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A Food Management System based on IoT for Smart Refrigerator

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Abstract: The Internet of things (IoT) refers to the set of devices and systems that interconnect real world sensors to the internet. This includes many different systems, including smart objects, smart monitoring devices, home automation systems, smartphones and many more. This paper deals with the designing of a smart refrigerator which is able to take voice input from user giving information about food item kept in fridge like name of the product and before what date and time it should be used. User should get notification about a food item before it gets rotten. Items which are expired will get added in shopping list. User can ask to provide appropriate recipes with item present in fridge. This supplementary device for a smart refrigerator will keep check on the expiry of food products and it will notify the current status of food items through an android app on our mobile phone, and will also remind us about the items are going to spoilage before they actually get rotten. Thus it will save the money and food wastage as well as help us to live a healthier lifestyle.
Keywords: Refrigerator, IoT (Internet of things), Gyroscope Sensor, Android.

I. INTRODUCTION

Both the Research and the Industry has focused on the development of the Smart Home Environment. Developing the Smart Appliances is hence directly proportional to Developing the Smart Home environment [1]. It is an critical factor in the realization of smart home environment. The Kitchen is one of the most important place in the Smart home as it consists of many appliances which provides an better services to household [2]. The main focus of our project is on the smart refrigerator. Refrigerator is the frequently used domiciliary appliance all over the world for storing vegetables, fruits, milk etc. The Supplementary device for a smart refrigerator is hence designed to transfigure any of the existing refrigerator into an smart cost effective machine. Many efforts in the development of smart refrigerator has been made, none of them has been energy efficient or cost effective. The modern living and fast paced environment does not allow the user to keep track of food items inside the refrigerator. Smart refrigerator compares the status of the food for e.g. expiry date, quantity. Importance of this work will be that it remove the food spoilage, reduce illness and make healthier lifestyle . Although many efforts have been put by industry to develop an smart refrigerator, the present or the existing technology is still not cost effective . The technology is too complicated for a simple household user who have only little knowledge of how the mechanism behind the smart refrigerator works [3]. The smart refrigerator is basically used to monitor the items inside the refrigerator and notify about the scarce products [4]. The idea of connecting the home appliances to internet or smart home environment is been seen as the future and it is highly regarded as next big thing. Here we are studying about smart refrigerator, because now a days peoples are very busy in modern life style. They actually do not have have time to look after their healthy habits and diet, since we are able to deal with the technology, we can design an smart refrigerator system which will be able to help us to maintain an healthier lifestyle without putting any extra effort and time.

II. LITERATURE SURVEY

A. Smart Refrigerator Using Internet Of Things

The Smart Refrigerator system is mainly implemented to convert the existing refrigerator into an intelligent cost effective appliance .The smart refrigerator system is capable of sensing as well as monitoring its contents. The smart refrigerator system is able to remotely notify the user about the scarce products via SMS and email [2].

1) Advantages

a) The hardware is developed which senses the items inside the refrigerator. In case of the scarce products, this notification is sent to the users mobile through an android application. The message comes with the information about product which is low in quantity and comes with an link which provides online purchasing

b) This project facilitate online purchase of the food items from the online vendors and notify the members of the family if the order has been placed.

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c) The Monitoring unit of the system has an software module in its memory, which will be always in the monitoring mode and will scans its input port for any of the update alert signal.

2) Disadvantages

a) The smart refrigeration won‟t be able to communicate with the users if there is weak network connection.

b) Cleaning of this device should be done very carefully

B. Iot Based Smart Refrigeratorsystem

The paper deals with the designing of the smart refrigerator which is able to sense the quantity and quality of the food items kept inside the refrigerator. With the smart sensing technologies, this refrigerator will keep checking on the expiry of the food products and the spoilage of the eatable items. It will be smart enough to notify the present situation of food items through an android application on users mobile phone, and also will remind us about the items that are going to spoilage before they actually get rotten [7].

1) Advantages

a) The System discovers the presence of object by using the load cell sensor, which is used for checking the weight of products of the container where the objects are placed.

b) Smart refrigerator is designed for managing food items stored in it and advising it user what type of food store inside the refrigerator.

c) 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 refrigerator, and done with SMS.

d) Online shop via internet is possible

e) The Smart refrigerator is cost effective, economical and it is user friendly.

