Smart Fish-Tank

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Introduction

The smart fish tank monitor serves to make the process of owning and caring for a fish significantly easier by automating and simplifying many of the tasks that are necessary to keep a fish healthy. This system is easily configurable to fit in different size tanks by using different lids, and is able to be interacted with both on the device and online via a web server. This product is designed for new fish owners who are looking to simplify their fish care routine.

Features

- Display with live tank stats and updates
  - Temperature, pH, Water Clarity
- Speaker alerts on tank conditions
- Lid and auto-feeding system on schedule
- Heater with automatic temperature control
- Connects to web server that allows for remote view and control of system through website

Designs

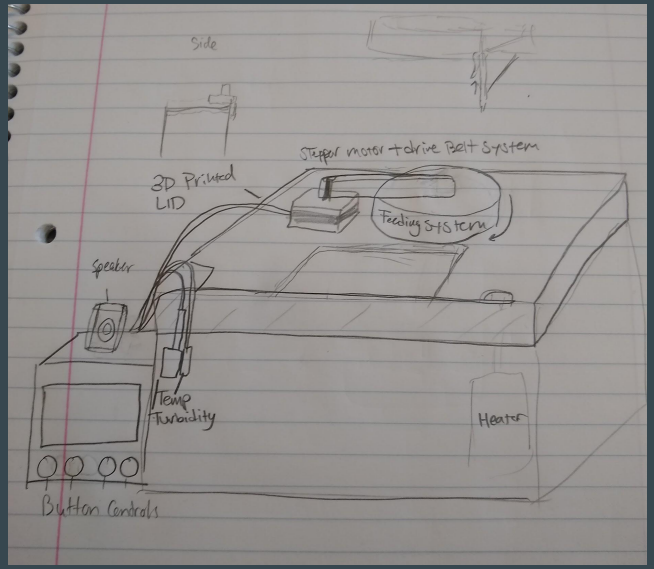


Figure 1. Initial Sketch

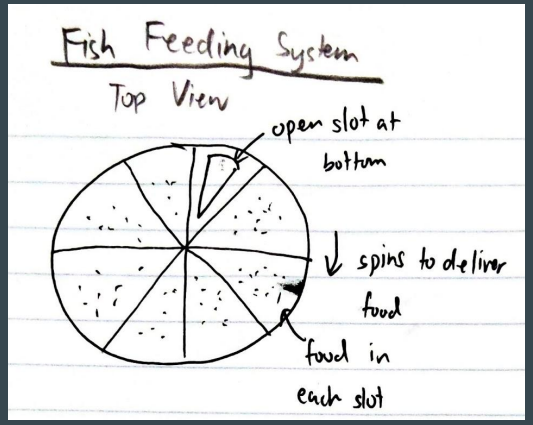


Figure 2. Feeding Mechanism Top View

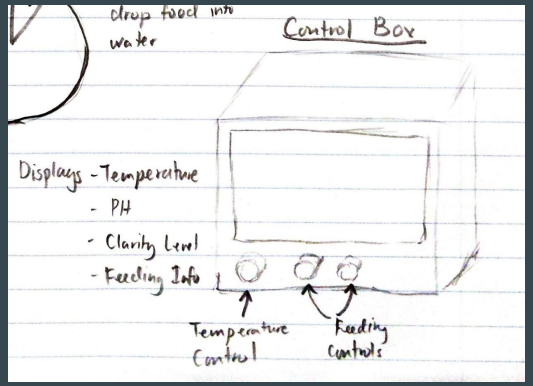


Figure 4. Control Box

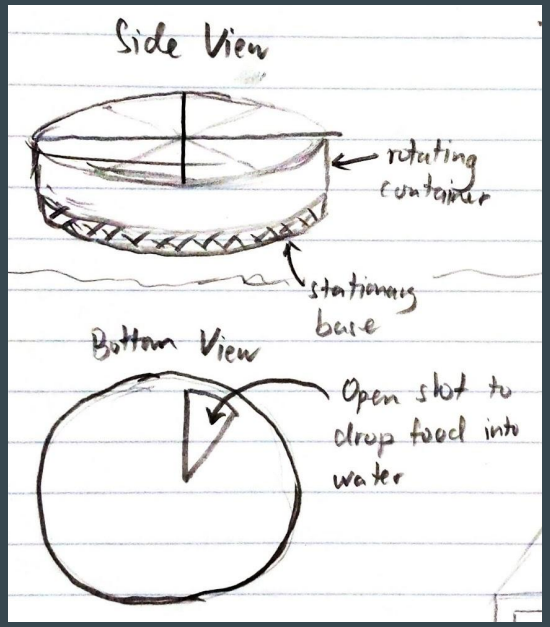


Figure 3. Feeding Mechanism Side and Bottom View

CAD

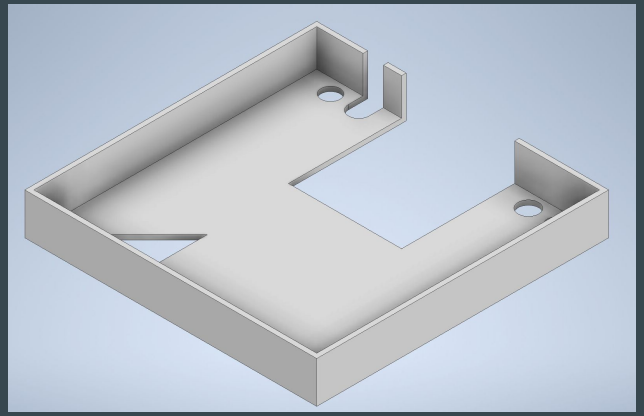


Figure 1. Lid Final CAD

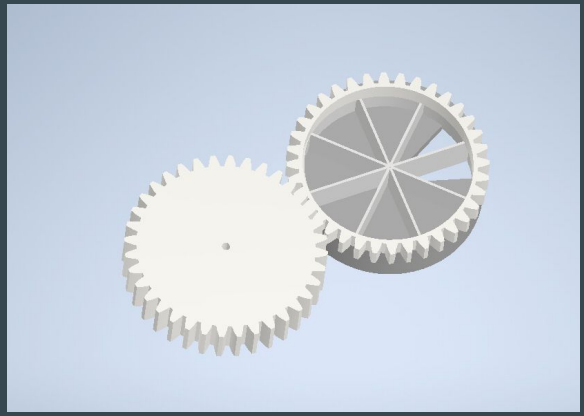


Figure 2. Gear and Feeding Schematics

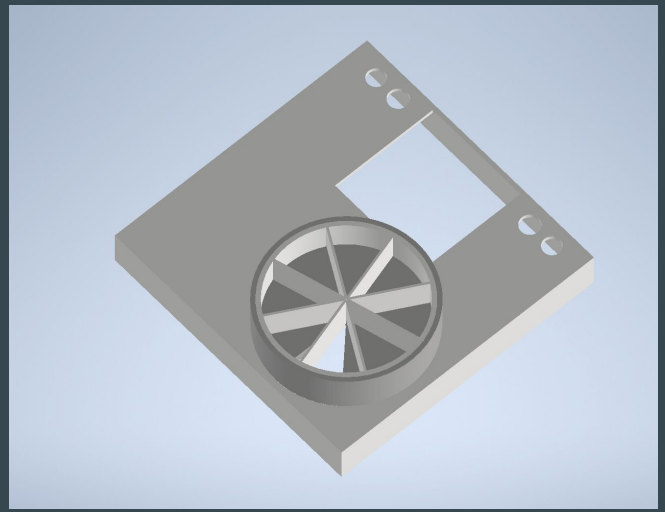


Figure 3. Lid with Feeding System (No Gear Attached)

