

PROJECT-1: SMART WATER FOUNTAINS:

PHASE-1

Project objectives:

Smart water fountains represent a convergence of modern technology and sustainable water management practices. These innovative fountains leverage Internet of Things (IoT) technology to enhance water dispensing efficiency, user experience, and conservation efforts. By integrating sensors, real-time monitoring, and remote management capabilities, smart water fountains provide data-driven insights into water quality, consumption patterns, and maintenance needs. It can help with the oversight they need to avoid water waste. Sensors monitor multiple parameters, like temperature, humidity, and soil moisture to calculate how much water crops need. IoT-enabled water management systems leverage numerous sensors that collect real-time insights on how resources are used.

The proposed system uses four sensors which are pH, turbidity, ultrasonic, DHT-11, microcontroller unit as the main processing module and one data transmission module ESP8266 Wi-Fi module (NodeMCU). The microcontroller unit is a significant part of the system developed for water quality measurement because The Arduino Mega consumes low power.

Iot Devices Design:

TURBIDITY SENSOR:

Turbidity is the calculation of the water clearness, i.e. the number of particles suspended in the water. It uses light to detect suspended particles to evaluate light transmit and dispersion rate. The calculation measures the numbers of water particles floating in the water, for example, plant waste, sand, silt and clay, impacting the sunlight. Excess turbidity can reduce marine life reproduction and lead to various types of human illness . The rate changes with the total number of particles suspended in water. Total Suspended Solids (TSS) increases in water with increasing turbidity. The sensor produces both digital and analog mode output . The input voltage of the sensor is 5V with an analog output voltage ranging from 0 to 4.5V. It can withstand a maximum temperature of 100 C–900 C. The NTU (Nephelometric Turbidity Units) is its units. In essence, the sensor is positioned to the side of the beam. When light reaches the sensor, if many small particles are dispersed in the water, this small particle will be detected by the source beam.

ULTRASONIC SENSOR:

The ultrasonic sensor provides a 2cm - 4m measurement range. The sensor fabricated on a module that includes an ultrasonic transmitter (Trigger pin), receiver (Eco pin) and a control circuit. It generates a high-frequency sound wave of frequency 40 kHz, and it will be the valuation of the echo received by the sensor measures the interval between signal transmission from the pin trigger and receiving it back to the echo which further determines the distance to an object .

INTEGRATION APPROACH:

The system proposed in this paper is an efficient, inexpensive IoT solution for real-time water quality monitoring. The developed system having Arduino Mega and NodeMCU target boards are interfaced with several sensors successfully. An efficient algorithm is developed in real-time, to track water quality. A web-based application i.e., ThingSpeak is used to monitor the parameters such as pH value, the turbidity of the water, level of water in the tank, temperature and humidity of the surrounding atmosphere through the webserver.