Sri Lanka Institute of Information Technology


IT1040 - Fundamentals of Computing

Year 1, Semester 1- 2024

# Automated Cocktail-Making Machine

Proposal Document

P3-3


| IT Number | Name |
|---|---|
| IT24100327 | Perera B.P.N. |
| IT24100576 | Pathberiya H. A. |
| IT24100818 | Pabasara H.E.T. |
| IT24101297 | De Silva L.J. |
| IT24103306 | V. Thuvarkan |
| IT24100273 | Munasinghe T.H. |

# Background

This project aims to develop a cocktail-making machine incorporating Arduino technology to streamline the process. Rather than manually making cocktails, automating the cocktail-making process can ensure the quality and consistency of the cocktail every time. This study explores the idea of integrating software and hardware to develop a device to enhance the cocktail-making experience overall.

# Problem & Motivation

Cocktail making is a relatively easy task. But manually making a cocktail is tedious. Getting the right amount of ingredients and keeping the correct consistency every time can be challenging, especially in a commercial setting.

Automating the cocktail-making process ensures consistent quality and taste, reduces preparation time, and allows anyone to make delicious cocktails. This device can improve service efficiency and customer satisfaction in a commercial setting.

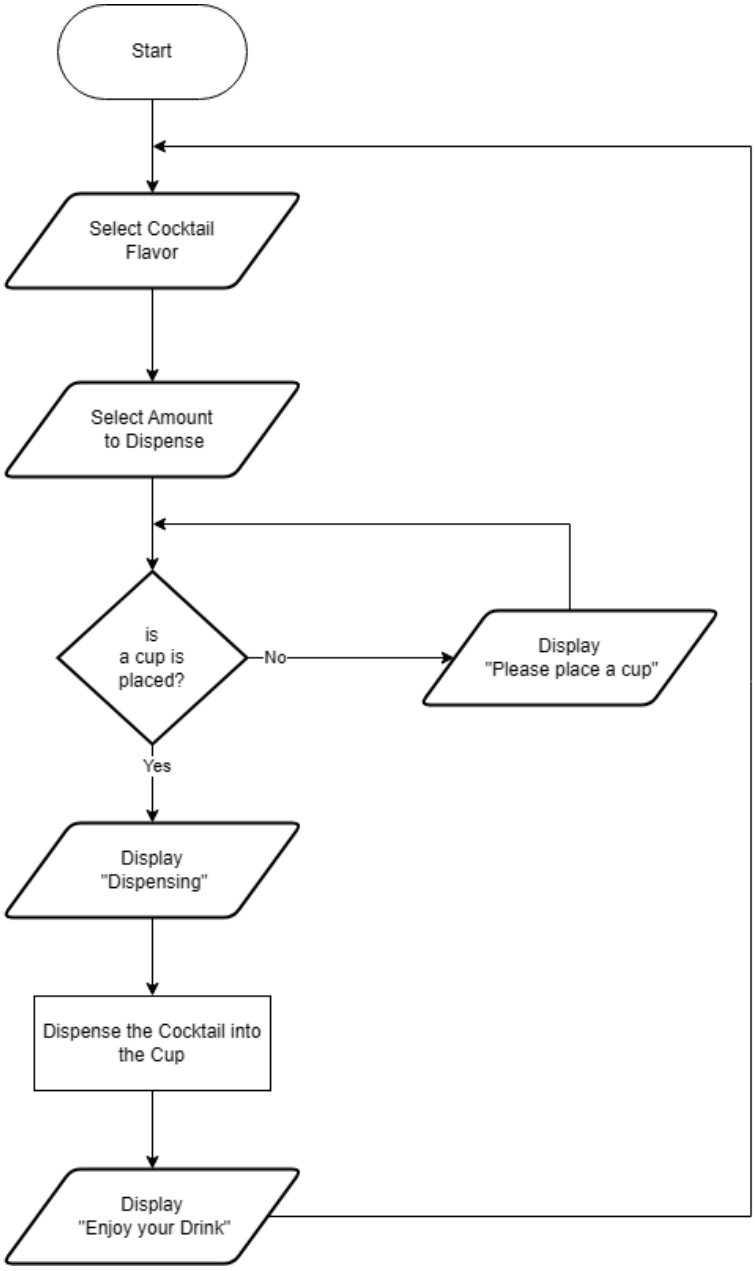
# Our Aim

To design and develop an automated cocktail-making machine capable of quickly and consistently making cocktails of different flavors for home and potentially commercial use.

