Analysis and Research on the Influencing Factors of Continuous Use Intention of Mobile Game Players based on Python Semantic Analysis

Dining Chen

School of Journalism and Communication, Beijing Normal University, Beijing, 100875, China

Abstract

This paper uses Python software to crawl 13580 player comment data about "Harry Potter Magic Awakening" in the famous mobile game sharing community TapTap, extracts high-frequency feature words from the comment text through word segmentation, carries out semantic network analysis and conceptualization of the text data, and further carries out semantic network analysis and classification analysis, in an attempt to explore the factors that affect players' willingness to continue to use, in order to provide a mirror for the game development industry. It provides a new idea for the research of game data analysis.

Keywords

Python; Game Mechanism; Semantic Analysis.

1. Introduction

IP (intellectual property) is translated into intellectual property in Chinese, also known as intellectual achievement right. In the traditional intellectual property system, IP refers to the exclusive rights that intellectual workers produce achievements in the process of intellectual labor and enjoy according to law. In the new media era when IP development is in full swing, the connotation of IP economy can be extended infinitely, which is similar to "Francise" (franchise), that is, various forms of products are derived from a certain copyright work. From the perspective of consumers, IP economy represents the phenomenon that consumers are interested in a certain kind of label, symbol and cultural phenomenon, which is transformed into consumer behavior. In 2015, there was a phenomenal outbreak of IP economy, and the Chinese market entered the first year of IP. Since then, many popular IPS have been mined and developed, and a wealth of cross media narrative works have emerged. Recently, JD consumer and Industrial Development Research Institute released the IP co branded consumption report, pointing out that the total sales of local IP in China will nearly triple in 2021. Generally speaking, the current IP economy is in a state of accelerated development, showing a comprehensive trend of Pan entertainment.

Game development has always been a hot field of IP adaptation. Gamma data shows that in 2020, the revenue of IP adapted mobile games exceeded 100 billion yuan for the first time, and IP change has become an important driving force to support the growth of China's game market. A mature IP with its perfect world outlook and fan appeal can often bring considerable economic benefits to game manufacturers. At the beginning of the school season in September 2021, Netease launched the RPG mobile game "Harry Potter: Magic awakening" (hereinafter referred to as "magic awakening"), which was jointly developed by Netease and Warner Bros. mutual entertainment and obtained the genuine license of "Harry Potter". Harry Potter is undoubtedly the most influential super IP in the world. It once ranked among the top ten most profitable IPS in the world with a total revenue of US $32.2 billion. Therefore, the mobile game of magic awakening has been highly expected and attracted the expectation of countless

Chinese original fans. By the end of the official launch, the number of reservation players on its official website had reached 15 million, and more than 500000 players had downloaded on the whole platform on the first day of the launch. According to the joint debugging of Deben consulting, Internet Weekly and eNet Research Institute in 2021, magic awakening led Netease mobile game revenue to increase by 26.5% year-on-year 2%, becoming the second place of IP games in 2021.

Less than a day after the game went online, the download volume of "magic awakening" on the mobile game platform taptap has reached 75 90000; According to Qimai data, the average daily download volume of the game has been more than 300000 since it was pre downloaded; In Huawei's application market, the download volume of Harry Potter: Magic awakening has reached 1.23 million; In addition, the micro blog topic # Harry Potter magic awakening # read as much as 10 600 million times, with 54.4 times of discussion 90000 times. There is no doubt that the mature IP universe of Harry Potter has brought explosive energy.

In January 2022, the mobile game "magic awakening" was denounced by the players again for the spring festival activities. "Ten thousand people asked to resign the Harry Potter magic awakening plan" ranked first on the microblog hot search list. Developers ignore the demands of players, unreasonable internal purchase consumption mechanism, lack of balanced game experience, great deviation from the original setting, single and boring game mechanism and other problems have ignited public anger. Although strong IP has helped developers take advantage of its "market tested user needs", the harsh recognition of the original fans of IP adaptation has always been a common problem in the IP economy. What makes consumers quickly "bow down" to the super IP of Harry Potter? What are the factors that affect the attitude of players in magic awakening? This paper attempts to explore the factors affecting players' willingness to continue to use the game by analyzing users' comments on the game, so as to provide reference and Enlightenment for the development of IP game.

