BOT Kitchen for Pantry

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Abstract—This system is software which is helpful for the businesses operate hardware stores, where storeowner keeps the records of sales and purchase. Mismanaged inventory means disappointed customers, too much cash tied up in warehouses and slower sales. This project eliminates the paper work, human faults, manual delay and speed up process. Inventory Management System will have the ability to track sales and available inventory, tells a storeowner when it's time to reorder and how much to purchase. In this project, the inventory is managed for the stock on grocery on hotels. The grocery is the important factor for the food preparation industries. The remaining stock in store room is identified using the load cell and the RFID tags. If the weight of the particular item gets reduced below the threshold, then automatic SMS will be sent to the super market. All these details of the load cell are updated in the IOT cloud with date and time. The owner can easily monitor the store room status from anywhere and at any time.

Keywords—RFID, ARDUINO UNO, IOT, RFID

1. INTRODUCTION

Kitchen in general is the one area which has lot of scope for development and specifically this development can be done using Internet of things. The technology that we are proposing is the future for kitchen based in hotels. It is basically designed to deliver a number of services with the help of cloud. Everything would be interconnected. One thing that is required is broadband internet connection. In short we can say IOT is an integral part of “BOT Kitchen for Pantry”, According to survey that was conducted by Next Market Insights in Oct 2014, more than 24% person who cooks for themselves or for the family in some way or the other use a smartphone of a tablet most of the time in order to find recipe or for some help regarding cooking itself. Other than this 24%, another major share that is 34% use the mobile technology on a semi frequent basis. The application of BOT kitchen will help the owner of pantry to track the inventory on day to day basis. A huge number of physical objects are being connected to the Internet at an Exponential rate realizing the idea of the Internet of Things (IoT). BOT Kitchen Cabinet is an innovative technology that incorporates interactive services. It is an embedded system which consists of load sensors, Radio- frequency identification (RFID) reader, Arduino UNO and tags to provide complete awareness about ingredients and availability information for better inventory management. The main features of the cabinet are: inventory management of grocery items, automatic shopping list preparation and sending that list to grocery.
Store, item identification and tracking the quantity that is left. The basic requirement of or the need to remember items that needs to be ordered i.e. grocery items will be eased and a log will be maintained which can be accessed almost from any remote location as the data will be stored on cloud.

2. **EXISTING SYSTEM**

   A. *Maintenance of record is a critical process.*

   Record maintenance is very difficult as in a hotel pantry a lot of stuff is required. A lot of money is wasted on keeping the database. Sometimes it also becomes hectic as the number of items are bought on day to day basis and that too in very large quantities.

   B. *Time consuming job and need high accuracy when placing the proper materials with its quantity.*

   This manual work is extremely time consuming as it includes management of paper work and keeping a proper check on the quantity of each item that is to be put in a drum.

   C. *Track of the goods is a complicated process.*

   Tracking the amount of the good is also very difficult since one needs to make sure when they need to restock it. So that it does not get finished and adequate amount is present for the next day. But manual checking does not help with any of this.

   D. *Materials Management is identified with arranging, securing, putting away and giving the suitable material of right quality, right amount at correct place in opportune time in order to co-ordinate and calendar the creation movement in an integrative route for a mechanical endeavor.*

   Updating data manually and keeping a check on it has lot of issues such as security, time wastage and costly. All these problems would be solved in the proposed system.

3. **PROPOSED SYSTEM**

   A. *Maintenance of record is very easy as it stores the data in the cloud.*

   Record would be maintained in a very efficient and cost effective way. This system would use the cloud in order to save the data. It would all be automatic and paperless. No scope of human error would be left.

   B. *Accuracy is high since it is digitalized.*

   Accuracy would shoot up exponentially since now everything is digitalised and less possibility of occurrence of any sort of error would be left. Hence more accurate judgement can be made and better decisions can be taken by the owner.
C. The tracking of goods is very easy as the cloud maintains log.

Now tracking of the items would be easier than never before. Since everything would be on the cloud, you can check anything anytime and anywhere since everything is present online and at one touch.

4. BLOCK DIAGRAM

ITEM 1:

The above block diagram is for item 1.

The Arduino UNO would be connected to power supply source. Load cell would help to know the exact amount of the ingredients left and it would also be connected to Arduino UNO in order to reflect the data. RF Transmitter would tell what ingredient or item is it such as sugar, pulses or rice.
ITEM 2:

The block diagram for item 2 is similar to item 1.

