Phase 1: Problem and Design Thinking

PROJECT TITLE	**IOT SMART WATER SYSTEM**
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GITHUB REPOSITORY LINK	**https://github.com/kirubagaran-v/IBM-NAANMUDHALVAN.git**

Abstract:

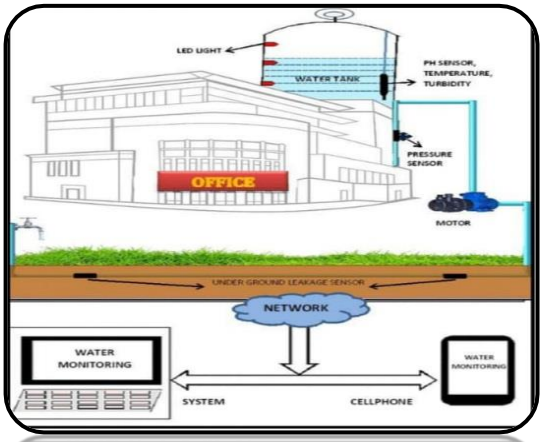
Water is essential for living things. So, we have to know about how to manage the water usage . where the water is being wasted ? find the places and we have to prevent this situation by **SMART WATER SYSTEM.** And we ensure the quality of water that is also important . so, monitor the pH value of the water by this plan .

1.Project Definition

1.1. Project Overview

We present the theory on real time monitoring of water quality and quantity using IOT. The system consists of arduino, microcontroller, different type of sensors like water flow sensor, pH and turbidity sensor and ultrasonic sensor. The arduino is the main processor of the system which control and process the data generated by the sensors.

1.2.Project Objectives



real-Time Water Monitoring System

A Wi-Fi module is connected to the Arduino device which help to transfer the data to the cloud over internet. The ultrasonic sensor helps to measure the water level when the water flow reach certain level then the water flow can be stopped automatically by turning the motor off or close the water flow in pipe by the help of Arduino. The water flow sensor measure the quantity of water flow through the pipe in a given time, this data will be sent to cloud for storage and analysis purposes. The other sensor like temperature, pH and turbidity sensor measure the water quality and help to determine whether the water is useful for drinking or any agricultural purposes.

2. Design Thinking

2.1. IOT Sensor Design

2.1.1. Sensor Selection

The essential component of the system of smart water system automation are:

I).ARDUINO UNO :

Arduino is a microcontroller board based on the **ATmega328P.** It has 14 digital input and output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

II).FLOW SENSOR

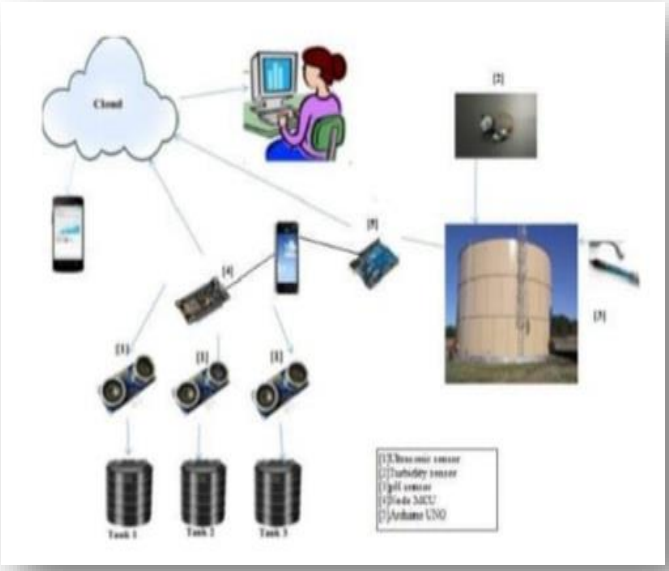
Sensor is used to measure the flow of water. This sensor basically consists of a plastic body, a rotor and a sensor. The pinwheel rotor rotates when water / liquid flows through the pipe and its speed will be directly proportional to the flow rate. The Hall Effect sensor will provide an pulse with every revolution of the pinwheel rotor.

