Published by :
http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 10 Issue 04, April-2021

FreshBox - IOT based Pantry System with Store Management

Satare Devika Jitendra
Information Technology
(Affiliated by Mumbai University)
Shah & Anchor Kutchhi Engineering College
(Affiliated by Mumbai University)
Mumbai 400088, India

Savla Karan Pankaj
Information Technology
(Affiliated by Mumbai University)
Shah & Anchor Kutchhi Engineering College
(Affiliated by Mumbai University)
Mumbai 400088, India

Khan Aman Islam
Information Technology
(Affiliated by Mumbai University)
Shah & Anchor Kutchhi Engineering College
(Affiliated by Mumbai University)
Mumbai 400088, India

Mrs. Pranali Wagh
Information Technology
(Affiliated by Mumbai University)
Shah & Anchor Kutchhi Engineering College
(Affiliated by Mumbai University)
Mumbai 400088, India

***Abstract*: This paper gives an understanding into the progress of an IoT based model to supervise the grocery levels at stores and commercial markets, whereas the model can also be utilized in home kitchens for basic pantry supervision. The pantry or inventory is a vital part of the store management and home that enhances its usability and is an environment where smart and automated technology can be improved. Utilizing this model as a base, real-time applications can be created to administer our present inventory effectively with its inference in the food and e-commerce industry. The inventory system will make managing the warehouses and kitchen pantry, medication, substantial inventories more effective and convenient.**

Keywords—Internet of Things, Arduino, inventory, grocery management,

I. INTRODUCTION

The expansion of innovation and technology is inevitable. Each development is made to productively affect human life. In spite of the fact that life is getting simpler, people are getting busier as every day passes. Therefore, execution in the kitchen and general stores is valuable to monitor the month-to-month utilizations of food supplies. According to the perspective of the food industry, the information received opens up a research path to examine the food utilization patterns economically, geographically and ethnically. As an attractive item, the execution will assist with tracking items sold or consumed. It will likewise stipulate when the items should be loaded once more. In any case, because of the seasonal effect of fresh items and their perishability, food sources can without much of a stretch fall apart in transit which lead to wastage. The control technique of new item stock is the key issue of store inventory administration.

This project helps to reduce workload and to ensure the smooth flow in the functioning for commercial purposes. This project has different features with Inventory to monitor the pantry values , Dashboard to show the previous records for future analysis as well as the user can create any notes of major information which is to be acknowledged later on. The project is thus focussed on addressing modern needs while keeping an eye to simplicity and ease-of-use.

II. LITERATURE SURVEY

IoT based Grocery Management System: Smart Refrigerator and Smart Cabinet.Muhammad Asad Khan, Hassan Mansoor, Uzair Shafique, Muhammad Hayyan Bin Shahid, Asim ur Rehman Khan:

The project uses cameras instead of sensors to read the data inside the cabinet and google firebase for the web application, the system also places an immediate order if the weight of the product goes below a threshold value. The system lacks in showing ideal features like weight and temperature of the cabinet also it cannot show track previous placed orders.

IoT based Grocery Monitoring System. Hardi Desai, Divya Guruvayurappan, Mustafa Merchant, Smeet Somaiya, Hetal Mundra:

This system is built using RAPG Low Capacity Single Point Aluminum Load Cell and Arduino board. The paper focuses on the mathematical interpretation of the data done using ThinkSpeak MATLAB more than the IoT based implementation of the inventory system. The load sensor used in the prototype is bulky and can be difficult to deploy in small spaces and the weight measure can be deviated considerably from the expected weight. With the inclusion of larger data, the use of RaspberryPi instead of Arduino in the system could have resulted in a more efficient data processing.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 10 Issue 04, April-2021

An Integrated IoT enabled On-demand Grocery Shopping and Delivery Cloud System using MTComm at the Edge. S M Nahian Al Sunny, Xiaoqing "Frank" Liu, Md Rakib Shahriar:

IGSDC framework tracks items in the inventory, notifies the users when they are coming up short on items and offers accessible buying alternatives from various providers. Utilizing MEHs, clients can screen, oversee, and work their assets from anywhere. The system is difficult for users who are not proficient in using high-tech systems. However, the system lacks security , better mechanisms can be used to provide privacy to the user.