2. Theoretical Framework

2.1. Willingness to Continue to Use

The behavior defined by the user's intention to continue using the concept of intention after the initial use is the extension of the user's subjective intention. In terms of concept, Blackwell believes that the willingness to continue to use is the subjective judgment of whether an individual wants to complete something in the future[1]; Peter J. P and others believe that the possibility or subjective probability of an individual's behavior in the future is called behavior intention, which can predict the possibility of the behavior in reality[2]. In the study of influencing factors, Barnes believes that the main driving forces of users' continuous use intention in the virtual world are perceived interest and perceived usefulness[3] through empirical research. In the field of game players' willingness to continue to use, foreign scholars Li (2015) and others verified the relationship between three kinds of use motivation and game users' willingness to continue to use with the help of information system sustainable use model, found that these three kinds of use motivation have a positive and significant impact on game players' willingness to continue to use, and divided them into seven related variables.

Table 1. Online game users' willingness to continue using scale based on game satisfaction [4]

Motivation	Hedonic gratification	Social gratification	Utilitarian gratification
Variable	Enjoyment Fantasy Escapism	Social interaction Social presence	Social presence Self-presentation

Domestic research mostly equates the willingness of continuous use with user stickiness. For example, Duan Feifei (2017) combined immersion theory with TAM model to measure the impact of three variables on mobile game players: game design, game content and player characteristics. The interaction and practicality of the mobile game itself have a significant impact on the game immersion experience, and the degree of immersion experience has a positive impact on the continuous use intention of mobile game users. The "willingness to use" discussed in this article refers to the player's willingness to continue to use a game, focusing on the reasons for the change between the intention before and after use.

2.2. Game User Motivation

The motivation of game users has always been an important research direction in the game field. According to different game purposes, art (1996) divides game users into four types: Archivers, explorers, socializers and killers. Achievers generally refer to those who devote themselves to completing tasks in the game and obtain certain game honors and rewards, Players who improve their game level and level to obtain stimulation and sense of achievement. Explorers generally refer to players who have fun in discovering and exploring the virtual world of the game. Socialists mainly focus on players who communicate and interact with other players in the game to meet their social needs, while murderers hope to obtain stimulation and sense of achievement by successfully killing or defeating the enemy.

Table 2. Nick Yee MMORPG game player use motivation types and variables [5]

Motivation	Social	Achievement	Immersion
Variable	Socializing Relationship Teamwork	Advancement Skills Competition	Discovery Role-Playing Escapism Customization

PVP (player to player) combat, social interaction and role building are the three core functions of magic awakening, which correspond to the three main game motivations of achievement, social interaction and immersion. In addition, we should not ignore the attributes of the IP adapted works of magic awakening. Users include a large number of original fans, and their attitude towards the adapted games is deeply affected by the consistency of the original works and the psychological expectations of fans.

3. Research Method

3.1. Selection and Preprocessing of Text Data

The text data of this study is the evaluation of the game by the players of magic awakening on the taptap platform. Taptap is a famous mobile game sharing and commenting community in China, and it is also an important online channel of magic awakening. According to the latest data, magic awakening has been downloaded nearly 4 million times in taptap channel, and about 3.5 million user comments 60000 items, with a total score of 6.00 0 (10 point system), of which about 30% are one star bad reviews. The platform shows that the game developers of magic awakening have settled in, and they are required to register users for the platform to comment. Based on this player base and comment mechanism, this paper believes that taptap user comments are well representative, which can reflect the player's attitude and willingness to use the game, and the attitude of merchants and services. First of all, the extreme value of user evaluation in software stores is too different, which is often dominated by simple praise and criticism attitude, filled with a large number of comments that are not constructive or even

