

AIM OF THE PROJECT:

To provide convenient access to clean drinking water by using water vending machine.

PROBLEM STATEMENT AND SOLUTION:

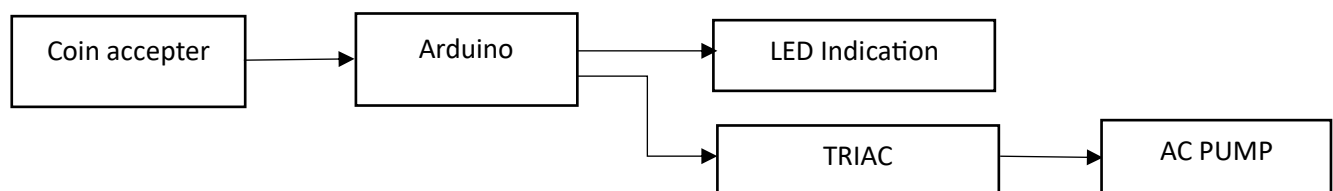
The water vending machine gives limited access to clean drinking water in public spaces, leading to inconvenience and environmental issues due to the prevalent use of single-use plastics bottles. Implementing automatic water vending machines in strategic locations to provide convenient, on to go access with no human intervention to purified water, promoting hydration, and reducing plastic waste.

PROJECT DESIGN SPECIFICATIONS:

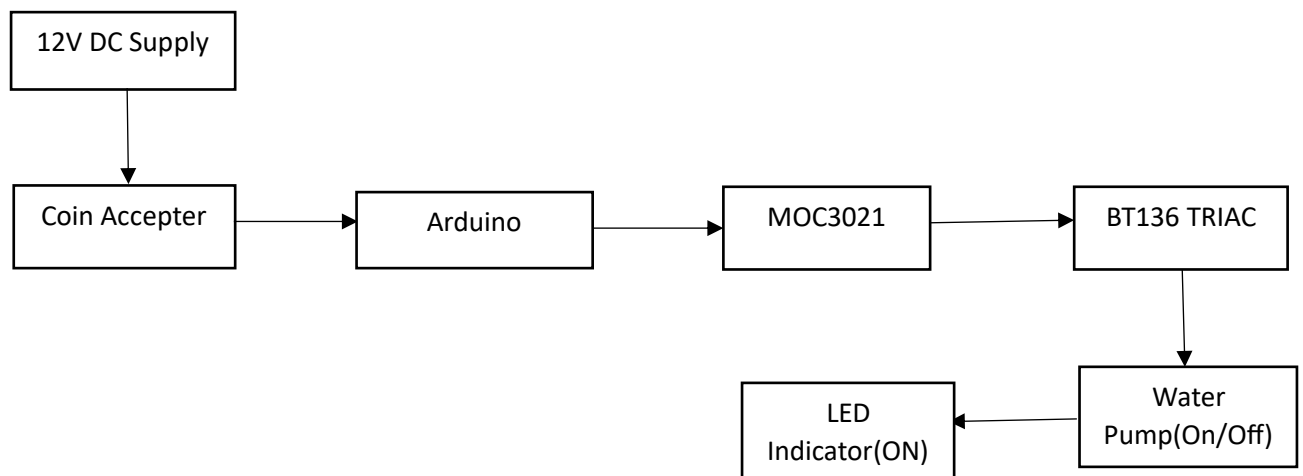
The water vending machine employs a single Coin Acceptor Module for accurate recognition of various currency coins, ensuring compatibility and security. The TRIAC and Optocoupler circuitry control water dispensing, providing a reliable and efficient process. A user-friendly interface with LED indicators enhances customer interaction, while a stable power supply ensures consistent performance and safety.

- **COIN ACCEPTER MODULE:** It acts as the input device which gives signal to the Arduino . First, press the push button located on the top and then insert the coin.
- **ARDUINO:** It receives the signal and gives the digital command to Optoisolator. .
- **OPTOISOLATOR:** It triggers the TRIAC to switch ON/OFF the AC water pump from our microcontroller with DC signal.
- **TRIAC:** We want to turn ON the device so we need to switch it on at $t_1=0$.
- **LED:** A LED is added later on to indicate the dispensing technique.

