SquadSearch

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Abstract

The Internet serves many functionalities. One such functionality is the ability to respond to high demands with multiple supplies. However, the Internet is extremely vast. For the demands and the supplies to meet, they need a middle man. For general demands and supplies, Google, Bing, and Facebook act as such middle men. There are other specialized systems for special tasks. For example, Uber helps people to find a driver to get to their destination while simultaneously allowing others to make money by being a driver. Traveling tourists can use Airbnb to find accommodations for them to stay on their trips.

In this project, we created a system that allows people to search for teammates, create groups, and find tournaments to play at. By having users create profiles with their contact and player information, we hope that this will help people interact with others who share the hobbies of playing their game and strengthen the overall community for that game. Our system will support popular esport games, such as Overwatch, PUBG, LoL or Dota 2.

Through research, we found out that this idea has been picked up by a start-up called GamerLink. However, our approach to this problem is different, and we believe it will lead to a better system.

Introduction and Problem Definition

Who do we play games with? The answers could vary from our neighbors to our friends at school, but all the answers yield one similarity: they are people whom we know. Thus, our choice in teammates is limited. This may become a problem when we wish to take a more serious approach to the game. Unfortunately, situations where we may be a serious gamer while our friends are not, or the skill gap between we and our

teammates is uncompensatable, may occur. Either these or thousands of other reasons could lead to a less than desirable situation in a team-based game. A solution to this problem is to expand our potential teammates list to the people whom we don't know. However, going door to door to ask strangers if they would like to join us in a game may not be a good idea in term of efficiency. Fortunately, with smartphones and the internet, we can search for the ones we need from millions of people in no time. Our application applies this idea into helping us find teammates.

We also want to address the concern about the project's importance, necessity, and role in epsort. Esport has become quite large and is still growing. As of today, there are over 200 million people playing the top 9 most played esport games [1]. Along with the large number of players, it is a massive industry that generates billions in revenue as well as employs hundreds of thousand people [2]. Yet, there still has not been an official forum for esports players to find each other and play together. The gamers around the world are making do with Facebook or other similar mediums for this functionality. However, they are not efficient enough and can't match the gamers' needs and expectations. Thus, an app like ours is necessary.

This app serves the purpose of connecting gamers, but the app is more than that. This connection of gamers is expected to have great impact in the development of the gaming industry. First of all, it will attract more new players into the games. One of the obstacles that prevent people to try new thing is that they don't have a companion to do it with them. This app can be used to solve this very problem. There are plenty of people who have this same problem and our app can help them to find each other.

Not only the quantity, but the quality of players is also improved by our app. By connecting gamers all around the world, our app stimulates exchange in skills and knowledge about the games between the players. The app can serve as a "melting pot" of gamers.

The two benefits above can also help the competitive esports scene. Many people play esports but only a tiny portion of them “go pro”. The reasons behind gamers’ indifference to play professionally are because it doesn’t pay well, it’s hard to find a team, and it’s hard to get good at the games (because of the limited of resources in teaching and coaching). Our app results in more players, more money flow into the industry, more chances to practice and more chances to find teammates, which will be the fix to the problem.

Current State of Art

Among the multiple search engines across the Internet, LinkedIn is one that fits with our application’s vision the most. LinkedIn is a professional network that provides their users a mean to easily find careers that make productive use of their skills. The utilization of this website is not limited to individual users, however, as companies and businesses may also use it to find potential employees [3]. Users create profiles in which they input their name, location, education, and skills, acting similarly to a resume. LinkedIn also gives users other options for customizing their profile in order to further sell themselves to companies and businesses, such as developing networks with various people and subscribing to job listings. According to Statista, the number of LinkedIn members in 2016 totaled to 467 million users [4], and that number only increased in the following year.

LinkedIn’s user interface looks similar to Facebook’s user interface with how the user’s main dashboard supports posts said person has subscribed to. However, the search bar for LinkedIn organizes into the following three categories: people, jobs, and posts. In doing so, the user can easily browse through what the LinkedIn network has to offer if they do not have a clear idea of what they are specifically looking for.

Another potential system we can draw inspiration from is Craigslist. The main page of Craigslist displays a world map in which a user may choose a specific location. From there, a user finds categories of different types of advertisements [5]. Clicking into one category brings them into a list of advertisements with information pertaining to that specification. However, Craigslist does not have a strict guideline of how to post their advertisement. As a result, some people answering advertisements with little information may find themselves asking more questions about the posting than actually buying the item, getting the job, etc. We want to avoid this particular problem by providing text boxes used for only specific information. Some of these text boxes may be required while others may not be.

