



MIDDLE EAST TECHNICAL UNIVERSITY

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS
ENGINEERING**

**EE 494-DESIGN STUDIO 1
WEEKLY REPORT V**

revolu***sys***

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1. Summary Of This Week's Progress

This week, the Revolusys team worked on communication submodule, image acquisition and image reconstruction submodules and transportation submodules. The details of the conducted work are given in the following sections.

2. Utilization Of Uart Pins Of Arduino Uno

It is decided to change the microcontroller utilized in communication submodule. Instead of Arduino Uno, Raspberry Pi will be utilized.

For Arduino Uno, UART Communication protocol is implemented. In transmitter part, TX pin and ground pin are connected to the LED driver circuit whereas for the receiver part, RX and ground pins are connected to the photodiode driver circuit. We successfully transfer 20 Byte length information with 9600 baud.

3. Preparations For Raspberry Pi 3b

Raspberry Pi is formatted to be used in communication part.

Files containing NOOBS install manager were copied to an SD card and Raspberian operating system was installed to the Raspberry Pi 3B, following the steps described by the manufacturer. [1] Upon completion of these steps, wifi connection of Raspberry Pi 3B was established.

The next step for Raspberry will be connecting camera module and taking image input to Raspberry using camera module.

4. Phyton Image Library (PILLOW)

In the image acquisition and image reconstruction submodules, it is necessary to process image. To do so, it was planned to use Python.

The fundamental commands of PILLOW which are useful for the purposes of image acquisition and image reconstruction submodules were examined. The Phyton scripts of codes that take an image as input, turn it to array or list, reconstruct the image using these arrays, resize the images and save the modified image as a new image file were written. [2]

The work on compression of image is ongoing.

5. Analysis On Usage Of 3d Printers And Test On The Sensors

For the material selection of the vehicle and terminals , plexiglass and balsa appeared as alternatives. Printing overall system with 3D printer costs too much since it weighs around 4 kg.

Also, different type of proximity sensors are tested (Ultrasound and IR). For example, ultrasound sensor gives reasonable results within 2-200 cm distance with 1cm precision. But it fails to measure the distance from tilted surfaces. Also, since some materials absorbs sound

wave, this sensor fails to measure the distance from that type of surfaces. Therefore, in production stage, these will be considered.

6. Conclusion

This week, progress is made in communication submodule, image acquisition and image reconstruction submodules and transportation submodules. The Revolusys will intensify its effort to complete implementation of all submodules till the end of this month.

7. References

1. *projects.raspberrypi.org*. [Online]. Available: <https://projects.raspberrypi.org/en/projects/raspberry-pi-setting-up>. [Accessed: 12-Feb-2020].
2. A. Demirdaş, O. Akdeniz, D. Atik, O. Boyraz, and M. Eyüboğlu, “ahmetdemirdas/EE493-Revolusys,” *GitHub*. [Online]. Available: <https://github.com/ahmetdemirdas/EE493-Revolusys/tree/master/Documents/About Programming>. [Accessed: 12-Feb-2020].