Project Title: Smart Water Fountain with IoT Connectivity

1. Introduction:

The Smart Water Fountain project aims to create an intelligent fountain system that automatically monitors the water level and can be controlled remotely using the Internet of Things (IoT) technology. This documentation provides a comprehensive overview of the project, including hardware components, software implementation, and usage instructions.

2. Components Used:

- Arduino Uno Microcontroller

- ESP8266 Wi-Fi Module

- Ultrasonic Sensor (HC-SR04)

- Water Level Sensor

- Relay Module

- Water Pump

- Connecting Wires

3. System Architecture:

The system consists of sensors (water level sensor and ultrasonic sensor) connected to the Arduino Uno microcontroller. The microcontroller communicates with the Blynk server through the ESP8266 Wi-Fi module. Users can monitor the water level and control the water pump remotely via the Blynk mobile app.

4. Hardware Setup:

- Connect the ultrasonic sensor and water level sensor to the Arduino Uno.

- Connect the relay module to control the water pump.

- Power the components as per the specifications.

- Ensure all connections are secure and properly insulated.

5. Software Implementation:

- Arduino Code: Developed using Arduino IDE, the code reads sensor data and controls the water pump. It establishes a connection with the Blynk server for remote monitoring and control.

  - Libraries Used: Blynk, Ultrasonic

- Blynk App Configuration:*The Blynk app provides a user interface to monitor the water level and control the water pump. Virtual pins are used to interface the sensors and control the pump.

 6. Code Snippet:

```cpp
// Include required libraries

#include <BlynkSimpleEsp8266.h>

#include <Ultrasonic.h>


char auth[] = "Your_Blynk_Auth_Token";

char ssid[] = "Your_WiFi_SSID";

char pass[] = "Your_WiFi_Password";


Ultrasonic ultrasonic(TrigPin, EchoPin);


BLYNK_WRITE(VIRTUAL_PIN) {

  int distance = ultrasonic.read();

  Blynk.virtualWrite(VIRTUAL_PIN, distance);

  if (distance < ThresholdDistance) {

    digitalWrite(PumpPin, HIGH);  // Turn on the water pump

  } else {

    digitalWrite(PumpPin, LOW);   // Turn off the water pump

  }

}


void setup() {
```

```
  Blynk.begin(auth, ssid, pass);   // Initialize Blynk

}


void loop() {

  Blynk.run();  // Run Blynk

}
```
```

7. User Instructions:

- Monitoring: Open the Blynk app, monitor the water level displayed on the Value Display widget (connected to virtual pin `VIRTUAL_PIN`).

- Control: Use the Button widget in the app to manually control the water pump.

- Troubleshooting: In case of issues, check the connections, power supply, and Wi-Fi connectivity. Ensure the Blynk app is connected to the correct device.


8. Conclusion:

The Smart Water Fountain project successfully demonstrates the integration of IoT technology to create an automated and remotely controlled fountain system. By combining sensors, microcontrollers, and mobile app interfaces, the project achieves efficient water management and user convenience.