Technical Journal

Week 09/05/21

The first week was primarily focused on group formation and planning. We as a team setup communication and bounced ideas amongst each other for a final project proposal. This included determining what was feasible for our collective skillsets. Individual introductions took place to share experiences and get a background for the project.

1. Meet and great
2. Communication setup (Microsoft teams/ for chat and file share)
3. Schedule weekly meeting
4. Project options and discussion

Week 09/12/21

The 2nd week after group formation marked the project decision and project proposal. We discussed our project idea amongst our professor for approval and looked at any contingencies. Amongst this discussion we ran into another group full of CS planning to do the software and app side of the project. The professor and project sponsor approved of a group of 9 working together to accomplish this goal.

1. Project decision
2. Project approval
3. Larger group formation
4. Resource (innovation campus Coach)

We decided to do the smart park system. This will indicate what stalls are occupied or vacant across college campus. It will also notify students and faculty what parking lots are completely full. This will save a lot of time and increase college campus traffic, efficiency, and convenience. We believe this is marketable across university campuses as parking is commonly a challenge. Increasing campus accessibility will also increase student enrollment and retention. We’ve decided to use 2 types of sensors to mitigate 1 point of failure. Further research is needed to decide what sensors to utilize. As of now we believe an inductive loop will be 1 of the 2 sensors.

Components

1. 2 types of sensors (infrared and inductive loop)
2. Power (hard wired/ battery/ solar)
3. Aduino or Rasberry pi

Week 09/19/21

In this week we fully integrated with our CS counter part to discuss and plan the electrical hardware in conjunction with the interfaceable IOS app. We tasked each EE team member with a research project and report deadline. Each EE member was to research a sensor for vehicle detection and provide why it would or wouldn’t be a good fit for the project.

During our report meeting we concluded that a magnetometer would be the most applicable sensor. We still have concerns that a 2nd sensor type would be needed to effectively complete our project. During this meeting, we created a basis for how the system will operate collect data and communicate. A magnetometer IC (integrated Computer) will be attached to an Arduino LoRa (Long Range) transceiver. This Arduino will be able to take the data from the magnetometer and send signals to a raspberry pi gateway. Each of our nodes/sensors will be configured to simply send a 0 when measuring the Earths magnetic field. When a disturbance is detected due to vehicle occupancy of the parking stall the Arduino will send an update signal of 1 in near real time to the gateway. We plan for all our sensors to be completely wireless and battery powered. The raspberry pi gateway will utilize a Rak 2245 LoRa hat which will allow the Raspberry Pi to receive data from the Arduino. This gateway will send off updates to the cloud where the phone app will update and interface with the user.

Week 09/26/21

Hardware purchases were made to begin integration and testing. CS team is updated accordingly with statuses of shipping dates and arrivals. One team member already owns a magnetometer IC and the Arduino LoRa transceivers arrived. Configuration of the prototype is crucial and a high priority item. We will begin learning about Arduino setup and test for data collection and calibration of magnetometer. We have completed our project planning paper and our next tasks to accomplish are getting sensors configured and working and creating a live power point to prepare for midterm presentations.

I will begin to time stamp my entries for research and hands on efforts going forward. (09/29/21)

09/28/21

Start 4:30 pm

Met with Coach Allen and Phong (CS team lead) to discuss requirements for Midterm Presentations. We learned that Coach Allen already has a gateway setup in the go create parking lot. We will no longer need Raspberry Pi or RAK 2245 hat for gateway. Orders have been canceled and we will primarily focus on sensor configurations.

Had an over the phone meeting with Alex (EE member) to discuss how to split up content for group presentations. We discussed what content should or shouldn’t be included. I created a list from all the information gathered. From this list each EE member will pick the content to cover for the presentation.

After sharing the list and communicating with the EE team I began to configure the Arduino MKR WAN 1310. This device will be our transmitter for vehicle detection. Since I conveniently live across the street from the Go Create facility, I will be trying to send a signal to the Gate way from my apartment. I would like to have a dummy signal sent to the gateway that can simulate a state (true/false, 0/1) and a unique identifier by Friday 10/01/21. Downloaded software and drives for Arduino and didn’t have proper micro USB needed for device detection and connectivity.

End 2:00 am

09/29/21

Start 09:30

Got some breakfast and ran to best buy to find a compatible micro USB. All they had in the entire store was a PS4 game controller cord for roughly $10.00. I went home to test and it was compatible. My laptop detected the Arduino. I will now work on setting up testing and begin to push for the dummy signal transmission.