

Problem

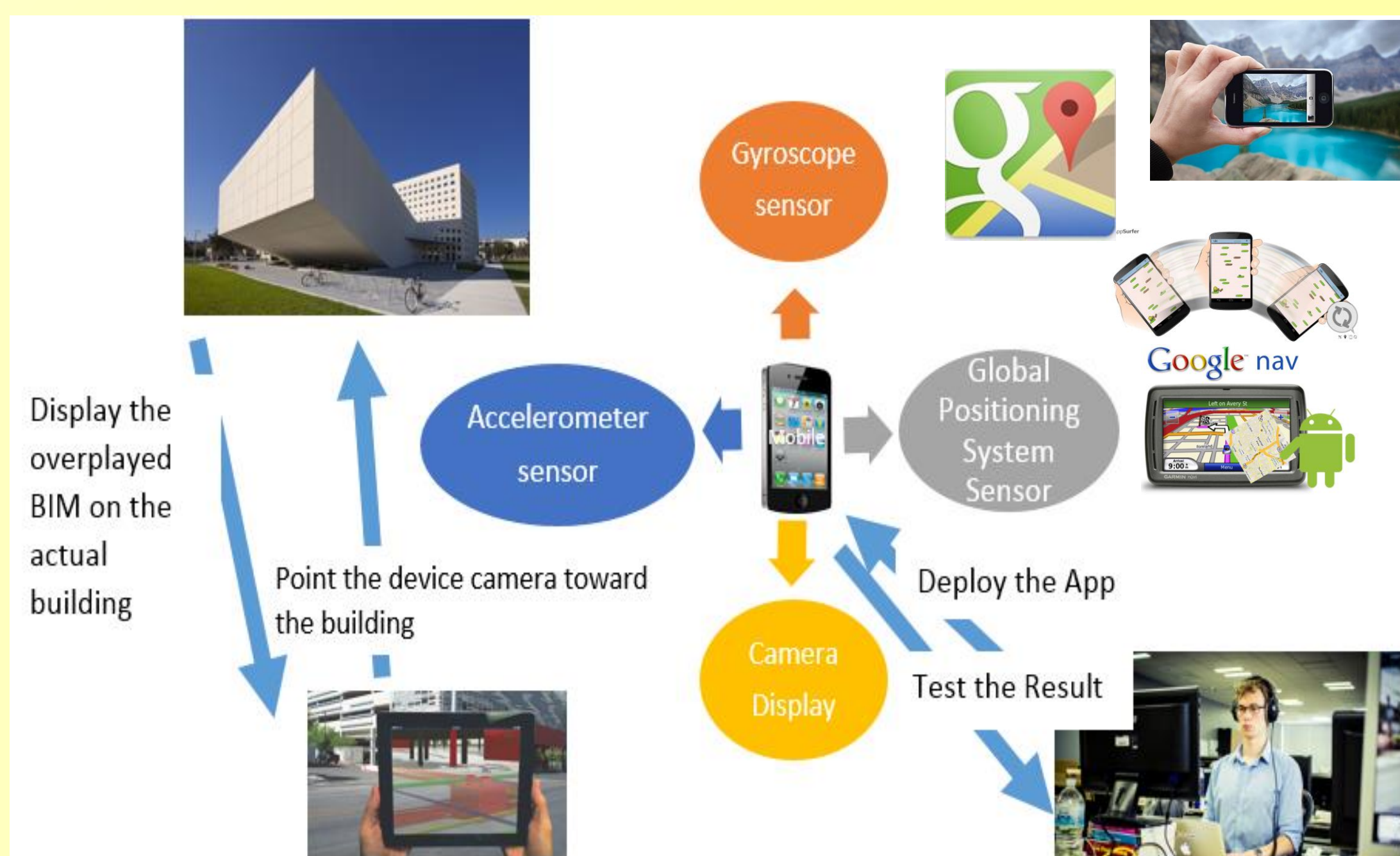
- How to reap the benefits of new technology for learning and education purpose?
- How to make the new mobile devices not only an entertainment tool but also a joyful learning engine?
- How to present Building Information Modeling (BIM) to experience the long lasting effect of visual learning?

