  
**Design Studio #4 - Weekly Progress Report #3**

DS Instructor: Gülbin DURAL

Partners:

* Fatih ÇALIŞ
* Fatih ÇAM
* Recep GÜNAY
* Huzeyfe HİNTOĞLU
* Sarah ILYAS

**In the previous week:**

At first, we have determined the criterias of the project. Then we have made a survey in our team to specify the weights of each criteria. After that, we have prepared the comparison table to finalize our decision about the projects. Finally, the chosen project was second project: The hockey game.

After our discussion, we have decided that one of the most difficult task in this project is to transmit the real time video from a distance of 30 meters. We have made some research about how one can achieve such a goal with what kind of components. After the feasibility research, we realized that most of the time people use FPV cameras to transmit a real time video from long distances. Although we have some other ideas for this purpose, FPV cameras are more likely to be used. Therefore, I decided to make a research about the working mechanisms of the FPV cameras and their price.

Basically, an FPV camera set is composed of a camera, an analog video transmitter with antenna, and a receiver. FPV cameras are using either CCD or CMOS sensor. Although the image quality is better for CCD sensors, the price and the power consumption of the FPV cameras with CMOS sensors are better. That being said, the quality of the transmitted video depends on the resolution of the camera. However, since the FPV cameras work on analogue video, their resolution is measured in TV lines or TVL rather than pixels. There are some options for TVL such as 420, 480, 600, 800 and 1000. Another quality factor about the cameras is Field of View, which determines the angle of the captured view. This is important for us, since our robot will need a large field of view to identify where the ball and the opponents goal are at that time. Latency is another factor, which highly depends on both the distance and the quality of the transmitted video. It is usually around 50ms, which is ideal for our project.

The second required component is the transmitter. It basically processes the image that is captured by the camera and encode this data into an analog signal with a high frequency. The most commonly used frequencies by FPV cameras are 900MHz, 1.2GHz, 2.4GHz and 5.8GHz. The transmitters and the receivers require an antenna to send/receive the video from longer distances. There are two different sort of antenna used at FPV applications: Bidirectional and Omnidirectional antennas. Bidirectional antennas are used for longer distances with lower radiation angles. Omnidirectional antennas can transmit or receive the video from any angle, but over a relatively shorter range. In our project, omnidirectional antenna would be more appropriate since the angle of the robot will not stay the same.

The last component is receiver. They basically decode the signal that is radiated by the transmitter and convert this data into a digital form. After this conversion, a screen is used to convert the data into a video. In most of the applications, for the easiness of the operation, the screen is a smartphone or a monitor.

The FPV cameras are perfect for our project in terms of application. However, their price may create a problem since the budget in the project is limited. The FPV sets can be obtained by buying all the items individually. In this case, the price is about 80$. Another option is to buy camera and transmitter combined and a receiver. In that case, the price is around 60$. (Fatih ÇALIŞ)