

# Incentivizing Play In Augmented Reality Games

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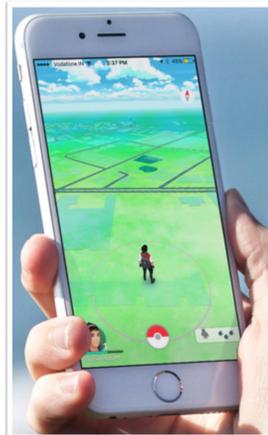
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## Abstract

There are many games right now use the real world as their game worlds. Location in these game worlds are based on GPS coordinates taken from user devices. Each player's location is visible in the game world to everyone else. These games also use augmented reality, the integration of digital information with the user's environment in real time, to interact with players. As a result, these types of interactions are new and we want to understand gamers incentive when playing these type of games. Moreover, it is important to understand the elements that make games like Pokémon Go, the most popular location based game, successful. We want to create a location-based, augmented reality game to get players data and understand players behaviors. The game starts with an undiscovered world, as the player moves, the world reveals and the player can conquered specific locations on the map to generate resources. Data collected are players' locations, players' interactions with others, players' online times, etc. These insights can be used to develop the next generation of location-based AR experiences. These type of data can be used in a wide variety of applications such as understanding crowd behaviors and crowd directing, a technique to guide/direct a crowd of people to a target location with or without people's awareness. This research serves as a useful, convenient platform to collect and process players' data.

## Background

Augmented reality games became popular in 2016. This increased the need for a platform for researchers to quickly deploy these type of games and testing different games mechanisms. The platform must allow researchers to collect players data to understand their incentives and interaction with the game and other players.



## Objectives

To create an iOS games to collect players data. The app should make use of Google Firebase for authentication, getting players statistic, and use Google Maps APIs for augmented reality. The app should be responsive, support multiples player at the same time. User data should be save to the cloud. The data collector should be able to see each players online time, interactions with other players and the games.

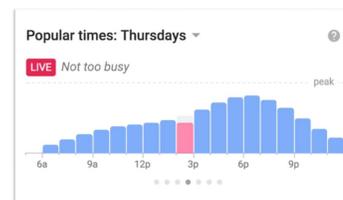
## Methods



We used Google Firebase as a backend data base for our app. User can create account securely using Firebase authentication service. Every interaction between player and the game will be saved to Firebase.

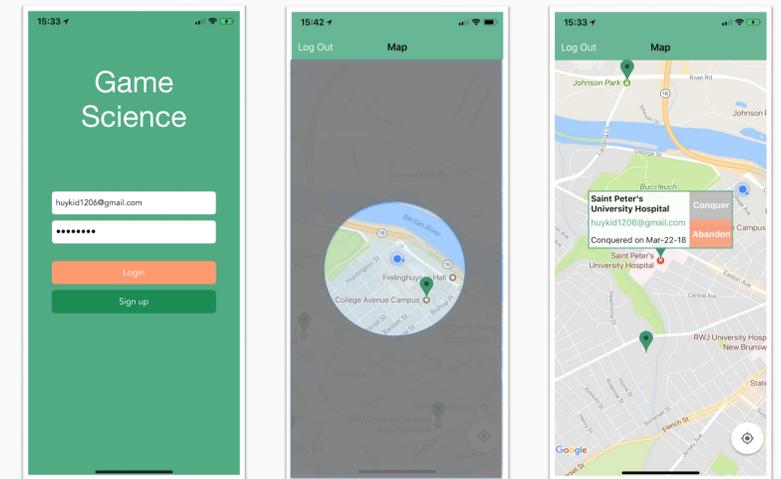


We used Google Maps API (free) to served as the game world. This is convenient because we can draw many layers of games element on top of Google Maps. Our data is fetch from the Firebase server and draw on top of Google Maps.



Each player can conquers several businesses. When conquered each location generates resources at the rate with respect to the number of people in that location. This data is not made available by Google for developers so we had to do some web scrapping. We had to analyze elements of Google website to get this data.

## Results



- These are screenshots from the app. The first screenshot is the authentication screen. User can login via email and password. The authentication information is securely saved in Firebase.
- The second screen is the player's initial world. The world is undiscovered. As the player moves, the world reveals and the player can conquered specific locations (marked by the green pins).
- The conquered location are visible across all players, those location generate in-game resources at a rate proportional to the number of people in that location.
- Those are the basic functions of this platform. Now we can quickly prototype different game mechanisms such as taking a picture to conquer a location, placing lures to attract other players to their location in different times of day, exchanging in-game resources to coupons to use in business locations in real life, etc.

## Future Directions

At the moment the game is quite primitive and served as a backbone for future development. In future research, different games mechanics will be deployed as well as in-game visual elements, artworks, sound effects to make the game more interesting.

## Acknowledgements

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