

SURVEY ON INTELLIGENT FREEZER

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Abstract— The Internet of Things (IoT) refers to the ever-growing network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other internet enabled devices and systems. One of the innovations of IoT is the Smart Refrigerator. It generates and updates the store and the shopping list which also helps the user in maintaining their diet and suggests healthy foods. If the idea of generating a recipe for the items that are going to expire and automatic setting of temperature for the foods placed inside the fridge is implemented with additional features, it helps in avoiding the wastage of food.

Keywords— Internet of Things, RFID, ARM microcontroller, Android.

1. Introduction

The Internet of Things is the internetworking of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors and actuators and network connectivity that enable these objects to collect and exchange data. Intelligent freezer is a refrigerator which has been programmed to sense what kind of products are being stored inside it and keep a track of the stock through barcode or RFID scanning. This kind of refrigerator is often equipped to determine itself whenever a food item needs to be replenished.

1.1 Architecture

The main component used in the intelligent freezer is the sensor. They perceive the environment through the help of cameras and through other medium. There are two process used mainly in this, they are acquisition and processing. Acquisition is the process where sensors are used to gather information about the foods and their status. This information's are preprocessed into the format that the microcontroller accepts as input. This information is processed in the processing phase and the corresponding actions that need to be taken will be sending to the user through the internet as the message. Wifi is used for the purpose of transferring information. The RFID is used in identifying the items. Whenever the items pass through the radio waves they will get identified by the sensors. The concept of

intimating the user about the low quantity of food can be implemented with this RFID.

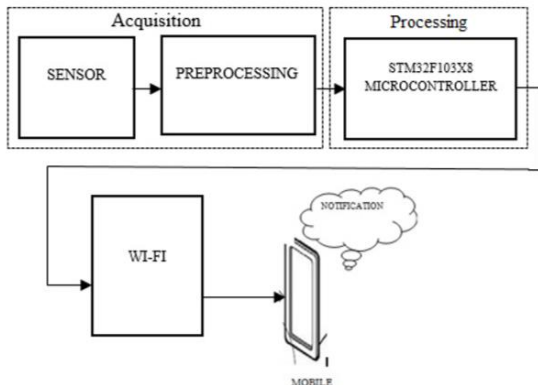


Fig 1. Process Architecture

It will use a counter to store the number of foods which will change according to the number of passes that made through the sensors. The android application in the mobile will act as a intermediate between the user and the refrigerator. This paper is organized as follows: Section [1] describes the internet of things and the intelligent freezer. Section [2] deals with the related works. Section [3] deals with the research directions and the proposed work which will help in overcoming the problem of food wastage. Section [4] deals with the research directions and the Section [5] contains the conclusion.

2. Related Works

Deepti Singh, Preet Jain, developed the Smart refrigerator architecture. This will intimate the user about the expiration of the food items. The packaged food item will contain the expiry date in its cover and all the information about the food product will be stored in the chips placed under the label. When the item is placed inside the fridge, the smart refrigerator will get the information by scanning the chips. Those information will be stored in the database. When the expiry date yet to come then the smart refrigerator will notify the user about the expiration of the particular food item. By

knowing this the user can make use of the food item before it reaches the expiry date. Prapulla S B, Dr. Shobha G and Dr. Thanuja T C proposed the Internet Refrigerator, finds out the stock of the product present in it and robotically place order for the nearest. Online shop via internet, if the stock is below the threshold level and at the same time the system will robotically send message, to inform the owner about the situation of the stock in the refrigerator, and done with the SMS. This system falls human interference. With advancement in sensors, the proposed system will be mad stronger in sensing status of the all types of food items and also helps to send message at different phases of items stock. Folasade Osisanwo, Shade Kuyoro and Oludede Awodele proposed the method displaying the information about the food item. When a food item gets placed inside the fridge, the internet refrigerator will get the information of the food item such as the vitamin present in it, the persons those who can eat it, the proteins percent, carbohydrates percent everything will gets stored in the database. And those informations will be displayed in the front panel of the refrigerator. The picture of the food item will be displayed in the panel, when the user click on the picture, the information about that food item will gets displayed parallel to the food item. By analyzing these information the user can intake the food that suits them. Emily Moin proposed the grocery management system. It resolves an identity of food products in the refrigerator. The system further determines a status, such as the expiration dates, weights, freshness, quantity, or any other measure, of the food products shelved in the refrigerator. The system compares the status of the food products with one or more predetermined criterias, such as whether the food product is within a threshold number of days of it expiry date, whether the food product is below a threshold quantity. This can be

