



Water pH Monitoring

Under Professor Aftab Hussain

Location : Nilgiri Ground Floor Water Cooler

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Step 1: Environment Setup

We installed the Arduino IDE, along with the packages and libraries necessary to ensure the IDE was compatible with the ESP32 microcontroller board

The sensor we used was a DF Robot pH Sensor Pro



Step 2: Writing Code



After looking through the various sources and GitHub repositories consisting of thousands of lines of code, we realized the crux of the code could be as simple as :

1. Read output from sensor
2. After appropriate testing, write an equation to calibrate the sensor and give the desired values

Step 2 Continuation...



In order to check if the sensor was working, we used soap water and lime water to check the variation in the output

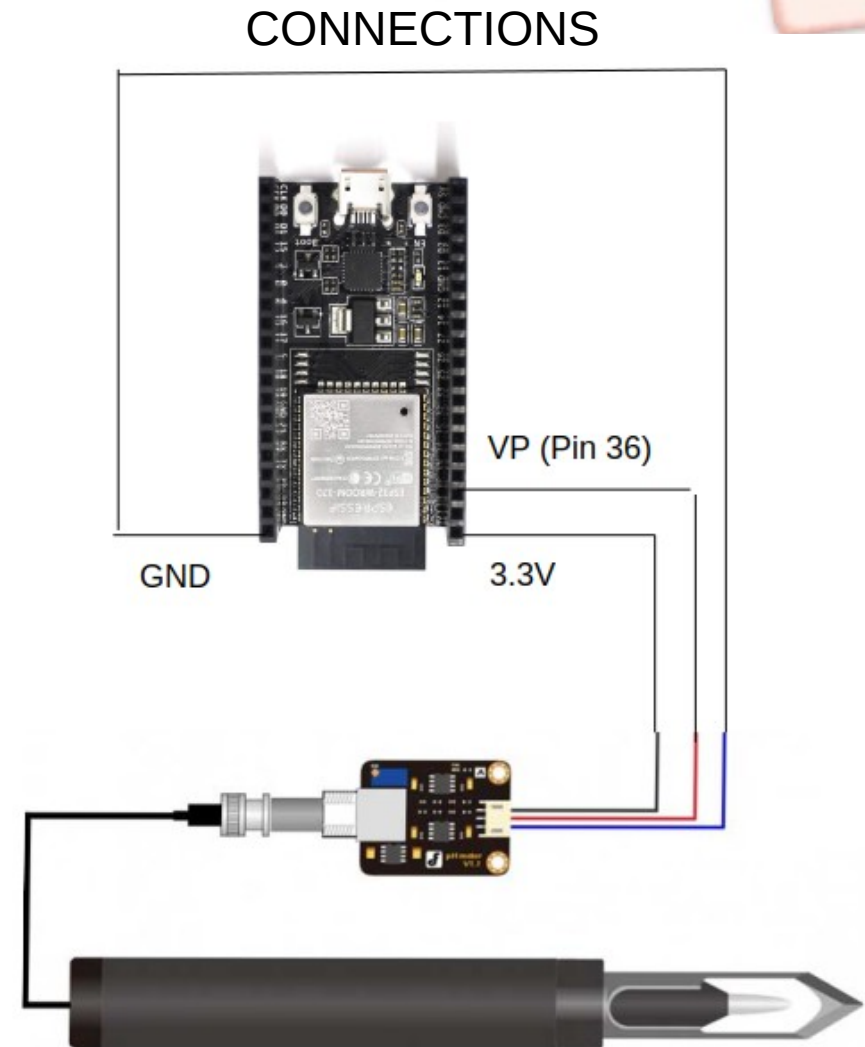
Initially when the sensor entered a new solution, the voltage fluctuated for a long time before it settled down and became fairly constant

Calibration

Once we received the buffer solutions, we noted the voltage outputs for each of the two pH values(4&7), then wrote a straight line equation to convert the output voltages of the sensor to the desired pH values.

