3/10/21

Testing and coding of sensors

Things done:

- Tested L515 3d camera and get a sense of its accuracy (I tested the accuracy at short ranges, Mei Lin tested out accuracy of the range and the measure tool at 5m as well)

- Setting up of mmWave sensor

- Performed and tested out out-of-box and 3d-people counting demos for mmWave and get a sense of its accuracy and resolution.

- Looked into the parser (cannot find the C codes for the parsing; only have python parser)

- Bought the power supply for the jetson Nano

- Ryan tested out the jetson Nano and got the OS installed

- Mei Lin continued to look into implemented human detection codes for L515, trying to debug the source code

Current state of project:

- Sensors and equipment are all checked and tested

- L515 shows accurate readings at mid-range of about 5m

- mmWave sensors have accurate range (similar to L515) and good enough resolution for human detection. It is able to detect humans within 5m range. However, it is yet to be tested at longer range beyond 5m due to lack of space (will be testing out the sensors on Wednesday in the lab)

Problems faced:

- mmWave configuration and setup is long and complicated. Very small switches that needs to be toggled on the evaluation board itself as images were uploaded and the programmes were ran (A sim card tray eject pin was used to flip the switches). Many dependencies and software need to be installed.

- Could not find the C codes for the parser, only found the python version. Ryan and Mei Lin have found both python and C++ libraries for their respective equipment, hence, I might request them to use python instead.

- Cons of python include slower performance than C, but development speed will be faster and less prone to errors. In addition, Ryan is not familiar with C, hence, might be worth changing to python codes.

- Mei Lin faced many challenges in implementing the demo deep neural network code for L515 due to the prerequisites and when she ran the codes, there were many errors. She has sent us the link to the GitHub page and we will be trying to debug the code before next Wednesday.

Work to be done:

- The sensors have to be tested next Wednesday in the actual environment itself (lab) and record its accuracy and resolution at further ranges. Next, we have to come together with the codes and try to communicate and interface the respective codes.

- Interfaces:
    1. Between mmWave and Jetson Nano: mmWave to store the sensed information in the jetson Nano inform the servo motor how much to pan via the jetson Nano

    2. Between Jetson Nano and servo motor: Calculate how much to pan the servo motor using the data from the mmWave and communicate this data to servomotor

    3. Between L515 and Jetson Nano: After servomotor pans the L515 to the correct angle, jetson Nano sends the boundary coordinates (from the mmWave) to the L515 to inform the L515 which area to count the number of people. L515 will count the number of people in the bounding box and send the data back to jetson Nano.