations we make in Google/Microsoft translate, and the prediction of the next word by our phone when writing a message are the result of natural language processing. Text mining, which has become very popular recently, is also part of natural language processing. Thanks to text mining, we can process the thoughts that pile up on the Internet and make sense of them. For example, using the Twitter API, we can find out what percentage of those who receive and write tweets about climate change think climate

change is dangerous and have information about the public. In addition, natural language processing is used in speech recognition. Technologies such as speech recognition and automatic lip-reading are used to assist the hearing impaired as well as in monitoring [48].

Natural language processing processes differ depending on the language. The computer first examines the transformation of words with suffixes at the root. The first process is called lexical. Then it tries to understand what the words mean based on their order in the sentence. The second process is called syntactic. Then it examines what the sentence is trying to explain. The third process is called semantic. Finally, it examines what the sentences are trying to express by putting them together, which is pragmatic.

In summary, the computer learns the context of speech by examining the root of word separately, ordering of words separately, meaning of sentence and speech, and extracts a meaning from this speech [49].

Examples of 10 different projects can be given to the application areas [50].

- Text Classification and Categorization
- Named Entity Recognition (NER)
- Part-of-Speech Tagging
- Semantic Parsing and Question Answering
- Finding Interpretation (Paraphrase Detection)
- Language Generation and Multi-document Summarization
- Language Translation (Machine Translation)
- Speech Recognition
- Character Recognition
- Spell Checking

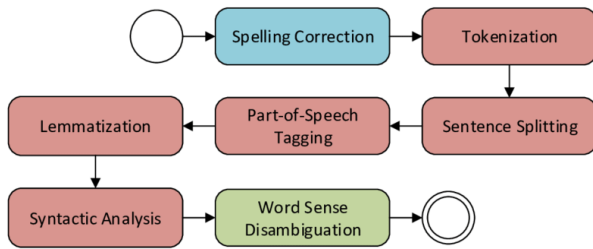


FIG. 9. NLP PIPELINE [51]

A. VADER (Valence Aware Dictionary for Sentiment Reasoning)

VADER is a dictionary and rule-based sentiment analysis tool specifically designed for predicting emotions in social media texts. They create a generalizable and valence-based gold standard sentiment dictionary for social microblogging platforms by using a combination of some qualitative and quantitative methods in 2014. They then combine these lexical features with five general rules that people use when expressing or emphasizing emotional intensity. In this approach, each of the words in the dictionary has valence values that indicate both positive and negative emotional polarity and emotional intensity on a scale of -4 to +4. VADER analyzes a text by checking whether any of the words in the text are in the dictionary. It also checks some of the rules mentioned above. It then uses the word ratings to create four emotion metrics: positive, neutral, negative, and composite ratings. The first three, positive, neutral, and negative, indicate the proportion of the text that falls into these categories. The last score, the composite score, is calculated by adding the valence scores of each word in the dictionary, adjusting them according to the rules, and then normalizing them from -1 (most negative) to +1 (most positive) [52].

B. Text Cleaning and Processing

Let's look at a few terms before we delve into text cleanup.

- **Stem:** Stem allows us to get to root of word. To give an example with three words, if words eat, eat, enough are found in same text, stemming process takes root of all three.
- **Root:** Root is a word root, as in English, and is expected to have a meaning.
- **Lemma:** Lemma is morphological rooting of the word. For example, the lemma of the word "touchy" is "to take", we can define it as dictionary equivalent of plain form of words.
- **Stemming:** Stemming is name given to taking root of word. Stemming NLP varies according to applied language.