Step 3 : Connecting Hardware

- We initially chose to connect to 5V, but due to some excessive electrical noise, the code was not being uploaded onto the microcontroller board, hence we shifted it to 3.3V through which it worked smoothly.
- Pin 36 is an analog input pin.



Step 4: Code Modifications



Wifi Reset:

In order to take care of the wifi reset problem, we added an if condition in the main loop to check if the wifi is connected at each iteration. If not, the program resets and runs through the wifi setup process again

Step 5 : Bringing it together



We rolled up all the wires, collaborated with another team and packed all our components into a box for safe and dry deployment

Step 5 Continuation...



1. Each microcontroller was connected to a charger
2. Each charger was connected to a single female to male connector
3. This connector connected to another female to male connector which was connected to the main wire (which would be plugged into the wall for power)

Step 6 : Deployment



We found a water tank in Nilgiri.

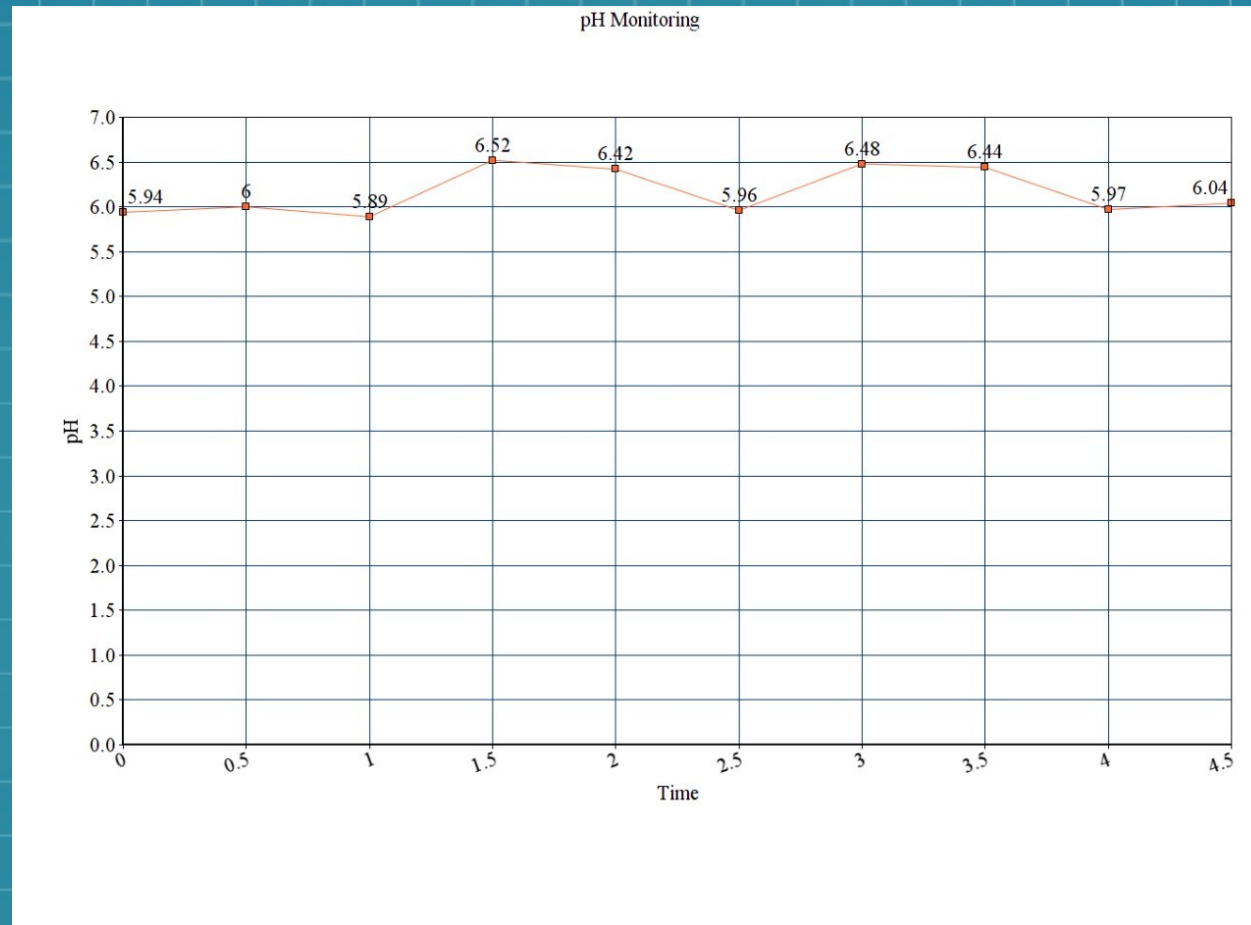
We put both sensors in the water tank and pulled the wires out through the same hole through which the filtered water entered the tank

