Internet of Things Created Water Observing System

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Abstract - The system uses a combination of sensors, communication technologies, and cloud computing to collect and analyze data related to water levels, temperature, pH, dissolved oxygen, and other parameters. With the growing concern for water scarcity and pollution, such systems have become essential for ensuring the sustainable management of water resources. IoT-based water monitoring systems leverage wireless sensor networks and communication protocols to collect data from various sources, including water bodies, distribution systems.

Keywords:- – Internet of Things (IoT), Water Monitoring, Water Quality, Water Conservation, Wireless Sensors, Real-time Monitoring, Water Management, Remote Monitoring, Data Analytics, Smart Irrigation, Water Consumption, Environmental Monitoring, Water Treatment.

INTRODUCTION

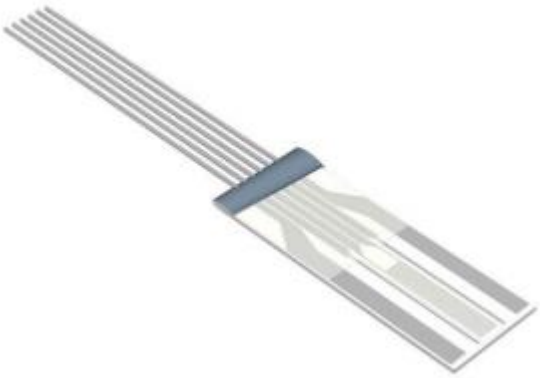
An IoT-based water monitoring system is an advanced technology solution that uses sensors, communication networks, and cloud-based data analytics to provide realtime monitoring and management of water quality, usage, and conservation. With the growing concern for water scarcity and pollution, such systems have become essential for ensuring the sustainable management of water resources. IoT-based water monitoring systems leverage wireless sensor networks and communication protocols to collect data from various sources, including water bodies, distribution systems, and consumer endpoints. The data collected from these sources is then transmitted to cloud-based platforms for analysis, which can be used to identify trends, detect anomalies, and optimize water usage. The system provides valuable insights into the quality of water, such as pH levels, turbidity, and chemical composition, and also helps to detect leaks and other anomalies in the water distribution network. This helps in timely and accurate decisionmaking by water management authorities, leading to improved water conservation and management practices. Overall, IoT-based water monitoring systems are a gamechanger in the water management industry, helping to conserve water resources, reduce wastage, and improve the overall efficiency of water management practices.

Existing Hardware

There are various hardware components that can be used for an IoT-based water monitoring system, depending on the specific needs and requirements of the application.

Water quality sensors: These sensors measure different parameters of water quality such as pH levels, dissolved oxygen, conductivity, turbidity, and temperature.

Conductivity Sensor: It is an instrument that measure the ability of a solution to conduct an electrical current.



Turbidity Sensor: A Turbidity sensor is a piece of equipment used to measure the cloudiness or haziness of liquid. It works on light transmitting and scattering process.

pH Sensor: A pH sensor is a device that measure the acidity and alkalinity of water and other solutions. It Use pH sensitive glass or a chemical part to detect the concentration of water.

Water Temperature and Humidity Sensor: A temperature humidity sensor is a device that can convert temperature and humidity into electrical signal that can easily measure temperature and humidity.

Smart valves: These valves using Relay can be remotely controlled and monitored, allowing for better management of water flow and distribution.

Relay: A relay is an electrically operated switch. It consists of of a set of input terminals for a signal or multiple control signal, and a set of operating contact terminals.

OLED Display: OLED, which stands for Organic Light Emitting Diode, is a relatively new type of display for televisions, smartphones, and computer monitors.

Wi-fi Module: A Wi-fi module is a device that broadcasts a wireless signal to allow smart devices to connect to connect to a network at high speed.

Wireless communication modules: These modules provide connectivity between the sensors and the cloudbased data analytics platforms, allowing for real-time monitoring and analysis of water quality and usage.

Microcontrollers: These are small computing devices that can be used to process data from the sensors and transmit it to the cloud-based platforms.

Power supply units: These units provide power to the sensors and other components, and can be batteryoperated or connected to the main power supply

Overall, the selection of hardware components depends on the specific requirements of the water monitoring application and the environmental conditions in which they will be used.

WORKING METHODOLOGY

The working methodology of an IoT-based water monitoring system typically involves the following steps:

Sensor deployment: Water quality sensors, flow meters, pressure sensors, and other hardware components are deployed in the water distribution network, such as in reservoirs, pipelines, and consumer endpoints. These sensors continuously measure different parameters of water quality and usage, and transmit the data to the cloud-based platforms.