useless; Secondly, the main function of the software store is to download the software. The vast majority of users have no comment motivation. They often comment in the software store when the software use experience is very poor or excellent. For example, in Huawei software store, the installation volume of "magic awakening" is as high as 30.44 million times, and the number of user comments is only about 20000, of which the highest five-star and lowest one-star comments account for more than 85%. After manual data cleaning, incomplete and invalid comments were deleted, and finally 11795 valid data were obtained. Combined with gooseeker software, word segmentation is carried out on the text data to remove words with no practical meaning such as prepositions, auxiliary words, adverbs and function words, and mainly retain adjectives, verbs and nouns. On this basis, word frequency is counted to obtain a high-frequency vocabulary. In addition, according to the actual situation, this paper makes user-defined modifications to the word segmentation thesaurus, such as merging similar words, unifying abbreviations with the expression of Chinese characters, adding proprietary words used by game players, etc., which improves the effect of word segmentation to a certain extent.

Table 3. Examples of high-frequency words

Label word	Word frequency	Label word	Word frequency	Label word	Word frequency	Label word	Word frequency
'Kejin'	11359	IP	3102	time	2447	bug	1842
card	5887	events	2895	like	2428	clothes	1719
Wangyi	5666	original	2751	gold card	2189	update	1698
plot	5171	problems	2748	directly	2176	mechanism	1610
'Gan'	4027	magic	2680	house	2164	turntable	1595
Harry Potter	3235	ball	2517	disgust	2152	everyday	1593
duel	3175	experience	2448	design	2105	balance	1562

Note: 'Kejin': Game terms, especially the recharge behavior in online games.

Wangyi: A Chinese Internet technology company, the developer of "Harry Potter Magic Awakening".

'Gan': Specifically refers to the behavior of investing a lot of time and energy in acquiring resources in the game.
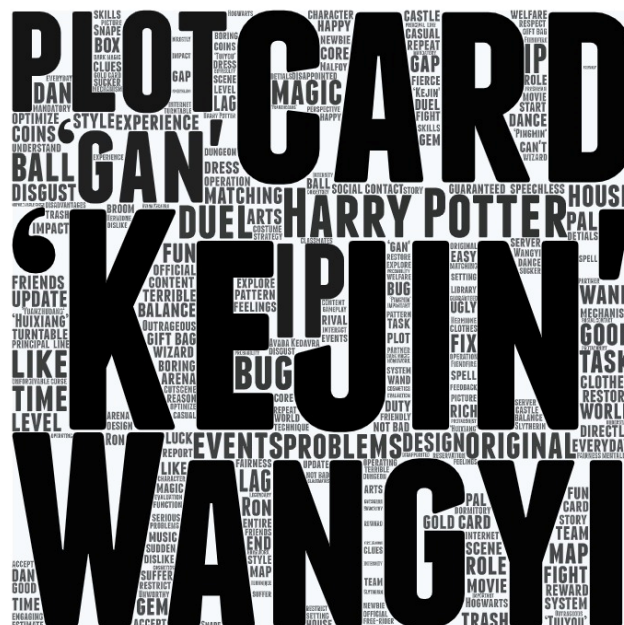
Fig 1. Cloud picture of some high-frequency words

3.2. Feature Extraction and Conceptualization of Data Text

Based on the statistical results of word frequency, this paper further processes the data, eliminates the ambiguous words such as "reasons", "sudden", "whatever" and "important", collects and classifies the remaining words according to the semantic relationship, conceptualizes them into categories that fit the framework of this literary theory, and finally obtains 9 types of attribute words.