does anyone actually play this game anymore? i came back after 6 years and the seas are empty... does anyone know it's player count?It's so insanely difficult to die to solo or even duo gankers, you have shields, cleanses, mounts, invis, dashes...literally choose one or two and you can escape from anyone. Zone entrances have invis shrines, spawn protection buffs etc to the point that hardly anyone spawn camps. Gear is so so cheap, and expensive ones give minimal improvement, so as a newbie you can easily wear cheap gear and go to black zones (full loot pvp zones) and earn 10x the value of your gear in an hour. The high profit:gain ratio in cheap gear means that on the rare occasion you are ganked by a coordinated ganking party, you can brush off the losses and go again.The black zone is huge, and you can often find nice offmap spots where you hardly come across anyone. Most players aren't bothered to comb every inch of every zone hunting for targets, especially when most players are wearing cheap gear anyway. I can play the game while listening to podcasts, no problem. Soooo chill. Put on some gathering gear and go mine some ores for extra chill, since you get even more escape abilities with your gathering gear and you get to see numbers go up, just like a relaxed pve mmo.

FIG. 11. EXAMPLE OF COMMENT DATA AFTER TEXT-CLEANSING

There are three types of stemming algorithms: **Snowball Stemmer, Porter Stemmer and Lancaster Stemmer** [53] [54] [55]. All are available in Python's NLTK library. Porter Stemmer is the oldest of them all, and to put it simply, he tries to find a common root by removing the common endings of the words he finds. Snowball Stemmer, an improved and more aggressive version of Porter Stemmer – also called Porter2 – runs faster, so it is more used. Lancaster Stemmer is the most aggressive algorithm among them, so that sometimes it can find roots that don't really mean anything, but the good thing is that it's more tamperable.

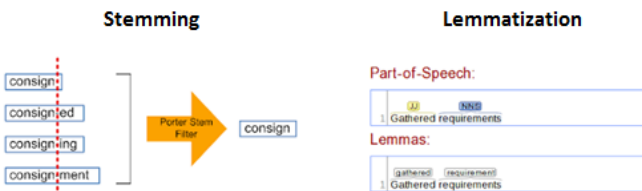


FIG. 10. STEMMING AND LEMMATIZATION WORKFLOW

- Lemmatization:** Lemmatization examines words morphologically. As an example: "They are going" consists of third person plural form of verb to go in present tense. Here, initial unconjugated form of word is called a lemma. In this example, going is a lemma. Lemmatization algorithms need a dictionary to work. Likewise, if we give an example in English, "Feeds" is augmented form of third person singular of verb feed.
- Tokenizing:** Tokenizing can be defined as breaking a sentence into smaller meaningful units. Tokens are meaningful small units, symbols, words, phrases can be given as examples of tokens. The parsing changes depending on the tokenizer you use.

players are among most important structures make MMORPG games unique.

IV. FINDINGS

VADER is sentiment analysis method in research method. After stemming, lemmatization and tokenizing stages, text seen in Figure 10.

