Introduction to Internet of Things

Smart Container

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Introduction

The Smart Container is an innovative IoT device designed to monitor the quantity of items stored within and alert users when supplies are running low. Additionally, it features an expiration date tracking system that provides visual and digital notifications as the expiration date approaches. This solution aims to address common issues in kitchen management, such as over-purchasing and food waste, by providing timely alerts and notifications to users.

Components Used

Node MCU ESP8266:
A low-cost, Wi-Fi-enabled microcontroller used for connecting and controlling IoT devices.

Ultrasonic Sensor:
Measures the distance to an object using ultrasonic waves, ideal for detecting the quantity of contents in a container.

Bread Board:
A reusable platform for prototyping and testing electronic circuits without soldering.

LCD:
A liquid crystal display used to show information such as sensor readings and status messages.

Buck Converter:
A DC-DC converter that steps down voltage efficiently to power different components in the circuit.

LED:
A light-emitting diode used for visual indicators, such as expiry notifications and container identification.

Functionality

01 Expiry Notification

02 Quantity Detection

03 Container Identification

Expiry Notification

Introduction:

- Managing the expiry dates of stored consumables is crucial for ensuring safety and quality.
- Often, items are forgotten until it's too late, leading to wastage or use of expired goods.
- Our Smart Container provides a seamless solution to monitor and alert users about approaching expiry dates.

Expiry Notification

Functionality Description:

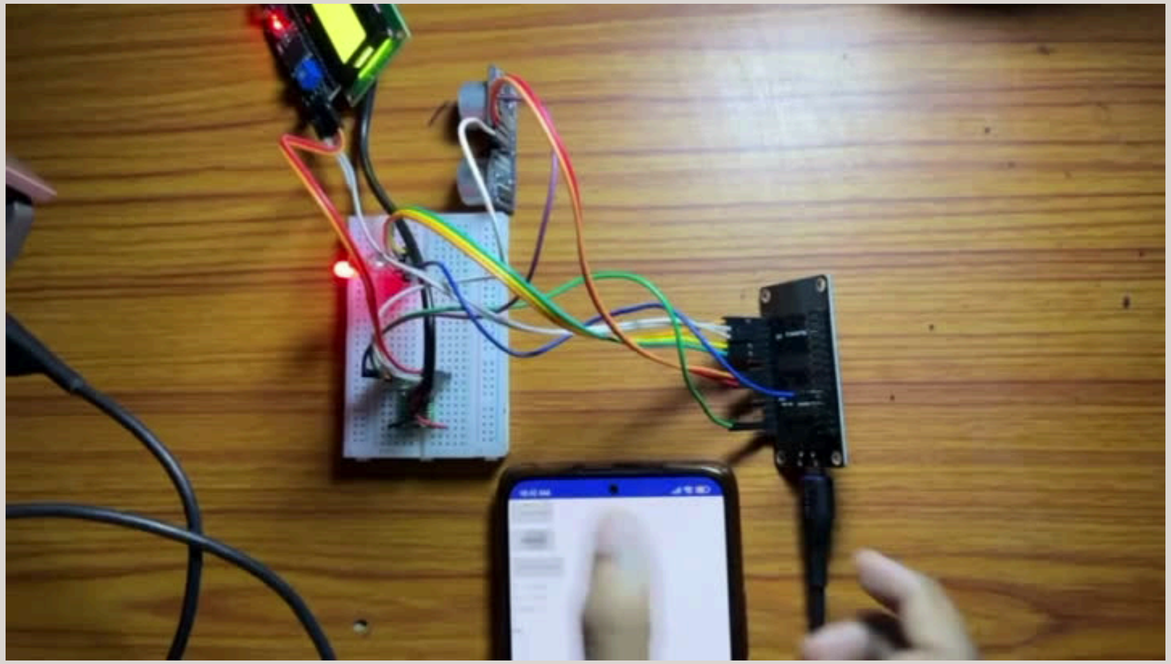
- Users enter the expiry date of the content into the app.
- The app compares the entered expiry date with the current date.