Table 4. Attributive word

Main motication	Related variables	Partial corresponding vocabulary
Social motivation	Teamwork	Team/rescue/ball/Quidditch/class
	Socializing	world/public channel/calling/Emoji
	Relationship	Application/friends/borrow/chat/bind
Achievement motivation.	Advancement	'Kejin'/'gan'/Magic Book/level/score
	Skills	skills/golden card/rank/strategy/the forbidden forest
	Competition	duel/fight/match/enemy/knock/balance
Immersion motivation	Discovery	adaptation/design/plot/art//music/bug
	Role-Playing	House/name/ID/avatar/schoolmate/wand
	Customization	clothing/dress/customize/dubbing/DIY/settings

4. Feature Association Analysis based on Social Semantic Network

This paper further analyzes the social semantic network of the keywords in the high-frequency thesaurus, and forms the co-occurrence matrix thesaurus and the first-level node social semantic network diagram. The co occurrence relationship between various keywords is shown in the co occurrence matrix by the relationship index. For example, the co occurrence frequency between "Kejin" and "card" reaches 3664 times, the co occurrence frequency with "Gan" reaches 3066 times, the co occurrence frequency between "events" and "Gan" reaches 1264 times, the keyword with the highest co occurrence frequency with "quit" is "Kejin", and the three keywords with the highest co-occurrence frequency with "events" are "Kejin" "card" and "Gan".

Table 5. Co-word matrix (based on summary comment data)

	'Kejin'	'Gan'	Card	Plot	Original	Events	Quit	...
'Kejin'		3066	3664	2504	1864	2716	826	...
'Gan'	3066		1347	1054	800	1264	314	...
Card	3664	1347		1788	1527	1344	657	...
Plot	2504	1054	1788		1434	1000	375	...
Original	1846	800	1527	1434		348	364	...
Events	2716	1264	1344	1000	348		289	...
Quit	826	314	657	375	364	289		...
...	...	...	...	...	...	...	...	...

The overall semantic network shows the bridge relationship between high-frequency words. Through figure it can be found that the position of the node from the center of the network reflects the position of this concept in the semantic network. From the figure, it can be seen that the core node is "krypton gold", which is associated with most nodes. In addition, "plot",

"Wangyi" and "card" are most closely related to other feature words in the semantic network and co-exist frequently. They and "krypton gold" have become the four core feature words in the whole semantic network. At the same time, there are several very important nodes: "bug", "match", "planner", "original" and other core feature words, which act as a bridge in the semantic network, make the whole semantic network interconnected, and realize a close connection between different user views and different evaluation objects. These core feature words are the core evaluation objects that users attach importance to. It is worth mentioning that the nodes associated with the high-frequency word "quit" are "duel", " the forbidden forest ", "Gan", "Kejin" etc.
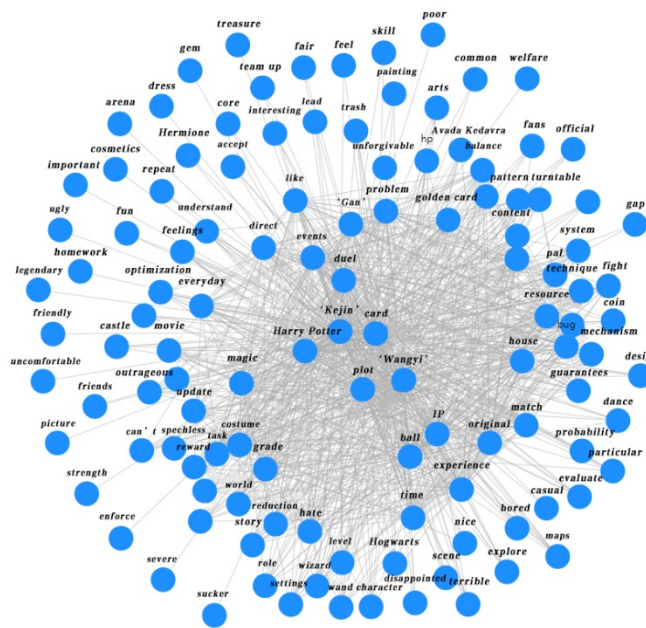

