DEPARTMENT OF INFORMATION TECHNOLOGY

Project name : Smart Water fountains

Team name : Proj_224781_Team_7

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PROBLEM DEFINITION:

The project involves implementing IoT sensors to monitor water consumption in public places such as parks and gardens. The objective is to promote water conservation by making real-time water consumption data publicly available.

This project includes defining objectives,designing IoT sensor system developing the data sharing platform and integrating them using IoT technology and python.

OBJECTIVES:

The smart water system using IoT is an innovative solution that leverages the IoT for management and conservation of water resources.

Water management problems such as water usage ,overflow in water tank. To overcome this problem by implementing proper monitoring.

Through a network of sensors, the system collects real-time data on water quality and consumption. This data is processed in cloud based platform.

It highlights potential of IoT in revolutionizing water management practices, ensuring sustainable access to clean water for current and future generations.

PROJECT :

A suite of sensors is critical in providing effective and data-driven water resource management in a smart water management system that leverages the possibilities of IoT. Flow sensors, water quality sensors, pressure sensors, and level detectors collect essential data regarding water usage, distribution quality, and storage levels on a continual basis. These sensors send real-time data to a Raspberry Pi central unit, which serves as the system's brain. The Raspberry Pi receives data, executes bespoke software, and provides the computational power required for quick analysis and decision-making. It can detect anomalies such as leaks or variations in water pressure quickly and initiate actions such as sending notifications or modifying valve settings.

REQUIREMENTS:

- Flow Sensors

- Water Quality Sensors

- Pressure Sensors

- Level Sensors

- Leak Detection Sensors

- IoT Connectivity Modules

- Central Control Unit (e.g., Raspberry Pi)

- Data Analytics and Visualization Software

PYTHON CODE:

```python
SmartWaterSystem.py
1    import RPi.GPIO as GPIO
2    import time
3    import paho.mqtt.client as mqtt
4
5    # Set up GPIO for the ultrasonic sensor
6    TRIG = 23
7    ECHO = 24
8    GPIO.setmode(GPIO.BCM)
9    GPIO.setup(TRIG, GPIO.OUT)
10   GPIO.setup(ECHO, GPIO.IN)
11
12   # MQTT Configuration
13   MQTT_BROKER = "your_mqtt_broker_address"
14   MQTT_PORT = 1883
15   MQTT_TOPIC = "water_level"
16
17   # Create an MQTT client
18   client = mqtt.Client("WaterLevelSensor")
19
20   def measure_water_level():
21       try:
22           # Trigger the ultrasonic sensor
23           GPIO.output(TRIG, True)
24           time.sleep(0.00001)
25           GPIO.output(TRIG, False)
26
27           while GPIO.input(ECHO) == 0:
28               pulse_start = time.time()
29
30           while GPIO.input(ECHO) == 1:
31               pulse_end = time.time()
```

```python
32
33              pulse_duration = pulse_end - pulse_start
34              distance = (pulse_duration * 34300) / 2
35
36              return distance
37          except Exception as e:
38              print(f"Error: {str(e)}")
39              return None
40
41  def on_connect(client, userdata, flags, rc):
42      if rc == 0:
43          print("Connected to MQTT broker")
44      else:
45          print("Connection to MQTT broker failed")
46
47  def publish_water_level():
48      distance = measure_water_level()
49      if distance is not None:
50          client.publish(MQTT_TOPIC, str(distance))
51          print(f"Published water level: {distance} cm")
52
53  client.on_connect = on_connect
54  client.connect(MQTT_BROKER, MQTT_PORT, 60)
55
56  try:
57      while True:
58          publish_water_level()
59          time.sleep(60)  # Publish data every minute
60  except KeyboardInterrupt:
61      GPIO.cleanup()
62      print("Exiting...")
```

CONCLUSION

In conclusion, a smart water management system using IoT represents a groundbreaking solution for addressing the challenges of modern water resource management. By seamlessly integrating sensors, data analytics, and remote control capabilities, this technology offers a more efficient, sustainable, and responsive approach to managing our vital water resources. It enables real-time monitoring, immediate issue detection, and data-driven decision-making, ultimately contributing to water conservation, quality assurance, and the provision of a reliable water supply for both urban and rural areas. As the world faces increasing water scarcity and environmental concerns, smart water management systems using IoT have become indispensable tools in the journey toward more responsible and resilient water resource management.

THANK YOU