Lastly, Facebook provides an interesting feature for its users that we also hope to utilize eventually into our system. In Facebook, users have the capability to create events and invite other users to that event. The creator of the event can add a photo to help describe the event along with a timestamp and description. They can also allow their invitees to invite other people should they want to further spread the word about their event. Once a user receives an invitation, they will get a notification on their dashboard. They will have the choice to either accept, reject, or think about going. This is an effective method to notify people of upcoming events as more than 60% of Facebook users see public events on the provided newsfeed [6].

GamerLink is a phone application that carries a similar idea as ours [7]. However, a team member found that the application was very hard to use. In this app, users put up their information in the form of 4 attributes, Playstyle, Skill, Region and Communication, along with a short introduction so other users can find them using a filter system. Those 4 attributes are necessary to find matching teammates but there are other essential attributes that GamerLink fails to include. Not everyone has the same schedule or is free all the time to play video games, so letting the users to find people with a matching schedule is important. Moreover, for esports, each of the game may

have several different roles for players such as Support, Healer, Tank, etc. If people want to make a team, they need to know the roles of others so they can find the right ones. One more feature that GamerLink lacks is that they only support users as individuals. Letting users post their information as teams will make teams finding the players or roles they are lacking of or the people to find a spot in a team easier. In addition to region, the search can be improved by letting people to find teammates based on language. For a diverse area like North America, people who live in the same region may not speak the same language, thus make communication in a team based game impossible.

There is one more similar service with a website and application called Meetup [8]. People can create events and find events of other people based on geolocation and interests. But the main focus of this service is more about events, such as business meetings and photography session, than about the individual person and groups of people. We wanted to focus on connecting people initially through their common interests before providing possible events for the people to meet up in person.

Upon looking at these systems, we envision an application similar in style to LinkedIn and Facebook in terms of search. Similarly to those two systems, the user will have the option to customize their profile to their liking. However, there is some information that will be required of the user such as their name for account purposes and some sort of contact information. While LinkedIn has three main indexes for their searches, we decided to have one main index of Game. From there, we will eventually add sliders for users to specify their searches for certain characteristics they want in a player. While we want to implement a simple advertising system as Craigslist, we also want it to be organized in a way that makes it much easier for our users to search for a certain player. As a result we have an algorithm that ranks a user's search results based on location and skill.

Architecture

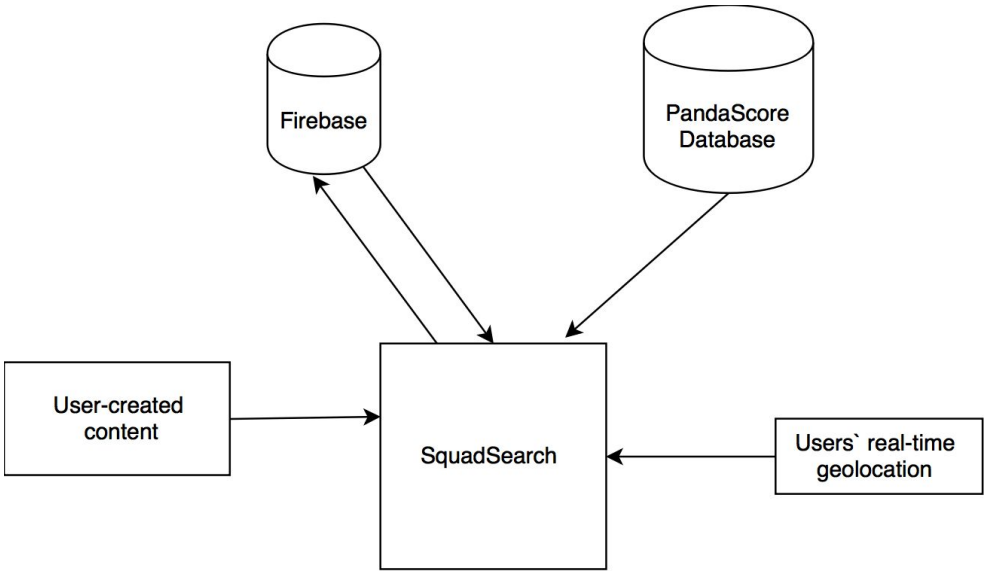
The application combines different data streams in order to provide recommended search results for the users.

The main data stream we use is episodic. We rely on the users to input the necessary information in their profiles. The information is then used to create ads for certain games. As the users continue to play, some of their information is subject to change such as their roles and skill level. As such, they will need to update their profiles to reflect this new changes if they want to search for new teammates.