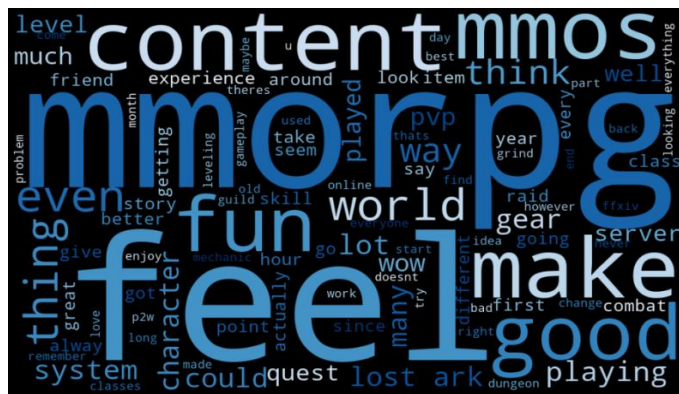


FIG. 14. WORD CLOUD POSITIVE WORDS

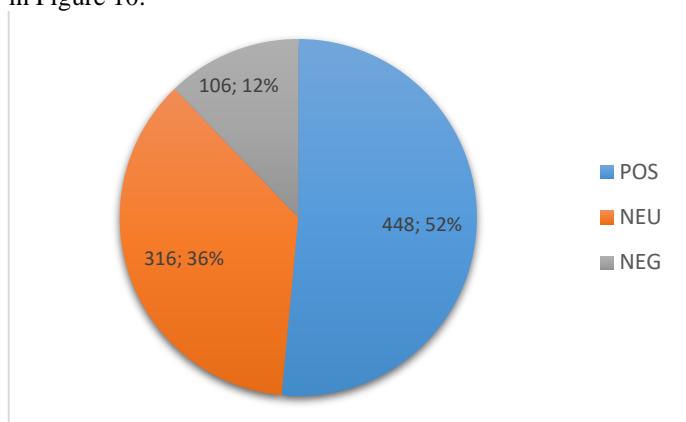


FIG. 12. PIE-CHART FOR DISTRIBUTION OF SENTIMENT FREQUENCY

As seen in Figure 12, sentiment analysis distributed positive (n=448, %52), neutral (n=316, %36), and negative (n=106, %12). Comments are mostly positive and neutral. Number of negative comments is very few.

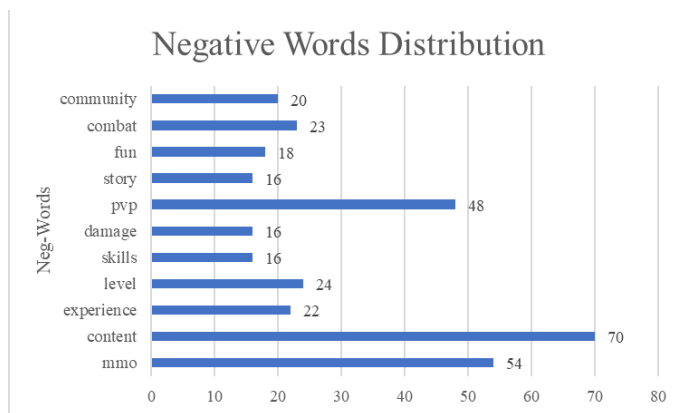


FIG. 15. NEGATIVE WORDS DISTRIBUTION

According to Figure 15, can interpret which is in negative group, focuses on content, pvp, story, combat and community. Content and fun players are among most important structures that make MMORPG games unique.

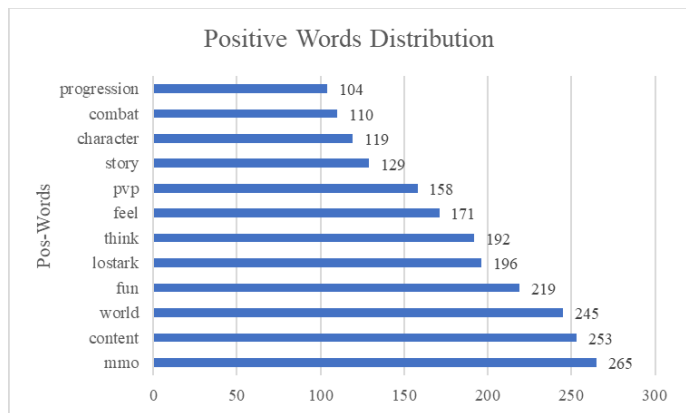


FIG. 13. POSITIVE WORDS DISTRIBUTION

According to Figure 13, can interpret MMO (Massively Multiplayer Online), which is in positive group, focuses on content, world, entertainment, and feeling. Content and fun

According to Figure 17, can interpret which is in neutral group, focuses on game, players, items, people, combat and content. Combat and items are among most important structures after players and game that make MMORPG games unique.

