GOVERNMENT COLLEGE OF TECHNOLOGY ,COIMBATORE-13

DEPARTMENT OF ECE

SMART WATER FOUNTAINS

TEAM MEMBERS :

AKSHAYA V A- 71772114102

DEEPITA M J-71772114105

DHANVARTHINI-71772114106

KRITHIKA S-71772114120

PROJECT DEFINITION: The project aims to enhance public water fountains by implementing Iot sensors to control water flow and defect malfunctions. The primary objective is to provide real time information about water fountain status to residents through a public platform. This project includes defining objectives, designing the Iot sensor system, developing the water fountain status platform and integrating them using Iot technology.

INTRODUCTION: The smart water fountain project introduces a modern approach to traditional fountains, integrating IoT (Internet of Things) capabilities to transform a common water feature into a dynamic, interactive, and energy-efficient spectacle. This innovation combines technology, design, and sustainability to create a captivating experience for viewer.

KEY OBJECTIVES

- Efficient Water Management
- Interactive User Experience
- Customizable Fountain Effects
- Energy Conservation
- Real-time Monitoring and Control

PROJECT DESCRIPTION:

The basic idea of this **Arduino Water Fountain** is to take an input from any external sound source like mobile, iPod, PC etc., sample the sound and break it down to different voltage ranges, then use the output to turn on various Relay. We first used a condenser mic based **sound sensor module** to perform on the sound source to split the sounds into different voltage ranges. Then the voltage will be fed to op-amp to compare sound level with a particular limit. The higher voltage range will correspond to a relay switch ON which comprises a musical water fountain operating to the beats and rhythms of the song. So here we are building this **Smart Water Fountain using Arduino and sound sensor.**

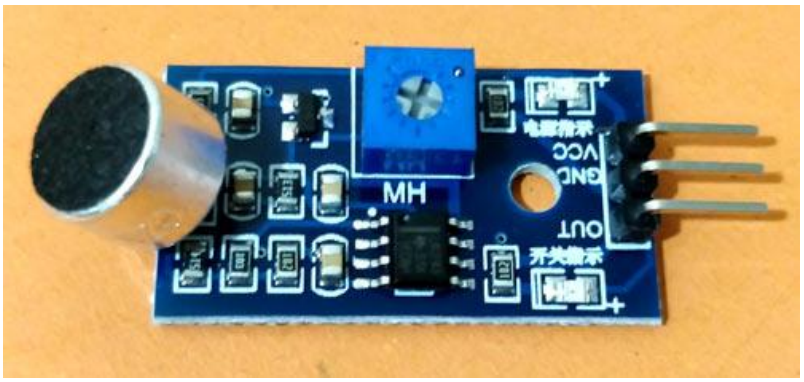
COMPONENTS REQUIRED:

1. Arduino Nano
2. Sound sensor Module
3. 12V Relay Module
4. DC Pump
5. LEDs
6. Connecting wires
7. Vero board or Breadboard

WORKING OF A SOUND SENSOR:

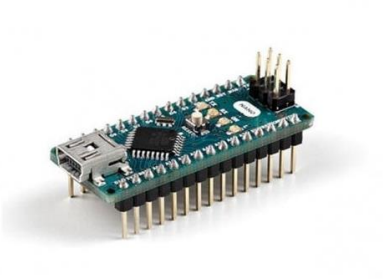
The Sound sensor module is a simple electret microphone based electronic board used to sense external sound from the environment. It is based on the **LM393 power amplifier and an electret microphone**, it can be used to detect whether there is any sound beyond the set threshold limit. The module output is a digital signal which indicates that the sound is greater or lesser than the threshold.

The potentiometer can be used to adjust the sensitivity of the sensor module. The module output is HIGH/LOW when the sound source is Lower/higher than the threshold set by the potentiometer. Same sound sensor module can also be used for measuring the sound level in decibel.



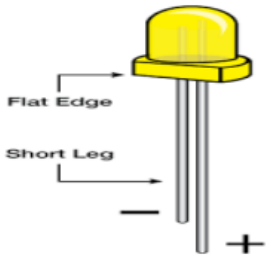
CONTROL SYSTEM:

This includes a microcontroller (e.g., Arduino, Raspberry Pi) or a dedicated fountain controller. It manages the fountain's operation and can be programmed for various water patterns and schedules



LIGHTING:

LED lights are commonly used to illuminate the fountain at night or create colourful water effects.



WATER RESERVOIR:

A container that stores the water supply for the fountain, often connected to a water source or a recirculating system

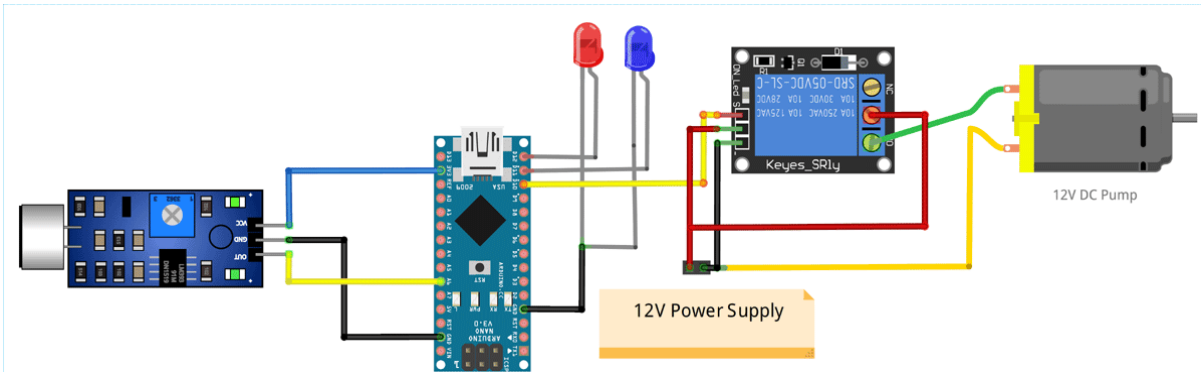
RELAY:

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.

DC PUMP:

DC powered pumps use direct current from motor, battery, or solar power to move fluid in a variety of ways. Motorized pumps typically operate on 6, 12, 24, or 32 volts of DC power. Solar-powered DC pumps use photovoltaic (PV) panels with solar cells that produce direct current when exposed to sunlight.

CIRCUIT IMPLEMENTATION:



The sound sensor is powered with 3.3V supply of Arduino Nano and the output pin of the sound sensor module is connected to the analog input pin (A6) of Nano. You can use any of the analog pin, but make sure to change that in the program. The relay module and DC pump is powered by an external 12VDC power supply as shown in the figure. The input signal of relay module is connected to digital output pin D10 of Nano. For lighting effect I chose two different colours of LED and connected them to two digital output pins (D12, D11) of Nano.

Here the Pump is connected in such a way that when a HIGH pulse is given to the input of Relay module, the COM contact of the relay is get connected to the NO contact and the current gets a closed circuit path to flow across the pump to activate the water flow. Otherwise the pump will remain OFF. The HIGH/LOW pulses are generated from Arduino Nano depending on the sound input.

Integration Approach

To integrate a smart water fountain, begin by defining project objectives and selecting a suitable microcontroller or dedicated controller as the central brain. Connect sensors (e.g., water level, temperature) and actuators (pump, lighting) to the controller, and write code to manage their operation, incorporating user interaction through remote control or smartphone apps. Ensure a stable power supply, implement safety measures, and, if required, integrate water quality control components. Test and calibrate the system, create user interfaces for control, place components in a weatherproof enclosure, document the process, and establish maintenance procedures.