Robust Augmented Reality using RGB-D SLAM

By

Ze Zhang

Department of Engineering Mathematics
University of Bristol

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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

4 Timeline

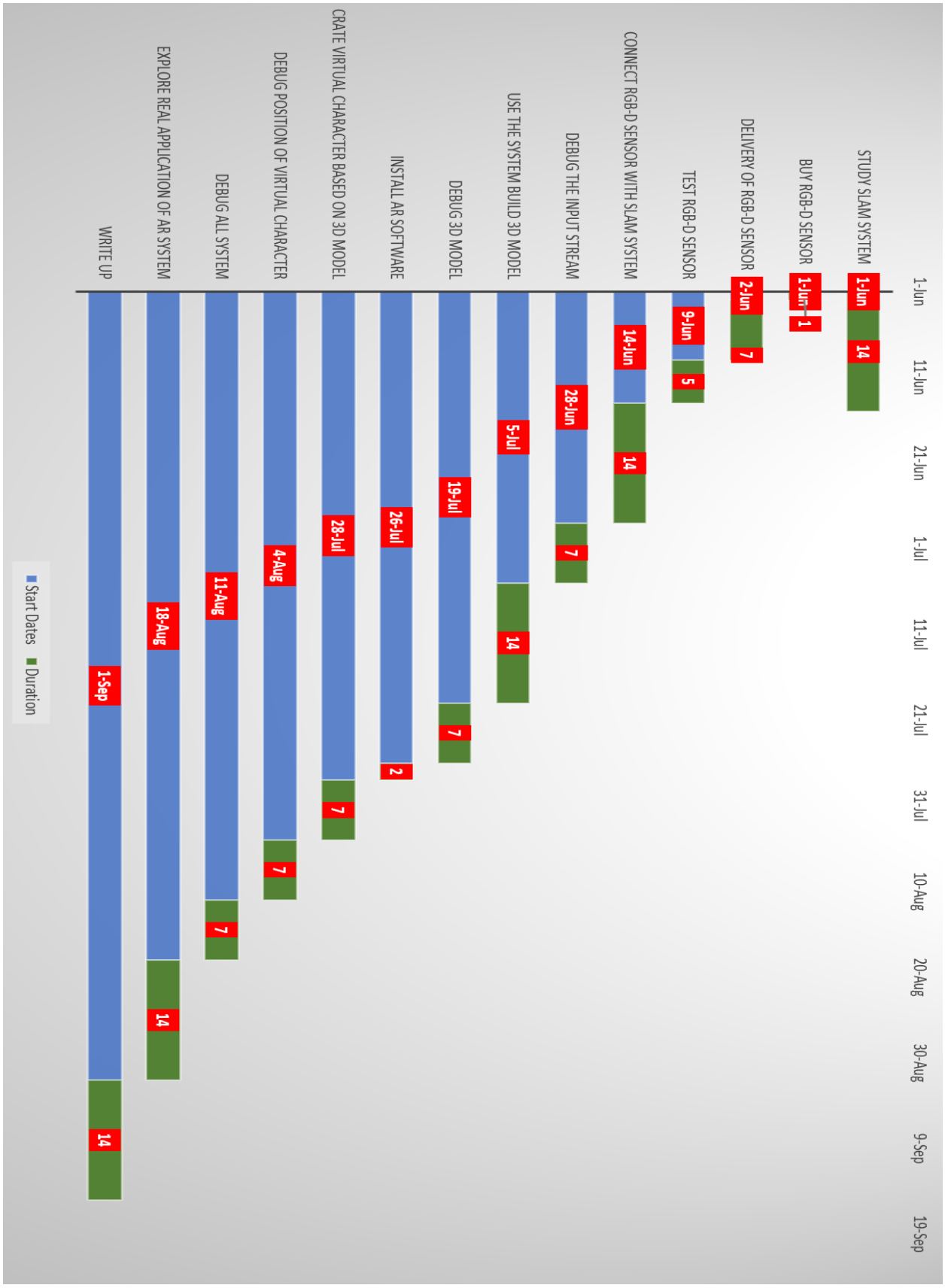

Figure 2: Timeline