



Project Documentation

“Water Salinity and Solubility Monitor”

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Project Introduction :

Our project is about a monitoring device that can monitor substances and their ions soluble in water.

Part 1: Firstly we will gather up water(Sample), which we will measure salinity pointing out the soluble minerals and salt inside the water. This module we can then provide to any Water Treatment plant who can extract the salt from the saline water.

Part 2: Moreover we can check the complete amount of organic and inorganic compound solution in water. Which can afterwards be managed to maintain favourable conditions for usage. We'll be able to know the pH and the concentration of a certain element dissolved in the water.

Social Impacts

Motivation

Only 40% of people in Bangladesh get purified drinking water. About 53% of the coastal areas are affected by salinity. Salinity causes unfavorable environment and hydrological situations that restrict the normal crop production throughout the year. People who use land in these areas are very poor. Moreover Residence based water reserves can't always maintain fresh water. And industry level materials can harm freshwater sources which is a major crisis for the wetland biodiversity.

Solution

In this case we are trying to build such a project which can help the people in rural areas who are susceptible to water based issues and diseases. In case of individual uses this product can warn about severe changes of substances soluble in water.

Functional Features:

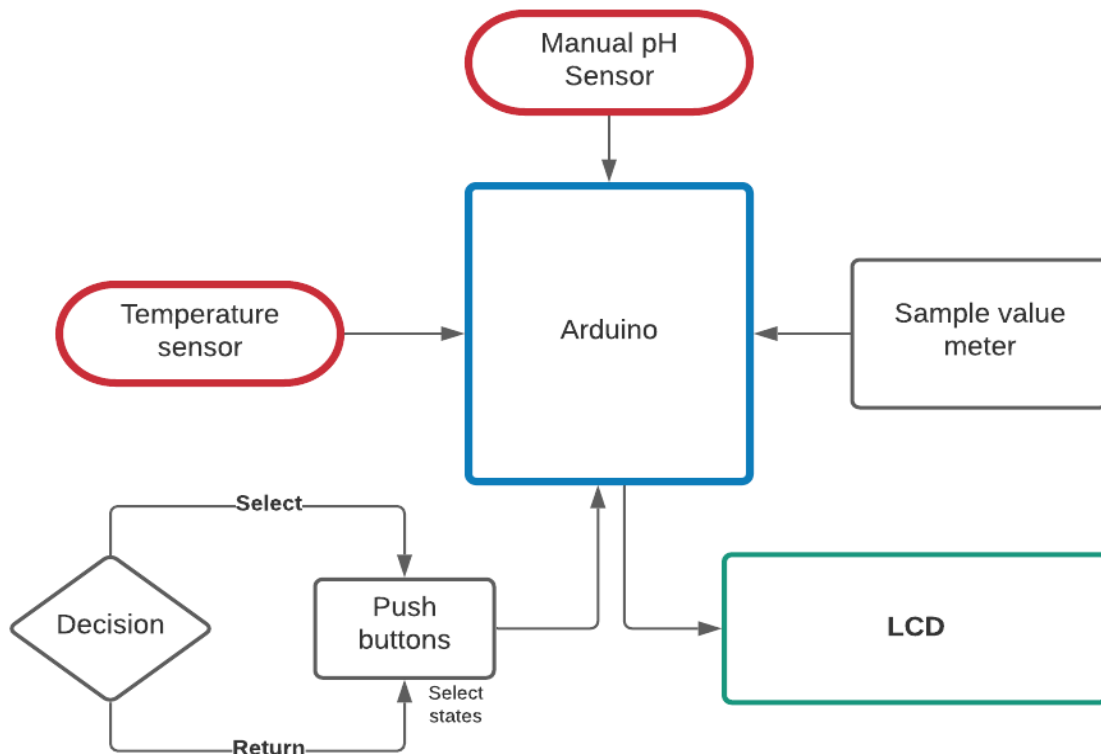
- Solubility Monitoring - TDS
- Temperature Measurement - TMP36
- Salinity Monitoring
- Mineral Ion monitoring - TDS
- pH Measuring - pH Sensors

Components:

1. Arduino (Uno) Board
2. Breadboard
3. Push buttons
4. Registers
5. Multimeter
6. Power supply
7. Potentiometer
8. TDS Sensor
9. Temperature Sensor (TMP36)
10. pH Sensor (Made manually)

Workflow:

Here, we can see that the components and other sensors are integrated with the arduino board. The input is taken from its environment and output is printed out on the LCD screen. We have implemented the individual functions step by step,



First the program will require the parameters and requirements by which we can select individual contaminants with navigation buttons (**Select** for changing and **Return** for applying and go to the next state) and bound the limiting values of the contaminants in the memory. Gradually we will be able to quantify the concentrations of the dissolved pollutants. This we can do, by putting in the **average value**, **minimum ppm** and **maximum ppm**. After that we will require to measure the temperature and pH of the sample water manually. The temperature can be adjusted to find the adjacent pH.

Observation

Step 1: Simulation starts, Requires SELECT button to initialize.
 Step 2: After pressing the "Select" button, Contaminant list appears for working with individual contaminant tests on samples.
 Step 3: Let's Select the contaminant "**Fe**" and then press "**Return**" for further progress
 Step 4: Then we need to enter the average number of samples taken to measure using "Select" button
 Step 5: Then we will give the Minimum and maximum ppm value for the sample to be tested
 Step 6: Let's take Min ppm value **2** and Max ppm value **4**
 Step 7: Then we will require to insert the sample of the waters [We used power supply to simulate a sample signal]
 Step 8: As a result after analysis, we will get the water's ppm value which is **3**
 Step 9: After pressing the Select button, the program will activate the temperature sensor and print the sample's temperature in Celsius which is **9**
 Step 10: Next, the program will show the measured pH value of the sample water as it is activated for the next interrupt.

Point to be noted, The whole mechanism is based on simulation, so we can only demonstrate the signal differences of voltage to simulate sample values for each measurement. In the end, all the calculations are provided in the code section of the simulation.

Manual:

Here we will measure the temperature and pH value of the sample. By getting the value we can compare with ideal temperature and pH which will help us to identify if the water is polluted or not. Ideal temperature is 25 degree celsius and ideal pH value should be 7.

1. We will have to select the contaminant which is responsible for the water pollution. There are 8 contaminants which have been selected.
2. Then we have to take the average number of Ion/contaminants which are present in water.

3. Now, we have to take the minimum and maximum ppm value of the contaminant material which we have selected. Like for Arsenic the threshold which is the maximum ppm here is can 0.001 ppm declared by WHO. That's why the minimum and maximum ppm is needed which represents the least amount of minerals and the threshold we can consume.
4. After that, the water sample is taken. As it is a simulation, the sample value is given manually in the power supply. This power supply will provide an analog voltage which will be the substitute of our sample.
5. Now, with the help of some equations we measure the Ion ppm which is ideal for the sample value and also for the temperature.
6. By taking the value from the temperature sensor we get the pH value of the sample water.
7. Therefore, we can analyze the data for further analysis. And generate the solubility of the sample water.

Reference:

- ❖ [The drive link for Demo video and other relevant files](#)

Github repository link:

- <https://github.com/mahirashrafemad/Water-solubility-test>
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