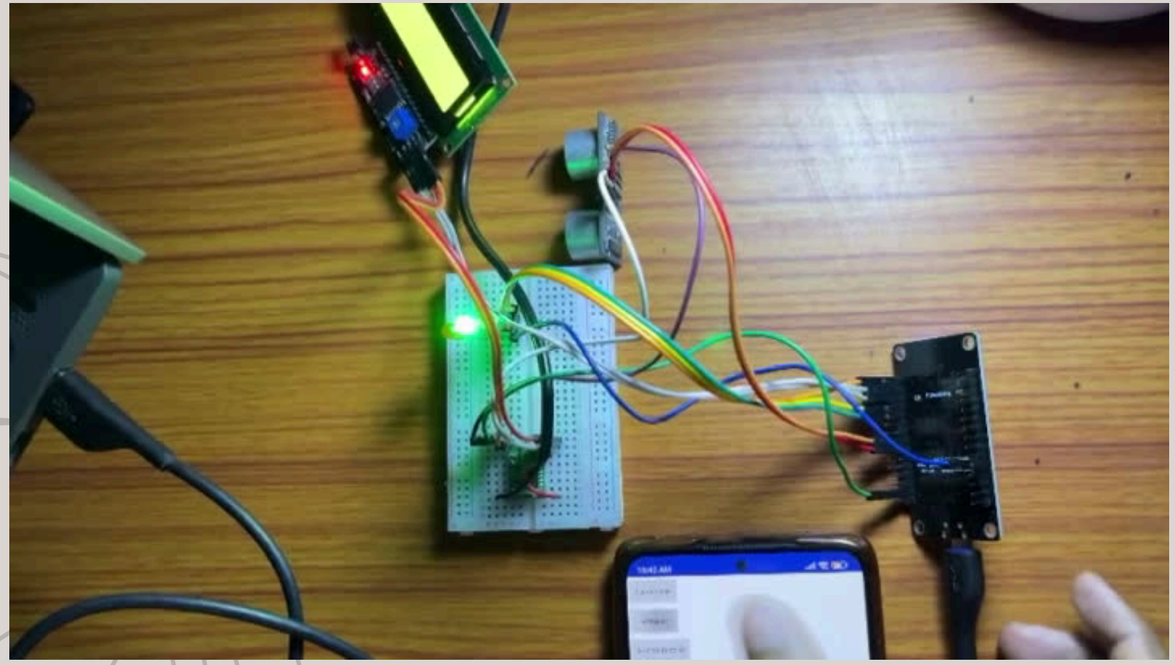
Visual indication using LEDs:

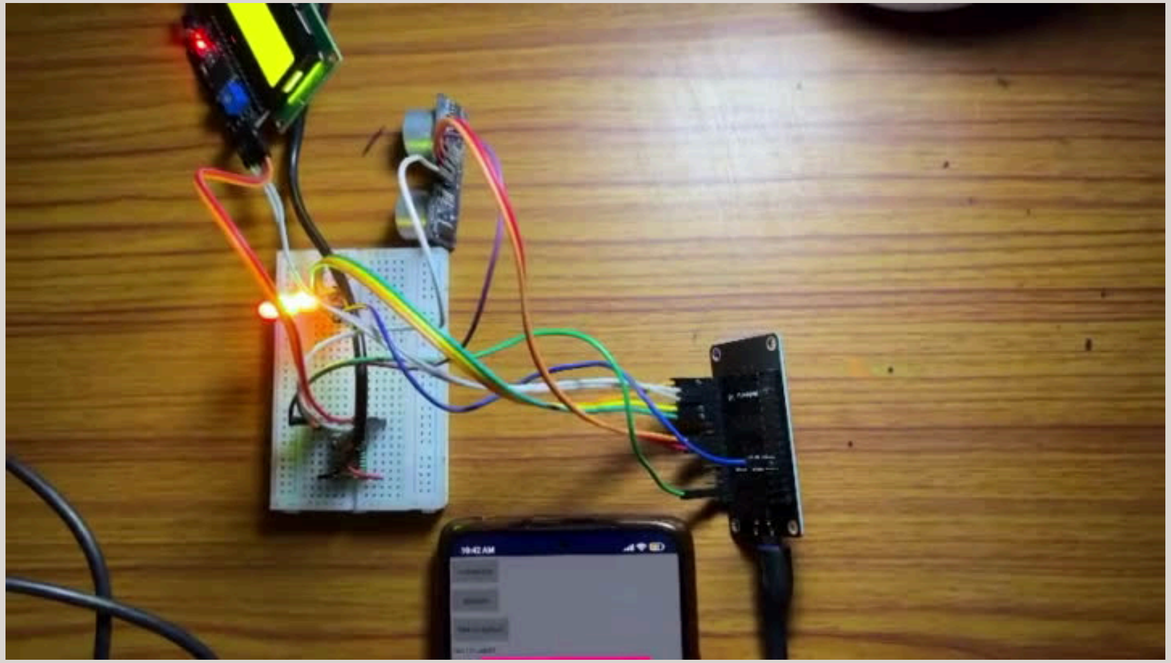
  - Green Light: 10 days before expiry.
  - Yellow Light: 5 days before expiry.
  - Red Light: On the day of expiry.