Fig 2. Overall semantic network diagram

After the detailed analysis of the social semantic network using the Rost tool, the co-occurrence semantic network of 150 high-frequency words is obtained. The arrow pointing relationship and the line thickness between keywords more intuitively indicate the degree of association between high-frequency keywords
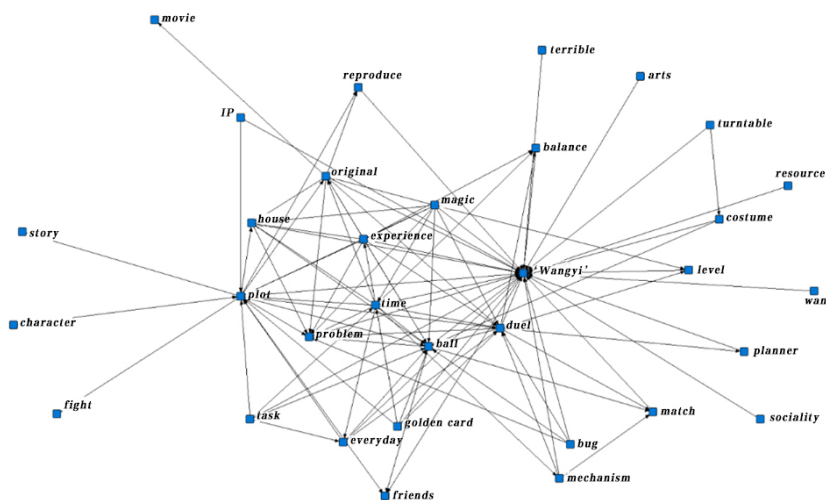

Fig 3. High frequency word semantic network diagram

Based on the feature correlation analysis of semantic network, it can be seen that the main factor affecting users' social experience in the game is the forced social link, which makes many users without social motivation feel pressure; The main factors affecting users' achievement experience in the game are arena mechanism such as match and internal purchase mechanism; The main factors affecting users' immersion experience in the game are game plot, sound effect, picture, world setting and so on.

5. Classification Analysis

Through the analysis of high-frequency thesaurus and social semantic network, we can basically get the factors that significantly affect the users' willingness to continue to use magic awakening. On this basis, this paper continues to explore to what extent these main factors affect the users' willingness to continue to use magic awakening. Classify the overall comment data after word segmentation

Table 6. Labeled classification Thesaurus

Category	Tag words
Achievement motivation	recharge/price/Kejin/Gift Box/turntable/sucker
	upgrade/rank/skill/level/grade/resource/magic book
	pvp/score/duel/battle/hard/fight/against
Immersion motivation	HP/worldview/plot/original/adaptation/feelings/film/movie
	clothing/dress/clothes/equipment/DIY/dubbing
	frame/picture/style/exquisite/delicate/art/music/sound
Social motivation	class/teamwork/team/rescue/league/cooperate/cooperation/partner
	channel/dialog/shield/apply/application/chat/emoji
	interactive/interact/friend/dormitory/social/anxiety/roommate

The results show that among the 11795 comments, 9670 comments contain marking words, which shows that the selected tag words are representative. As shown in the table shows that in terms of categories, there are 7779 comments related to achievement motivation, accounting for 43%, 7543 comments related to immersion motivation, accounting for 41%, and 2966 comments related to social motivation, accounting for 16%. It can be seen that among the three main game motives, users of magic awakening pay more attention to achievement motivation and immersion motivation, and pay much less attention to social motivation than the first two.

6. Conclusion

Based on the results of word frequency analysis and semantic network analysis, the Kryptonian system of Magic Awakening is the game experience that players care about most. The gap between card levels and resources directly determines the competitiveness of players in the pvp game, which is the core of the game, so many players not only need to spend a lot of time and energy to earn game resources, but also have to buy in order to improve the level. This has also become the main reason why players are generally dissatisfied with the Krypton gold system. On the whole, the game motivation of the players of Magic Awakening is mainly achievement motivation and immersion motivation, and the driving force of both is far greater than that of social motivation. Basically, it can be judged that the game experience that most players attach importance to is focused on game achievements such as upgrade, competition and card collection, as well as immersive game experience such as IP restoration, game fluency, picture and sound effects, while social experience is not the main need of players. The strong

social atmosphere makes some players find the feeling of "campus network", but the oversaturated social environment also makes some players feel stressed.

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