



WEEKLY REPORT

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WEEKLY REPORT I

In this document we will discuss our initial progress on the projects up to now. Firstly, we will give our reasoning why we have reduced the projects to two choices by examining all four projects. Thereafter, we will argue how we would progress if we were to choose one of them.

We were given four different projects. We have considered the projects based on the experiences that we can gain throughout the year and the specialization areas we have chosen. Therefore, we have identified the processes that the projects require, and we have listed the project in the order of what we could learn at the of the year. After initial discussions we have eliminated two of them according to the reasoning stated above. As a group, we focused on mainly the two projects. These are the “balloon catching” and “racing” robot projects. As we understand it, the “balloon catching” robot requires image processing in order to follow the balloons and similarly in the “racing” robot may also require it to follow the racing course. Also, frankly, when compared to the other two projects, these two are less attractive.

Nowadays, both in military and civil applications, teleoperated devices are widely used such as drones and unmanned aerial vehicles. We have associated the “goal scoring” robot project to these devices in a way that they all work in a similar basis. In addition to that, we believe that this project would be the most enjoyable among the others. The other project that we are still considering is the “mapping” robot because we believe that it is more applicable to real life. Therefore, the satisfaction that we will have after successfully implementing this project will be much more gratifying.

Now, we will discuss how we would progress and what possible problems we could encounter if we were to choose one of the above projects.

Firstly, we will consider the “goal scoring” robot. The main problem of this project is transmitting the real time video. We could use an RF module to solve this problem. In addition to that we discussed how we would implement the shooting mechanism. Some of the ideas we have considered to solve this problem are, as the following. The simplest method would be to use the body of the device to kick the ball. However, this method may not be as useful because in order to kick the ball the robot needs have considerable amount speed. But depending on the size our device we may not be able to speed up the robot due to the restricted area. Another solution may contain horizontal arms which

will sweep both sides of the device in order to kick the ball. However, this also has a problem. If the ball stood close to a wall, then the robot needs to be in a good position to be able to hit it. Our final solution that we have taught of is a kicking mechanism which can be achieved by converting the rotational motion of a motor to a linear motion using gears.

Secondly, we will consider the “mapping” robot. Mapping is one of the main tasks of a mobile robot in an unknown environment. Therefore, there are a lot of information related to this topic online. One of the first things that we have encountered is the “simultaneous localization and mapping” concept. As indicated in [1], SLAM has multiple parts such as landmark extraction, data association, state estimation, state and landmark update. We believe that this document can be a very useful resource while doing the project. The main parts of this project are; keeping track of the location of the robot which can be easily achieved by using motors with encoders which count the revolution of the wheels. Then we use this information into the position of the robot. The next part is scanning the environment via a sensor. Here we have a couple of choices such as laser scanner, ultrasonic scanner. Also, software will be a major part of this project.

In both of the projects, we could use any kind of programmable device such as Raspberry pi or Arduino as our main board.

Next week, we aim to finalize our decision and start working on the project that we will have chosen. Firstly, we will begin working on the moving mechanism of the robot.

REFERENCES

- [1] S. Riisgaard and M. R. Blas, “SLAM for Dummies: A Tutorial Approach to Simultaneous Localization and Mapping,” 2005.