Solution

- Learning with Augmented Reality (AR) has the potential for achieving the those goals.
- With the help of this technology, architectural students will learn about Building Information Modeling (BIM) passively while they are playing with their mobile devices.
- The proposed mobile application enhances the learning process with providing a building system assembly and infrastructure through Augmented Reality.

System Design

Main purpose of this project is creating a testbed to find the appropriate solution for improving the current AR application. Regarding this purpose alternative solution for the improving current AR app were tested and all provided as a testbed application.



Verification

The Learning with Augmented Reality application was tested in real environment. We applied unit test, rainy day and sunny day test. The Testbed Application also tested in the same way.

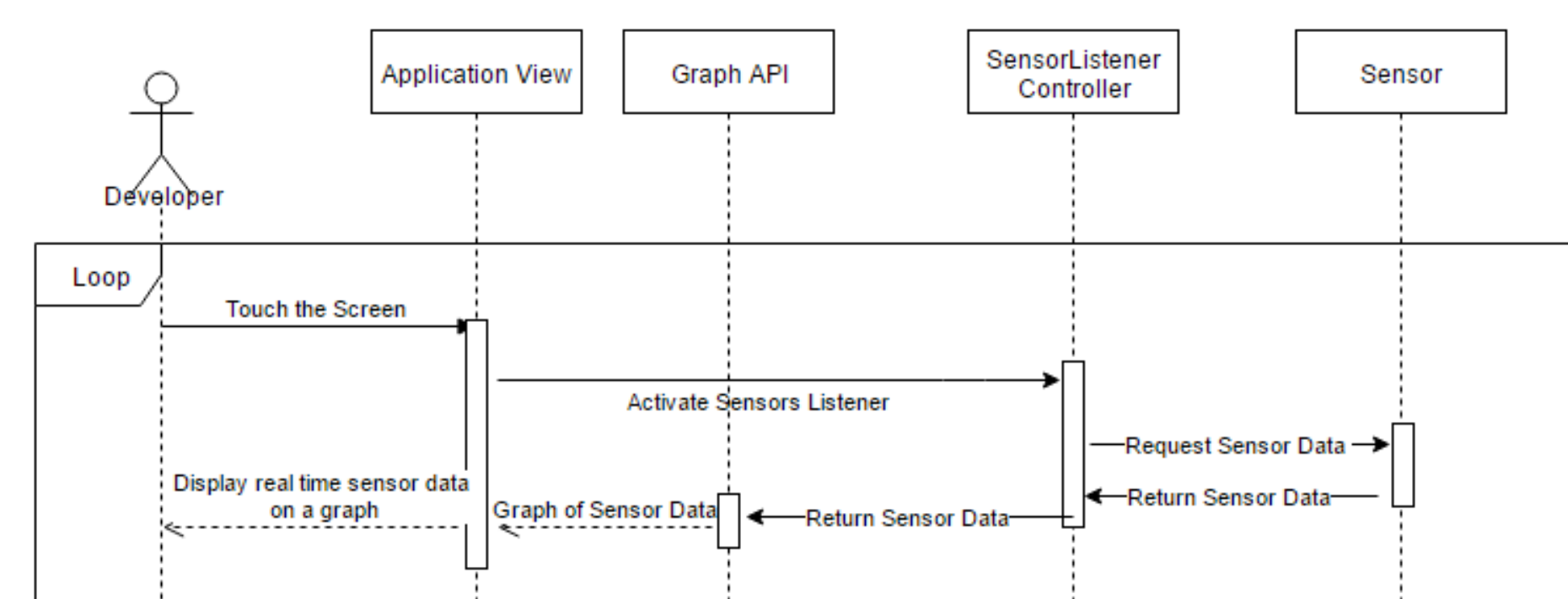
Current System

In the current application when the user opens the application and point toward SIPA building 3D BIM model is overlapped on top of the building.