2) Disadvantages: Different blocks are maintained to keep particular type of food. System won't work properly in case of food block and food type is exchanged.

III. PROPOSED SYSTEM

This proposed design aims to implement a supplementary device for smart refrigerator system, which will be easy to use and will be economical for the user. When fridges door is opened device will get in active state and after the hot word detection device will be ready to take voice input from user giving information about food item kept in fridge like name of the product and before how many days it should be used. Any new item added will show a popup window to check spelling of that item. This system is capable of reminding user to use a particular item before it gets expired The android app developed here is used as a GUI for the user where they will be able to see the condition of the food items kept inside the refrigerator.

IV. SYSTEM ARCHITECTURE

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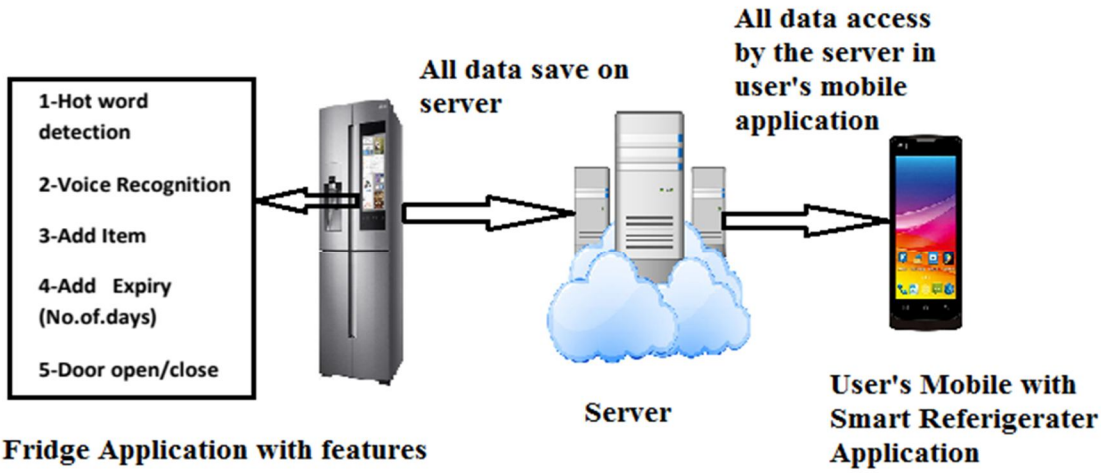


Fig.1 System Architecture Diagram

V. WORKING

This project is intended to have an operational model which monitors the contents inside the refrigerator in real time and help user to keep track of status of food items kept in fridge in case of any product which is low on quantity and quality. Also this project intends to add purchase order of food items to the list in android application. The proposed design aims to implement a supplementary device for smart refrigerator system, which is easy to use and economical for the user. When fridges door is opened device will get in active state and after the hot word detection device will be ready to take voice input from user giving information about food item kept in fridge like name of the product and before how many days it should be used. Any new item added will show a popup window to check spelling of that item. This system is capable of reminding user to use a particular item before it gets expired.

VI. FEATURES

A. No need to replace old refrigerator with smart fridge we can easily update our old fridge with smart fridge by using these application
B. Cheaper price than market smart fridge
C. Easy to use
D. No need to do list of vegetables every time, list is already present in our mobile application
E. Expire vegetables are listed in fridge application so we can easily remove that vegetables in fridge
F. Easy to use application.

VII. BACKGROUND

Using the Firebase real time Database as your backing data store we can allow you to get your app up and running very quickly. With the SDKs available for the web, Android, iOS, and a REST API it will help the integration smooth. While considering the o services, the Firebase team announced at the Google 2016 that it makes the platform very appealing as a service provider. Firebase real time Database sacrifices the functionality for speed. You may not be able to replace everything, but some critical paths of your application can be certainly enhanced.

VIII. FUTURE SCOPE

The given concept of smart refrigerator is more reaching than notifying the user about the contents of the refrigerator. It should be give importance on maintaining a healthier and good lifestyle by providing the nutritional value of the contents. The future smart refrigerator can give market price of the product added in shopping list. The refrigerator of the future would then be able to cross reference and act on reducing the ingredients used in future meal suggestions and helping to minimize food waste.

