Hygienic Touch-Free Automatic Water Vending Machine

Aim of the Project: *To make a hand free device which automatically Dispense when hand is placed before the device*

Problem statement:

- Traditional water vending machines require users to physically touch buttons, levers, or handles to dispense water, which can lead to the spread of germs and bacteria.

- In public places, this can be a significant concern, especially during pandemics or flu seasons.

- Additionally, manual operation can be inconvenient and may not provide an accurate measure of the dispensed water quantity.

Solution:

- Design and develop a touch-free automatic water vending machine that uses sensors and automation technology to dispense water without requiring physical contact.

Features:

- *Infrared sensors or motion detectors to detect user presence and trigger water dispensing.*
- *Automatic water level sensing and quantity control.*
- *Touchless interface (e.g., voice commands, mobile app control, or gesture recognition).*
- *UV or ozone water purification system for added hygiene.*
- *Real-time monitoring and data analytics for machine performance and maintenance.*
- *Integration with payment systems for easy and secure transaction*

Project Design Specification:

Technical Specifications:

1. *Machine Dimensions: 36" x 24" x 72" (H x W x D)*

2. Water Tank Capacity: 50 gallons

3. UV Purification: 254nm UV lamp with 30,000-hour lifespan

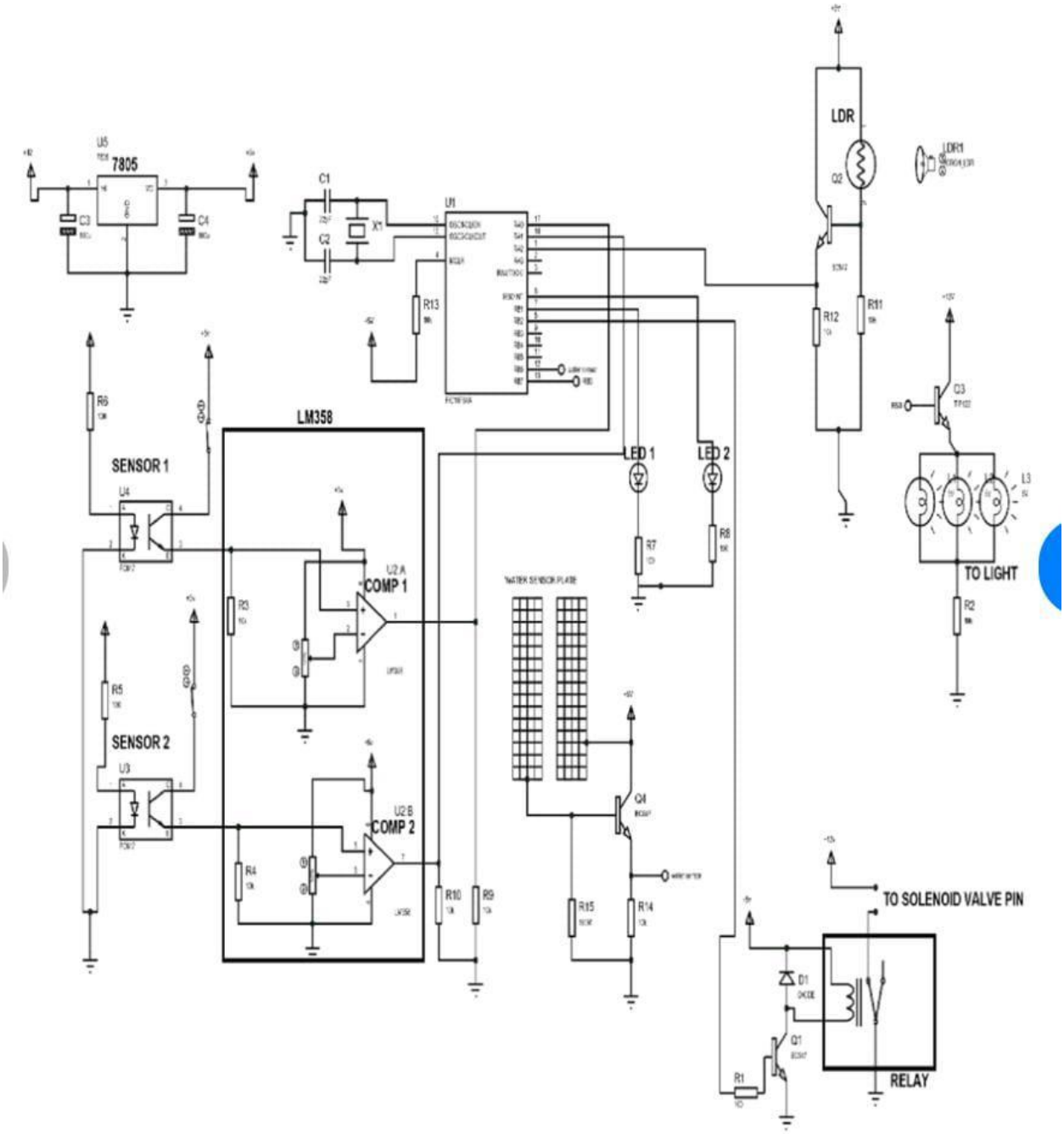
4. Sensors: Infrared sensors for touchless interface and water level monitoring

