SMART WATER FOUNTAINS

Project Report

OVERVIEW

1. Project Objectives

The Smart Water Fountains project aims to enhance water efficiency and promote public awareness by implementing IoT technology to monitor and manage water fountains. The primary objectives of this project are as follows:

Real-time Monitoring: Enable real-time monitoring of water fountain status, such as water quality, temperature, and usage.
Water Conservation: Promote water conservation by optimizing water flow and usage, reducing wastage, and enhancing water quality.
Public Awareness: Create a mobile app to provide users with access to fountain information, educating them on water conservation and fountain locations.
Remote Management: Enable remote control of water fountains for maintenance and adjustment of water flow, temperature, and filtration systems

2. IoT Sensor Setup

Hardware Components

Water Quality Sensor: Measures parameters like pH level, turbidity, and conductivity.

Temperature Sensor: Monitors water temperature to ensure optimal conditions.

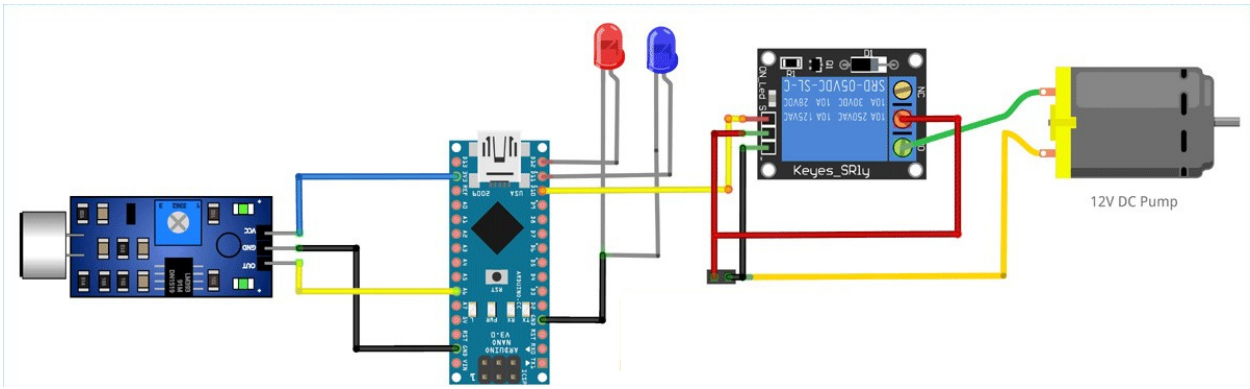
Flow Sensor: Measures water flow rates and detects abnormalities.

Raspberry Pi: Acts as the central hub for sensor data collection and management. Relay

Module: Controls the water fountain's pump and filtration systems.

Wi-Fi Module: Provides internet connectivity for data transmission.

3. Sensor Schematic



12 V power supply

4. Sensor Data Flow

1. Sensors collect data and send it to the Raspberry Pi via GPIO pins.
2. Raspberry Pi processes and stores the data locally.
3. Data is transmitted to a cloud platform for storage and analysis.

5. Mobile App Development

Fountain Locator: Allows users to find nearby water fountains on a map.

Real-time Status: Displays water quality, temperature, and usage statistics.

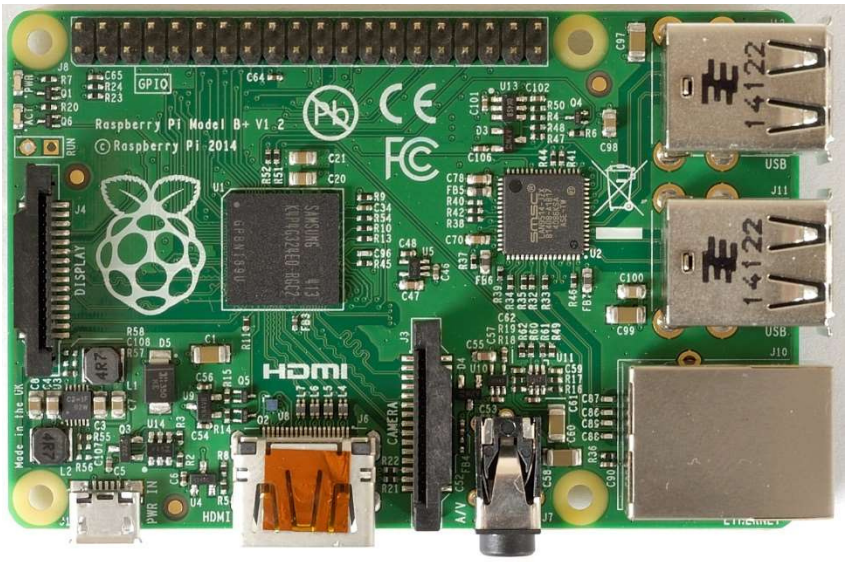
Water Conservation Tips: Provides tips and information on water conservation.

User Feedback: Allows users to report fountain issues or provide feedback.

6. App User Interface

The mobile app was developed for both Android and iOS platforms to ensure accessibility for a wide range of users. It features an intuitive and user-friendly interface to encourage public engagement and awareness.

7. Raspberry Pi Integration



The Raspberry Pi serves as the central controller in the system. It collects data from the sensors, processes it, and controls the water fountain's pump and filtration systems using the relay module. Additionally, it manages communication with the cloud platform and the mobile app.

8. Code Implementation

The code for this project is written in Python. It includes scripts for data collection, sensor calibration, data transmission, and remote fountain control. The code is modular and well-documented for easy maintenance and future expansion

Python code:

```
import Adafruit_GPIO as GPIO

import Adafruit_GPIO.I2C as I2C

import Adafruit_ADS1x15

import RPi.GPIO as RPIGPIO

# Initialize sensors and pins

adc = Adafruit_ADS1x15.ADS1115()

RPIGPIO.setmode(RPIGPIO.BCM)

flow_pin = 17

RPIGPIO.setup(flow_pin, RPIGPIO.IN, pull_up_down=RPIGPIO.PUD_UP)
```

```
# Read sensor data
water_quality = adc.read_adc(0, gain=1)
temperature = adc.read_adc(1, gain=1)
flow_rate = RPIGPIO.input(flow_pin)
```

10.Promoting Water Efficiency and Public Awareness

The real-time water fountain status system achieves its objectives by:

Water Efficiency: By monitoring water quality, temperature, and flow rates in real-time, the system can automatically optimize water usage, reduce wastage, and ensure water quality.

Public Awareness: The mobile app not only provides information about fountain locations but also educates users on water conservation with tips and real-time data. Users can see the positive impact of water-saving measures and become more conscious of water usage.

Conclusion:

the Smart Water Fountains project leverages IoT technology to enhance water efficiency, conserve resources, and promote public awareness of water conservation through real-time monitoring, remote management, and an informative mobile app. This project is a significant step toward creating a more sustainable and informed community.

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