Junhwan Lee
Taeho Kim
ECE153B

Project Proposal

An ultrasonic sensor system for vehicle detection application. Build a sensor system to detect vehicles or any other objects around the vehicle. Warn the user whenever there is a possible collision through the UI. The system must be accurate and precise to minimize the errors which can lead to safety hazards. The purpose for this project is to learn more about the system of ultrasonic sensors in vehicles which is a popular detection tool in the automotive industry.

Peripherals

- Microcontroller
- Ultrasonic Sensor: Measures the distance between vehicles.
- Micro Servo Motor: Move the vehicle to go forward or backward.
- Wii Nunchuck: Control the motor.
- Buzzer Sounder: Triggers the alarm whenever the vehicle is close to the external object(vehicle).
- Bluetooth Chip: Sends the signal from microcontroller to devices indicating the detection of other vehicles.

Serial Interface Protocols

- I2C: Connect peripherals together.
- UART: Connect the entire system to the computer.

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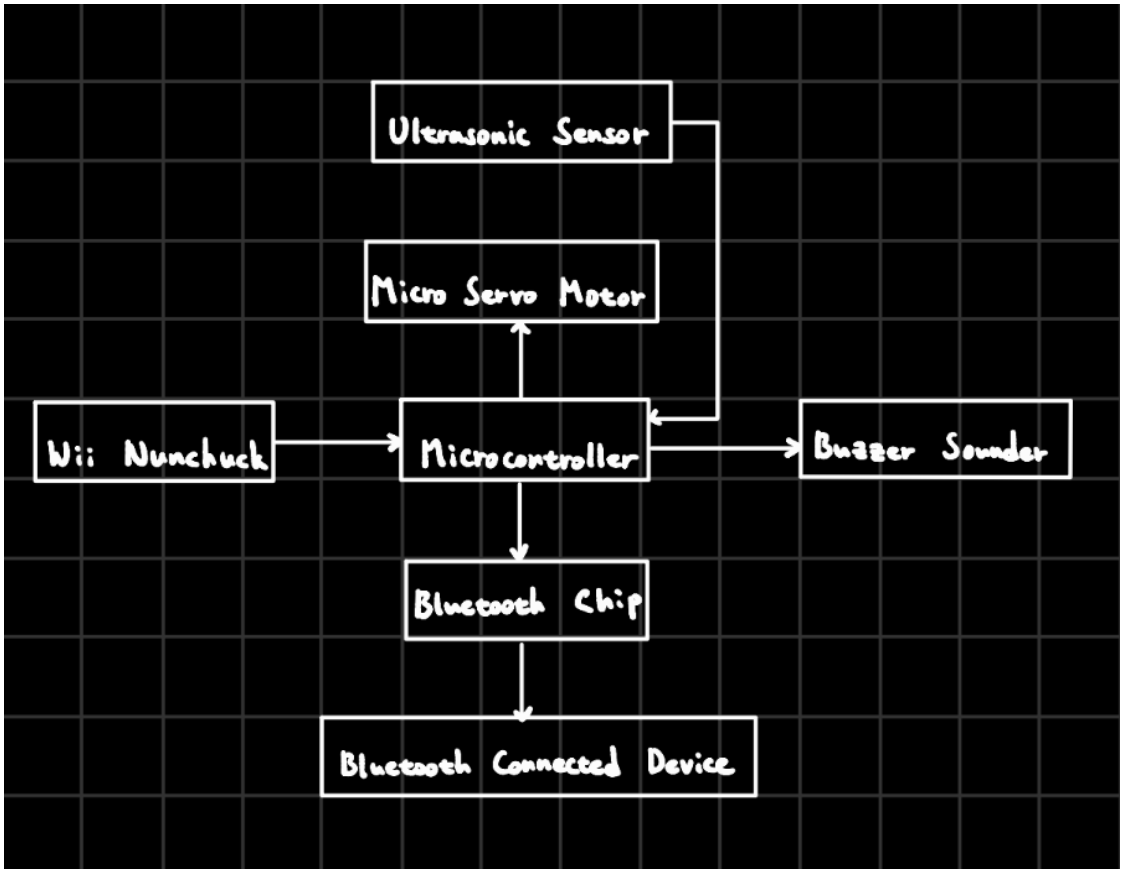
Block Diagram



Responsibility List

- Junhwan Lee: Design software structure and coding.
- Taeho Kim: Design hardware structure.

Software Structure

Microcontroller(master) is connected to the bluetooth chip(slave) in USART. The bluetooth chip only sends the output signal to the devices. Set the designated port pins for Wii Nunchuck and Ultrasonic Sensor as input devices and Micro Servo Motor and Buzzer Sounder as output devices. Wii Nunchuck inputs control the Micro Servo Motor and Ultrasonic sensor inputs trigger the buzzer sounder. Interrupts will occur whenever there's input signal from the

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Wii Chuck and its handler will direct which way the car should move depending on the input signal from Wii Nunchuck. Additionally, a certain input signal (when the other car is near) from the Ultrasonic Sensor will trigger the interrupt and the handler will force Buzzer Sounder to start making sound.

Website: https://sites.google.com/view/leekimproject/home