RECEIVER:

The Arduino Uno at the receiver end would update the data in the cloud using
ESP8266 modem.

5. **WORKING**
   a. The load cell is used for identification of weight of the item.
   b. The RF transmitter transmits the value to the receiver with the item code.
   c. Similarly, separate load cell and RF transmitter are used for separate items.
   d. All these values from different items are received in the receiver kit.
   e. The threshold is fixed for the different items, if the actual load is less than the threshold then SMS will be sent to the grocery shop.
   f. So, they can easily deliver the items easily without any confusion.
   g. All these data are updated in the cloud using ESP8266 modem.
   h. The entire data is present in the cloud.

6. **HARDWARE COMPONENTS**
   **A. Arduino**
   The Arduino Uno is a microcontroller board based on the ATmega328. It has fourteen digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. It can be powered with the help of external power supply or via a USB connection.

   **B. Load cell**
   Load sensor is basically used to calculate the weight of the item that is present in the container. It will issue a message when the quantity is less than the threshold amount.

   **C. RF transmitter and Receiver**
   It will help in order to identify the item that is present.

   **D. GSM modem**
   A GSM modem is a special type of modem which accepts a SIM card, and operates over a subscription to a mobile operator. It is similar to mobile phone. From the mobile operator perspective, a GSM modem looks similar to a mobile phone.

   **E. Wi-Fi modem**
   Using WIFI data would be saved on cloud and the grocery list can be tracked anywhere at any time.

7. **SOFTWARE USED**
   **A. Embedded C**
   It is an extensive version of C programming. It helps by providing support for developing
programs that are efficient for embedded devices. It is different from C language. This language is required to support or address features that are not present between embedded systems.

8. ARCHITECTURE

Fig.1: Architecture

Fig.2: Testing
9. **ALGORITHM**

![Algorithm Diagram]

**Fig.3: Algorithm**

The RFID sensors are used to detect the item name and a load sensor is also present on top of each and every sensor to detect the weight of the item. After getting the weight of the item with the help of Arduino the weight is compared with a threshold value and hence the weight still appears to be less than the expected weight than the item name along with the quantity of product required is sent to a long maintained in the cloud and after successful adding of all the items in the list having quantity less than the threshold quantity the list will be automatically sent to the grocery store so that he can pack the required items and get it shipped. no wastage of time in order to go to the store and pick the items.

//Xi Weight output of Xth check.

//Y represents the set of existing tags

//Yn will showcase the number of tags that were scanned in
the current scan.

//Z Threshold.
END ELSE

//sometimes no action is supposed to be performed
// Error can be caused due to hand pressure ELSE
END IF END ELSE

Item Weight = 0
Departed Item = X- (XX )

// Depart of an existing item ELSE
END IF

Item Weight = X - X

Incoming Item = Y - (YY )

// A New item has been arrived IF(X> X ) THEN IF((X - X ) Z) THEN

Requirement of a family in a time period:

Weight variation can help to find out the amount of item used in one particular day, this thing is logged in the database.

Wqty- quantity of item used per day
Eqty- required consumption of the particular item in the required time period

Automatic Shopping List Preparation:

Automatic shopping list would be prepared automatically. A threshold limit would be set for each item and as soon as the quantity would go less than this specified limit, it would be automatically added to grocery list.

10. Conclusion

In this project, the inventory is managed for the stock on grocery on hotels. The grocery is the important factor for the food preparation industries. The remaining stock in store room is identified using the load cell and the RF tags. If the weight of the particular item gets reduced below the threshold, then automatic SMS will be sent to the super market. All these details of the load cell are updated in the IOT cloud with date and time. The owner can easily monitor the store room status from anywhere and at any time. Our project is developed and tested for making life easier and maintaining a log for the items was very much needed. Time and effort has been put into this project for making it valuable .The cost of integrating this module into a smart kitchen is not high as only 3 microcontrollers have been used and not much technicality is required to understand the project.

11. FUTURE WORK

There is a scope of lot of improvement when it comes to delivery of food items by a grocery store to pantry or home. Drone facility can be used in it. A GPS system could be attached to it and the coordinated of the place where the delivery is to be sent could be set. This inventory can be integrated with smart kitchens in which everything is automatic and food recipies can also be stored for reference before cooking food.
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