Project Sense

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05/02/2023
Agenda

- Objective
- Original Design
- Requirements
- Physical Board Design
- Data
- Failures
- Successes
- Video Demo
- Ethical Issues
- Conclusion
Objective

- Create a notification system for a bicycle and car to communicate relative locations to each other
  - Uses GPS data and radio waves to inform each device of location
- System will give relative distance from another system within 30 meters
  - Allow both operators to be constantly updated of each other’s location
- Extremely helpful to either party when a bicycle or car shows up in their blind spot
Original Design / Final Block Diagram

Figure 2: Visual Aid of use of Project Sense

(Changes: Display and Speaker Omitted)
Requirements

- Input Voltage at 4.7 V
  - Checked with multimeter

- GPS should have clear view of the sky
  - Verified with weather readings

- Given the control signal, the right LED should turn on
  - Examined with Oscilloscope
Physical Board Design

GPS

Transceiver

Microprocessor (ATMega328p)

Power System (4.7 V)

LEDs
Data: Analysis & Interpretation
Data

Generated latitude: 12.00000000000
Generated longitude: 34.0000114440
12.00
34.00

GPS Data from system

Received latitude: 12.00000000000
Received longitude: 34.00000000000
1.24
code 0 sent
here
here

GPS Data from other system

Distance between systems
Failures

- Likely by improperly wiring our original components we broke our original set of ordered components
- Antenna of our original components were very flimsy and broke during usage
- Were unable to consistently yield GPS data that updated in real time
Successes

- Partially functional GPS unit
- Functioning Transceiver
- Able to correctly program ATMEGA
- Code seemed to be functional in determining distances when given generated GPS values
Video Demo
Ethical Issues

- User Privacy Concerns
  - Usage of Unique Tags to identify Bikes and Vehicles

- EM Waves Effects
  - RF limit incident on an individual
Further Work

● Implementing Directionality
  ○ Using UWB technology for computing more accurate angle of arrivals

● Incorporate visual Display for the car system

● Multiple user incorporation

● More precise GPS systems
Conclusion

● If we were to redesign our project, we would take a different approach
  ○ The approaches of time of flight and of GPS are not very reliable methods to accomplish our goals
  ○ Perhaps higher precision RF equipment could be used to accomplish our goals via time of flight

● We learned quite a bit throughout the project
  ○ This was our team’s first time tackling PCB design
  ○ This is also our team’s first time programming a microcontroller rather than using a dev board
  ○ It was a very worthwhile experience to research parts from scratch and implement them using information from the datasheet
Questions?