

Project Overview:

A smart water fountain can be designed to dispense water when it detects a pet or an object near it. This can be achieved by using sensors to detect proximity or motion and controlling the water pump accordingly. Here are the steps involved:

Hardware Components:

- Raspberry Pi (with Wi-Fi connectivity)
- Water pump
- Water reservoir
- Ultrasonic distance sensor (HC-SR04) or PIR motion sensor
- Relay module to control the water pump
- Power supply for the water pump
- Tubing and a water outlet
- Enclosure for the hardware

Setting up Raspberry Pi:

- Install the Raspberry Pi OS (Raspbian or Raspberry Pi OS Lite).
- Set up Wi-Fi connectivity.
- Install necessary libraries and packages (RPi.GPIO, Flask, etc.).

Wiring the Hardware:

- Connect the ultrasonic distance sensor or PIR motion sensor to the Raspberry Pi GPIO pins.
- Connect the relay module to control the water pump.
- Ensure the power supply is connected to the water pump.

Programming the Raspberry Pi:

Write Python code to interact with the sensors and control the water pump.

Use the RPi.GPIO library to handle GPIO pin interactions.

Create a web interface (using Flask or a similar framework) to control the fountain remotely.

Implement logic to dispense water when the sensor detects an object or pet.

Here's a simplified example of Python code for controlling the water pump using the RPi.GPIO library:

Report:

A comprehensive project report should include details of the problem statement, hardware components, circuit diagrams, software architecture, and a step-by-step guide for building and replicating the project.

It should also include sections on testing, results, challenges faced, and future improvements.