# Objectives

- Identify and procure all the necessary hardware components for the project.
- Design and assemble hardware components including Arduino board, water pumps, sensors, display, and other components like buttons, relays, etc.
- Write and implement control algorithms for hardware components like water pumps, and sensors using C/C++ using the Arduino IDE.
- Design and implement a user-friendly interface that allows users to operate the device with ease.
- Evaluate the system of the device by testing its accuracy when dispensing ingredients, consistency of the cocktail, and ease of use.
- Design and build suitable housing for all the components and finalize the project through evaluation of the overall user experience.

# System Diagram




# Explanation:

1. The user powers the device. The system displays the main menu on the LCD.

2. The user navigates through the menu using input buttons to select the desired cocktail flavor.

3. After choosing the flavor, the user can select the amount to dispense.

4. Once the user confirms, the system prepares to start dispensing the ingredients.

5. But before dispensing any ingredients, the system checks if a cup is under the dispenser using the ultrasonic sensor.

6. **If a Cup is Detected:**
   - The system proceeds to the next step, where it starts dispensing the ingredients according to the selected recipe.

7. **If No Cup is Detected:**
   - The system waits until a cup is placed under the dispenser. This prevents any spilling and ensures ingredients are only dispensed into a cup.

8. After the dispensing process is completed, the system displays a status message on the LCD indicating that the Cocktail is ready.

9. The user can now enjoy their Cocktail.

10. After dispensing, the system returns to the main menu, ready for the next use.

# Methodology

The methodology for developing the cocktail machine project covers the following components, tools, and technologies.

## Hardware Components

### *Arduino UNO R3*

- This is the microcontroller used for this project. Mainly chosen for its compact size and beginner friendliness because a lot of learning materials can be found online. And it's also capable of adding extra functionalities like Wi-Fi and Bluetooth using modules like ESP32.

### *6V - 12V Water Pumps & Silicone Tubes*

- These water pumps are used to deliver the necessary ingredients to the automated cocktail machine.

### *Ultrasonic Sensor HC-SR04*

- This sensor is used to detect whether a cup has been placed or not. If a cup is detected, the machine will dispense the ingredients.

### *16x2 LCD Display*

- Provide visual feedback to the user like flavor options, drink sizes (200ml, 500ml, etc.), and status updates.

### *I2C Adapter*

- I2C adapter is used to control the 16x2 LCD using only 2 pins of the microcontroller.

### *Push Buttons*

- The Push Buttons are used to receive user inputs like flavor options and drink size.

### *4 - Channel Relay Module*

- This Module is used for controlling high-voltage devices like water pumps with the Arduino UNO.

### *12V 2A SMPS AC DC Power Supply*

- The Arduino UNO cannot supply enough power for the Water pumps, so this AC-to-DC converter will be used. This device converts 220V Alternative Current(AC) to 12V Direct Current(DC).

### *5V Voltage Regulator*

- Used to regulate the 12V from the power supply to 5V, which is used to power the Arduino board.

