**IOT PHASE-5**

**SMART WATER MANAGEMENT**

**BASED ON IOT**

**HARDWARE COMPONENTS;**

**. Sensors Used With Boltduino/Arduino**

**. 5V Relay**

**. I2C LCD**

**. Boltduino**

**. 9V Battery**

**. Bolt Wifi Module**

**. IRF540 MOSFET**

**. Water Flow Sensor**

**. Ultrasonic Sensor X 2**

**. 1N4007 Rectifier Diode**

**. 12V DC Solenoid Valve**

**. Water Lifting Submersible Pump**

**. 4-way Capacitive Touch Switch Module**

**. 3-6 V Mini Micro Submersible Water Pump**

**. LM35 IC (Temperature sensor)**

**SOFTWARE COMPONENTS;**

**. Piezo Buzzer**

**. IR Sensor X 2**

**. DC Motors X 2**

**. 12V DC Adapter**

**. TCS3200 Color Sensor**

**. Capacitive Touch Sensor**

**. ESP8266 Motor Driver Shield**

**. Analog Multiplexer IC – CD4051**

**SOFTWARE APPS ONLINE SERVICERS;**

**. Arduino IDE**

**. Bootstrap Studio**

**. Spyder (Anaconda)**

**. Twilio**

**. Canva**

**. Hostinger**

**. Integromat**

**. Mega Creator**

**. Pichon (Icons8)**

**DEVELOPMENT OF SMART WATER MANAGEMENT ;**

**Water scarcity is a growing issue. According to several UN reports, it will directly affect nearly 20% of the human population by 2025. By 2040, roughly 1 in 4 children worldwide will be living in areas of extremely high-water stress. This is not limited to developing countries. Indeed, freshwater—the one we drink, bathe, grow our vegetables with, and cook with—is incredibly rare. Only 3% of the world’s water is fresh water, and two-thirds of that is hidden away in frozen glaciers or unavailable for use.**

**According to several NGO’s, about 1.1 billion people worldwide lack access to water, and a total of 2.7 billion find water scarce for at least one month of the year. Climate change and a growing population are the main reasons for this but they aren’t the only ones: collapsed infrastructure and distribution systems, pollution, conflict, overloaded water systems, and poor management of water resources are just a few of the human factors that are increasingly denying people their right to safe water and sanitation.**

**And when water is scarce, sewage systems can fail and the threat of contracting diseases like cholera, typhoid fever and other water-borne illnesses surges. Ecosystems around the world are suffering. And the price of water becomes more expensive which indirectly influences the countries’ economies.**

**The IoT has the ability to lessen this worrying picture. Smart Water Monitoring and Management Systems, based on the combination of sensors, big data and AI technologies, can provide to water utility operators, farmers and companies the ability to measure, monitor and control their water distribution networks as well as the quality of the water distributed. Less waste, less consumption, and a better management of the water’s quality can improve dramatically the preservation of our planet’s resources.**

**PYTHON SCRIPT**

**import random**

**import time**

**import paho.mqtt.client as mqtt**

**# Simulated water flow sensor data**

**def read\_water\_flow():**

**return random.uniform(0, 10) # Simulated flow rate in liters per minute**

**# MQTT client setup**

**mqtt\_broker = "your-mqtt-broker-url"**

**mqtt\_port = 1883**

**mqtt\_topic = "water-flow-data"**

**client = mqtt.Client("WaterFlowPublisher")**

**# Connect to the MQTT broker**

**client.connect(mqtt\_broker, mqtt\_port)**

**while True:**

**try:**

**# Simulate reading water flow data**

**flow\_rate = read\_water\_flow()**

**message = f"Flow Rate: {flow\_rate} L/min"**

**# Publish the data to the MQTT topic**

**client.publish(mqtt\_topic, message)**

**print(f"Published: {message}")**

**# Wait for a set interval (e.g., every 5 minutes)**

**time.sleep(300)**

**except KeyboardInterrupt:**

**break**

**# Disconnect from the MQTT broker**

**client.disconnect()**

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