implemented for use in an internet, intranet and other client and server environment. The system can be program instructions implemented locally on a user device or implemented across a client device and server environment.

3. Research Directions

- To avoid the wastage of food we introduced some features such as i) Automatic temperature set ii) Recipe Teacher iii) Quantity notifier. Automatic Temperature set: In order to maintain the required temperature for the things that have been placed inside the refrigerator we have proposed this idea.
- The idea is fully about maintaining the required temperature for the things. While placing the things in the refrigerator we have to give the name of the item as the input.
- The refrigerator in turn connects to the internet using the iot and finds the temperature for the given input. Then it automatically sets the freezer temperature to the temperature of the item that has been given as the input.
- In case if there are more than one item placed inside the refrigerator then the mean temperature for the items that have been placed will be found out automatically by the freezer and the temperature will be set according to that.
- Recipe Teacher: The user may not know what to do with the item that is going to expire. If they did not came up with the recipe then the food item will be wasted. In order to overcome this problem, we introduced recipe teacher.
- This will inform the user about the item that is going to expire along with the recipe using that ingredient as the main component. So, the people will easily use that ingredient to prepare the delicious foods. Quantity Notifier: Diabetes patients needs to place the insulin in the refrigerator because they may need that at any time. So, it will inform the

user about the occurrence of the medicine and the also the lack of it.

- By notifying this to the user the user will get the medicine from the store for future purpose. If this idea is applied it will avoid the problem of wastage of food.

4. Discussions

As mentioned in section iii, this will improve the efficiency of the refrigerator. Radio frequency identification: A micro chip is placed inside the label which will contain the information and gets stored in the database when exposed to the radio signals. The food items that are going to be placed inside the refrigerator should be attached with the RFID cards. The RFID antennas fixed in the refrigerator will recognize the products unique RFID tags and they inform the user whether the product is out of stock or not. The three concepts that discussed in the previous section may improve the efficiency of the refrigerator. For eg: Sometimes, people may forgot to change the temperature of the freezer when they place ice creams and other related products. In such cases the food item will melt and their occurs the wastage of food and money. To overcome this problem the automatic temperature set has been mentioned. This will avoid this problem. The notification to the user about the food products are send through android applications. The android application will be connected to the refrigerator through the Internet of Things.

5. Conclusion

The internet refrigerator which is a typical IoT makes our daily life more convenient. Considering the positive side and the development this will bring to our daily life, convenience and comfort will be inevitable in our routines. This affects or impacts not the consumer or user alone but food manufacturers, food retailers, the product

(refrigerator) manufacturers and even repairers or maintenance officers. According to, for users, it makes lifestyle easier, quick and efficient and of good quality as menu can be planned easily, short or no time is spent arranging item based on expiration, no food wastage, more efficient shopping and so on. For Refrigerator manufacturer, it saves the labor cost, easy plan can be made for future products based on the understanding from the consumption pattern; this new technology becomes a new source of income, and so on. Food manufacturer gets to easily advertise their products to the right customers efficiently, cost of inventory and labor becomes reduce, origin of a food item can be traced easily. For retailers or distributors of items workload is reduced, better projections can be made on market conditions and sales also cost of product can be controlled. Therefore there is no facet of life that embraces the internet refrigerator that will not benefit from its emergence positively regardless of whatever pitfalls attached to this. If embraced the potentials of nation's economy will definitely become greater.

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