5. Materials: Stainless steel, BPA-free plastic, and antimicrobial coatings

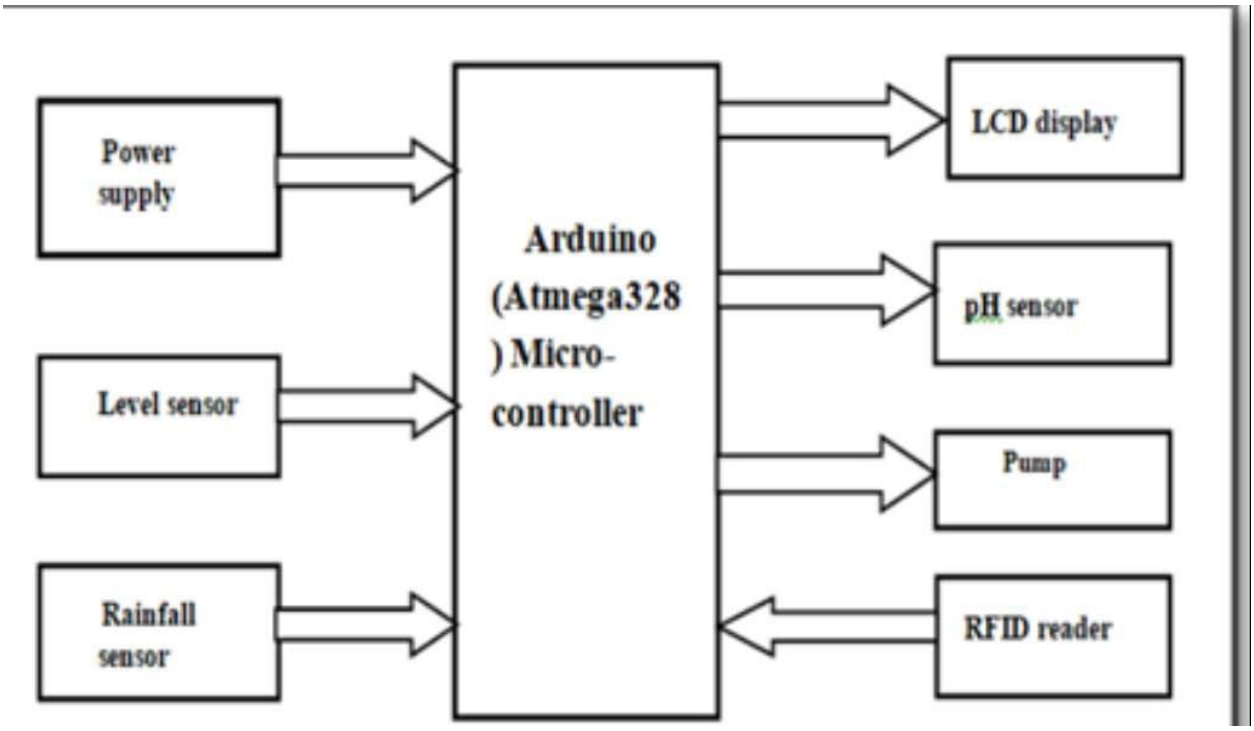
6. Power Supply: 110V, 60Hz, 10A

7. Water Pressure: 30-50 PSI

