Week 3 Software Progress Report

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This week our aim was to have the robot following the white line. We did this by having the camera take a picture of the ground in front of it, and then read the colour of 16 pixels spaced evenly in a horizontal line across it. If the returned value was over 160 then it was reported as 1 so white, if it was below this number then it was 0, so black. By looking at the distribution of 1's and 0's across the horizontal line the robot could tell where the white line was and turn accordingly, if the 1's were all to the left it needed to turn left and vice versa for right, but if they were all in the middle it needed to drive forwards. Running this we found it had a tendency to turn left which upon further investigation turned out to be a hardware problem with the wheels. Upon a suggestion from Arthur we set the AVC to first drive forwards a small amount before reading the white line and this fixed our problem.

Another problem we ran into was that if the robot lost the white line and was only seeing black, it was not able to relocate the white line so went off course. To fix this we made the robot count the number of 1's that it saw one each horizontal line, if there were none it meant that there was no white line so the robot was set to travel backwards until it found it. We had some trouble with this and found that it only worked initially and that as the robot continued to run it would be less and less accurate. Looking over the code we found that it would count the number of 1's per line but would not clear this number before analysing the next line so the number of 1's was accumulating. We added a line to set the number of 1's to zero before each time they were counted and this worked better.

This week we also worked to get SSH working on all of the groups personal laptops so that we could all more easily access the code without having to be physically connected to the pi. We were able to get It to work easily both Mohammad and Antony's laptops, however Campbell and Kimberley ran into problems while trying connect and Fergus was absent. We sent an email to Elf to ask if he knew what the problem may be and he responded saying that it wold only work for those with Mac computers, hence it worked for Mohammad and Antony, but those with windows needed to download another software called Putty. Doing so fixed the problem Campbell and Kimberley had and they are now also able to connect.

We had some spare which we initially intended to spend improving the code and making the robot run fasters and slightly more accurately, however some hardware changes still needed to be made which would need to be considered when making changes to the code. Therefore we decided to work on the 1st quadrant and get the networking part completed so that the robot could open the gate at the start. This only required us to add the following lines of code in:

```
connect_to_server("130.195.6.196", 1024);
send_to_server("Please");
char message[24];
receive_from_server(message);
send_to_server(message);
```

After making these changes to the code we tested it and it worked. Therefore our robot is now able to clear the first and second quadrant of the maze.

- added float error (stuck on black it goes back and checks for white)
- 7.5 as is half 16(ish)
- set speed for wheel – or +

- Then how far the robot will turn to correct itself
- Vleft = -
- Vright = +
- if error is –ve the 1’s are on the left