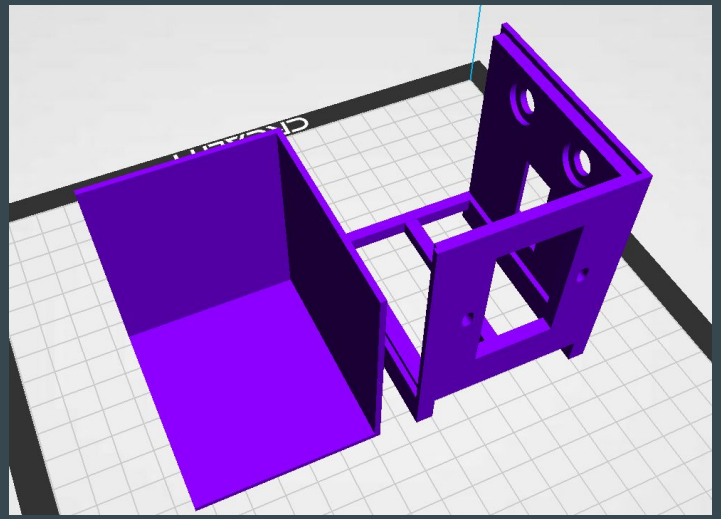


Figure 4. Display, Potentiometer, and Power Supply Housing

CAD

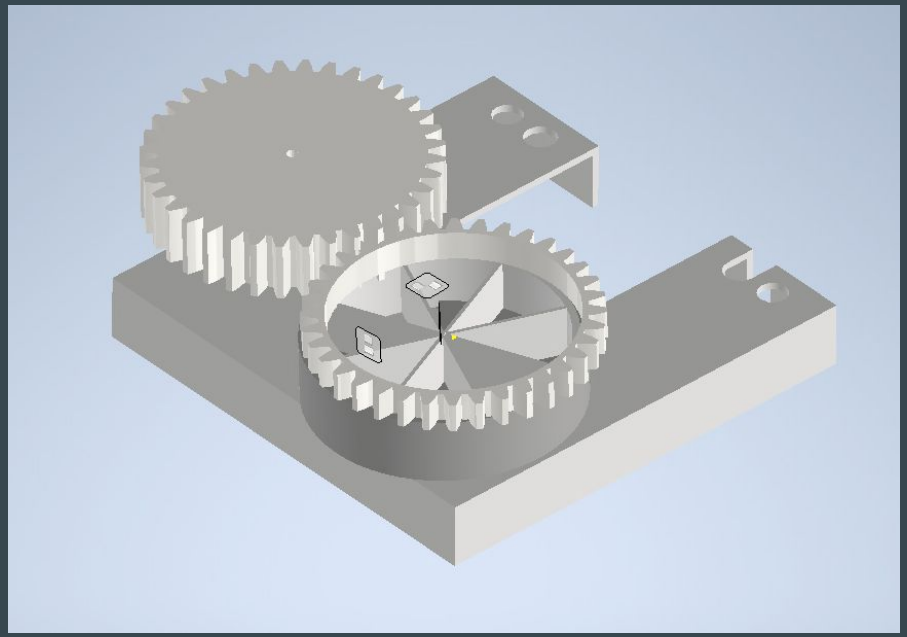