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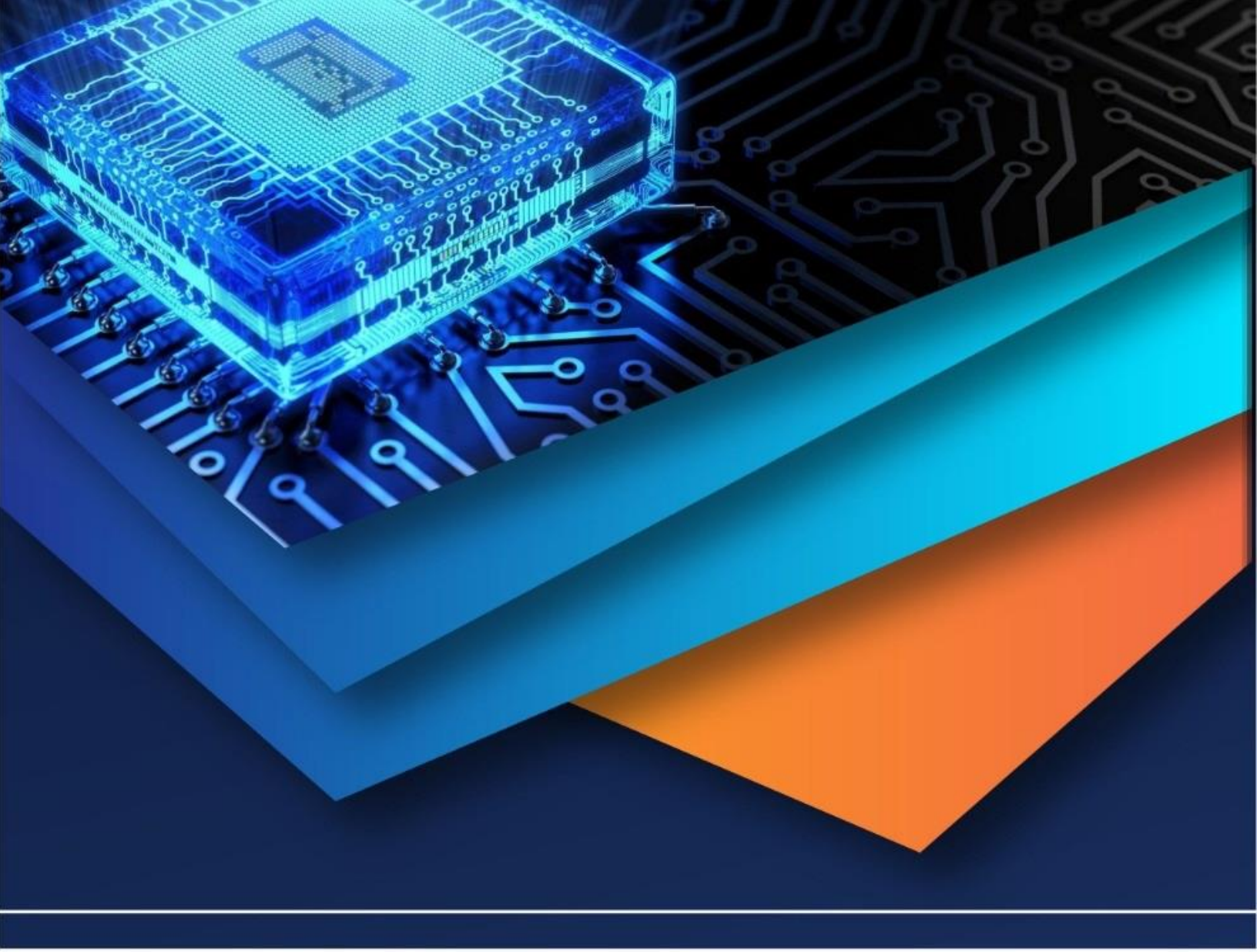
V1. CONCLUSION

Here we have introduced Supplementary device for a smart refrigerator which is designed to transfigure any existing refrigerator into a smart cost effective machine. The proposed supplementary device for smart refrigerator is designed for managing items stored in refrigerator. And also through the smart refrigerator people can save money with less effort. We are confident that such type smart refrigerator will be important in future smart homes. The concept of smart refrigerator is far more reaching than notifying the user about the contents of the refrigerator. Smart refrigerator is cost effective, economical and user friendly

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