Benefits:

- Helps prevent usage of expired items.
- Provides visual reminders for timely usage.







Quantity Detection

Introduction:

- Keeping track of the quantity of items in a container is essential to ensure a constant supply.
- Manual checking is often inconvenient and prone to errors.
- The Smart Container's quantity detection system offers an automated and reliable way to monitor levels.

Quantity Detection

Functionality Description:

- An ultrasonic sensor is used to measure the remaining quantity of the content.
- The sensor sends data to the app.
- The lcd and the app notifies the user when the content level is low and needs refilling.

Benefits:

- Ensures that the container is always adequately filled.
- Prevents running out of essential items unexpectedly.

Container Identification

Introduction:

- Identifying the correct container can be challenging, especially in settings with multiple similar containers.
- This often leads to confusion and inefficiency in accessing the right items.
- The Smart Container's identification system simplifies this process, saving time and effort.

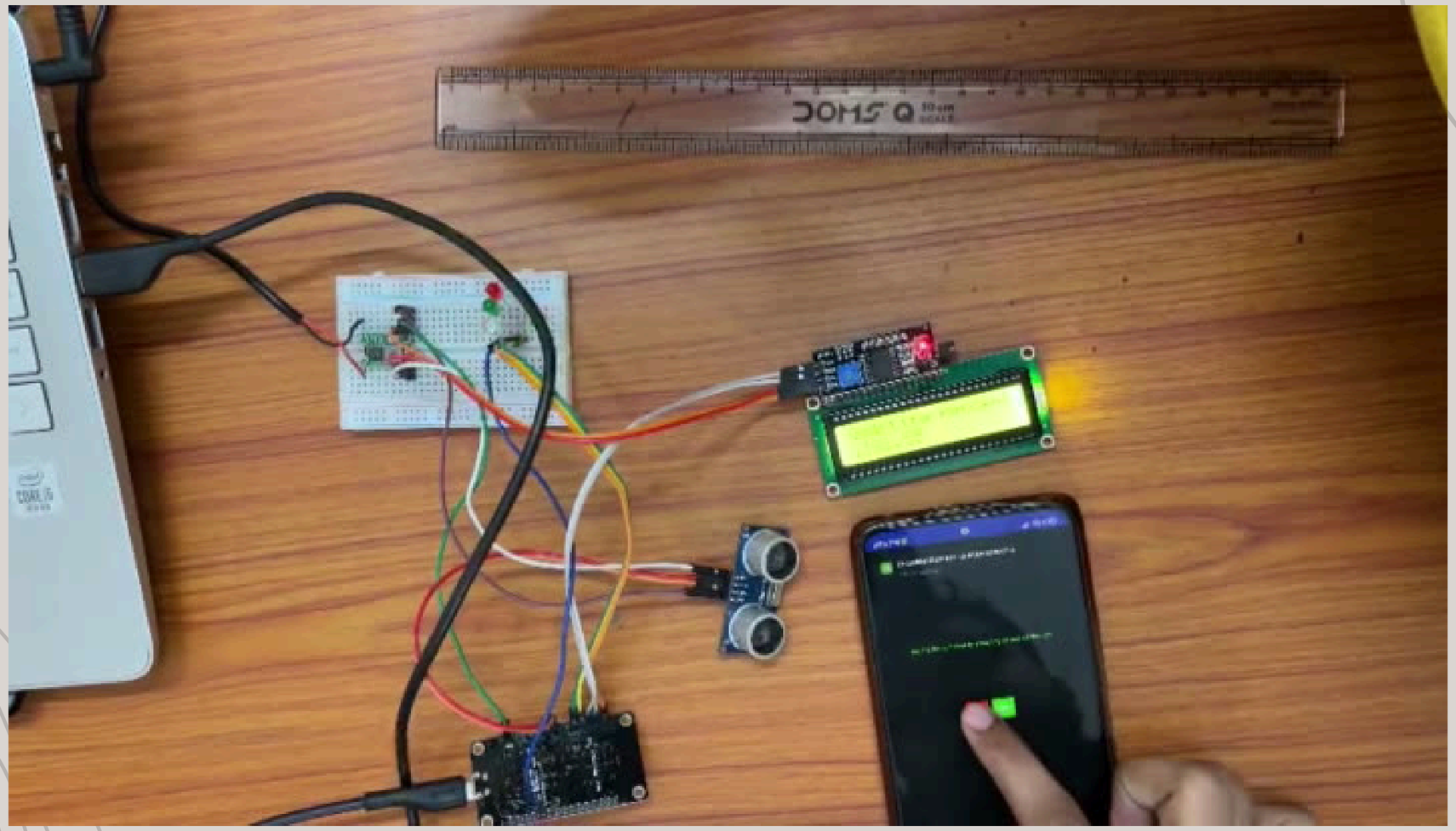
Container Identification

Functionality Description:

- The app has a feature to identify a specific container.
- When triggered, an LED on the corresponding container lights up.
- This allows users to easily locate the required container.

Benefits:

