SUTD 2022 50.046 CCIoT Project Individual Report

James Raphael Tiovalen / 1004555 (Group 3)

Main Contributions

For our project, our entire group worked together for all of the different components: hardware, embedded firmware, backend server, and frontend user interface client on the cloud. My area of contribution was centered more towards the embedded firmware part, along with some minor contributions to the other parts as well.

My main contributions were:

- Developed the original fluid distribution algorithm, taking into consideration possible network loss cases. After further discussion with Ragul and Xing Yi, this evolved into the current algorithm with two policies: cost minimization and availability.
- Soldered the header pins and the cables to the HX711 ADC hardware modules at SUTD Fabrication Laboratory.
- Developed and tested the embedded firmware together with Xing Yi in a collaborative manner. We adopted a pair programming approach towards the embedded firmware development, whereby I focused more on the security, status display and algorithm aspects, whereas Xing Yi focused more on the server integration and MQTT message protocol format aspects.
- Implemented the intuitive slider inputs in the Control Panel section of the web-based frontend user interface for operators to use.

Activity Time Breakdown

Duration	Activity
20 hours	Embedded firmware development and testing with Xing Yi. Integrated multiple libraries together and developed proper message protocols to ensure compatibility between the backend server in the cloud and the embedded firmware in the ESP32s.
3 hours	Soldered header pins and cables to the HX711 ADC.
1.5 hours	Implemented the slider inputs on the frontend web user interface.
4 hours	Discussed, developed, and iteratively improved on the core network loss-tolerant algorithm/protocol together with Ragul and Xing Yi.

Peer Review Feedback

Teammate Name	Rating (out of 5)	Comments/Remarks
Ang Song Gee	5	Really did a lot of work with the user interface and the authentication component of the backend server and frontend client. A great teammate indeed!
Han Xing Yi	5	I did pair programming together with Xing Yi on the embedded firmware development and testing. She also did a great job in implementing the backend server. She's a really fantastic teammate!
Velusamy Sathiakumar Ragul Balaji	5	Really did a lot of work with the overall big-picture system implementation, the hardware, core fluid distribution algorithm, and the cloud server configuration setup. A superb teammate, will recommend!