III).WI-FI MODULE :

The ESP8266 is capable of hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module come pre-programmed with an AT command set firmware. The ESP8266 module is an extremely cost effective

3. Real-Time Transist Information Platform

3.1.Mobile app interface

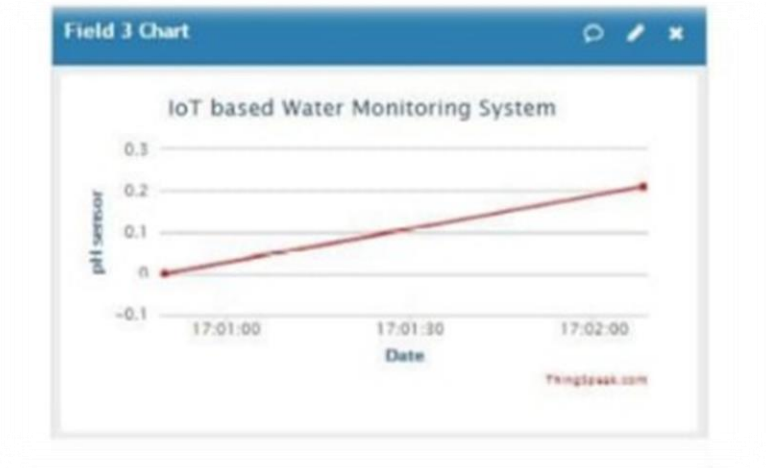


3. Integration Approach Using Arduino and cloud

HOW TO USE CLOUD?

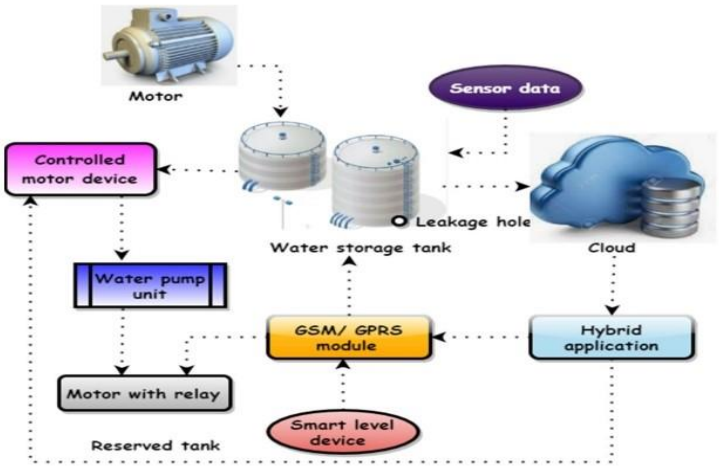
This system is using Wi-Fi module (Esp8266) to send the sensor data to the cloud. All the sensors are connected with Wi-Fi module. Wi-Fi module needs the internet. So here Mobile data or Wi-Fi is the access point for the internet. And after all this data sends to the cloud. The following figure show the data stored in cloud