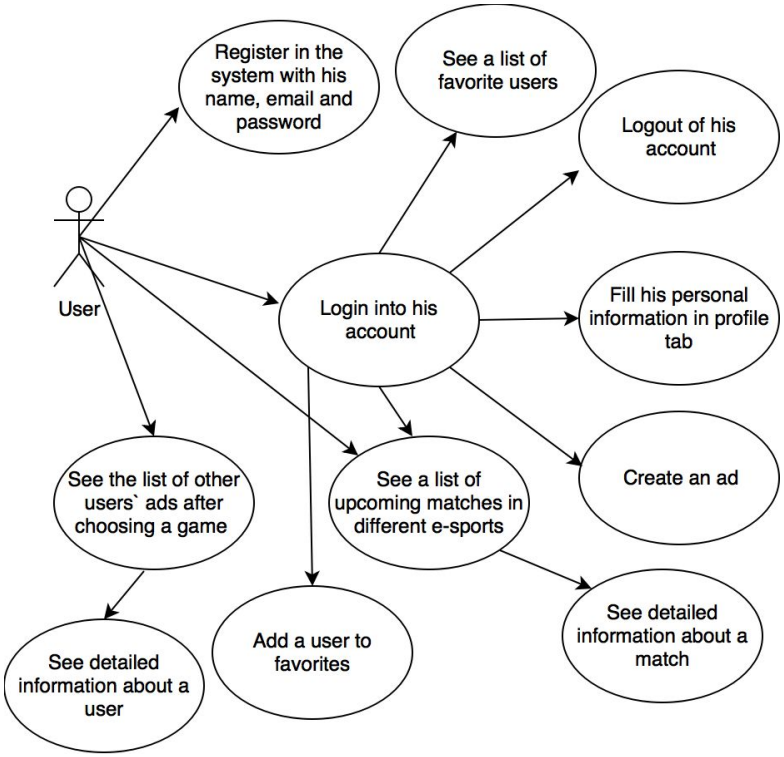
Another data stream we use is dynamic, and it helps to recommend the most relevant users in the search. We take the dynamic information of a user's real time geolocation from their phone sensor. This information is then used in the algorithm to firstly present ads from users who are located closer to a person that makes a query. All the information from those two streams is structured and saved in the real-time database Firebase and then used in an algorithm to show relevant ads for users.

As persistent data, we used information from a database for the Tournaments tab. After a user clicks on the tab, they will see a table of upcoming matches sorted by start time. If the user taps on the match that is interesting for them, another screen will appear with more detailed information about the event, such as the game, league and team names. All the information shown in the Tournaments are organized from data we receive from PandaScore.

The two below diagrams display the software architecture and use case of our application.



Picture 1. System architecture diagram



Picture 2. Use case diagram

Query and Input Environment

While users will have the option to make an account in our system, it is not necessary to do so to put in a search query. On the search page, the user will have explicit games to choose from by scrolling through. After the user chooses their game, they simply need to click on the “search” button, and the system will take them to a list of advertisements that are most relevant to users.

When a user makes a profile, they simply press on the “sign in” button and enter their email address. If the email address has not yet been registered in our database, the system will ask for the user’s first and last name along with a new login password before directing them to a blank profile page. If the email address has been registered, the system will only ask for the user’s password in order to redirect them to their profile. For the user’s profile, the user will be able to include a username, Discord tag, Skype username, and Steam account. They also have the option to hide the name they entered when they first made their account on their profile and advertisements when other users examine said user’s profile. Underneath their contact information the profile has various Game Advertisements that users may fill out. The user can scroll through the games and click on one. Once they do, they will be redirected to a page in which they can fill out their information pertaining to that specific game. This will result in an automatic creation of an advertisement about the user in which other users may now find based on their queries.

At the current moment, all the games include the same information that users can fill in such as Skill Rating, Role, and Looking For. However, we plan to make each game have specific information pertaining to said game for users to input their information in order to make the searching easier on the user. Most of the data we will get for our system is persistent data as we rely on the user to input their information so that we may be able to provide them with the information they want.

While we have not yet implemented it, we planned to allow users the option to create their own groups. In creating groups, users would have been able to include a group name and provide information on which role on the team has been filled in by which member. The group leaders will also be able to recruit members by sending invitations. Through the invitations, other users would have been able to accept and join the group. We had also planned to expand our search to allow users to input more specific queries, which will provide an easier experience for users without an account.

