IOT\_PHASE-03

SMART WATER FOUNTAINS

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**IoT sensors in public water fountains to monitor water flow and detect malfunctions**.

1. **Define Objectives**:
   * Clearly define the goals of the project, such as improving water fountain efficiency, reducing water wastage, and ensuring timely maintenance.
2. **Sensor Selection**:
   * Choose appropriate IoT sensors for the project. In this case, flow rate sensors and pressure sensors are essential. You might also consider water quality sensors to detect contamination.
3. **Connectivity**:
   * Ensure that the sensors have connectivity capabilities (e.g., Wi-Fi, LoRa, cellular) to transmit data to a central monitoring system.
4. **Power Source**:
   * Decide on the power source for the sensors. Options include battery-powered sensors, solar panels, or power from the fountain itself.
5. **Sensor Placement**:
   * Strategically place the sensors within the fountain. Flow rate sensors should be positioned to measure water inflow and outflow, while pressure sensors should be placed to monitor system pressure.
6. **Data Management**:
   * Set up a data management system to collect, store, and analyze sensor data. Cloud-based solutions are common for IoT projects.
7. **Real-time Monitoring**:
   * Implement a real-time monitoring system that allows you to track the performance of water fountains remotely. This can be achieved through a web-based dashboard or a mobile app.
8. **Malfunction Detection**:
   * Define criteria for detecting malfunctions, such as significant changes in water flow or pressure. Set up alerts or automated actions when malfunctions are detected.
9. **Data Analysis**:
   * Analyze historical data to identify patterns and make informed decisions regarding maintenance and improvements.
10. **Maintenance Scheduling**:
    * Create a maintenance schedule based on data analysis to ensure the water fountains are serviced regularly and efficiently.

**Python script that simulates sending water fountain status data to an MQTT broker**

import paho.mqtt.client as mqtt

Import random

import time

# MQTT broker details

broker\_address = "your.mqtt.broker.address"

port = 1883

username = "your\_username"

password = "your\_password"

# MQTT topics

topic = "water\_fountain/status"

# Function to simulate water fountain status data

def get\_water\_fountain\_status():

# Replace this with your actual sensor data retrieval logic

return random.choice (["ON", "OFF"])

# MQTT callback functions

def on\_connect(client, userdata, flags, rc):

if rc == 0:

print("Connected to MQTT broker")

else:

print("Connection to MQTT broker failed with code: " + str(rc))

def on\_publish(client, userdata, mid):

print("Data published to MQTT broker")

# Create an MQTT client

client = mqtt.Client()

client.username\_pw\_set(username, password)

# Set the callback functions

client.on\_connect = on\_connect

client.on\_publish = on\_publish

# Connect to the MQTT broker

client.connect(broker\_address, port, keepalive=60)

# Start the MQTT loop

client.loop\_start()

try:

while True:

water\_fountain\_status = get\_water\_fountain\_status()

# Publish the status data to the MQTT broker

client.publish(topic, water\_fountain\_status)

print(f"Published status: {water\_fountain\_status} to topic: {topic}")

time.sleep(5) # Adjust the interval as needed

except KeyboardInterrupt:

print("Script terminated")

# Disconnect from the MQTT broker

client.disconnect()