Data of ultrasonic sensor

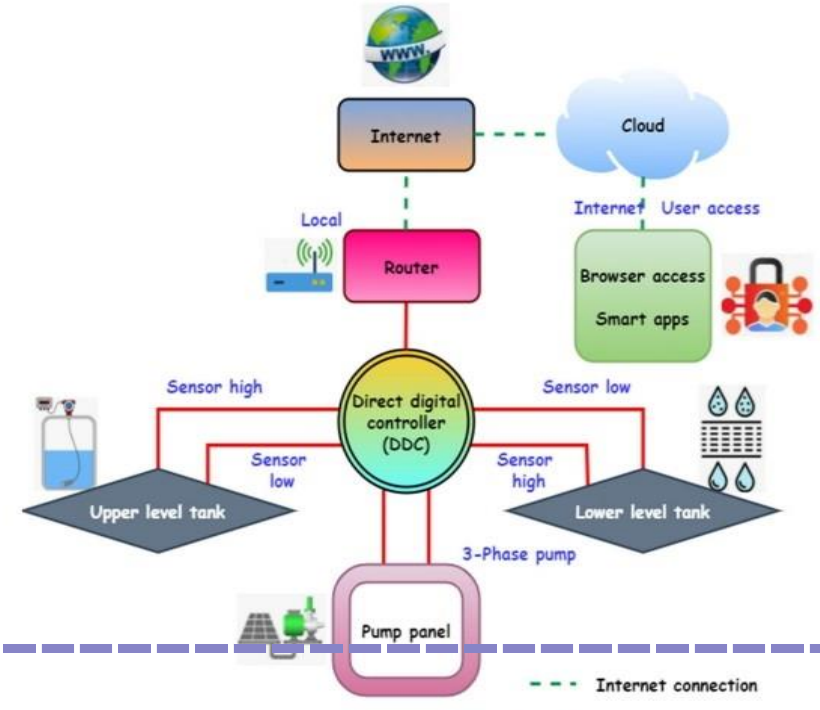


Data of pH value sensor

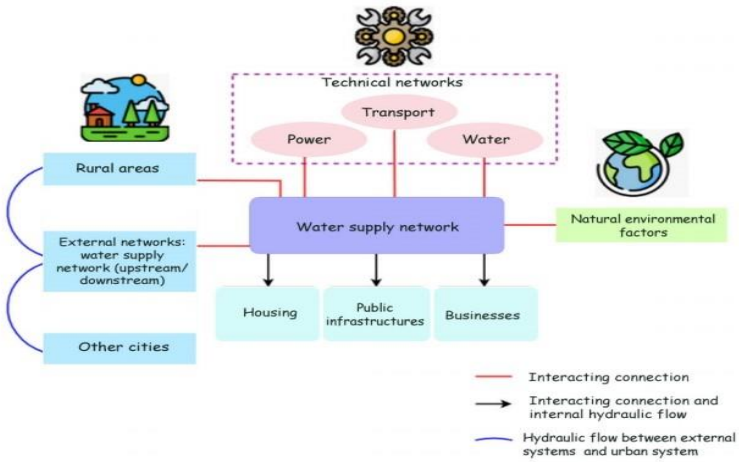
4. Architecture diagram



The smart water tank using IoT. A hybrid application and two devices make up the microgrid system. The first device measures the water tank's height and sends the real-time information to the cloud using a smart-level device. The GSM module of the smart level sends a signal to another device, a motor-controlled device, which automatically activates and deactivates the motor based on the signal. They activate and deactivate motors when they receive an input signal. With this technology, a leakage measurement hybrid application has been constructed. The device's ultrasonic Smart Level sensor continuousl With a microprocessor and UR detector, the GSM/GPRS module may send data to the cloud, where it can be stored and accessed remotely [40–42]. The effects are extraordinary. As the water level in the tank rises or falls, the intelligent level device sends a signal to the regulated motor device to turn the motor on or off, respectively. IoT devices upload information to the cloud, which can be evaluated later. Users can tell the system to alert them if a specific threshold is met. A system for intelligent water management should allow for constant monitoring of water levels. Overflows and leaks in water systems can be spotted quickly by real-time monitoring.



The IoT-based smart water management systems. Three-phase pumps, as previously indicated, are often used in water management systems for high-rise structures. This can lead to tanks being overfilled or pumps being overworked, which wastes water and energy and shortens the life of the pumps. For this reason, an intelligent water management system was created that can be used alone or as part of a larger building management system (BMS). Water level sensors in different tanks were linked to a direct digital controller (DDC), which controlled the whole system. The DDC controls the pumps through the pump panel to which it is connected. People can remotely operate the pump and check tank levels using a smart app with a DDC. It needs to be linked to a local Wi-Fi network or the internet to attain this purpose



The strategy of the water supply network. During functional analysis, the activities of a system are represented by two types of functions: main and technical. The essential aim of a system's behavior is communicated by its functions, and the system's response to stressors imposed by the external environment is modeled using technical functions. Using functional block diagrams (FBDs), the system and its surrounding environment are represented in functional analysis. An external functional analysis aims to identify the system under consideration, its boundaries, and the external contexts with which it interacts.

CONCLUSION & FUTURE SCOPE

In this paper, a prototype water monitoring system using IOT is presented. For this some sensors are used. The collected data from the all the sensors are used for analysis purpose for better solution of water problems. The data is sends to the cloud server via Wi-Fi module ESP8266. So this application will be the best challenger in real time monitoring & control system and use to solve all the water related problems.