Presentation and Output

After a user inputs their query, they will be directed to a page containing the information that fits their intended search. Multiple profiles will appear in a list that the user can scroll through. If the user is not logged into their profile, the search results will be sorted based on the user's location, with the people closest to the user at the top, along with any additional information the user inputted such as skill level and role. If the user is logged into their profile, the search results will also be based on the user's profile information. For example, if a user has the role of Tank in Overwatch, their search results will not include players who are also Tanks.

The user can then click on one of the listed advertisements in order to view it. If they clicked on a player's advertisement, they will be taken to the player's profile. The identity and contact information the player inputted will appear along with map to show their general location. However, the information pertaining only to the game the user initially searched for will appear. As such, if the player had filled out other advertisements for other games, those particular information will not appear. The user can return to their search results through the "back" button on the top left-hand corner.

On the other hand, we wanted that if they clicked on a group's advertisement, they will go to said group's profile page. The group is structured similarly to the search

results presentation as the user can also click onto the individual members to see more information about them concerning about the game the user initially searched for. In order to make a new search, the user must press the “return” button at the bottom of the screen.

Once a user has looked at another user’s advertisement, they also have the option to “favorite” that player by clicking on the star button. Favorited players will appear in the user’s favorites list. Similarly to how the search results are presented, a user’s favorite list can be scrolled through to look at the various users and groups. Upon clicking on a favorited player or group, the user is taken to that specific profile page.

Should the user click on the tournaments page on their navigation bar, they will be brought to a page listing various upcoming matches that are sorted by the date of a match. Users can tap on an interesting match for them to see all the details on one screen, such as the game name, league name, league logo, team names and logos, and game start time.

Component Details and Algorithms

The iOS application has been developed using Swift language and XCode environment. For a real-time database we used Firebase. The application consists of the following five tabs on the bottom of the screen: Search, Profile, Groups, Favourites and Tournaments.

The Search tab is a simple screen, where a user can see and choose the names of different games. After they choose the game, one tap on search button will take them to the next screen with relevant ads from other users based on the information of the initial user. The Profile tab is where users fill in certain information about them and where they can make ads for different games they play. While the Groups tab is still in development, we plan to have it contain the various groups the user is in. It will provide the functionality to create new groups along with inviting other players and joining other

groups. The Favorites tab contains a list of players and eventually groups that the user had favorited. Lastly, the Tournaments tab allows the user to see upcoming matches of different games. While the Search and Tournaments tabs do not require an account to access, the Profile, Groups, and Favorites tabs do.

The search function uses an algorithm to rank the results of the search. If location data is available, it first uses that to compare the distance of two ads from the user. The weight of the ad is the log2 of the difference between the longitude and the latitude of the ad and the user's location. If the ad has a Skill Rating assigned to it, and the user has posted an ad and given their own Skill Rating, it also weights the ads by the log10 of the difference between the ad's skill rating and the user's skill rating.

Whichever ad has the lower weight (i.e. a smaller difference in distance, and/or a smaller difference in skill rating) is displayed first in the search results. Users will want to find teammates who are both close to them and similar in skill to them, in order to create a balanced team that is able to play frequently. Teammates who are too far apart may not be able to play the game at the same time as each other, and teammates with wildly different skill ratings will not be able to play at the same level as each other, so one teammate will be "carried" by the other.

User Studies and Evaluation

In order to test the various components of our system, we first created multiple fake accounts. On each account, we varied our inputted information so some profiles might have contained a username, other profiles might have hidden their name, and more profiles might have different games filled out for advertisements.

Our initial test made sure that a user without an account could still utilize the search system. Without signing in, we filled out our query and scrolled through our search results. Our ranking algorithm seemed to have work as the accounts with

locations closest to our location had priority over the other accounts. Upon clicking an advertisement for a player's profile, we were able to see their inputs such as their username, contact information, and information relevant to the initial game we searched for. However when we attempted to favorite the player, nothing happened as it should since we only allowed that feature for users with an account.

Afterwards we tested the system using one of the accounts. The search system worked the same as it had when we tested it without logining in. However, since we now had an account, we saw that the system properly sorted the results so the players close to us in both skill and distance were at the top. The favoriting option also worked as the star for favoriting darkened once we clicked on it. Checking our favorites page showed said player's profile in the list.

When we asked some of our friends to test it out, they appreciated how simple it was to input their information and an automatic ad is created for them. They said that the structure of the presentation was also easy on their eyes, and they can quickly scan a player's profile to see if they really wanted to play with said person. While our testers were satisfied with the overall system, they also asked if we planned to incorporate other features such as messaging and event creations to make it easier for them to interact with other users. At the current moment though, we are focused on providing a way for players to find other players to team and compete with.

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