- Simplifies the process of locating the correct container.
- Reduces the time spent searching for specific items.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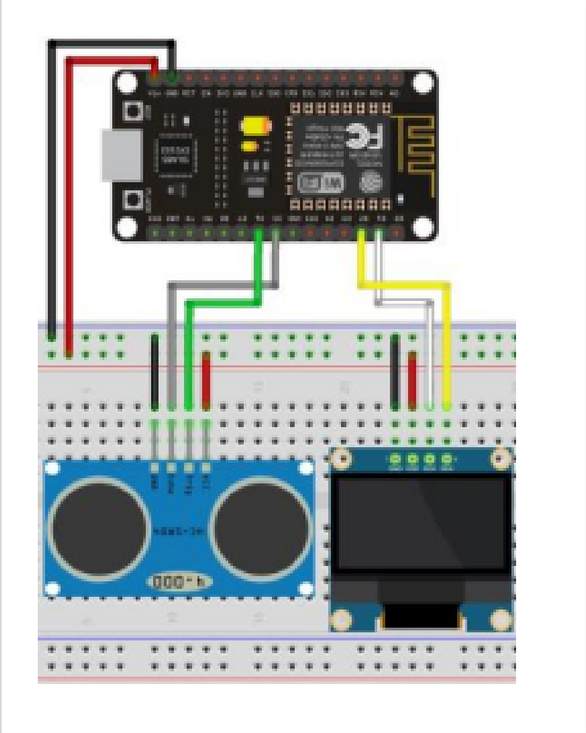
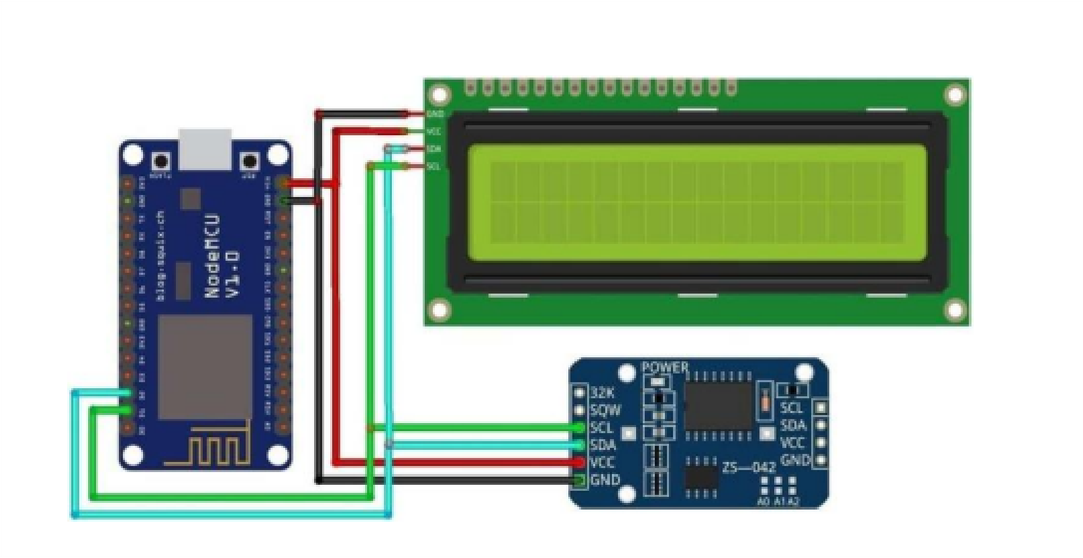
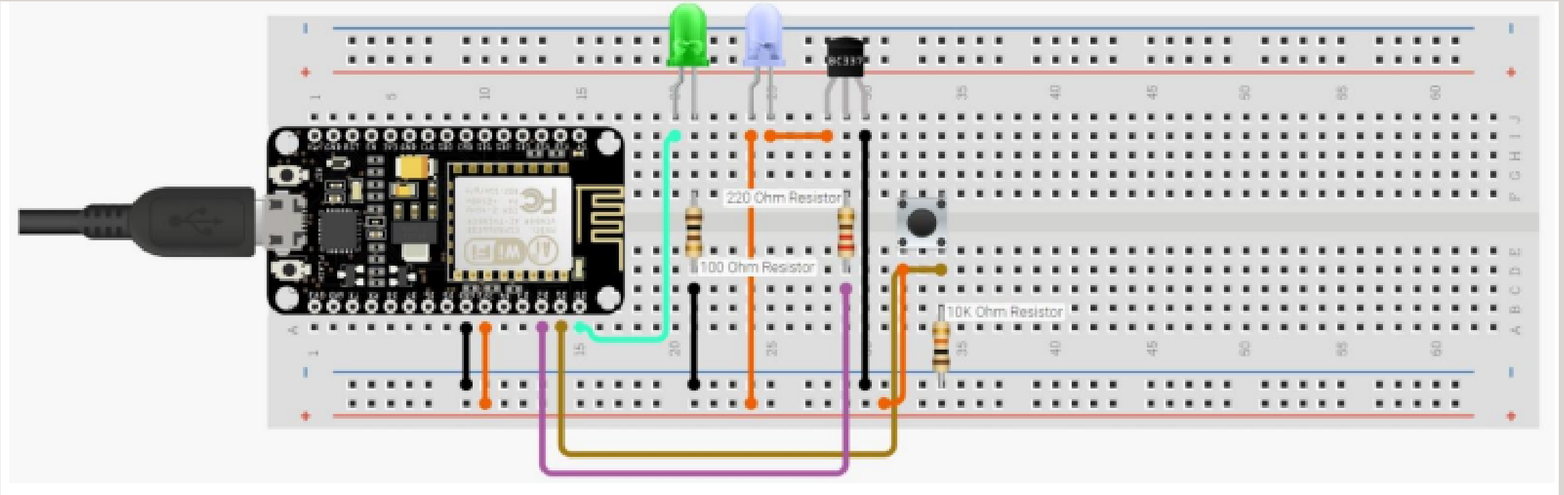
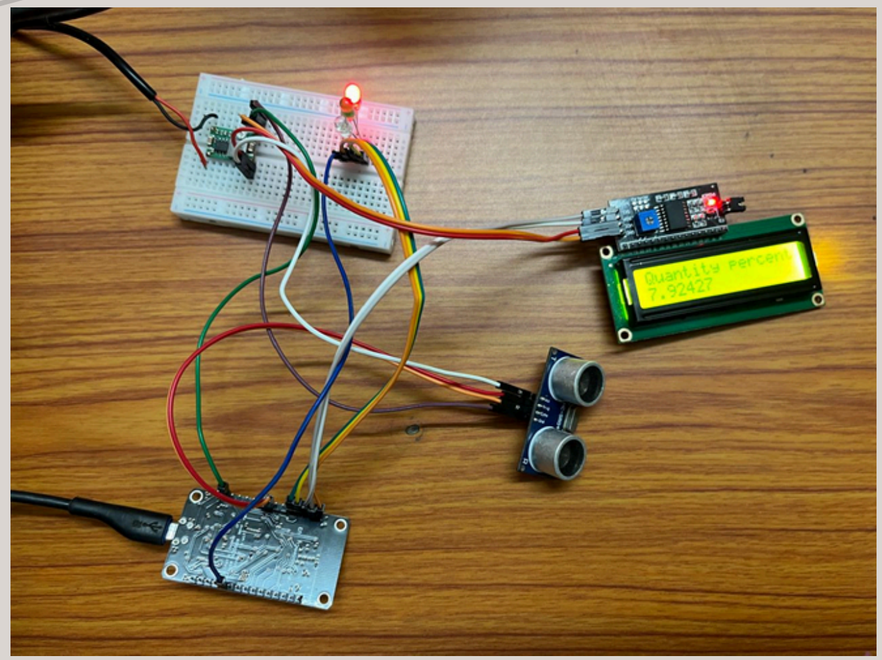
Circuit Diagrams