Figure 1. Full Lid CAD

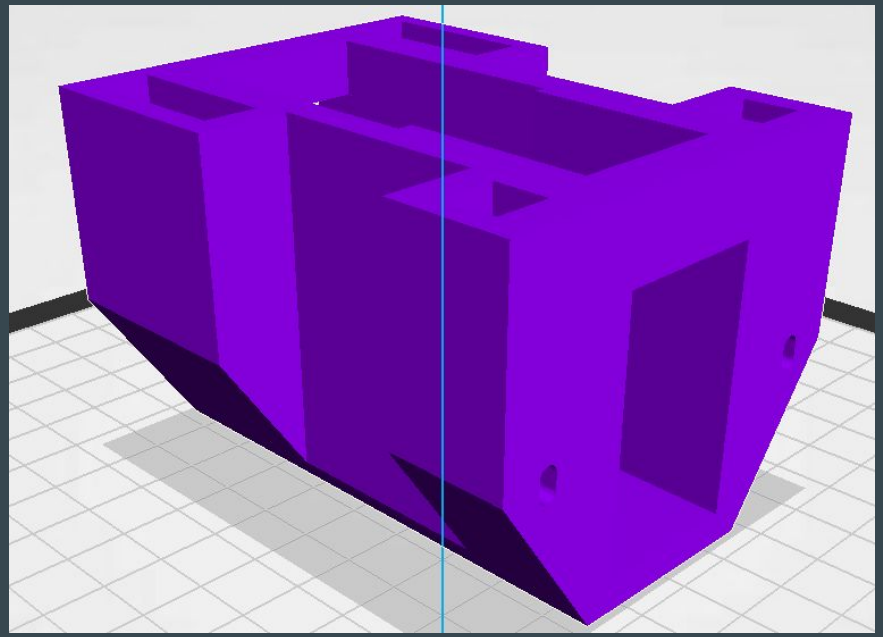
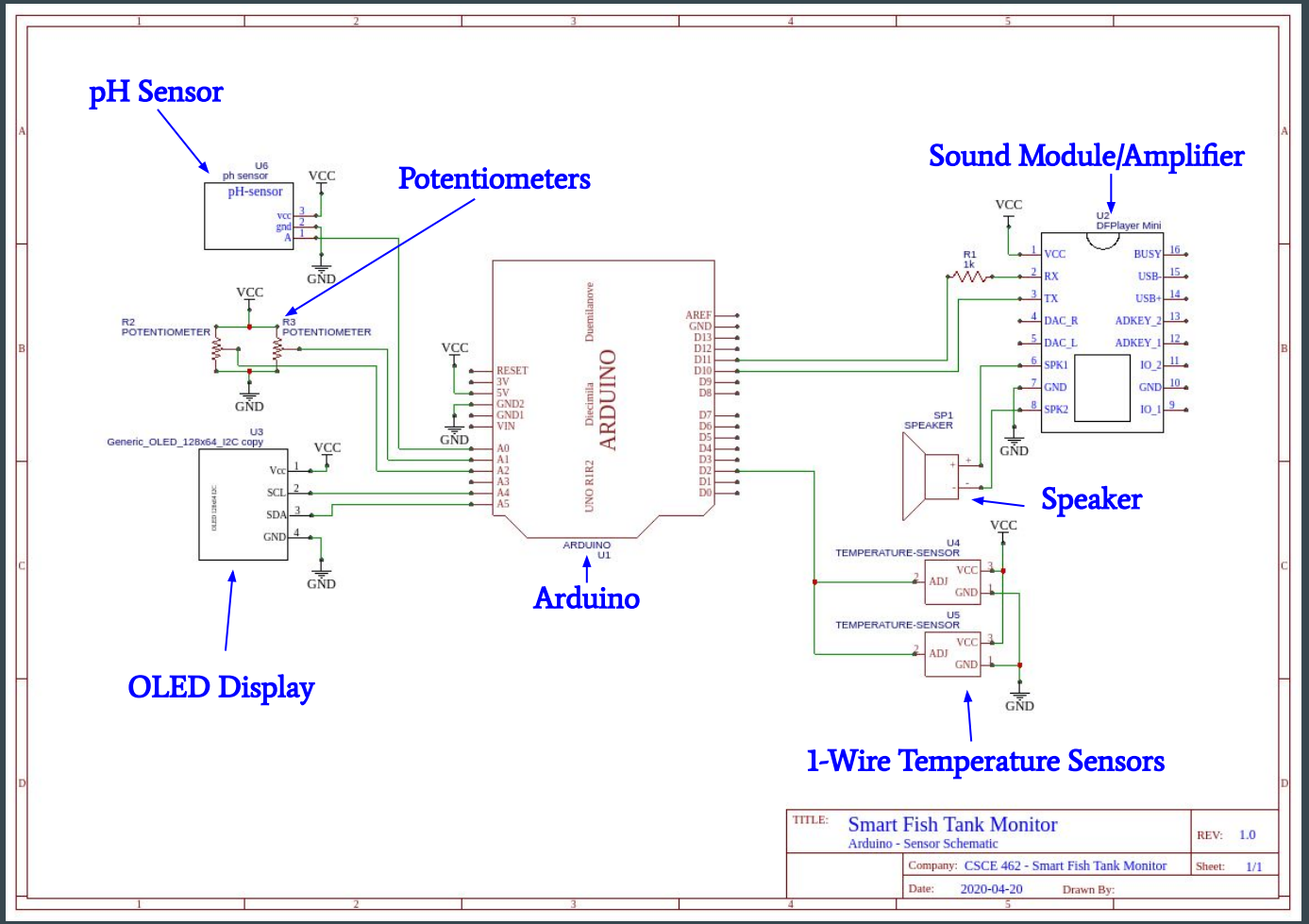


