



I-SENSE REU at Florida Atlantic University



Kayleigh Taylor

College Park Scholars – Science & Global Change Program

Electrical Engineering

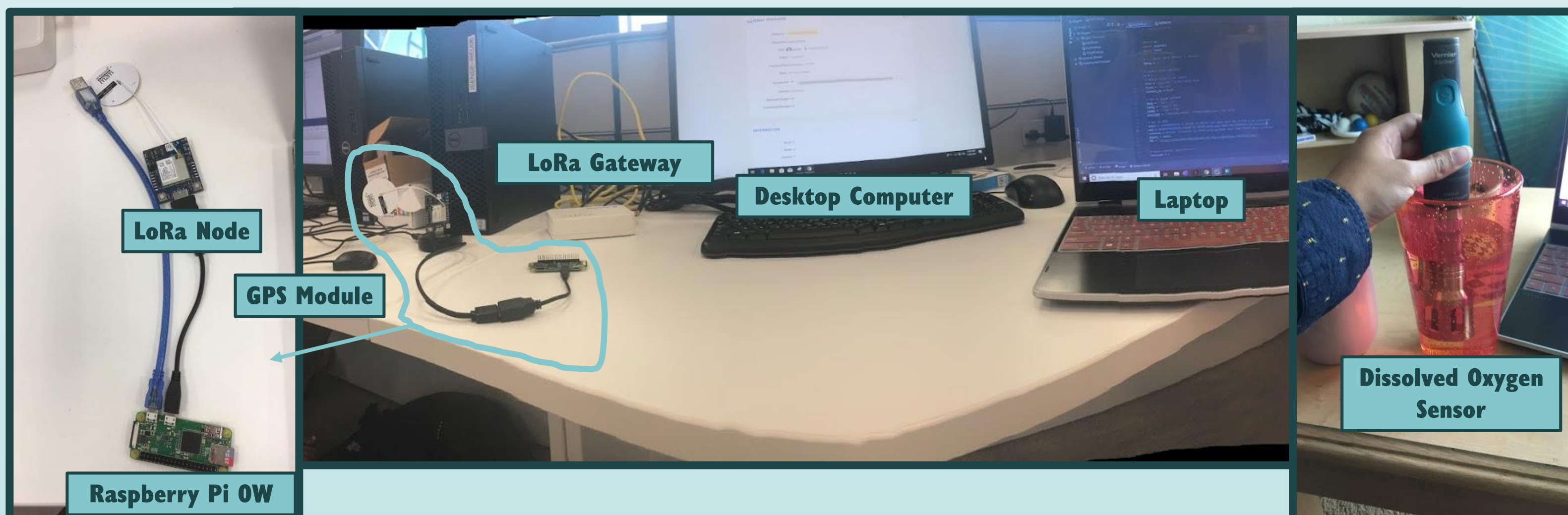
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College Park Scholars Academic Showcase, May 1, 2020

Abstract:

Sufficient dissolved oxygen levels are necessary for fish survival. Modern aquaculture practices rely on human intuition to monitor and react to changing dissolved oxygen levels in fishponds. Paper-based data collection can be unorganized, difficult to analyze, and error-prone. As a result, ponds can reach dangerously low dissolved oxygen levels. This project involves the development of an automated dissolved oxygen monitoring system for fish farms. The system supports efficient data collection, data presentation, and analysis, enabling predictive dissolved oxygen management.

Materials:

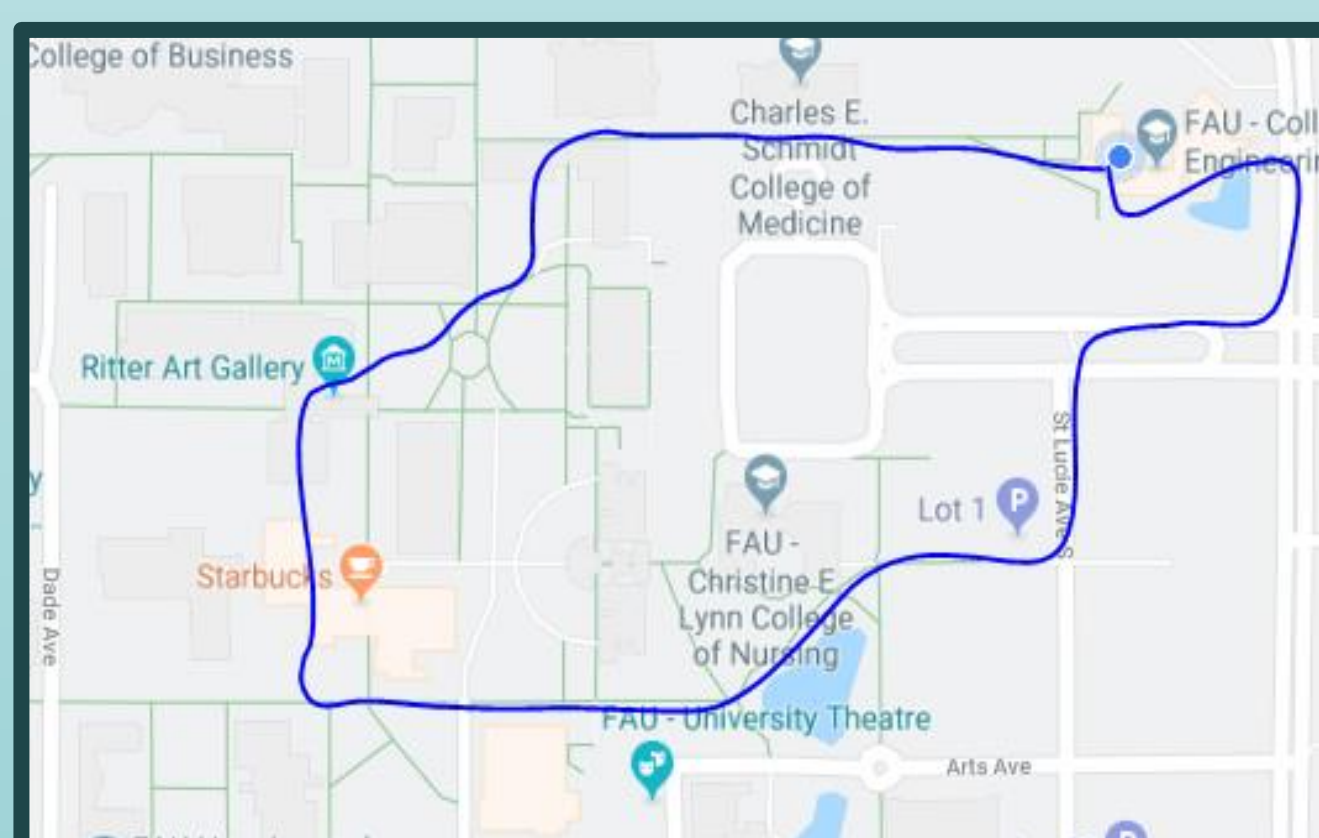


Results:

The LoRa Gateway was shown to have an inadequate range to be implemented over the area required for this project. When tested, 77.11% of packets were dropped within the required range.

Methods:

- Set up LoRa Gateway and Node so that packets could be sent between the two devices
- Wrote program to get Raspberry Pi to automatically collect and send GPS data every 30 seconds via LoRa Node.
- Wrote program to take data sent to Gateway and display it on a map.
- Walked on path specified in results section with LoRa Node, Raspberry Pi, and GPS module to get data
- Compared sent packets stored on Raspberry Pi to data received by gateway



Path followed around FAU campus to test received signal strength



Area where signal was received from node. Each pinpoint shows measured signal strength from GPA coordinate

Discussion:

Overall, the results of my research showed the LoRa gateway model provided for the project was inadequate. In order for the project to progress, a new LoRa gateway model needs to be used with the node. This project was done as a part of the HAUCS project, Hybrid Aerial/Underwater Robotics System. Its goal is to improve aquaculture practices via an autonomous drone system. By researching automating dissolved oxygen measurement, the project can integrate a dissolved oxygen sensor onto a drone to improve efficiency in collecting this data.

Site Information:

Florida Atlantic University I-SENSE Lab

777 Glades Rd, Boca Raton, FL 33431

Dr. Jason Hallstrom

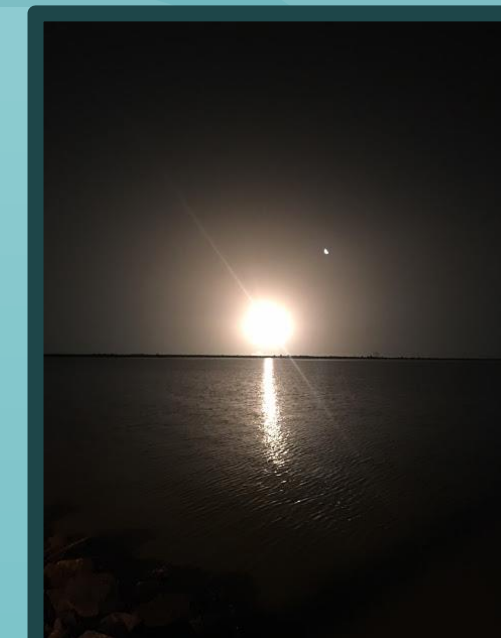
Goal: Conduct research related to sensing and embedded network systems.

Experience:

Working with other students researching different topics in another state allowed me to learn and experience much more than just my own project. I learned about past and present research projects at FAU, such as researching leatherback turtles diving depth and emotion detection. The program also hosted workshops related to business and graduate school to help us prepare for the future. I also was lucky enough to gain many friendships through the experience, and get to do other activities, such as watch the SpaceX Falcon Heavy Launch and visit the beach.



Participants in research at FAU



SpaceX Falcon Heavy Launch



Miami Beach Sign



Johnson Sea Link at Harbor Branch Oceanic Institute



Acknowledgments:

Dr. Jason Hallstrom, Dr. Bing Ouyang, Dr. Jiannan Zhai, Dr. Paul Wills, Chancey Kelly, Yanjun Li, Stepan Mazohka; Drs. Holtz & Merck