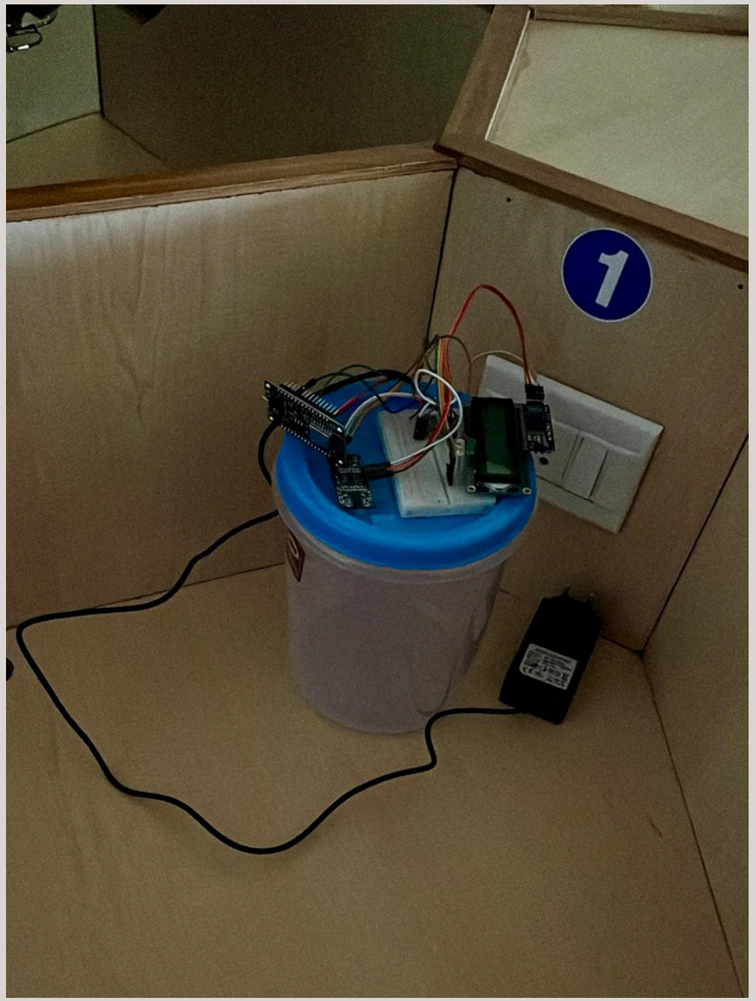


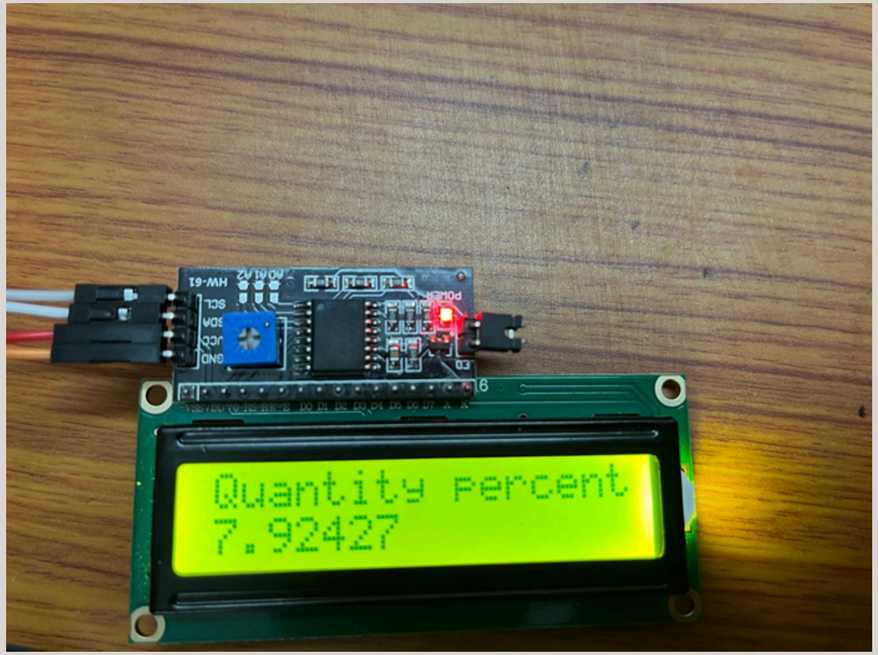




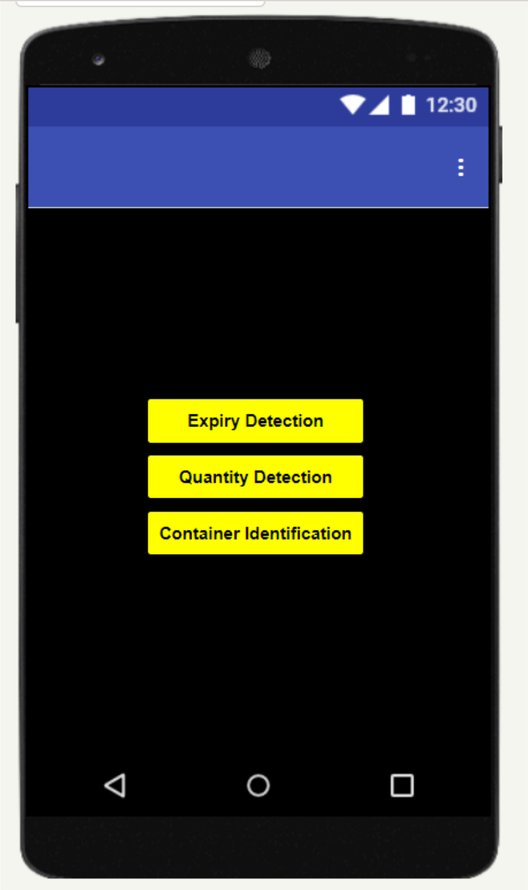
Implementation

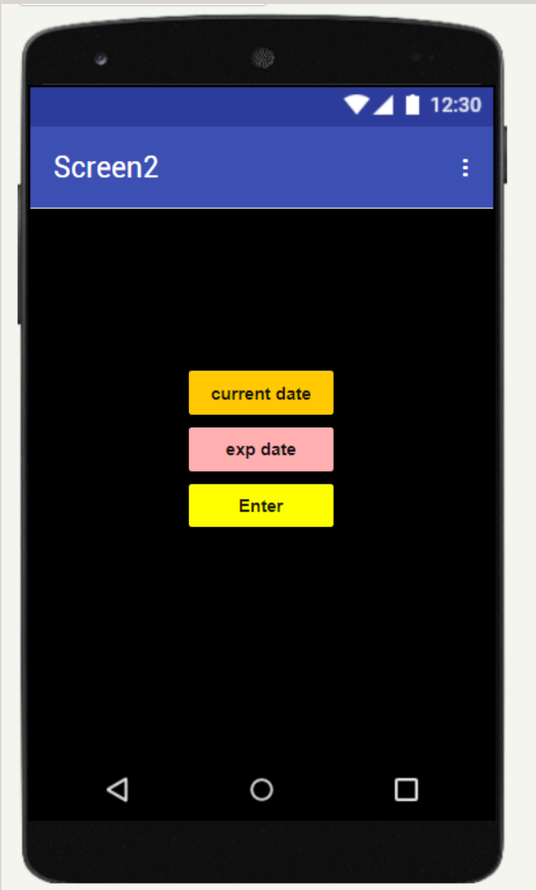


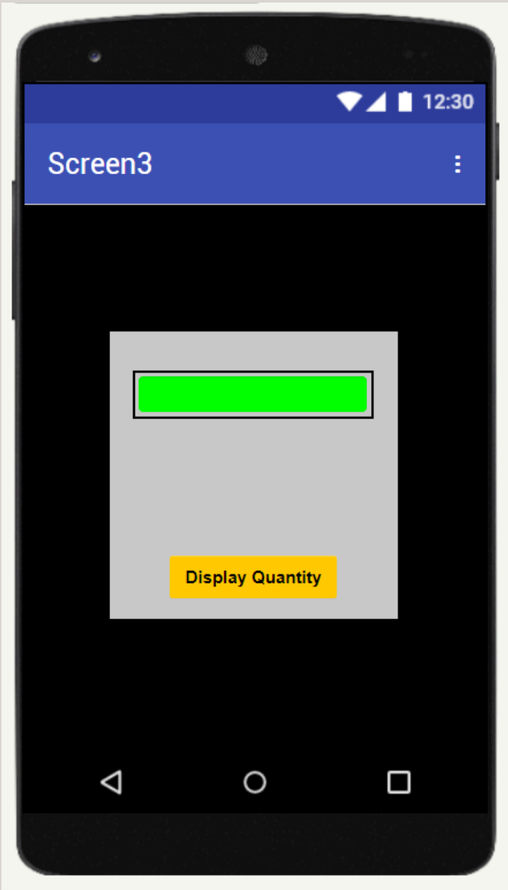


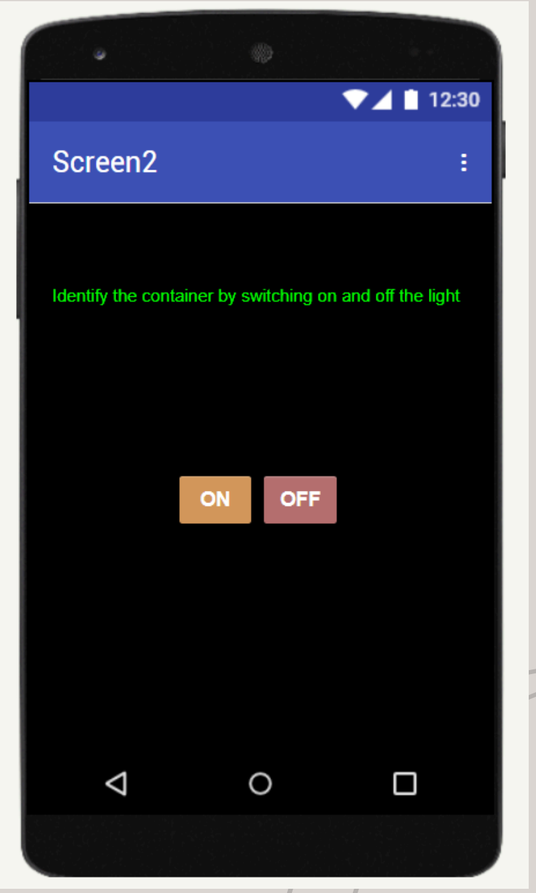


App Interfaces









Future Works

Making the container much more compact with less connections

Can integrate voice assistants for the container identification functionality

Create a robust database and interface that stores information of multiple containers and displays to the users

Conclusion

The Smart Container project successfully demonstrates the potential of IoT technology in enhancing kitchen management. By providing real-time alerts for low inventory levels and upcoming expiration dates, the Smart Container helps users manage their kitchen supplies more efficiently, reducing food waste and improving overall convenience. The project achieved its primary objectives, including the development of a functional prototype and the integration of hardware and software components. Future improvements and additional features can further enhance the system's usability and effectiveness.

Thank You