

## ***SMART WATER FOUNTAIN***

### **PROJECT DEFINITION:**

The project aims to enhance public water fountains by implementing IoT sensors to control water flow and detect malfunctions. The primary objective is to provide real time information about water fountain status to residents through a public platform. This project includes defining objectives, designing the IoT sensor system, developing the water fountain status platform and integrating them using IoT technology.

### **DESIGN THINKING:**

#### **Objective:**

Our goal is to design a smart water fountain that can monitor the water quality and automatically replace water when polluted (not healthy) or running out. We will use sensors to measure the water quality. Common water quality measurement factors include temperature, pH-value, conductance, turbidity and hardness. Considering the pollution at home can only affect limited factors, we choose temperature, pH-value and conductance to be the three properties used for calculating water quality in our water fountain. These data will be collected, calculated, and reflected to the user in terms of "Good", "Average" and "Bad". The water fountain is also designed to self-filter the water every time when water is pumped through the submersible water pump.

#### **Sensor Design:**

We are mainly using four sensors here temperature sensor, pH-sensor, conductivity sensor, liquid level sensor.

#### Temperature Sensor:

A water-proof temperature sensor is going to be used. Part number from sparkfun is: DS18B20 . This temperature sensor is compatible with a relatively wide range of power Supply from 3.0V to 5.5V. The measured temperature ranges from -55 to +125 celsius Degrees. Between -10 to + 85 degrees, the accuracy is up to +-0.5 degrees. This sensor can Fulfill all requirements needed for this project.

#### PH-sensor:

PH value is a valued indicator of water quality. This PH-sensor works with 5V voltage, Which is also compatible with the temperature sensor. It can 6measure the PH value from 0 To 14 with an accuracy of +- 0.1 at the temperature of 25 degrees.

#### Conductivity sensor:

Conductivity sensor is also part of the water quality assessment. The input voltage is from 3.0 to 5.0V. The error is small, +-5%F.S. The measurement value ranges from 0 to 20 Ms/cm which is enough for water quality monitoring.

#### Liquid Level Sensor:

This sensor is responsible for reflecting how much freshwater is left in the water tank. When the water level is low, fresh water will be pumped to the water tank to ensure the Water fountain keeps running with freshwater. This sensor is 0.5 Watts. For water level from 0 to 9 inches, the corresponding sensor outputs readings from 0 to 1.6. From that, the Quantity of freshwater left can be determined **Information platform:**

The screen will be used to display the readings from the sensors in a real-time manner. In addition, other necessary information will also be displayed. As described in the sensor part, the water quality and remaining water quantity will be displayed. The screen will be programmed so that it makes it easy for users to read information. After programming the screen, a conclusion of water quality(Good, Average, Poor) will be displayed along with the remaining water level.

### **Integration Approach:**

The data acquired from the sensors will be transmitted to the control unit. Control unit will then have some logic designed to send corresponding signals to control other blocks of the water fountain. At the same time, the display screen on the water fountain will display the readings along.