

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 continued to integrate the overall system: Raspberry Pi - Server Network communication, Optical Character Recognition, streaming on web, Text to Speech module (Espeak). Spell Checker will be integrated to the system for a better performance.

Integrated system is tested for two different use-cases. First one is, remote access to the hardware device via web stream/video stream. This scenario based on the relative or friend of the user who is accessing remotely to the system and assisting the user. Second one is self-contained Image Processing tool. In this scenario, Raspberry Pi sends captured image to the server to be processed. During processing, text in image is detected and converted to string. Result string returns to Raspberry Pi. Both tests are successful and meets the expectations.

Data flow on server is optimized to response faster than first prototype. Access to the disk is minimized to decrease response time.

We have worked on Optical Character Recognition optimization and improvement. Some text images were unable to read by Tesseract engine due to some reasons: blurred image, complex background, small font size etc. Therefore, enlargement of the font and zooming the text image, thresholding methods and Super Resolution Technique are researched, implemented and tested. In order to handle complex background problem, different thresholding methods applied and color of characters is changed to black and background to white. After that text area in the image detected and cropped from the image in order to supply a suitable input to Tesseract.

We have obtained the distance information of objects by using Ultrasonic Sensor. We have connected Sensor with Raspberry Pi through its GPIO pins. We imported GPIO library from Raspbian OS in the Python script. By using this script, we can detect the time difference between the sonar input-output signals, used for calculating the distance by dividing this difference into speed of sound. Next challenge for us would be integrating this information meaningfully into the system. There are two possible usage, one of them is to directly convert this info to the speech using TTS module. The other possible usage is to detect the object at the middle of the taken frame and tell the user how far this object is. These possibilities are researched. First possible usage is tested and sonar output is directly integrated with the TTS module. Other possible usage will be studied.

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 continued to meet on Saturday and Monday every week. Even though each person deals with different tasks, in order to motivate each other we have worked together. Aside from these meetings, we had meetings to test the overall integrated system. Also, we participate the meetings with our project assistant Serdar Çiftçi.

In our cooperation strategy, we have pursued the last sprint's method. Although, each person also worked on distinct tasks, some tasks such as Super Resolution Technique research, Optical Character Recognition improvement and optimization were handled by multiple team member.

Task	Assigned Member	1 st we ek	2 nd we ek	3 rd we ek
Overall System Test	İlkyaz Yasal			X
Super Resolution Technique Research and Implementation	İlkyaz Yasal		X	X
Research of the Road Sign Recognition	İlkyaz Yasal	X	X	
Enlargement of the font and zooming the text image Implementation and Test	İlkyaz Yasal	X		
Optimization and improvement of reading texts with different font colors and background color	İlkyaz Yasal	X		
Overall System Test	Sema Köse			X
Implementing, Testing and Comparing Thresholding Methods	Sema Köse	X		
Research Object Recognition Techniques and their Algorithms	Sema Köse	X	X	
Research Super Resolution technique in OpenCV	Sema Köse		X	
Extracting text area from image with complex background and make image characters black and background white	Sema Köse		X	X
Overall System Test	Mehmet Can Avaroğlu			X
Integrating sonar output to the Text-To-Speech module (test)	Mehmet Can Avaroğlu		X	
Research about detecting the nearest object using distance information	Mehmet Can Avaroğlu	X		
Overall System Test	Okan Altıngövde			X

Overall System Integration	Okan Altingövde	X	X	
System Optimization	Okan Altingövde		X	
Spell Check/ Corrector Research	Okan Altingövde			X

Backlog Updates

What are your backlog updates?

Project meets all the requirement that are stated in startup document. However, there are improvements, better solutions and also new ideas to add to the system. Using the raspberry pi's h264 hardware encoder with gstreamer to stream video is one of them. We were not able to achieve that goal last sprint but it will be in our to-do list for the next.