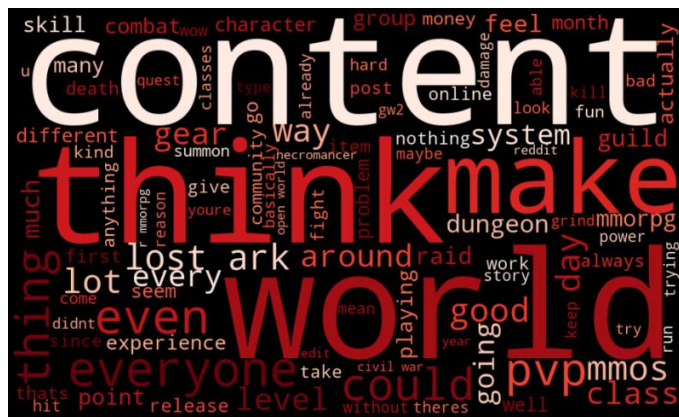


FIG. 16. WORD CLOUD NEGATIVE WORDS

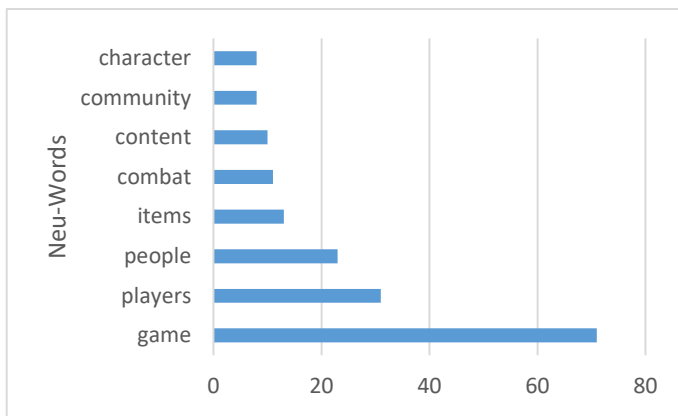


FIG. 17. WORD CLOUD NEUTRAL WORDS

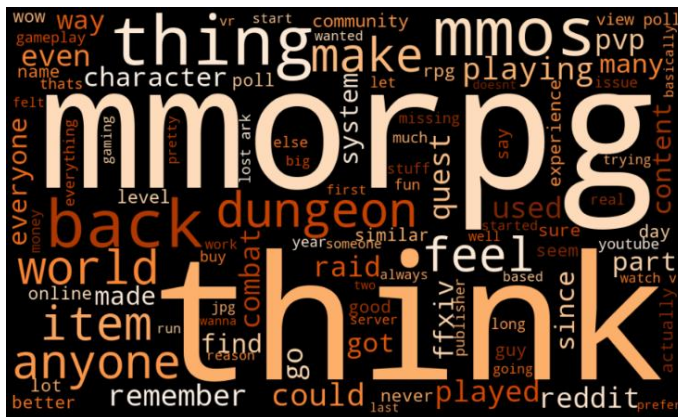


FIG. 18. WORD CLOUD NEUTRAL WORDS

## V. CONCLUSION

People who are attracted to MMORPG are people who like to Role-play online with other real people, hence the acronym MMORPG (massively multiplayer online roleplaying game). Not surprisingly, quite a lot of MMORPG gamers rarely play any other type of game (or at the least, don't even come close to putting the amount of time into other game genres).

It's the social interaction and the character development that's the real draw. While other genres like single-player RPGs, open-world, 1<sup>st</sup>, and 3<sup>rd</sup>-person action, and etc., have bits and pieces of the same features, MMORPG generally covers all the bases for giving a player the feeling of being part of a living, breathing virtual world. Features like player housing, player-driven economy, factions, the high capacity of players, and the immense size of the world, are what typically set it apart from other video game genres [56].

Positive, neutral and negative sentiment distributions are given in Figure 12. Information in the comments, gameplay accessibility, mechanics, arena battles, and art style why it's so booming in a major base game is reflected in the attractive feature results. Another factor is the story. A strong story of WoW and similar games are among the top preferences of the players [57]. Some concepts are in both groups, this is because

some players like factors such as content, combat, community, etc., while others do not, for example.

As a result, there are common words in positive, neutral, and negative group. These words are positive for some players and negative for others. However, after an element in the game industry is mentioned negatively by the players, it remains in the minds for a long time. In this respect, although the content and multiplayer structure are in the positive group, they represent the negative emotion more.

However, one of main reasons why MMORPG games are still played by players is the community, which is one of the important elements. That is, players play the game to belong to a community and to be in constant communication with that group [58]. In this respect, it is important that games that have been or will be released in this genre pay attention to the community factor.

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