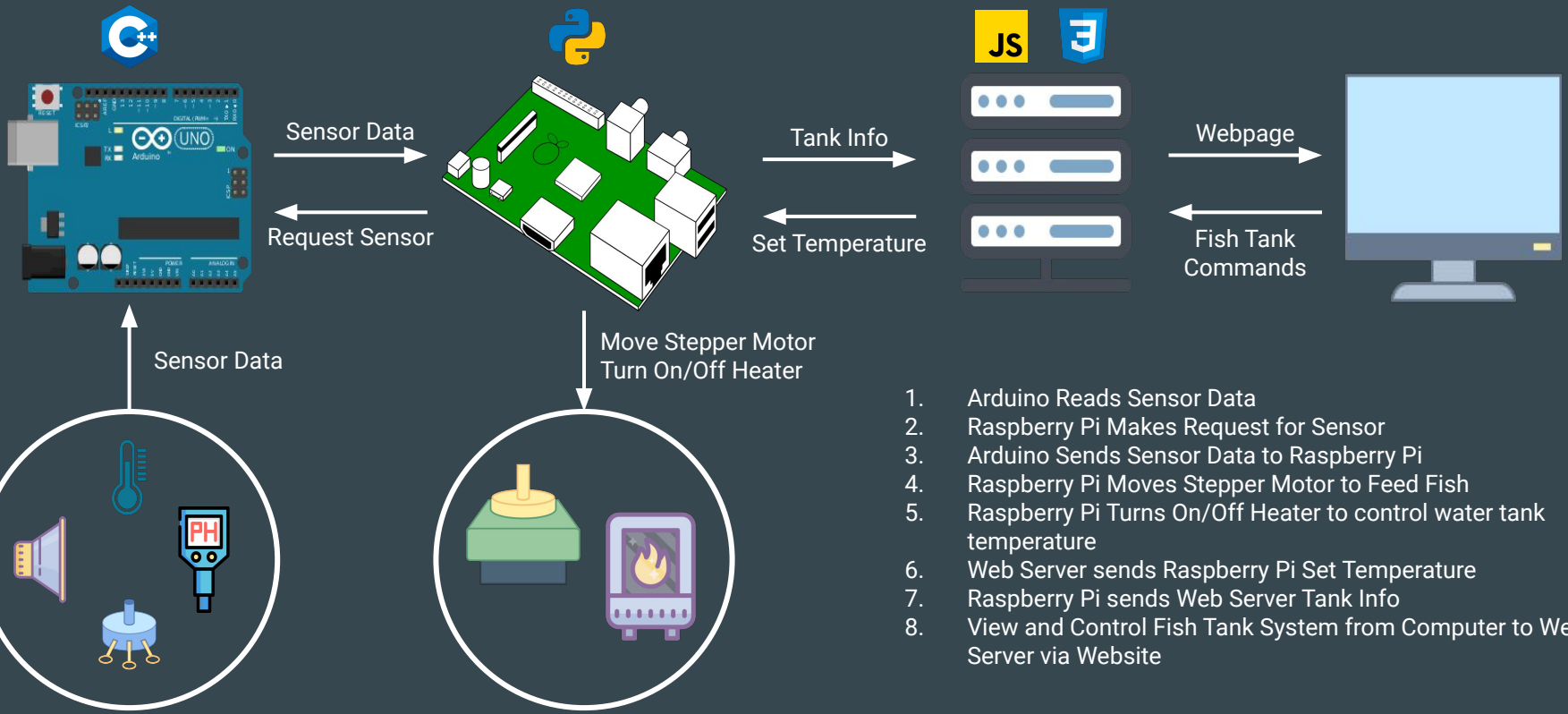
Figure 2. Arduino, Raspberry Pi, and Sensor Board Housing