Step 6 Continuation...

Once we successfully placed the sensors, we mounted the box containing the microcontrollers and other electrical connections onto the wall using a drilling machine

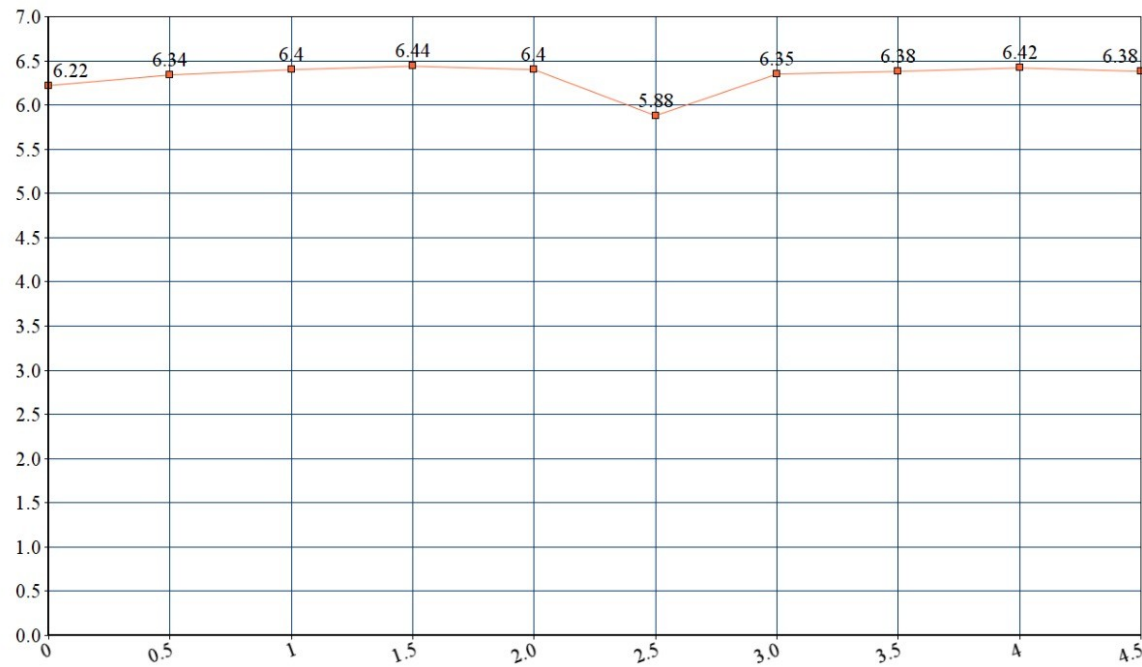


Data on the Server



Beginning data points

Data on the Server



Final data points

Conclusions Drawn

1. In the beginning there appears to be a lot of fluctuation in the detected pH between 5.8 and 6.5. This happens anytime the sensor is placed in a new solution
2. However towards the end it is seen that the pH value stabilized around 6.4
3. From this we can conclude that the water filter was doing a decent job at keeping the water within the safe drinking water pH range(6-8.5)