## Programming & Debugging

### *Arduino IDE & C/C++*

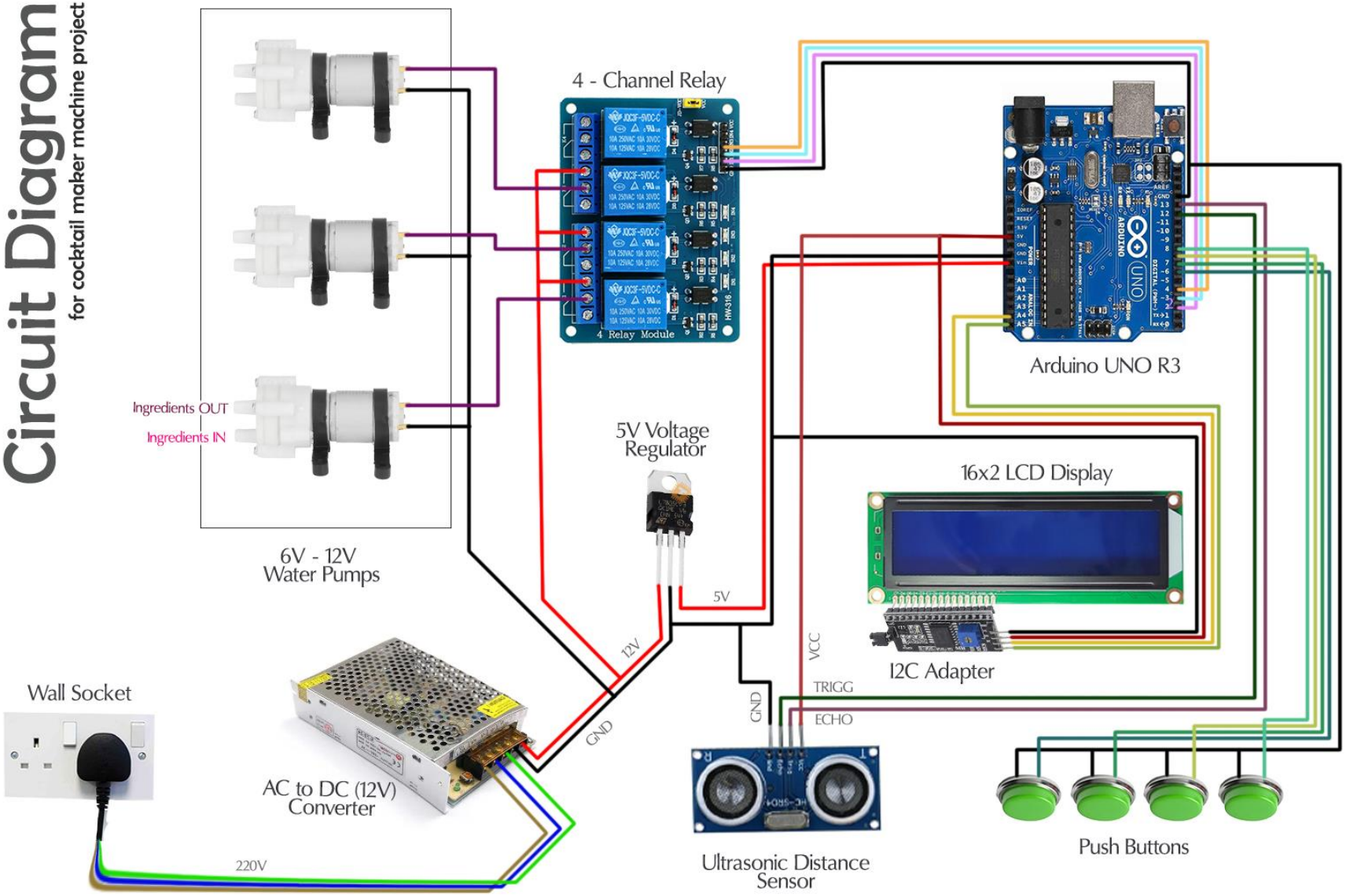
- Arduino is used to develop the necessary control algorithms for the project. Mainly utilized for implementing functions for water pumps, reading sensor data, user inputs, and displaying required text on the LCD Display.

### *Timer*

- Used for water pump flow rates and cocktail preparation time to evaluate the efficiency of the project.

# Circuit Diagram

for cocktail maker machine project



# Evaluation Method

## Accuracy

By comparing the quantities dispensed by the machine and the amount of ingredients set by programming, we can check how accurately the machine dispenses ingredients.

## Consistency

Check if the machine consistently makes cocktails with the same taste and quality over multiple uses of the machine.

## Speed and Efficiency

Check the time the machine takes to prepare a cocktail, from start to finish. And Efficiency when producing cocktails consecutively.

## Cleaning and Maintenance

Evaluating how easy it is to clean and maintain the machine considering factors like cleaning procedures and frequency of maintenance.

## User Interface

Evaluate the ease of use of the machine's interface. This includes selecting options and selecting the amount to dispense.

# References

https://docs.arduino.cc/
https://projecthub.arduino.cc/
https://projecthub.arduino.cc/Seafox_C/cheap-portable-cocktail-maker-barbot-with-app-c0a8c3