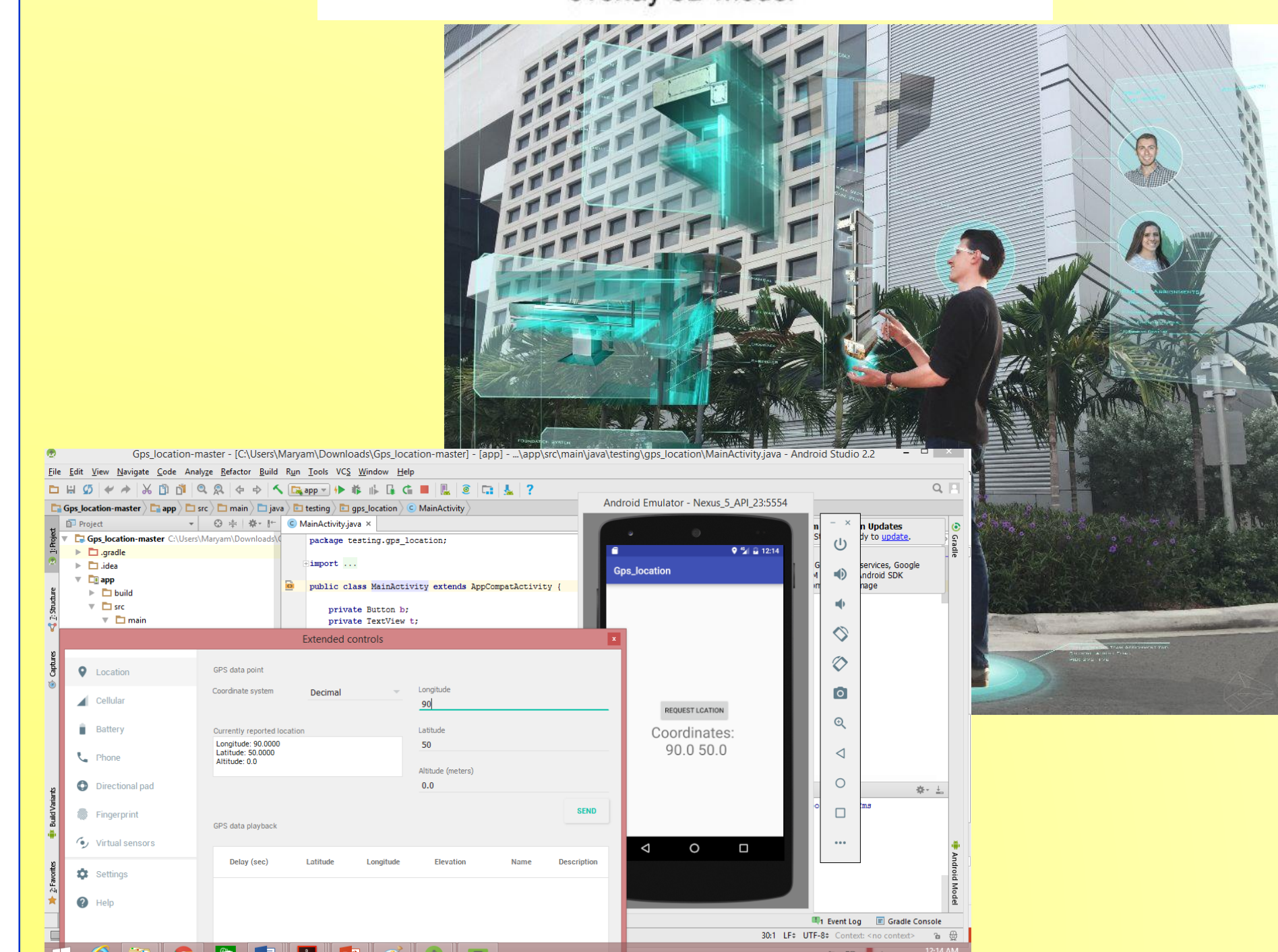
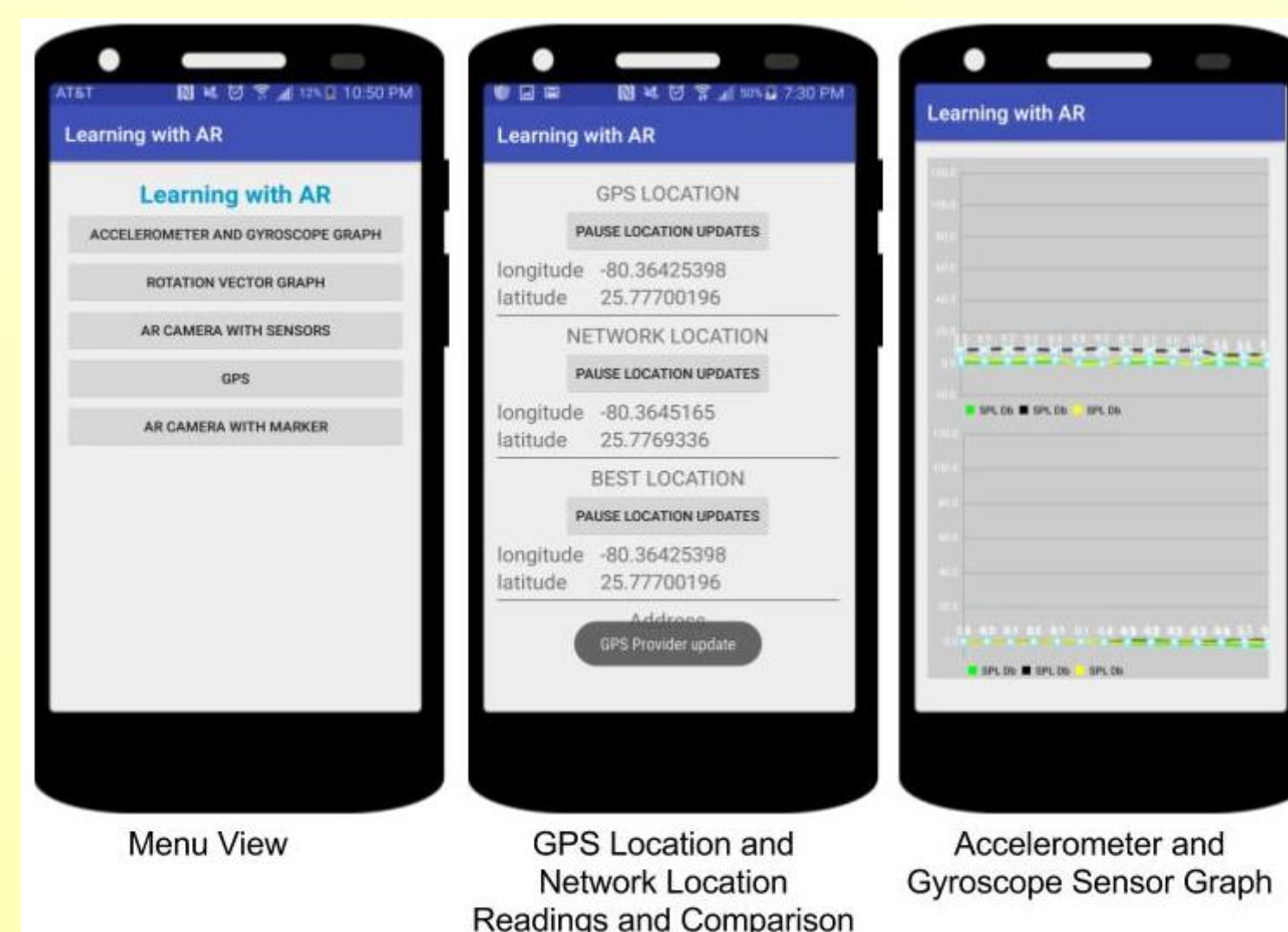
It works based on the GPS coordinate of the user and his position towards the building which is detected by device sensors.