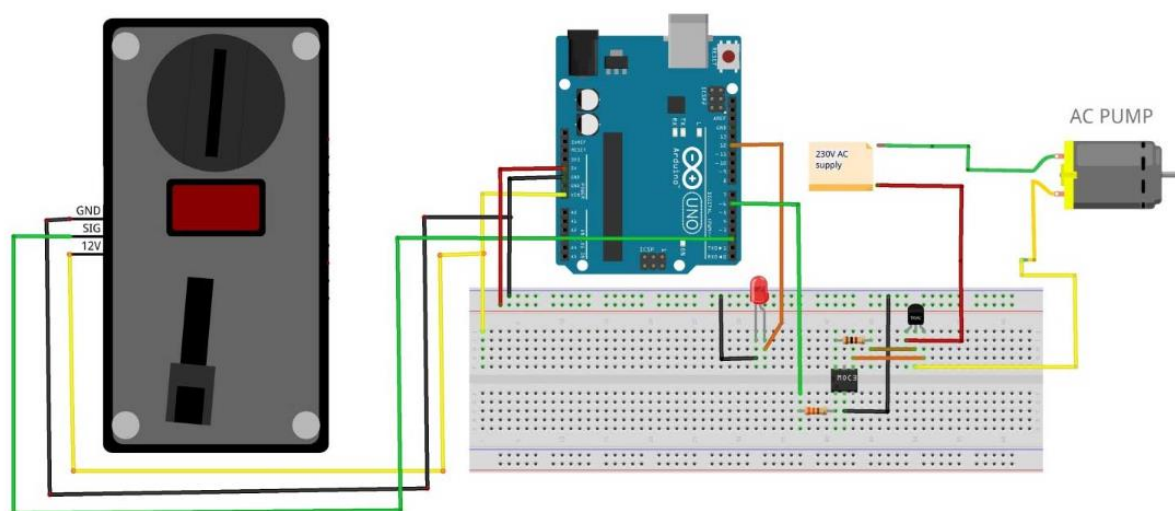
PROJECT ARCHITECTURE:



FLOW EXPLANATION:



WIRING DIAGRAM



COMPONENT WORKING AND FUNCTIONALITY:

- **COIN ACCEPTER MODULE:** Coin acceptor modules accept currency coins which can be suitable for various vending machines. Coin acceptor modules are available in multiple categories including single coin acceptor, comparable type coin acceptor, multi-coin coin acceptor, etc. The Single coin acceptor is specially designed to accept only a specific coin. A comparable type of coin acceptor is used to accept the coins that are similar to the coins put aside the coin acceptor. Multi-coin coin acceptors

can accept different coins with one machine, and output different signals to the microcontroller. In this project, a single coin acceptor is used.

The coin accepting device has an inbuilt microcontroller that takes data from the sensor inside the device and collects different coins. Using this data, the microcontroller knows whether this coin needs to be accepted or returned. The device is easily programmed using a push-button located on the top. The coin acceptor device gives us an impulse signal on the output pin for every inserted coin and by counting impulses we know how many coins have been inserted. It also has three switches which we use in order to select the type of signal we want to get on the output. The first switch has three position to select the impulse length. The second switch is used to set the signal to be +5 V(NC) or 0 V(NO) as shown in the figure. Using the 3rd switch, the precision of the device can be chosen.

- **TRIAC:** TRIAC is a three-terminal AC switch that can be triggered by a low-energy signal at its gate terminal. In SCRs, it conducts in only one direction, but in the case of TRIAC, the power can be controlled in both directions. Here BT136 TRIAC is used for AC Pump Switch ON/OFF purposes. TRIAC is triggered at a firing angle of 90 degrees by applying a small gate pulse signal to it. The time “ t_1 ” is the delay time which we have to give as per our application requirement. For example, in this case, as the firing angle is 90 percent, hence the average power output will be halved. In case we want to turn ON the device, we need to switch it ON completely i.e. $t_1=0$.
- **OPTOCOUPLER:** Optocoupler is also known as Optoisolator. It is used to maintain isolation between two electrical circuits like DC and AC signals. Basically, it consists of a LED that emits infrared light and a photosensor that detects it. Here MOC3021 optocoupler is used to control the AC Pump from our microcontroller signals which is a DC signal.
- **ARDUINO:** Here we are going to program Arduino to detect the coin insertion and coin type. Upon successful detection, it will turn on the Pump to dispense water.