# AGH Guide

## Ch1. Research of already made solutions

Combines 3 different technologies:

* Augmented reality
* GPS location system
* Google maps

All of them were built on foundation of another game called ingress by Niantic developer.

### Ingress

The goal there was to claim territory using portals located all around the world.

Ingress project goals:

* Get people off the couch
* Build local community connections
* Explore augmented reality tech

Ingress uses mobile device GPS system to locate the player and interact with portals which are situated on historical landmarks or monuments. The app presents a map to the player with completely black background with marked only buildings, roads and bodies of water. These geographical features are supplied by OpenStreetMap and formerly Google Maps. The game AR system includes only usage of GPS to locate the player and place the xm energy in the real world. The extension of AR such as projection of objects with the use of camera was added in Pokemon Go.

Ingress data was used to populate locations for PokeStops and Gyms in Pokemon Go, that is why they are located mainly on public art or historical landmarks.

### Pokemon Go

Pokemon Go as well as The Witcher Monster Slayer expanded the augmented reality by using the end device camera to project models of pokemons or monsters onto the real world. Pokemon Go encouraged people to go explore their neighbourhood to find different types of pokemons. The game includes mechanics that spawns specific pokemons in their natural habitat and at a specific time using the end device GPS system to locate the player and the clock to determine the time. The game includes also evolving pokemons, upgrading them and also breeding them. In game there are pokestops and pokegyms where players can fight with other players. The fighting mechanics are not sophisticated, they based only on the pokemon power stat and does not incorporate any tactics.

### Witcher Monster Slayer

This game by different developer, Spokko, allows the player to role-play as the Witcher and hunt monsters. Game bases on similar technologies as Pokemon Go. It uses end device GPS system and the clock to determine the player’s position and time and their camera for projecting monsters into real world. The player instead of catching pokemons spawned in different locations, fights monsters and completes quests. The player needs to track the monster first by following its trail and then kills it. Fighting mechanics are more developed in this game than in Pokemon Go and it bases on other games like Elder Scrolls: Blades combined with some Sekiro mechanics. Played ‘cuts’ the monster on the phone with his finger with proper timing to use quick or strong attack, and parry or block by tapping and holding the screen.

### Conclusion

All of the games use GPS, clock, Google Maps and camera to ‘augment’ the fictional world with the real one. They are relatively new and just developing. Their main goal is to encourage people to go outside with friends and explore the world. This type of games has problem with the battery usage due to its need to be constantly on and using various phone sensors and compartments. There are more of this augmented reality location based games like ‘Geocaching’, ‘Harry Potter: Wizards Unite’ (follow up of Pokemon Go by Niantic), ‘Jurrasic World Alive’ or ‘Zombies Run!’, that encourage exercise.

<https://ieeexplore.ieee.org/abstract/document/7907241> - paper on Pokemon Go pervasive sensors

## Ch2. Functionality of my app

When launched the app will display the Unity and agh guide logo and the go straight to displaying the map and location of the player. The user will need to give permission for using the location and camera. If launched for the first time the app will ask for the year, faculty and subject of studies. If the year will be 1st , and the user will answer ‘yes’ to prompt window with application to university tutorial proposal the app will go into ‘tutorial’ mode that will guide the user how to apply to the university and submit all the necessary papers. When done the app will exit the ‘tutorial’ mode. When in the ‘normal’ mode the app will display the location of the user, settings icon and search bar. The search option will include locating the dean’s office for the chosen faculty, buildings with rooms(guiding on the correct floor), and all offices(mby professor’s offices also). The settings will include changing the initially provided info, exit/enter ‘tutorial’ mode, exit the app. Many AR based games have the ability to project some models with the use of camera, AGH guide might also implement such option to highlight the searched building and display informations about it. The app should have user-friendly and minimalistic interface, be easy-to-use and be well optimized in particular in battery management because location based apps like this that needs to be constantly running are extremely battery draining.

## Ch3. Process of creating the app

### Tools preparation

In order to create the prototype of the app I will be using the Unity game engine. It is a free of charge game engine available for everyone. Most of the new game developers and also big companies use this engine (more about it here). For the creation of the game scene I have 2 options, I can use the Google Maps SDK for unity or Maps SDK for unity. The first one is paid but gives broader options in context of possibilities, whereas the second one is free to use but offers less variety of tools. Either SDKs are sufficient for my cause, but I decided to use Google Maps SDK for being more advanced, and they offer 3 month free-trial which should be enough to finalize the prototype. For the AR camera connected functionality I will use the ARFoundation packages with ARCore package that implements AR on android devices. Google Maps SDK also provide the AR packages but I will supplement them by packages mentioned above.

All of the example apps I described previously use the end device GPS and camera and I plan on doing the same thing. The Google Maps SDK makes it incredibly simple, so that will not be a problem. There is built in location game package as well as AR package which takes care of the whole process of implementing end device camera and GPS system.

To test my build I will use my personal phone Huawei p10 Lite with enabled developer options and Unity Remote 5.0 app to test some parts faster not needing to install the build on my phone. To test whole app I will need to build the unity project and install it on the phone.

## Ch4. Conclusions

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