GPM: Enhancing Online Gaming Engagement and Experience through Precise Matching Algorithm

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Introduction

The Gaming Player Matching system (GPM) is an app designed to assist gamers find gaming partners and also serve as a social networking software. Looking from the gaming companies and platforms' standpoint, GPM can be a valuable tool to increase daily average online time, attract new users, and drive higher profits. By enabling social connections between players, the app can foster greater user engagement and retention. Additionally, by providing a streamlined platform for gamers to find compatible teammates, the app can help decrease toxic behaviors, alleviate user frustration and minimize the likelihood of losing users.

Business Goal

a) Market Research

The gaming industry is experiencing rapid growth on a global scale. According to a report published by Newzoo, a leading market intelligence provider, the online gaming market is valued at $184.4 billion as of 2022, with China and the United States leading the market with $45.8 billion and $45.0 billion, respectively.

As the gaming industry expands, there is a growing demand particularly in the game companion services segment. Casual gamers seek individuals to play with, while more professional gamers aspire to improve their skills and turn gaming into a career, such as e-sports. The Chinese gaming "accompaniment" market has witnessed remarkable growth in recent years, with a market value of 13.8 billion yuan (approximately $2 billion) in 2020, an increase of 44.6% from the previous year. Bixin, a digital platform with over 40 million users, is one of the most popular game companion platforms. In addition, some game streamers offer companion services through live streaming platforms, such as Douyu, Huya, and Panda TV. There are also platforms that facilitate player connections, such as Tongfu Xingkong, Gamify, and YY. The market for game companion services is expanding, as more players purchase these services for entertainment, and skilled players offer these services to earn a part-time or full-time income.

By contrast, the gaming companion market in the United States, while similar to China in terms of overall market capitalization, is not as well-developed. SuperData reported that the gaming "accompaniment" industry's market size in the United States reached $293 million in 2020, a 30% increase from the previous year. Companies such as Gamer Sensei, Boosting Factory, and Elo Boost Pros operate in this industry. The potential for growth in the game accompaniment industry is promising, especially in the United States, and requires pioneers to tap into this market.

b) Target Customers

In light of the immense potential of the game companion market, our GPM app targets a diverse range of customers, including players, online streamers, and game companies.

For players, nowadays 66% of Americans playing video games regularly. Additionally, 61% of gamers utilize video games to extend their social interaction, with approximately half of them having met significant others through this medium. Our app can fulfill these needs for social interaction and foster greater engagement within the gaming community.

For online streamers or e-sport coaches, prolonged periods of isolation may lead to burnout and decreased productivity. Collaborative efforts have been shown to boost morale and foster inspiration among these individuals, leading to increased productivity and support. The

current approach for finding collaborators includes utilizing platforms such as Discord, Facebook, and browsing channels, which are often inefficient and lack security. Our app offers reliable matches based on sophisticated algorithms, providing a secure platform for collaborations.

For game companies, the business model has undergone significant changes in recent years, with in-game transactions surpassing traditional one-time game sales in profitability. Consequently, it has become increasingly important to match players and enhance their long-term engagement. Our app offers a valuable solution for game companies by providing a platform for players to connect and engage with one another, ultimately increasing their overall engagement and retention rates.

c) Business Model

Our business objective is to develop an application that can efficiently and precisely connect gamers for online gameplay. By implementing this idea, our business can benefit in several ways. Firstly, the app can provide a personalized gaming experience for users by matching them with not only gamers they are interested in but also players of similar skill levels and interests, leading to increased engagement and satisfaction. Moreover, This app creates a significant opportunity in the gaming industry, as it addresses the issue of gamers struggling to find appropriate teammates, which can often lead to a suboptimal gaming experience . Furthermore, the app can also help reduce toxic behaviors in online gaming, as players are less likely to exhibit negative behavior towards teammates. The app presents a unique opportunity to improve the online gaming experience, enhance player engagement and satisfaction.

In order to make sure the matching is successful, we will utilize a key performance indicator (KPI) to measure the effectiveness of our player matching system. This KPI will assess the redirect to game rate, which indicates the proportion of successful matches that result in players actually starting the game together. Additionally, we will incorporate personality tags or labels for users to enhance the accuracy of our user matching process. Moreover, we will implement a rating system for users, which will provide valuable feedback to further refine our user matching algorithms.

There are several potential ways for the Gaming Player Matching system (GPM) to earn money: Firstly, the app can implement a subscription-based model. The app can charge a monthly or annual subscription fee for premium features, such as access to advanced user matching algorithms, more personalized recommendations, and additional social networking features. Moreover, The app can display targeted advertisements to users based on their gaming interests and preferences. Advertisers can pay to display their ads on the app, providing a source of revenue for the business. Last but not least, the app can establish strategic partnerships with gaming companies and platforms, and earn a commission fee for every successful match made through the app or receive a percentage of the revenue generated by users who benefit from exclusive deals and promotions offered by gaming companies and platforms.

