

# Automatic Kitchen Shelf

Rajashree Mane, Shrutika Thorve, and Shital Nikam, *Member, IEEE*

**Abstract-** The design and development of a “Smart Kitchen Shelf” identifies the grocery items in the kitchen. The kitchen shelf is augmented with sensors to measure the weight of an item which is updated to a database whenever grocery items are placed or taken out for cooking. The weight of an item in a container is measured with the help of weight sensors and pressure plates. It will be display on OLED screen. Through this we can also able to change the grocery item in a respective container. The system will alert the user when the grocery item has reached a predefined threshold level as well as place the order to a predefined grocery store with the user approval. The weight sensing section consist of similar container specification and content identification, pressure plates and weight sensors measuring all content on that shelf. The system also generates automated shopping list when an item reaches the defined threshold level, which is based on requirements. This design will simplify the responsibility of grocery management which further can lead to more sophisticated kitchen utility applications. It might be incorporated as alone operating module in smart home or smart kitchen.

**Keywords –** OLED , Internet of Things, Weight sensors, Pressure plates.

## I. INTRODUCTION

The kitchen is a very important place of a home and cooking is one of the day to day activities. The usual difficulty in a kitchen during cooking is finding the items to be out of stock and also to make a shopping list. With busy schedules, it is very hard to manage grocery stocking and shopping. This problem generally happens with working women. Also it becomes tedious to observe family consumption, refill interval and stock required to cater guest visits. Today, Internet of Things is driving the innovation very rapidly. The kitchen is a new focus for innovation in Internet of Things era. The kitchen is one of the ideal place where automation at various levels can be done. A combination of smart applications along with the internet various sensors and other technologies can make the kitchen to be more smart and responsive. Smart Kitchen Shelf using Internet of Things is the new innovation in kitchen shelf to make them responsive towards grocery stoking. This system will simplify the responsibility of grocery management along with the generation of shopping list automatically. In this project, we are going to design sensor based Smart Shelf that is capable of measuring the availability of different types of grocery items and alert the user when the item has reached predefined threshold level. The system will also be able to generate the shopping list for user and place order to predefined grocery store with the user approval. The user

will be able to choose the items that they need to purchase. This system will interact with user through the mobile application. Smart Shelf is an embedded system which will consists of weight sensor, reader to provide complete information about items for better kitchen management. It uses weight sensing mechanism which sends the information related to the weight of every item that has a unique tag. The embedded sensor measure the weight of the items which is updated to the database whenever the items are placed or taken out. The main features of smart shelf are: 1) Checking the status of grocery item in a container 2) Automatic shopping list generation and alert messages to indicate grocery required 3) Item identification and tracking 4) Allow user to set the threshold for different items. If threshold is not set then the system will take the last refill quantity as the maximum quantity. The algorithms involved in this design are: 1) Algorithm measuring the availability of grocery item in a container using weight sensor 2) Algorithm to identify, track and manage grocery 3) Algorithm for automatic shopping list generation.

## II. LITERATURE SURVEY

- 1] Rakesh Satapathy, Srikanth Prahlad, Vijay Kaulgud, “ Smart Shelfie Internet of Shelves For higher on-shelf availability” , 2015 IEEE Region 10 Symposium  
Describes how the shelves at a retail store can be made smarter such that they can raise alerts to restock themselves. Alerts to workers in retail shop can skip manual checks and alerts to CPG companies can accelerate refill if retailers do not maintain the right quantity or restock within Service Level Agreement (SLA). Using load sensors have been the most common practice yet it has not succeeded as anything else on the shelves still meant available. Thus the challenges we face are to track not only the quantity but also the right brand, right variant in the right position with right visibility to shoppers on the right shelf. Internet of Things can help make this thing (shelves) smarter to required extent. The authors have enabled shelves to take its own selfie using a simple camera and then the images processing algorithms takes care of performing required analytics and generate alerts with the person responsible. This solution scores higher over other hardware and capital intensive IoT solutions being worked upon.
- [2]Joan Melia-Segu and Rafael Pous, “ Human-object Interaction Reasoning using RFID-enabled Smart Shelf” ,2014 International Conference on the Internet Of Things  
In pervasive retail, Radio Frequency Identification(RFID)-enabled smart shelves are becoming common place. Real-time information about the items stock and location is provided by these devices, that being fact, few efforts have been made to

reliably detect human interaction with the items. Novel approach is presented by author on real-time human object interaction detection. This approach is based on RFID using supervised machine learning techniques.

[3]Sean Dieter Tebje Kelly, Nagender Kumar Suryadevara, and Subhas Chandra Mukhopadhyay, Fellow, IEEE, "Towards the Implementation of IoT for Environmental Condition Monitoring in Homes", IEEE SENSORS JOURNAL, VOL. 13, NO. 10, OCTOBER 2013

### PROPOSED SYSTEM

The functional representation of the system is shown above.

The load sensor or load cell senses the environment and send the data to the application.

LCD display is used to display the status of each item and corresponding value.

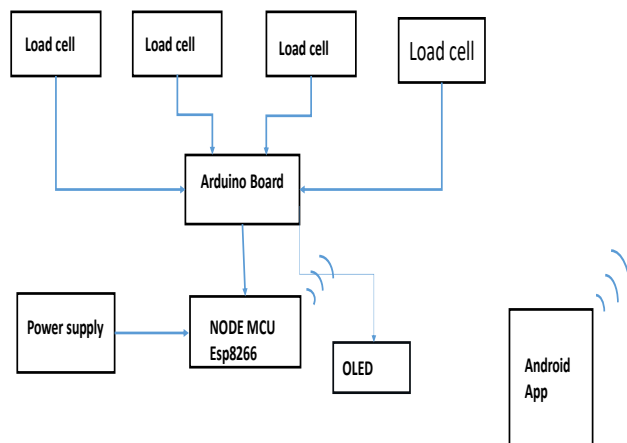
The application analyse the data, decide the action to be taken and update in the database.

The user interact with the system through wireless android application.

When an item is found to be below the specified threshold level, the shopping list state is triggered.

It will ask for the user permission to place *the* order of particular product.

### BLOCK DIAGRAM-



### II. RESULT AND DISCUSSION

- i. System will display quantity of component
- ii. System will send message for remainder
- iii. Automatic shopping list generation

### III. CONCLUSION

This system is an initiative towards the smart kitchen that includes weight sensing technique. This system is efficient to identify and track usages of the grocery items .It is a conceptual idea when implemented can streamline the inventory management of kitchen and grocery. This would reinvent the kitchen to become more responsive and intelligent to support the inventory stocking and shopping list generation . It can be implemented to support the smart home initiative and become an essential prototype as currently, there are oven and fridge.

### REFERENCES

[1]Mutsaklisana Chaiyaporn, Verma Apoorva, Saxena Gaurav: Smart Shelf for Smart Kitchen-An Internet of Things initiative: International Journal of Advanced Engineering Research and Science, Volume-2, Issue-12, 2015.

[2]Amita Thakare, Pooja Gandhe: A review paper on kitchen monitoring system using embedded web server: International Research Journal of Engineering and Technology, vol-4, issue-2, 2017

[3]Karupiah Pal Amutha, Raja Pitchiah, Chidambaram Sethukkarasi: Smart Kitchen Cabinet for Aware Home: National Ubiquitous Computing Research Centre, Issue-2012.