Schematics

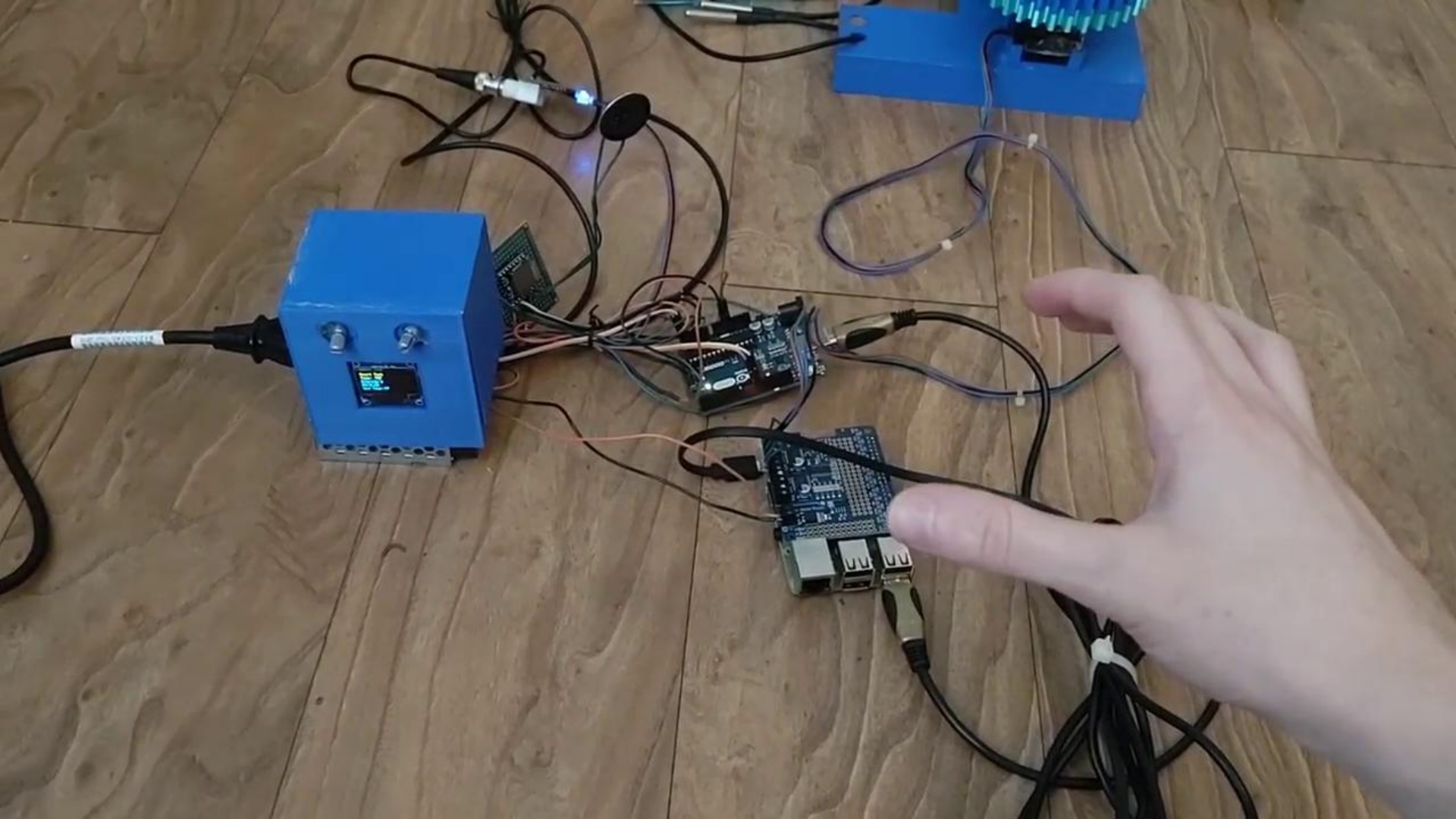
- Arduino connects 5V sensors
- Raspberry Pi UART via USB