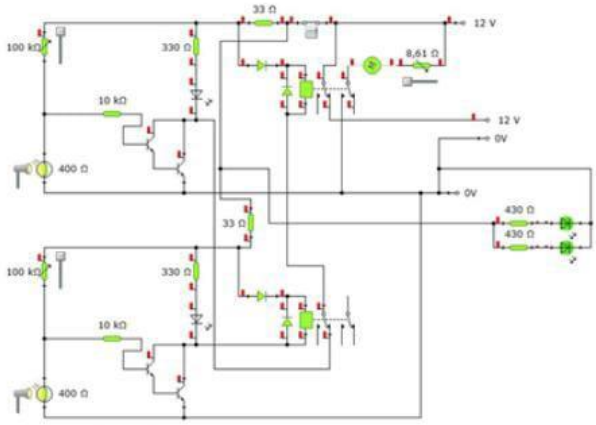
Architecture:



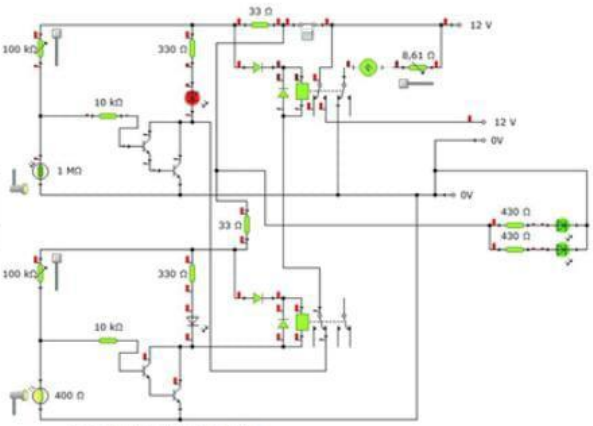
Flow Explanation:



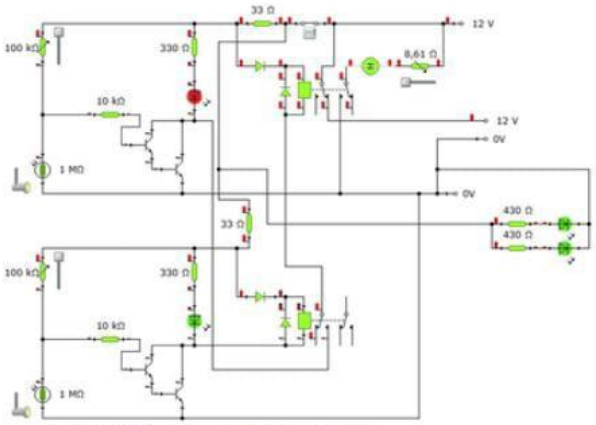
Wiring Diagram:



1. starting position

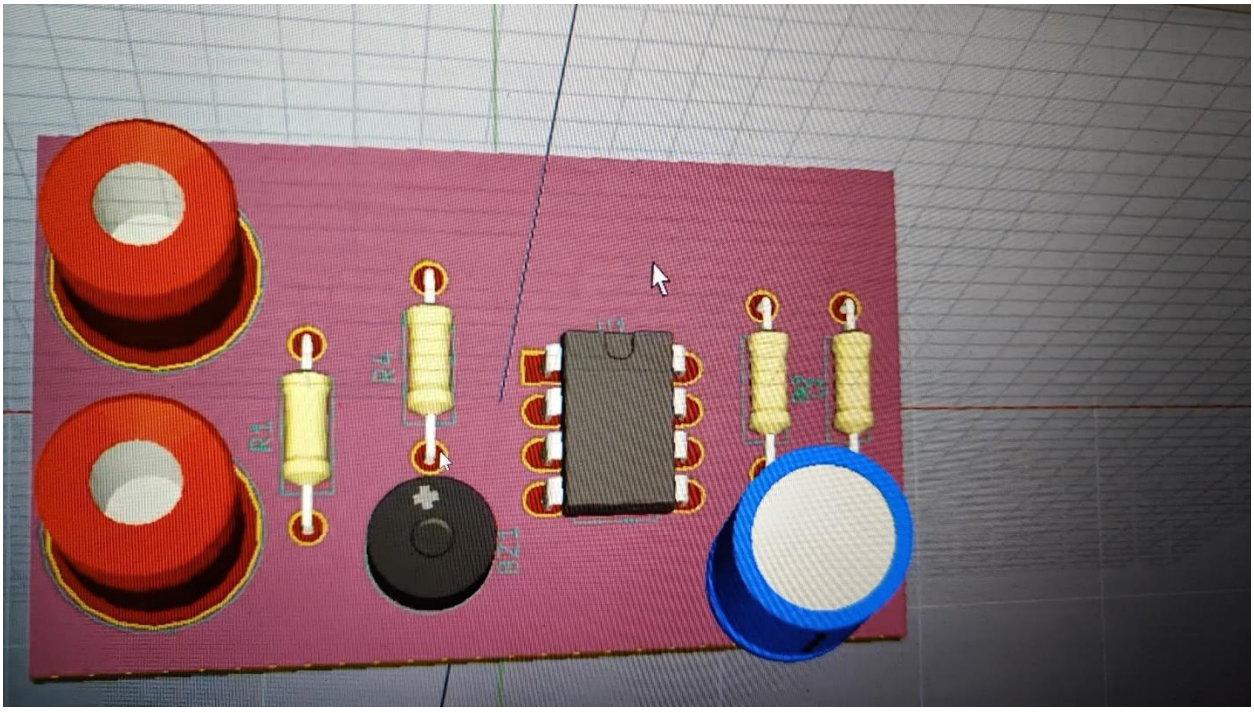


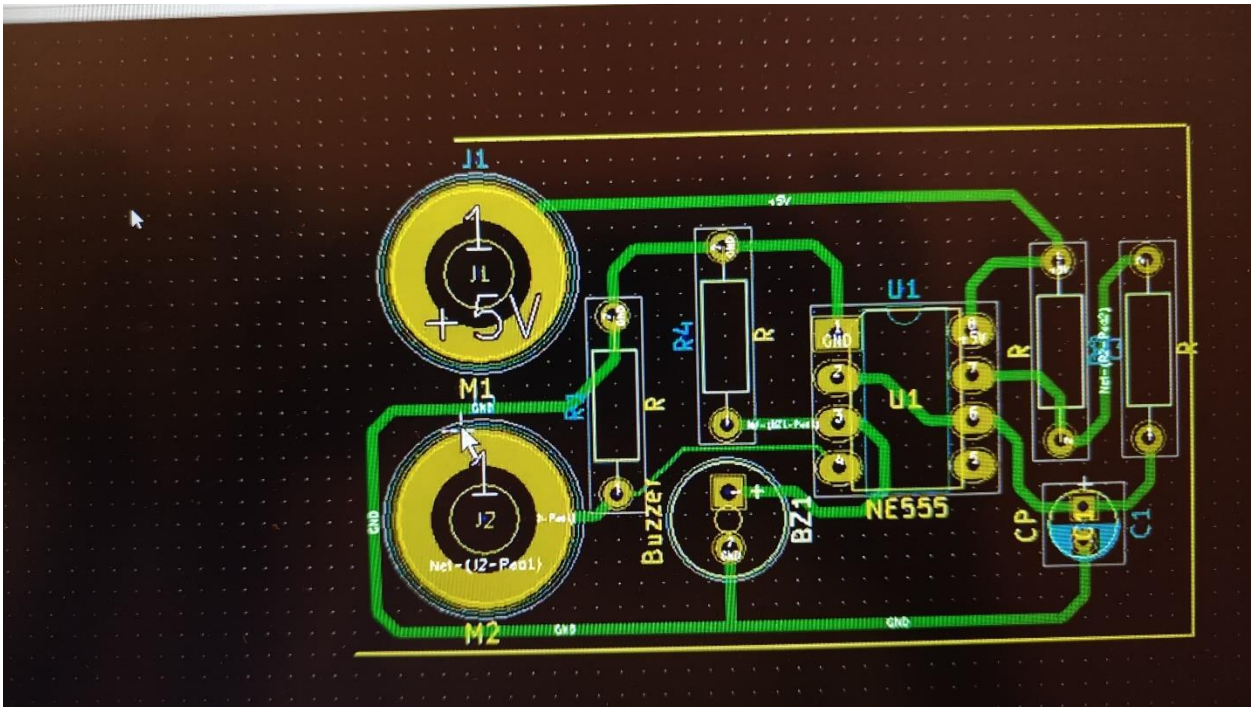
2. The pump/engine is working



3. The glass is full pump/engine isnt working anymore

<u>Ki cad PCB Desing:</u>





Components Working Principle/Functionality:

1. Water Storage Tank: Stores purified water.

2. Water Pump: Pumps water from the storage tank to the dispensing nozzle.

3. UV Water Purifier: Purifies water using ultraviolet light.

4. Infrared Sensor: Detects the user's hand or container.

5. Control Panel: Processes user input and controls machine functions.

6. Dispensing Nozzle: Releases water into the user's container.

7. Electronic Payment System: Handles payment transactions.

8. Temperature Control System: Maintains water temperature (optional).

Working Principle:

1. User approaches the machine and places their container under the nozzle.

2. Infrared sensor detects the container and sends a signal to the control panel.

3. Control panel activates the water pump and UV purifier.

4. Purified water is pumped to the dispensing nozzle.

5. User selects the desired amount of water using the control panel.

6. Machine dispenses water into the container.

7. Payment is processed through the electronic payment system.

8. Machine dispenses water and updates transaction records.

Functionality:

1. Touch-free operation ensures hygiene.

2. Automatic dispensing eliminates manual handling.

3. UV purification ensures clean drinking water.

