In summary, this game allows participants to add a digital layer upon the physical space in order to introduce a new way of helping people to understand their cognitions about the space. The project as a whole aims to look into a various cognitive reactions from participants based upon the memory and recall the information about the space involved, also the level of fixation on the digital contents, together with observing the different haptic modalities to identify the most appropriate settings for this AR game.

We researched on a series of historical references about Geo-based AR games. Collectively, they used the information from location services, trying to let the app to spawn digital contents at certain geo-locations and explore and play with them later. While many existing AR games have some problems of conveying a correct, interesting and unambiguous information to the participants. Diving this issue deeper, a significant fact is, people’s levels of cognition are different, depending on reasons both from themselves and situations, Upon this, in order to understand the behavior of participant based on cognitions, we had an idea of creating a guessing panel to allow participants to use their imaginations to figure out what virtual objects other people built, and also to check if the accuracy relates to the actual space around them. We are expecting to create a systematic analysis for their gaming experience.

So, we set up a few digital contents(POIs) initially within a certain area to let participants to explore with the app we gave them, each POI gets resolved when pointing a mobile device to it. We did a comprehensive experiment with almost 30 participants. upon a time limit(divided into 2 halves, 1st half without maps, while the 2nd maps are enabled) and how did they behave in order to get the right content, so that we can analyze about how participants navigate themselves through the space based on their cognitions.

The results shows that, roaming along a designated pavement, participants often ignored the spatiality and were unable to re-visit the unvisited area, and panning the device while walking would be a pure chance to collide into the AR object. We also discovered that most of the time participants turned on the maps system until they got close enough to the marker(map pin) they were exploring, and then they switched the system to the AR interface. Apart from those behaviors, there were some other issues when participants were standing too close or even exactly on things they tried to resolve(step-into problems) and just couldn’t find the content. And although AR Interface allows participants to see the physical background, human’s memory and cognition doesn’t seem to process virtual and real information parallelly enough, which disproved the hypothesis that digital layer would necessarily help people’s spatial cognition. Finally, we investigated the haptic cognition by giving different ways of gestural input for the participants to try and find out what’s the best modality of haptic system for this game.