

Smart Parking Lot

Milestone 1

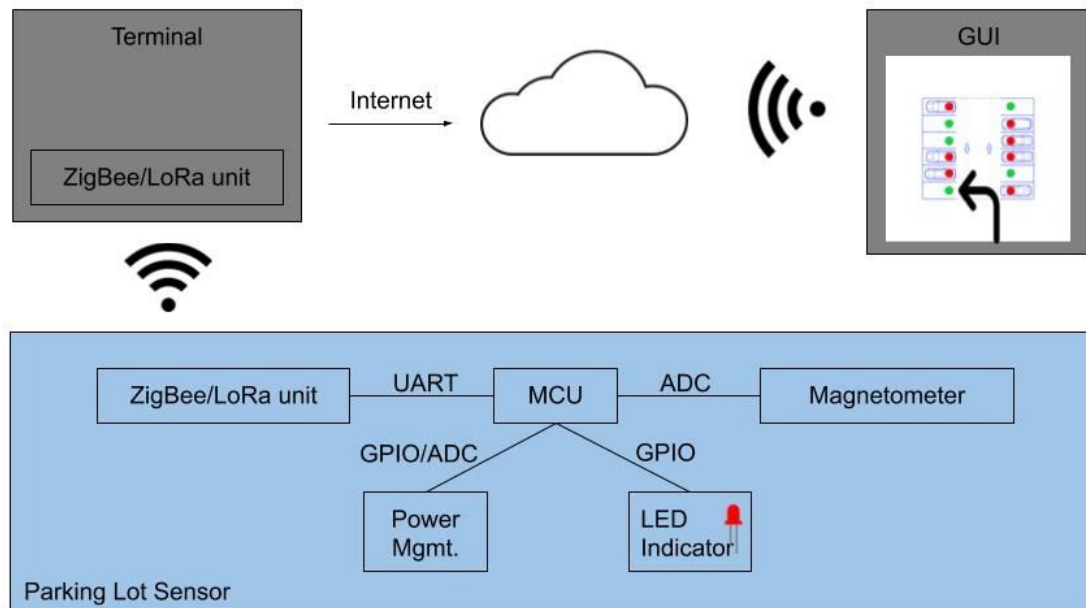
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Specification

Our project is to prototype an autonomous platform used to navigate drivers to parking spot vacancies.

- A. The driver will access available parking space information through a graphical user interface, ideally programmed to an app, or alternatively, a web page.
 - a. When the driver arrives at the entrance, they will push the “Search for Space” button. The driver may be required to enter the floor they are interested in.
 - b. The GUI will then present occupancy information of the entire floor using a sketch with all the parking spaces on that floor.
 - c. The occupied spots are marked red, and the available spots are marked green.
 - d. The driver will drive to the available spot and park the vehicle. No more interaction with the GUI is needed.
 - e. (tentative) if the entire floor is rather huge and involves a lot of parking spaces, the GUI will actively direct the driver to the parking space by providing the shortest path with waypoints on the floor sketch.
- B. The graphical user interface is actively updated, representing parking occupancy information received from a backend host.
 - a. Parking Lot staff can utilize the GUI to overwrite occupancy information, allowing parking spots to be temporarily marked as “occupied” for maintenance.
- C. The host communicates with the entire mesh network of sensors. Each sensor records either a vehicle’s arrival or a vehicle’s departure to the single parking space the sensor is located at. Upon each successful detection, a change of state will be transmitted to the host.
 - a. Sensors will be installed in the ground.
 - b. The host receives updates from each sensor in passive mode in daily usage.
 - c. Parking Lot staff may request diagnostics from sensors, such as battery usage, daily count, functionality health check, and guidance light.

Block Diagram



Member Responsibilities

These will be the long-term responsibilities for each member:

- Andrew Lu - Parking Lot Terminal / Gateway
- Finn Linderman - Wireless Communication Firmware
- Luyao Han - Sensors / Sensor Firmware / PCB Design / Power Management
- Seungjun Cho - GUI / Path Finding Algorithms

Since we are still in the early stages of development, and since the group is split in terms of location, these are the short-term responsibilities:

- Finn Linderman and Luyao Han
 - Vehicle detection sensor research (i.e. Magnetometer)
 - PCB creation
- Andrew Lu and Seungjun Cho
 - Communication module research (i.e. LoRa vs. Zigbee)