4. Electronic payment system facilitates easy transactions.

5. Temperature control (if available) provides chilled or room-temperature water options.

6. User-friendly interface and display guide the user through the process.

Program:

```
const int COIN = 2;
const int TRIAC = 6;
const int LED=12;
boolean Coin_insert = false;
int count=0;
void setup()
{
  Serial.begin(9600);
  attachInterrupt(digitalPinToInterrupt(COIN), coinInterrupt, RISING);
  pinMode(TRIAC, OUTPUT);
  pinMode(LED, OUTPUT);
}

void loop()
{
  if(Coin_insert)
  {
     digitalWrite(LED, HIGH);
     delay(1000);
     digitalWrite(TRIAC, HIGH);
     delay(12000);
     digitalWrite(TRIAC, LOW);
     delay(2000);
     Coin_insert = false;
```

```
  }
  else
  {
  digitalWrite(LED, LOW);
  digitalWrite(TRIAC, LOW);
  }
  }

void coinInterrupt()
{
 Coin_insert = true;
}
```

Outcome:

1. Improved Hygiene: Eliminates direct contact with the machine, reducing the risk of germ transmission.

2. Increased Efficiency: Quick and easy dispensing process, reducing waiting time.

3. Enhanced User Experience: Convenient and modern way to access clean drinking water.

4. Reduced Labor Costs: Automated operation minimizes the need for manual handling and maintenance.

5. Increased Revenue: Reliable and efficient operation can lead to increased sales.

6. Better Water Quality: UV purification ensures clean and safe drinking water.

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