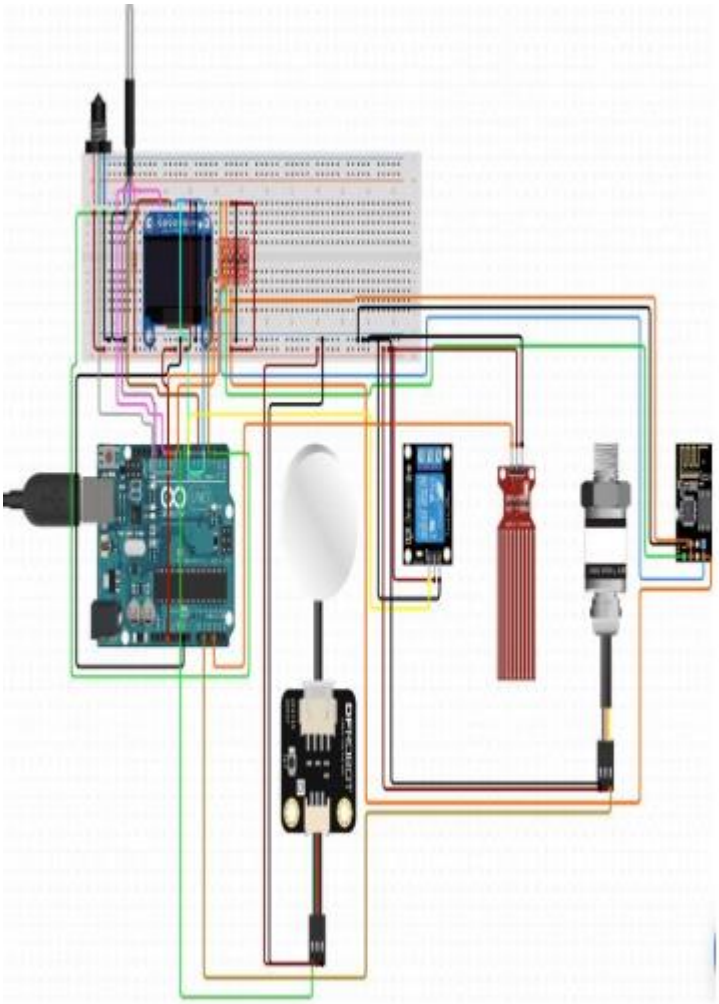
Data transmission: The sensor data is transmitted wirelessly using communication modules, such as cellular or Wi-Fi networks, to a cloud-based platform for processing and analysis. The data can also be stored locally in the sensors or gateways, and transmitted to the cloud when connectivity is available.

Data analysis: The cloud-based platform receives the sensor data and applies data analytics techniques, such as machine learning and artificial intelligence, to analyze the data and generate meaningful insights. The data analytics can be used to detect anomalies, predict trends, and optimize water usage and conservation.

Alert generation: If any anomalies or issues are detected in the water distribution network, such as a leak or water quality issues, the system generates alerts that can be sent to water management authorities or consumers through SMS, email, or mobile applications.

Visualization and reporting: The system provides realtime visualization of the sensor data through dashboards, which can be accessed by water management authorities, consumers, and other stakeholders. Reports can also be generated to provide a summary of the water quality and usage trends over a period of time.

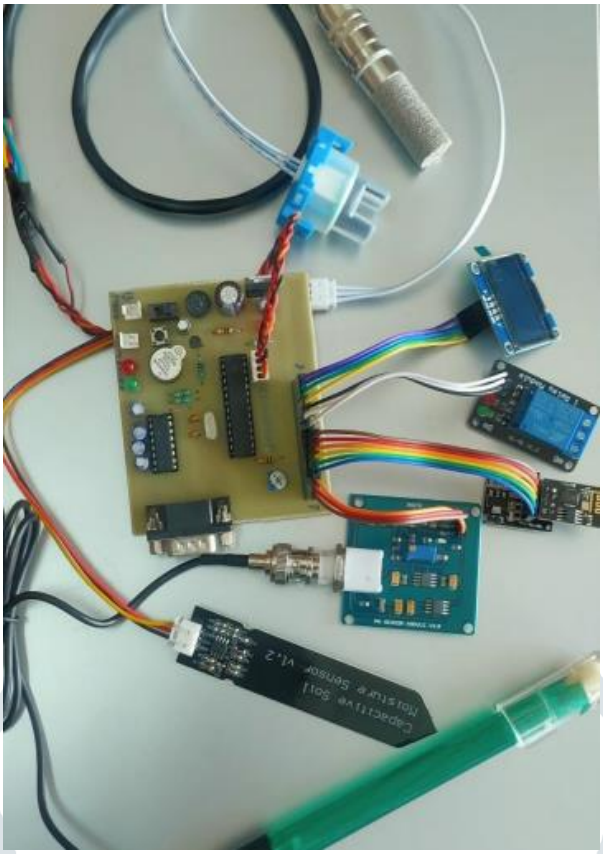
Overall, the working methodology of an IoT-based water monitoring system helps water management authorities to make timely and informed decisions, leading to improved water conservation, reduced wastage, and enhanced management practices.



Circuit Diagram

HARDWARE DETAILS

1. CORE MICROCONTROLLER
2. OLED DISPLAY
3. WIFI MODULE
4. CONDUCTIVITY SENSOR
5. TURBIDITY SENSOR
6. PH SENSOR
7. SOIL TEMPERATURE AND HUMIDITY SENSOR
8. RELAY MODULE
9. POWER SUPPLY



Hardware Setup

CONCLUSION

In conclusion, an IoT-based water monitoring system has numerous benefits, including real-time monitoring, automated data collection, and analysis, remote control and management, and improved water resource management. It can also help in detecting leaks, reducing water wastage, and ensuring the availability of safe and clean water for consumption. However, the success of the system relies heavily on the accuracy and reliability of the sensors used and the availability of a stable and secure network connection. Therefore, careful consideration should be given to the selection of appropriate sensors and the design of the network architecture. Overall, an IoTbased water monitoring system can greatly improve the efficiency and sustainability of water management practices.

REFERENCES

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