IoT Based Smart Inventory Management System for Kitchen Using Weight Sensors, LDR, LED, Arduino Mega and NodeMCU (ESP8266) Wi-Fi Module with Website and App. Sifat Rezwan, Wasit Ahmed, Mahrin Alam Mahia and Mohammad Rezaul Islam:

This system is the implementation of a smart cabinet based on the idea that the grocery items can also be kept outside the refrigerator. The system provides a plethora of benefits and uses. Although, the system itself is quite bulky and requires quite a lot of space. The interface could be tricky and cumbersome for users to understand and use efficiently.

III. Design And Development Of The Prototype System

The project model named as 'FRESHBOX' is actually created with a futuristic thought for commercial usage where companies holding a number of branches can order their daily need of requirement to a single central branch or a head branch. The proposed thought is conceptualized on a mixture of the Internet of Things with Wireless Sensor Networks.
Through this section we will cover the following topics:
A. System Concept
B. Technical Details
C. Software Implementation/User Interface
D. Hardware Implementation

A. System Concept:

The system targets three types of users namely Admin, Branch Manager and Home-users. The Admin is responsible for handling the orders received and the management of different branches in an area. The status of the orders is also processed by the Admin.

The Branch Managers are responsible for managing the branch allotted to them. Branch Manager tracks the inventories of their respective branches and places necessary orders to the Admin. The manager acts according to the requirement on a day to day basis and coordinates with the central branch. The household users can use the system for real time monitoring their pantry and work with the notes created in the task list
The implementational flow of the system is explained in the diagram below

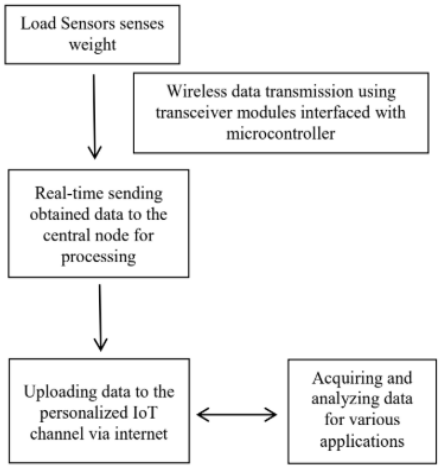

Fig. 1. Implementation of the System

B. Technical Details

The technical details that describe this proposed system are addressed in this section.

1. Technologies used

We use Python – Django for the web application system. Django Administration along with SQLite is used as the database for the system. This allows us to store various vital information without any third-party interference. Arduino board along with various sensors are used for tracking and receiving the inventory data seamlessly.

C. Software Implementation/User Interface

The web application is designed in a way that retains good balance between maximizing functionality and maintaining simplicity.
The web-application consists of four main pages-
1. Inventory
2. Dashboard
3. Store
4. Tasks

1. Inventory:

For this Smart Inventory, compartments are needed to detect and measure the items kept in it. In this way, a little bureau containing compartments fused with various sensors is assembled as a model. Then, the device associates the received weight value to food items (names) and records the information with time stamps. The weights of the individual items are fetched from the load cells in the cabinet module according to their respective item's name.

The load cells measure the weights according to its scaling factor and generate the exact weight of the item placed on it. The weights are then routed to the data storage and receiving module to the user. The user can access the weight of individual items through the web application.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 10 Issue 04, April-2021

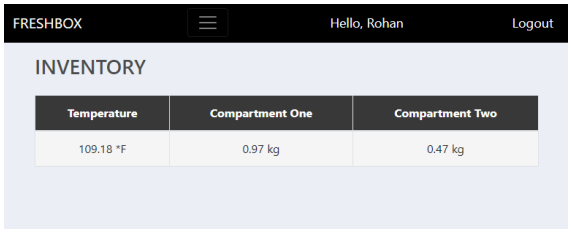

Fig. 2. Inventory

2. Dashboard:

The Dashboard feature provides the previous order data to the individual branch holders and the Admin dashboard where the central branch holder will have access to every individual branch orders. It also shows the status of the orders whether they are pending or delivered. The data can be useful for analysis and future predictions based on the past requirements of the respective branches.

