Water Monitoring System for Automated Inland Shrimp Production

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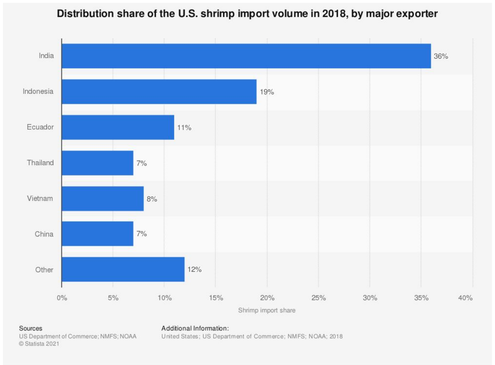
Objective

Our project is seeking to solve a key problem for the US shrimp market. Reducing the price of imports by cultivating them in the United States in a controlled environment.



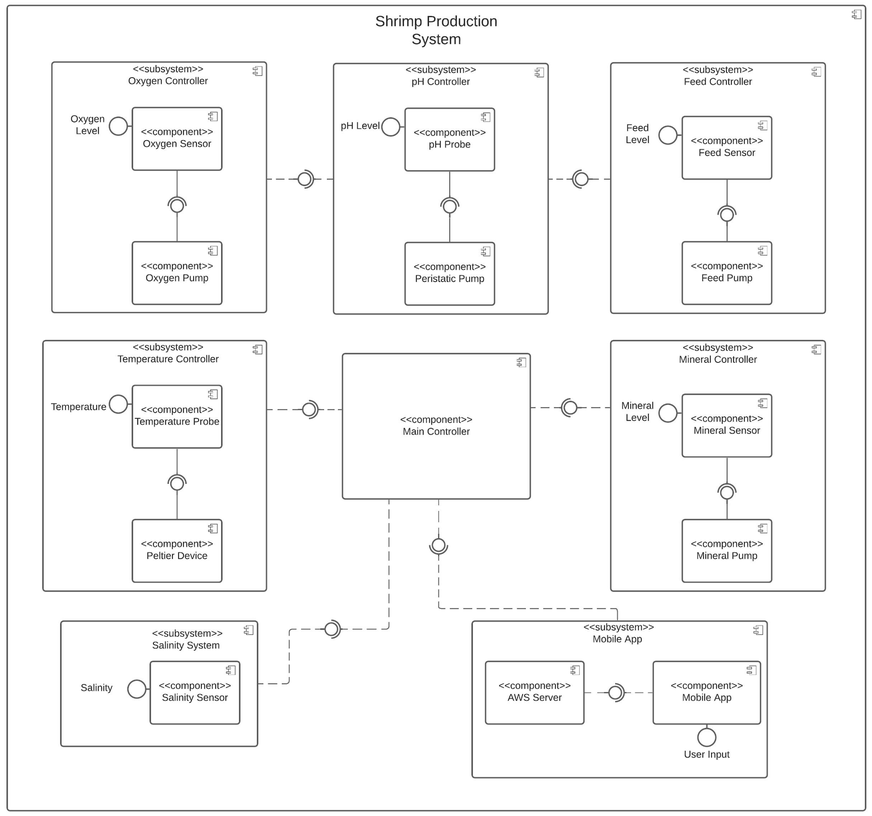
Background

The US imported 698,358 metric tons of shrimp in 2019 and when it was sold, it was sold for double its price. That's $8/kg before it's sold. Our project is going to tackle various aspects of this market such as cost, quality of shrimps and inland production. Inland shrimp production done in the US will bring the cost per kg down significantly. The main factor contributing to the high price as of now is the import from Asian countries and South American countries.

Proposed Solution

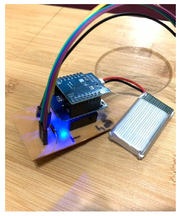
To solve this problem we designed a system that takes readings from the water that the shrimp are in and autonomously adjusts environmental parameters such as oxygen, ph, temperature, mineral levels, this is paired with a mobile app that lets the user see and adjust these parameters from anywhere.

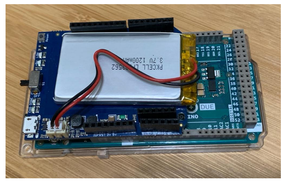
Block Diagram



Components

- Ph Probe
- Dissolved Oxygen Sensor
- Air Pump
- Temperature Sensor
- Peltier Water Pump
- Ammonia Sensor
- Weight Sensor
- Salinity Sensor
- ESP 8266
- Arduino Due





Results

We've successfully started growing multiple ghost shrimp on a small scale!

Summary

As a team we learned about automating system, working with IoT (the Internet of Things), and a lot about shrimp and their many needs. From our results with the live shrimp we can conclude that our solution works on a small scale. Further development would be required in order to adapt this project to work for large scale shrimp production. Possible Improvements could be adding more Feeders around the tank, more powerful pumps for the Peltier and oxygen system, and a Peltier with a higher cooling capacity.

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