# Robust Augmented Reality using RGB-D SLAM

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# 1 Aims and Objectives

## 1.1 Aims

This project will study how to develop a robust Augmented Reality (AR) system based on RGB-D SLAM system. This AR system will use the accurate 3D model which is generated by SLAM system, so it is more robust and accurate than most other AR system.

## 1.2 Objectives

- Study RGB-D SLAM system.
- Connect new RGB-D sensor with SLAM system.
- Using SLAM system to contrast 3D model.
- Using AR software to create virtual character.
- Apply AR system in google map if time permits.

# 2 Motivation

AR and VR are two hot concept today, prevalent people also know them as VR film and AR game. I know AR because of the famous mobile game pokemon go which is showed in figure 1a. Then I find another AR app called SekaiCamera which is developed by Japanese company Tonchidot in figure 1b. It can add comments on object which is captured by your phone camera. I think AR is more useful than VR because it adds information on real scene instead of create a new scene. However, pokemon go and SekaiCamera are simple AR systems which only use 2D image and GPS. I want to develop a more robust AR system based on accurate 3D model which is provided by RGB-D SLAM system.


(a) pokemon go


(b) SekaiCamera

Figure 1: AR system

# 3 Risk register

Table 1: Risks

| | **Risks** | **Mitigation** | **Likelihood** | **Impact** | **Score** |
|---|---|---|---|---|---|
| **1** | Can not understand RGB-D SLAM system | Ask research assistant immediately when some code is difficult to understand | 1 | 3 | 3 |
| **2** | Late arrive of RGB-D sensor | Ask supervisor to buy RGB-D sensor early, prepare some other work to do | 1 | 2 | 2 |
| **3** | Failure to connect RGB-D sensor with SLAM system | Work together with my college who also use this RGB-D sensor and keep in touch with research assistant | 2 | 4 | 8 |
| **4** | Can not find problem when debugging the program, after all programming | Make small objects and debug AR system after program every part of the code | 2 | 4 | 8 |
| **5** | Break the RGB-D sensor | Calibrate the RGB-D sensor strictly as the specification. Be careful with RGB-D sensor and keep it safe after experiment | 1 | 4 | 4 |
| **6** | Do not have enough time to explore the application of AR system | Complete tasks as the time line strictly, give feedback to supervisor after every task | 1 | 4 | 4 |