Sprint Evaluation

What is the progress of your project in this sprint? What goals are achieved? What problems are overcome? If you are updating your plans what are your justifications?

In this sprint, we have done research on these subjects: Optical Character Recognition and Tesseract OCR engine, Client/Server Architecture on the Raspberry Pi and ultrasonic sensors usage with the system.

In the previous sprint, we aimed to work with two Raspberry Pi, in order to accomplish the tasks faster and not to block group members' individual works. For this purpose, in addition to our Raspberry Pi which is ready to run software, we have obtained another Raspberry Pi from our project assistant Serdar Çiftçi and installation of Raspbian OS (Linux distribution) were completed.

Tesseract, an optical character recognition engine for various operating systems, were successfully installed and output is generated from sample images in the txt form. Moreover, in case of capturing the object in an inappropriate way, the orientation of the captured object is changed to a suitable position in order to recognize characters more precisely. Also removal of the background in the images and changing pixel colors of the image tasks were completed. These implementations were required particularly to give suitable images as input to the Tesseract engine for the purpose of Optical Character Recognition.

Voltage divider circuit were assembled in order to safely use the Ultrasonic Sensor with Raspberry Pi. Distance information of the objects were measured by the sensor correctly and output is generated in the text format.

Raspberry Pi and server network connection is another task that is completed in this sprint. Ultimate goal is to stream camera feed from Raspberry Pi to web server. In order to do that a network communication has to be set up between those devices. Network protocol selected as UDP since timing is more important than quality in application. Raspberry Pi is in a role of client. Captured image is encoded as "jpg" file and data is sent on UDP sockets to the server device which is a laptop for now. Received image is showed successfully on the laptop screen. Note that network connection is constructed using Ethernet. Using this approach, we are able to watch camera feed on the laptop device.

Integration of Espeak, network connection and image processing is the last part of the sprint. Espeak Text to Speech is built on Raspberry Ri. Raspberry Ri sends image frames successfully and receives a text as a result of the frame and pipe that to the Espeak application.

For the time being, our primary aim is processing images to read texts on any kind of signs, books and also medicine. Project also has an extra feature which is remote help from relative by using user interface on webpage. Real-time videos and images will be supplied to the webpage and a relative can guide the user simultaneously.

Team evaluation

How well your is team working together? How many meetings did you hold? Are you planning any changes in your cooperation strategy? Which work is completed by which member (in a Gannt chart)?

In this sprint, we have met more often each week (strictly twice a week Saturday and Monday). We had meetings with our project assistant Serdar Çiftçi on a weekly basis and one meeting with our project advisor Sibel Tarı.

In our cooperation strategy some changes have occurred. We have started to work as a pair on certain subjects. For example, Optical Character Recognition, Raspberry Pi web access and Raspberry Pi - Laptop Network Connection and Server/Client Communication tasks were handled collectively.

Task	Assigned Member	1st week	2nd week	3rd week
Recording video to a network stream using Raspberry Pi implementation/test	İlkyaz Yasal	X	X	
Capturing image to a network stream using Raspberry Pi implementation/test	İlkyaz Yasal	X	X	
Background Removal in images using OpenCV	İlkyaz Yasal			X
Pixel Color Operations in order to supply suitable input to Tesseract engine	İlkyaz Yasal			X
Obtaining the elements for Voltage Divider Circuit and Assembling the Circuit	Mehmet Can Avaroğlu	X		
Testing and Using Sensor with Raspberry Pi to obtain distance information of the object	Mehmet Can Avaroğlu		X	
Sending Output of Sensor to a Network Stream (test)	Mehmet Can Avaroğlu			X
Research about OCR	Sema Köse	X		
Changing perspective of the objects in the image	Sema Köse		X	
Installation of tesseract and generating txt files from simple text images	Sema Köse			X
Raspberry Pi – Server Network Connection	Okan Altıngövde	X	X	
Image Processing – Espeak – Netwotk Integration	Okan Altıngövde			X

Backlog Updates

What are your backlog updates?

For the second sprint, our aims were learning Image Processing methods and techniques and successfully conduct edge and color detection. Edge and color detection implementation were completed. For now, our primary goal is to read texts on signs, books and medicine prescription by using Image Processing and object recognition is planned to be done by user's relative who connects to the webpage. Object recognition with image processing is planned as a backup for this feature. Hence, this task is postponed due to the priority of other functionalities. Also, there is no user interface to render remote user input to HTML for now.