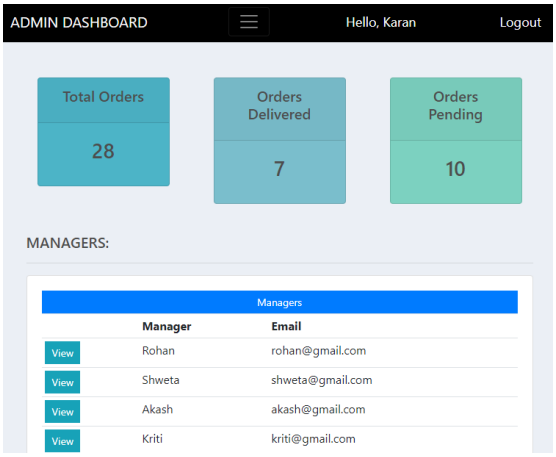

Fig. 3. Dashboard

3. Store:

The store page contains the items list that a Branch Manager can order from if their inventory threshold value is low. The Add to Cart button redirects the user from store to cart where necessary changes in the cart can be made i.e., add or remove certain items and then the user fills in the address details where the delivery has to be made. Once the submit button is clicked, the order will be placed. The Admin can view the placed order and make necessary arrangements for the same.

4. Tasks:

The tasks page is provided for the ease of the user. The home user can add their grocery items on the list whereas the Branch Manager or Admin can store the order/status details or the inventory items to be restocked at the branch. Any user can create, update the existing task, mark a task as done or delete any task easily.

D. Hardware Implementation

We have used an Arduino Uno microcontroller for managing the operation and transfer of sensor data to the user application. Sensors like FSR (weight sensor) and TMP-36 (temperature sensor) are used for tracking and collecting crucial inventory status data. Wires and breadboards are the components used for connecting the whole setup. Motor fan is used for regulating the temperature of the inventory as required for the items kept in the pantry. The temperature in the inventory can be controlled by the user as required. The we

The circuit diagram for the hardware implementation is shown below

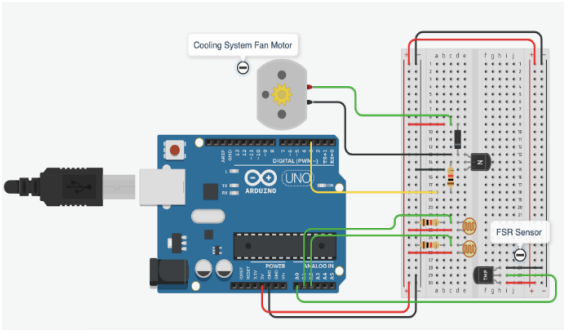

Fig. 4. Circuit Diagram

IV. CONCLUSION

This application shows how effectively one can use IoT to dispose of human intercession and computerize manual cycles. FreshBox provides data driven matching of consumers and suppliers based on their needs and capabilities. The model framework effectively exhibited FreshBox's capacity to provide exceptional IoT enabled management of food for commercial as well as some household use. Using FreshBox, consumers can track the items in the pantry through IoT sensors and suppliers can monitor and operate their warehouse machines remotely. By utilizing the data gained, it is likewise conceivable to manage the average utilization of goods and items in the inventory. This could additionally be used for planning the monthly expense cost on food and different commodities.

V. FUTURE SCOPE

There are some features that can be effectively implemented after the deployment of this system on a large scale.

To understand its maximum capacity, more research is required including growing better security, privacy mechanisms, utilizing data analysis and machine learning algorithms, applying resource management and so forth.

For an eatery or large and huge family restaurants this can make a great difference, and can also be used in medical facilities to store various medicines and keep a track of it .

A further scope of this project would be to automatically place an order with suppliers when the items in the inventory falls below a set threshold value level.