The model perspective and orientation changes smoothly with the user motion. To this point model only works on some specific predefined locations. Our contribution is a testbed which helps the development teams to explore other alternatives for further refinement of the current system. We have tested several techniques and proposed them in a single separate application.

Object Design



Screenshots



Requirements

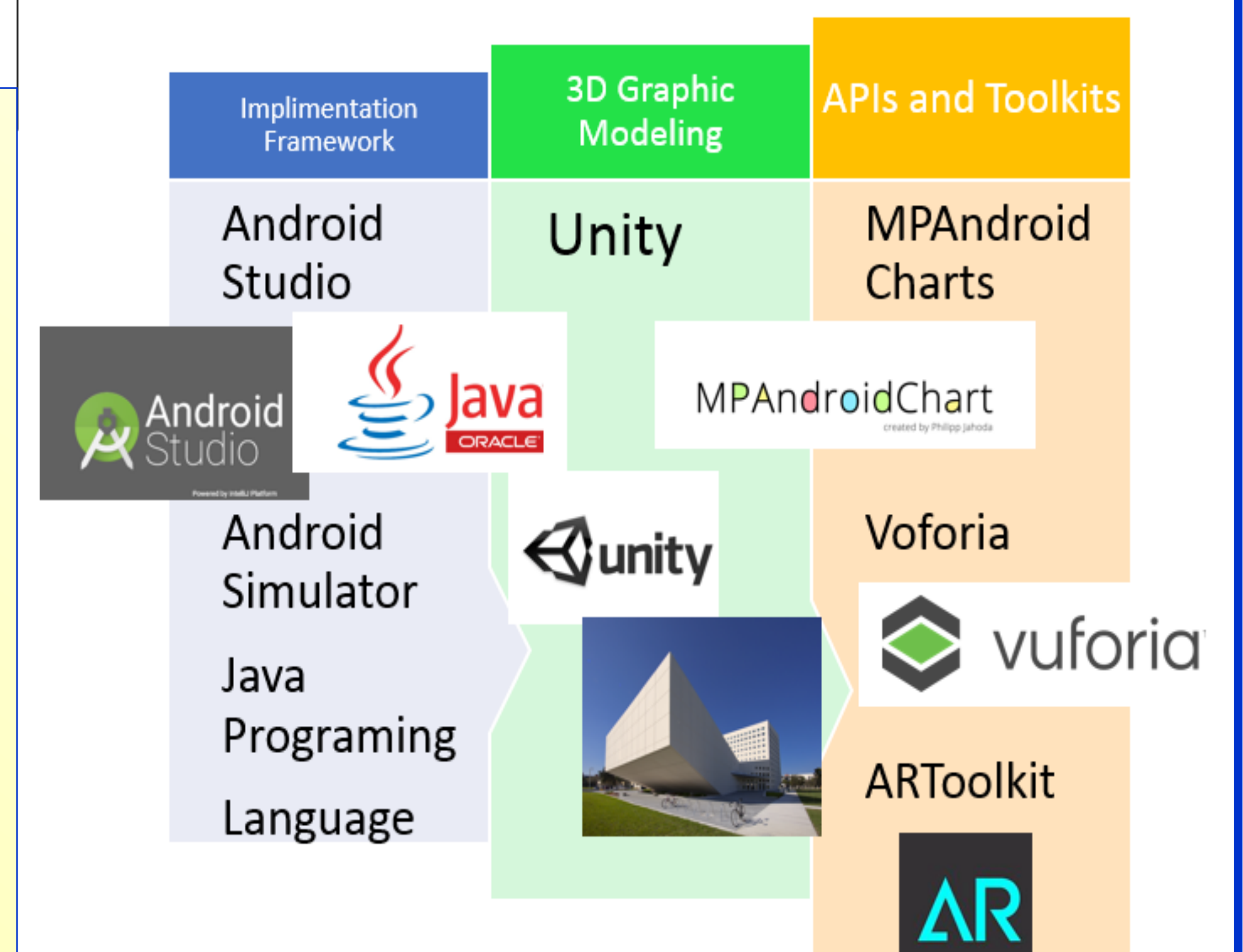
To see the perfect building model overlapped on top of the building, mobile device should have:

Updated android operating system and granted access to

- Camera
- GPS
- Gyroscope and
- Accelerometer

Mobile camera should point towards the building in the predefined locations which are set earlier and marked in the site. Otherwise appropriate message pops up that guide the user toward suitable position. In the case that device camera does not point toward the building, appropriate message will guide the user as well.

Implementation



Summary

Considering the research form of the project, we have gone through different approaches for application implementation. As a part of my contribution, I have implemented:

- The sensor data (accelerometer, gyroscope and GPS) reading and displaying in real time as a graph.
- The marker detection (image recognition) and overlaying the model on top of it.
- We provided the testbed as an application that display whole attempts together.

Acknowledgement

The material presented in this poster is based upon the work supported by Maryam Aghili. I am incredibly grateful for the privilege of having such team member "Maria. E Presa Reyes" who always supports and helps me to be a better developer.