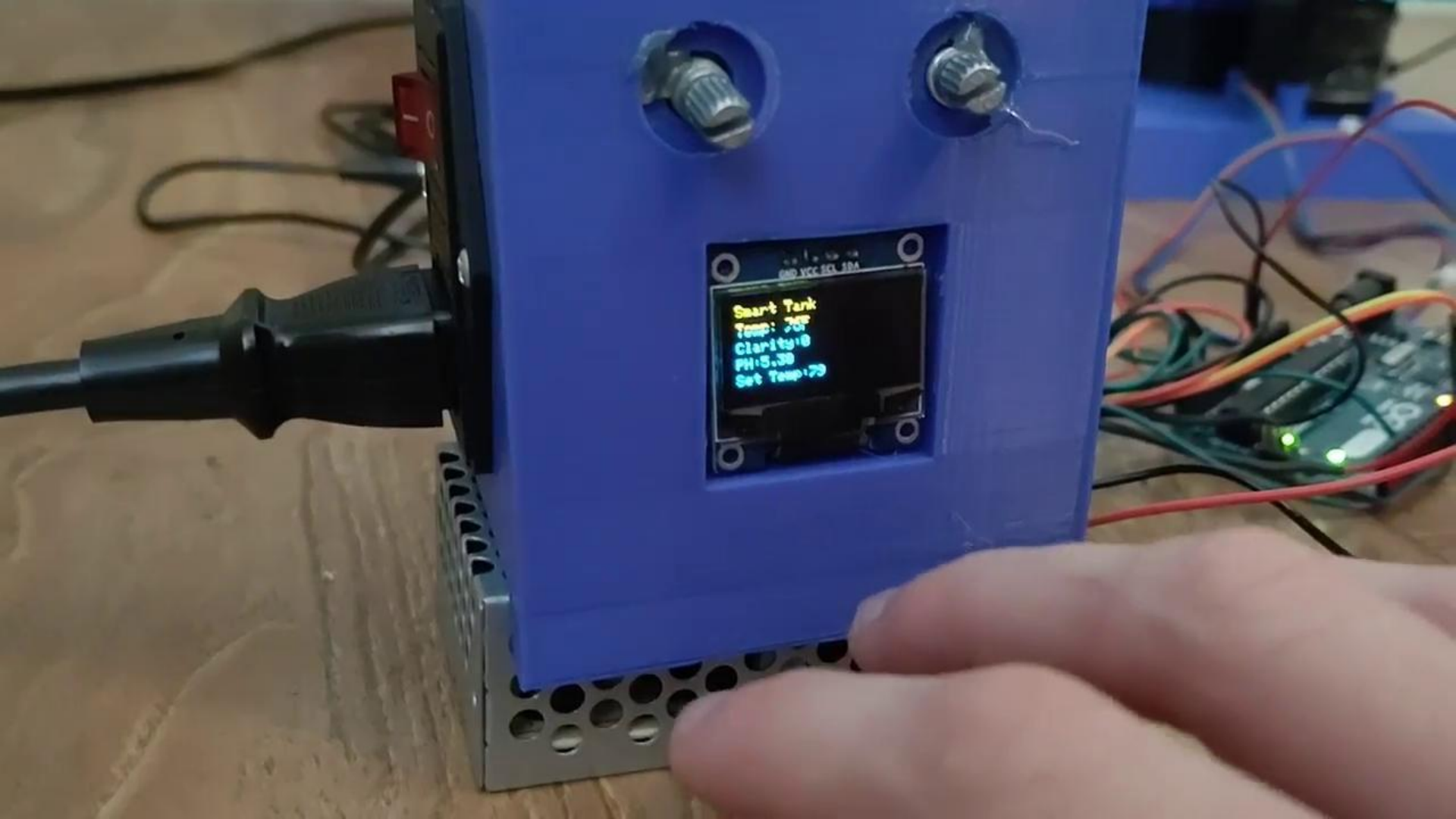


System Diagram

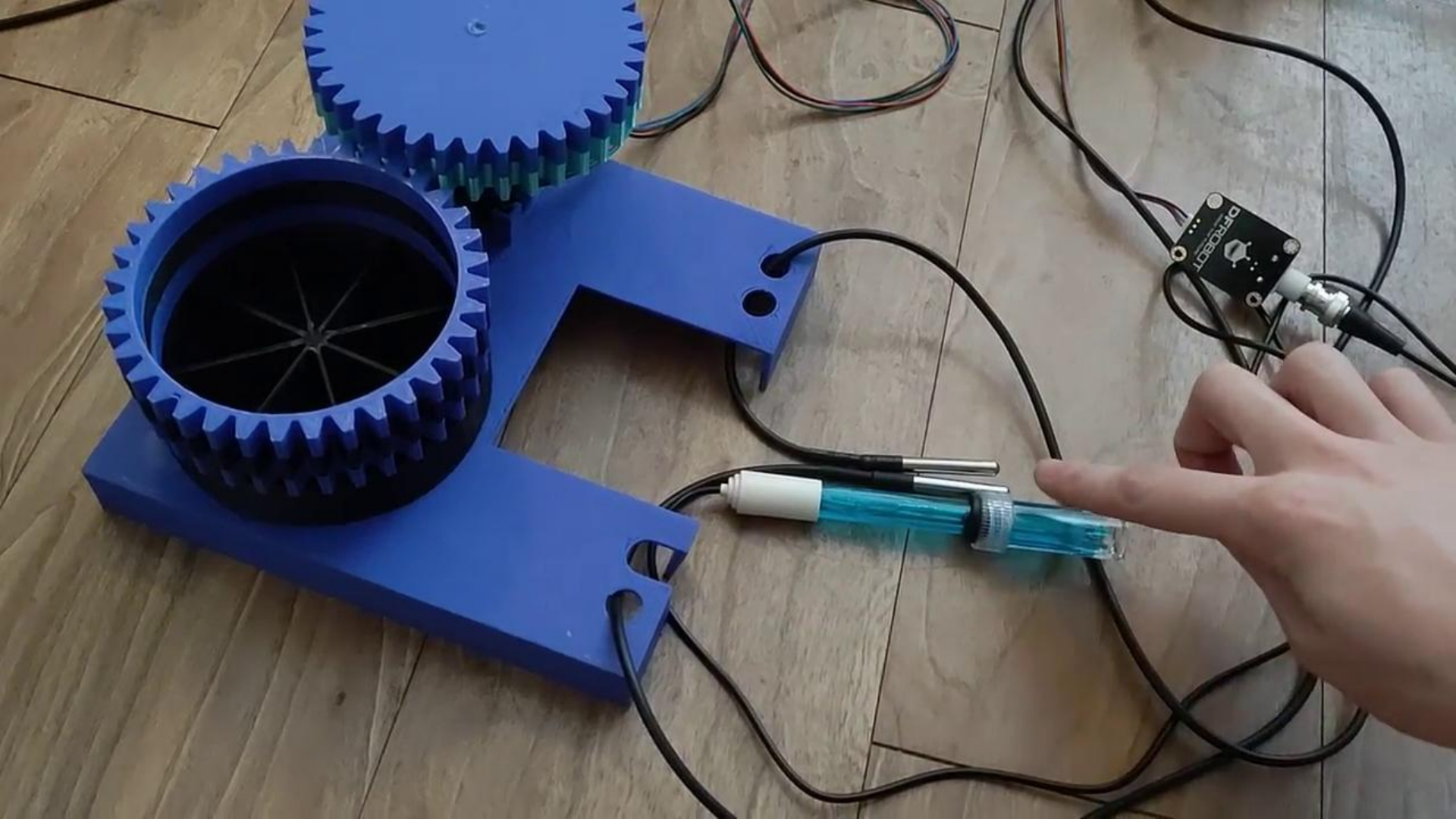


1. Arduino Reads Sensor Data
2. Raspberry Pi Makes Request for Sensor
3. Arduino Sends Sensor Data to Raspberry Pi
4. Raspberry Pi Moves Stepper Motor to Feed Fish
5. Raspberry Pi Turns On/Off Heater to control water tank temperature
6. Web Server sends Raspberry Pi Set Temperature
7. Raspberry Pi sends Web Server Tank Info
8. View and Control Fish Tank System from Computer to Web Server via Website




GND VCC SCL SDA
Smart Tank
Temp: 70F
Clarity:0
PH:5.30
Set Temp:79


Start Test
Clarity:4
pH:5.38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Challenges

- Corona Virus makes collaboration difficult
- Each member has different part of project
- Parts no longer available or takes too long to ship
  - Used Arduino for 5V sensors and Raspberry Pi for WiFi
  - Original plan - single Arduino with WiFi
- Arduino ran out of memory and causing crashes
- Could not purchase more 3D Printing Filament
- Turbidity (Water Clarity) Sensor no longer available

Thanks and Gig ‘em