

IoT Based Food Inventory Tracking System for Domestic and Commercial Kitchens

¹Omkar Mulay, ²Manas Bhalerao, ³Sayali Bhamare, ⁴Vinod Gaikwad, ⁵Dr. Kamini Nalavade

¹Student, ²Student, ³Student, ⁴Student, ⁵Professor
Computer Engineering,
SIEM, Nashik, India

Abstract: A key component in effective kitchen management is inventory control. Keeping track of the kitchen inventory leads to more informed planning and decision-making. With technology advancing in a fast pace and everything around us becoming automated, people prefer to monitor and perform their day-to-day activities by using the smart devices they carry everywhere rather than manually recording and monitoring things. Maintaining and keeping track of everyday common food inventory is becoming one of the major problems in various households, restaurants and food chains. Replenishing the containers at the right moment and also knowing the expiry of foods is a major concern. Working people and busy restaurants find it difficult to keep track because it requires human intervention at the right time. Through this, it is easy to keep an eye on potential problems related to waste and pilferage. In this project we propose an IOT (Internet of Things) based food inventory tracking system, which ensures real time monitoring of the kitchen inventory. The collected data can be analyzed in real time to understand the daily or weekly consumption and also predict usage/consumption patterns. There is also provision to check the real time status, history of consumption through a application. The system contains a Microcontroller, load cell and wireless Module, MQTT broker, a hybrid application through which real time inventory tracking is performed. The proposed solution is completely wireless and reliable for both domestic and commercial purposes.

Index Terms: IoT , Cloud Computing, Inventory, and esp8266 etc..

I. INTRODUCTION

Kitchen inventory management becomes more advantageous for more informed planning, decision-making and luxury of individuals. Every day the modern people expect new device and new technology to simplify their day to day life. The innovators and resembles are always trying to find new things to satisfy the people but the process is still infinite. Now a days, kitchen automation became modern and precise to monitor the fields. In the 2000s, Internet connectivity became the type for many applications and today is expected as part of many enterprise, industrial and consumer products to provide access to information. However, these devices are still primarily things on the interaction and monitoring through apps and interfaces .With the advancements in Internet technologies, and wireless sensor network (WSN), a new trend in the era of ubiquity is being realized .Enormous increase in users of internet and modification on the internet working technologies enable networking of everyday objects. This system finds a wide application in areas where physical presence is not possible all the time .The system offers a complete low cost, powerful and user-friendly way of real-time monitoring and remote control of kitchen.

II. LITERATURE SURVEY

Smart Home Monitoring And Controlling System Using Android Phone.

In this project, it describes a zig-bee module and android based home monitoring system for security, safety and healthcare for human. This system is flexible and can be implemented in many research areas. This paper introduces a smart home system which could surprise household appliances remotely and realize real-time monitoring of home security status through mobile phone[1]. The personal computer is used to monitor the various parameters in the proposed system. Android Phone is main advantage compared to personal computer for using any place[1].

Smart Kitchen Cabinet For Smart Home.

This paper describes a conceptual design of a smartkitchen cabinet. This system incorporates grocery itemidentification, inventory management of grocery items andautomatic generation of shopping list. The smart kitchen cabinet consist of two different sections each leveraging twosensing mechanisms: weight sensing section consist of fixedsize container having RFID tag defining container size withproductdescription RFID tag reader, and ultrasonic levelsensor for measuring the level of contents in the container.RFID tag reader, and weight sensor meaning all the contentson that shelf[2].The embedded sensor measure the weight or the level of theitems which in updated to the database whenever groceryitems are placed or taken out for cooking. When the item search the predefined threshold level, the system generatethe automated shopping list[6].

IoT based Grocery Monitoring System

This paper provides an insight into the development of an IoT based prototype to monitor the grocery levels at homes and supermarkets. A compatible and affordable wireless sensor network is implemented. Serving as an asset for research in the food

industry, this implementation can be used to observe the food consumption patterns. Using this prototype as a base, real-time applications can be developed to manage our current inventory efficiently with its implications in food and e-commerce industry [2].

III. SYSTEM ARCHITECTURE

In this IoT platform based project, wireless communication is used. Here, NodeMCU (ESP8266) is used to communicate with cloud. There are mainly two types of groceries item. One is countable and another is uncountable. For measuring countable groceries item, we used load cell. Load cell measures the weight. For measuring uncountable groceries item like spices, rice, pulses, tea leaf, sugar, salt etc., we used load base sensor for measure the levels of the groceries item kept in the compartment.