A dream success for this app would be to become the go-to app for gamers worldwide, with millions of users finding enjoyable and compatible teammates every day. This would translate into a significant increase in user engagement, retention, and revenue for gaming companies and platforms that partner with us, and a significant impact on reducing toxic behavior in online gaming. Additionally, the app would be widely recognized as a solution to the longstanding problem of frustrating player matching experiences in online gaming. However, if the initial plan does not work as intended, a possible plan B would be to pivot the app's focus from player marching to social networking. In this case, the app would shift its focus towards fostering connections between gamers based on shared interests, gaming preferences, and other personal factors.

Data

Our potential data source comes from an information collection system. By the time a new user registered for our service, we will collect and gather basic information from the user. Certain categories include: Age, gender, self-description, favorite games, etc.

On our planned path, we will cooperate with big video game companies including Steam, Microsoft and Tencent. If users choose to log-in using a third-party account, we can read their stored information on users' playing game history, active time period, etc.

The basic information gathered from users might contain fake information as it is purely uploaded by users. This is a common problem in online dating and matching apps. Scammers target online dating services to commit identity theft and financial fraud. In fact, 50% of Americans who have used a dating app in the past five years have experienced catfishing, which is more than double from 24% over 5 years ago. The weakness of this data information system is that there's no effective way to test the authenticity of the data.

Analytics Goal

Our goal is to match each online user with one or more online users who play the same game and have similar hobbies or interests. The main technique used in matching apps is clustering. For all the profiles that we obtained from our users, we will be doing real-time matching. By performing clustering(unsupervised machine learning), a user will be matched to top 5 users that have the highest similarity score based on clustering algorithms. Both of them will be redirected to the gaming app if they all clicked "interested".

Through our matching algorithm, users will be able to find friends/significant others with the same interests and play the same video games. This could add extra joy to users when they are playing games.

To prepare the dataset for clustering, we will need to first scale, vectorize then perform PCA on the dataset. With vectorization we will be using count vectorization & TF-IDF to see if they have a significant effect on clustering algorithms. The processed data frame will contain vectorized self-description and scaled categories. The next step is to perform dimension reduction by using Principal Component Analysis. We will be using 95% variance as a standard to determine the number of features. With our data scaled,vectorized, PCA'd, we can begin the clustering process. The optimized number of clusters will be determined using David's Bouldin score. Based on the previous steps, we can finally assign each profile to a cluster using K-means clustering.

There are some follow-up questions after we implement the algorithm. A good approach to test the algorithm and find potential drawbacks is to use resampling and study cluster stability. In other words, we can resample the data(using bootstrap) and compute the "closeness" of the resulting partitions, as measured by Jaccard similarities. It can be visualized to see whether certain clusters dissolved or the number of observations in each cluster changed significantly. One last thought on drawbacks is that K-means clustering simply puts profiles into a single cluster and we cannot determine how many profiles to present to the users. Another approach is to use hierarchical clustering which group objects into clusters based on their similarities. With hierarchical clustering, profiles would then be narrowed down to the top 10 similar or correlated profiles with each other.For example, any random profile within the dataset would be shown ten similar profiles from their respective cluster.

Weaknesses and challenges

One of our primary challenges is to establish partnerships with large game corporations, as this is vital but difficult to accomplish. Partnering with game companies is important for acquiring customer information and enabling access to popular games. However, many giant companies with substantial customer bases may not require cooperation with us to maintain

their existing customers or expand their business. Therefore, demonstrating our value in improving active users and promoting spillover between games is key to earning their trust.

The accuracy of our matching system is another significant challenge. During the initial stage, we will need time to gather sufficient data to train and adjust the matching and recommendation system, which may cause customers to lose patience and trust in the app, leading to a high churn rate. Even at the end of this process, achieving perfect matchings consistently may be difficult. Our algorithm primarily focuses on matching users based on simple similarity, which can lead to less accurate recommendations as the algorithm initially suggests users with the highest similarity score. Moreover, people may not always be interested in connecting with those who share the same interests, and instead may seek out individuals with different backgrounds, interests, and habits. Thus, it is crucial to constantly attract new users and modify our algorithm by incorporating both Collaborative filtering and Content-based filtering into our matching and recommendation system.

Real-time matching presents another challenging hurdle. Ensuring that matched users are online at the same time is difficult, and if they are not, the matching loses its significance as users cannot chat and play games together regularly. Encouraging users to develop a habit of using the app, such as requiring them to turn on notifications and considering their usual online time during matching, could help overcome this issue.

Lastly, there is the challenge of delayed earnings. Our business primarily earns revenue from membership costs and game ads, which will only occur after the app has achieved phase-specific milestones, developed a stable and active user base, and earned recognition from individual customers and game companies. Therefore, having sufficient initial investments and funds and ensuring operational efficiency are essential.

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