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SMART FRIDGE - A 24/7 Grocery Reminder

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Abstract - *The internet of things is an upcoming domain which is already ruling the computer world. It helps in connecting an electronic device with non electronic device. Devices like vehicles, home appliances and other kind of physical devices like are embedded with electronic components or software components etc. Refrigerator is an essential part of every household kitchen and it's basic function is that the items present inside of the fridge are cooled to a temperature below ambient temperature of the room. With modernization of technology, new type of smart refrigerators have come which perform various activities but they are very costly. The existing system concentrates more on the recipes that can be created using the grocery kept inside and uses costly technologies like infrared and ultrasound to monitor it. And focus of cost reduction is low. Hence, we propose an idea in the project using the GSM technology, micro controller, pressure sensor, RFID and LDR to do their respective jobs.*

Key Words: *micro-controller, IOT, sensors, GSM, RFID*

1. INTRODUCTION

In this smart world of ours, the role of refrigerator is very important. It stores food, protects it from bacteria and doesn't let the food go stale. So normally if there's no refrigerator, people will face a lot of problems and even their food eating habits won't be the same. So, with modernization of technology, the refrigerators have become smart and perform various smart functions which are very important in making our life easy but the cost this modern technology is still high. To provide a low cost smart refrigerator, we plan to introduce a system such that using the GSM technology, sensors, micro controller such that it can notify the user when the grocery kept inside and help them monitor the quality and quantity of items stored inside the refrigerator and when the items stored inside reach below a certain threshold of weight and the user is made aware of fact that he needs to refill it before the items are completed depleted

2. EXISTING SYSTEM

In the Existing system, we find many types of smart refrigerator which are very expensive, that can't be afforded by everyone and has a lot of complicated functions. Refrigerators when not maintained properly generate lot food wastage due to lack of timely usage and monitoring of food items stored. A person has to constantly monitor the quantity of items stored, so they don't run out of items. Also the existing system doesn't focus on reducing the cost for masses and uses high end technologies like ultrasound and infrared to monitor the grocery present inside. And also may tell the recipes to cook based on the items stored inside. A recent survey conducted by national level organizations have found that the food wastage in India is at a staggering 40% and 20% of all food stored in the refrigerator gets thrown away due it getting stale, and the main reason being that users aren't aware of that food item being stored in their refrigerator or when those items will go stale. And such an amount of wastage of food in country like India needs to be reduced since a lot of our population lives in poverty and most of the nation face shortage of food. And small change in reducing the wastage may lead to greater change

3. PROPOSED SYSTEM

In proposed system we have introduced the GSM technology with a microcontroller. This includes GSM modem, sensors, micro controller. We in our project have used the following sensors to make the Smart Fridge, by introducing the sensors and micro-controller the Smart Fridge works to monitor the items present inside the refrigerator and their shelf life. With the help of GSM facility, we can get a notification to our mobile about the information of the items stored inside the refrigerator, we can also see which items are stored inside the refrigerator and also with the help of sensors the weight of all items stored inside the refrigerator can be known and when the grocery present inside the fridge reaches a certain threshold, it can notify the user about it so that the user can refill it before the stock runs out. The user may be also be notified about when a certain item is expiring and may notify the given user to use it before expiration. The user could be notified about the various online vendors about the items to be refilled before they get exhausted. The main objective of our system is to monitor quantity and quality of items present inside the refrigerator so that there might be no spoilage or wastage of items. The sensors we used are:

1. Pressure sensor – it is an analytical device used for the detection of a weight of items.

2. LDR– It stand for light dependent resistor and it has variable resistance which changes according to the intensity of light falling upon it.

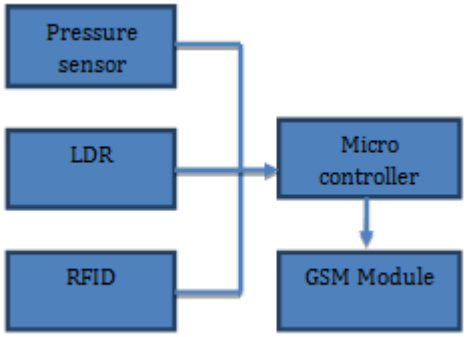
3. RFID- It stands for radio-frequency identification and it is a technology where the RFID or smart tags are used to encode digital data and can be accessed by the user using radio waves

4. Micro-controller - It contains one or more CPU's along with memory and programmable I/O peripherals Program

memory in the form of ferroelectric either RAM, NOR Flash or OTP ROM is also integrated on chip, as well as a small amount of it on RAM.

5. GSM module - GSM (Global System for Mobile communications) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation digital cellular networks used by mobile devices such as tablet,

4. SYSTEM ARCHITECTURE



The data collected from the Pressure sensor, LDR, RFID is sent to the micro-controller which controls the data and it processes the information collected and the data is sent to GSM module which further sends the notification to the user about various things stored, quantity of items and shelf life of items before they go stale. The LDR and Pressure sensor is mainly used for monitoring the quantity of grocery. And RFID is used monitor the shelf life of stored items. Based on RFID, we can also monitor the expiry date and tell the user to use if before the expiration. And the user may also be prompted to buy the items using the various online vendors

5. MODULE IDENTIFICATION

Our system 'Smart Fridge' is divided into five modules

1. LDR:
   - The light dependent resistor is used as the change in the intensity of light falling over causes changing in output voltage
   - The quantity of items is monitored by it.

2. Pressure Sensor:
   - The pressure sensor is used to keep track of various items stored in various compartments
   - The weight of items on the pressure sensor gives us the quantity.

3. RFID:
   - It is a module is made such that the shelf life of items can be easily obtained.
   - When the product is about to go stale, it can be used to make user remind to order the product before it gets depleted.

4. Microcontroller:
   - The microcontroller being used is 8051.
   - The microcontroller receives the data from the various sensors and processes it
   - Further the information is forwarded to GSM module to notify the user.

5. GSM Module:
   - This module is an essential part of the project
   - The main work of this module is to get the information or record the information and send the same to the user
   - The module is connected to the microcontroller which gets the data from above items and processes information and to send to user.

6. CONCLUSION

The Smart Fridge is capable of monitoring the contents present inside. And notify the user when there is a scarcity via SMS (Short Message Service). The module not only prevents any wastage of food but also keeps track of all the items present inside it. Hence, it provides a much more efficient manner to manage the quality and quantity of the grocery stored inside.

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