A website is used for monitoring the Smart Inventory from anywhere anytime. A mobile version of this website is also use from anywhere by using cloud. The purpose of the website is show accurate data of the sensor throughout cloud and in which show monthly statistics about inventory

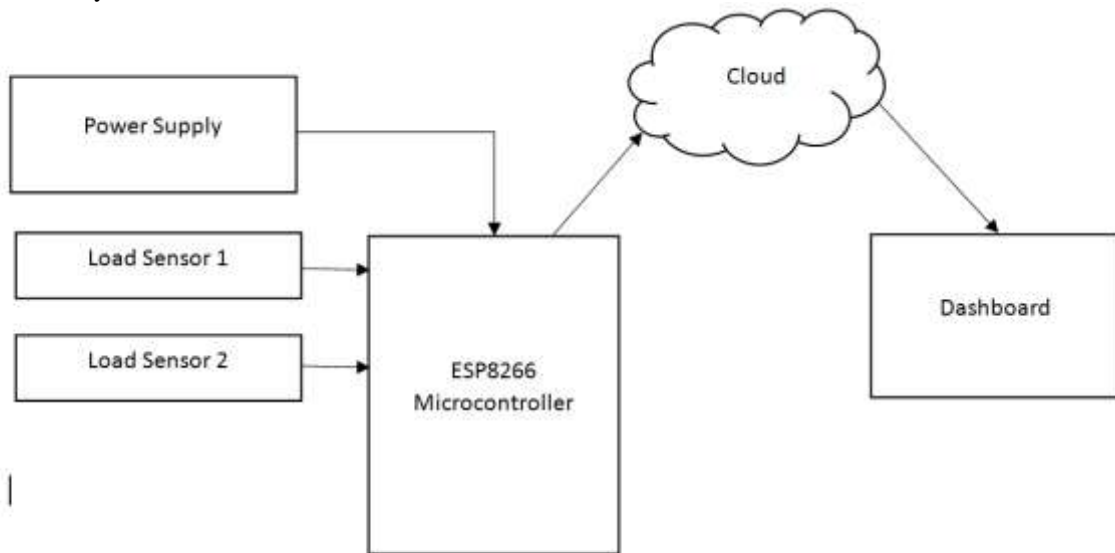


Figure 1: Block Diagram

For this, website is built for monitoring the Smart Inventory from anywhere anytime. A mobile version of this website will also be developed. From this website user can monitor inventory and order groceries from anywhere. User can also see the order history and order status whether the order is accepted or not. System can generate a statistical report of how much inventory has been used. User can also add or remove cabinets and change compartments' name. If the groceries from inventory are equal or less than 10% then user will be notified.

IV. MATHEMATICAL MODEL

S = { I, O, F, Success, Failure }

S=System, I = Input, O = Output, Success = Success case, Failure = Failure Case.

I = { I1, I2, I3 }

I1= Load cell-1, I2=Load cell-2, I3=Load cell-3.

O = { O1, O2, O3 }

O1=Weight-1, O2=Weight-2, O3=Weight-3.

F = { F1, F2 }

F1= Calculate Weight.

F2= Use KNN to find containers with Minimum Stock.

Success Case= System Showing accurate reading of Weight.

Failure Case =System Showing wrong reading of Weight.

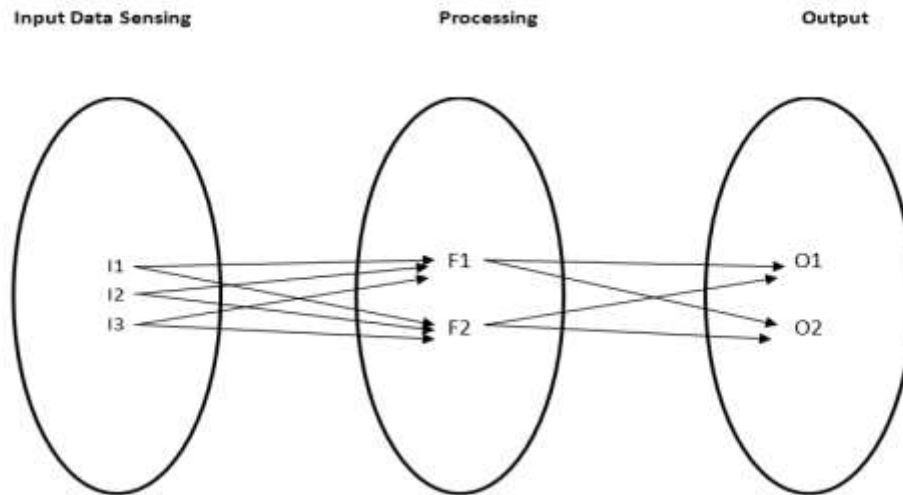


Figure 2: Venndiagram

V. CONCLUSION

This application demonstrate how easily one can leverage IoT to eliminate human intervention and automate manual processes. For a restaurant or large hotel, this can make a big difference .A further enhancement of this app would be to automatically place an order with suppliers when inventory falls below a critical level. The possibilities are endless, and with cloud state of the art data warehousing and the 99.999% reliable messaging infrastructure of MQTT, building such solutions is fast, secure, and highly scalable.

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