VI. REFERENCES

[1] M. A. Khan, H. Mansoor, U. Shafique, M. B. Khan, A. R. Khan, M. H. B. Shahid, "IoT based Grocery Management System: Smart Refrigerator and Smart Cabinet", 978-1-7281-4216-6/19/$31.00 ©2019 IEEE

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 10 Issue 04, April-2021

[2] S M Nahian, X. F. Liu, M. R. Shahriar, "An Integrated IoT enabled On-demand Grocery Shopping and Delivery Cloud System", 978-1-7281-2708-8/19/$31.00 ©2019 IEEE DOI 10.1109/EDGE.2019.00024
[3] K. Hong, H. J. Kim, C. Lee, "Automated Grocery Ordering Systems for Smart Home", 978-1-7281-1253-4/19/$31.00 © 2018 IEEE
[4] M. Fujiwara, K. Moriya, W. Sasaki, M. Fujimoto, Y. Arakawa, K. Yasumoto, "A Smart Fridge for Efficient Foodstuff Management with Weight Sensor and Voice Interface", ICPP '18 Comp, August 13–16, 2018.
[5] H. Desai, D. Guruvayurappan, M. Merchant, S. Somaiya, H. Mundra, "IoT based Grocery Monitoring System", 978-1-5090-4884-7/17/$31.00 ©2017 IEEE
[6] Statista, "U.s. consumers: Online grocery shopping-statistics & facts," 2015 (accessed April 16, 2019). [Online]. Available: https://www.statista.com/topics/1915/us-consumers-online-grocery-shopping/
[7] A. Fagerstrøm, N. Eriksson, and V. Sigurosson, "What's the thing in internet of things in grocery shopping? a customer approach," Procedia computer science, vol.121, pp. 384–388, 2017.
[8] H. Desai, D. Guruvayurappan, M. Merchant, S. So-maiya, and H. Mundra, "Iot based grocery monitoring system," in 2017 14th Int. Conf. on Wireless and Optical Communications Networks (WOCN), 2017, pp. 1–4.
[9] Y. Vilner, "The internet of shopping (ios) is a thing, and its growing," 2016. [Online]. Available: https://www.forbes.com/sites/yoavvilner/2016/03/23/ the-internet-of-shopping-ios-is-a-thing-and-its-growing/
[10] S. Cho, D. Lee, Y. Jung, U. Lee, and D. H. Shim, "De- velopment of a cooperative heterogeneous unmanned system for delivery services," J. of Inst. of Control, Robotics and Sys., vol. 20, no. 12, pp. 1181–1188, 2014.
[11] Marcus St¨ander, Aristotelis Hadjakos, Niklas Lochschmidt, Christian Klos, Bastian Renner, Max M¨uhlh¨auser. "A Smart Kitchen Infrastructure", 2012 IEEE International Symposium on Multimedia.
[12] Beatriz Bordetas Bravo, Javier Cuadrat Fernandez, Mario Monsreal Barrera, Jesus Royo Sanchez. "Implementation of RFID tags in food containers in catering business", ITG-Fachbericht 224 - RFID Systech 2010.
[13] Karuppiah Pal Amutha, Chidambaram Sethukkarasi, Raja Pitchiah. "Smart Kitchen Cabinet for Aware Home", SMART 2012.
[14] Richard Voyles, Jaewook Bae, Bret Smith, David Kusuma and Ledu Nguyen, "Smart Tupperware: Active Containers for Kitchen Automation", SICE Annual Conference 2008.
[15] CF Hsu, HYM Liao, PC Hsiu, YS Lin, CS Shih, TW Kuo, JWS Liu2006 IEEE International Conference on Systems, Man and Cybernetics 5, 4276-4283
[16] M. Kranz, A. Schmidt, A. Maldonado, R. B. Rusu, M. Beetz, B. H¨ornler, and G. Rigoll "Context-aware kitchen utilities", In Proceedings of the 1st international conference on Tangible and embedded interaction - TEI '07, New York, New York, USA, 2007. ACM Press, pp - 213–214.
[17] Alaoui, Lina, James Deen, Stephanie Ahn, and Fei Ye. "Kitchen Manager: Your Shopping and Food Inventory Made Easy"
[18] Joo, Kwang Hyoun, Tetsuo Kinoshita, and Norio Shiratori. "Agent-based Grocery Shopping System Based on User's Preference.", In Parallel and Distributed Systems: Workshops, Seventh International Conference, IEEE, 2000, pp - 499-505.