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Advanced Refrigerator Stalk Management System Using IOT

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***Abstract*— IoT Based advanced refrigerator is an automation of refrigerator, Now a days Internet of things is the rescent technology every where we are using in the embedded systems, which mainly converts physical world into an internet world. refrigerator is essential as it stores the food items for a long time, In this paper we propose an architecture to have IoT benefits on regular embedded systems like common shopper machines, As they frequently need to give various advanced capacities contrasted with basic sensors, The last assumes a significant part to keep the information and information required for complex IoT administrations, here we will utilize the sensors to screen the status of the things in the refrigerator . The status of operation will be informed to the user with the help of IoT technique.**

***Index Terms*— IoT, Sensors, Physical world, Internet world, Food items, Advanced refrigerator.**

I. INTRODUCTION

Kitchen is one of the most important zones of intelligent appliances one of those device is refrigerator typically this is used for storing the vegetables, drinks, fruits, eggs, etc. This advanced refrigerator stalk management system is designed to convert normal existing fridge into advanced and low cost module using sensors.

The technology which allows things for communicating between each other is called as “internet of things” IOT. The main two categories of these things are: identified things and the connected devices, those things or objects can be interconnected with another object and also to the internet. Hence the connection of millions of devices through internet is called as Internet of Things (IOT).

Here we will utilize the sensors to screen the status of the things in the fridge, The sensors will be keeps track the things in the fridge. An equipment model is to be created which detects the substances inside the refrigerator, and triggers when the substance inside is underneath a specific limit or on decay or about surpass time span of usability, this trigger is sent to the clients versatile and in the long run to this email id through an android application

This module contains IR sensor for checking the level of cool drinks present in the fridge, Alcohol sensor to check the spoiled items in the refrigerator, RF module to check the expiry date of the items, Pressure switch to check the presence of items in the refrigerator.

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II. RELATED WORKS

Shruthi. P, R. Nagashree, Likitha R.V[1] have considered LDR sensor for checking the presence of food items in the system,they used ASIC RFID transmitter and receiver are utilized to screen time frame of realistic usability of substance. at whatever point substance inside the fridge goes below the predetermined limit or corrupted in quality on the off chance that the item is very nearly expiry, a trigger is produced which is being transmitted as message to the user.

Dr. Thanuja T C, Prapulla S B, Dr. Shobha G[2] have proposed a system in that they concentrated on the presence of products for that they used LDR sensor , A photo resistor or light-dependent resistor (LDR), the resistance of photo resistor diminishes with expanding occurrence light force; in different words, it shows photoconductivity. A photo resistor can be connected in light-delicate indicator circuits, and light-and dim enacted exchanging circuit.

Chang-Sub Han , Byungrak Son, Dong-Ha Lee ,Yong-Tae Jeon [3] have introduced a system with RFID for wellness service ,they propose a dietary administration patients as well as regular clients for supporting a health benefit. And after that, they build up an advanced mobile phone application for giving a health administration to every individual. As indicated by the test comes about, we can enhance the utility of normal shrewd icebox.

Emily Moin[4] have proposed grocery management system settle a personality of sustenance items in a refrigerator ,the system additionally decides a status e.g., expiry dates, weights, freshness, whatever the measure, of the nourishment items, here the system compares the status of the items with the other predetermined criterias, e.g., regardless of whether the sustenance item is inside a limit number of days of its expiry date, regardless of whether the sustenance item is underneath a limit amount, e.g., by weight, volume, etc.

José Rouillard[5] he proposed a Pervasive Fridge Against Uneaten Food Loss, here the work introduced is identified with the researches in the field of ubiquitous and pervasive registering. Speech and image recognition are also added in this model prototype. This contains different scan barcode, identify and store data related to products, with a smart phone.

Kusuma S M, Vinay sagar K N[6] have proposed home automation technology to control the operations of home appliances using cell phones and computers, so it will save the human energy and electric power.

III. PROPOSED METHODOLOGY

Figure 1 shows the proposed system, the main scenario is to develop an intelligent advanced refrigerator stalk management system ,it contains LPC2148 microcontroller which has 32 bit arm processor, In this system pressure switch,RF module, Alcohol sensor and IR sensor will be connected to an controller board named as LPC2148 board.

ARM processor we are using here is a arm 7 family , ARM7 family has ARM7TDMI, ARM7TDMI-S, ARM720T and ARM7EJS processors.

Power supply unit contains step-down transformer , input of transformer is 230 v AC,50hz,1A,across secondary end of transformer we will get 12-0-12v.

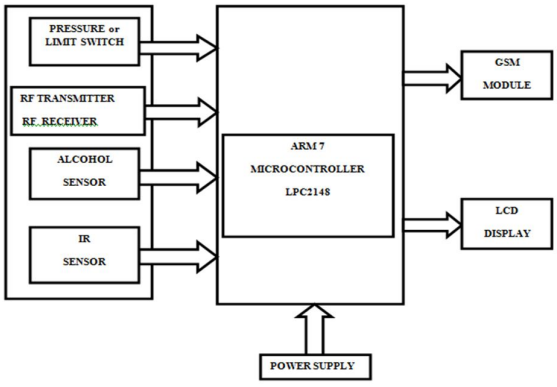

Figure 1: Proposed System

Rectifier circuit, used to convert AC to pulsating DC, where D1 and D2 diodes will be there ,during positive half cycle D1 will be conducting, during negative cycle D2 will be conducting then also some AC components will be there to remove those components we will be using a filter section ,which as two filters: ceramic capacitor used to remove the noise and electrolytic capacitor is used to remove the repulses, then regulator will come mainly used to maintain a constant voltage, two regulators are used here one is KIA 7812 to get 12 v dc voltage and KIA 7805 to get 5v dc output. driver and relay requires this 5v supply, where as buffer needs 12 v supply.

Mono stable multi vibrator have just a single stable state and creates a single output pulse when it is triggered externally, it has a 555 timer IC, the output of sensors will be connected to the triggering pin i . e second pin of 555 timer, then we will get a quasi stable state output across third pin of 555 timer this output will be passed to buffer and driver then corresponding relay will be activated that relay will be given to microcontroller from microcontroller we will connect to GSM module through UART ,hence we will get the output to the user mobile from the GSM module

Buffer do not affect the logical state of the digital signal, buffer is a impedance matching circuit, it has single gain amplifier, where output follows an input, we are giving input through the step down resistor to the buffer, the output of buffer will be connected to driver through the signal diodes, driver contains darlington pair its look like an inverter, the output of driver will be connected to relay, depending on the output of the driver the relay will be activated. The sensed information will be analyzed to activate the controlling devices and controller will be used as an server to interact with user.

A. Components Used

- LPC2148 Microcontroller
- Pressure switch
- RF module
- Alcohol sensor
- IR sensor

B. LPC2148 Microcontroller

The controller used is LPC2148, it contains 32-bit ARM processor, 32 kB to 512 kB of on-chip flash memory, it Provides 8KB of on-chip RAM,it contains Two 32-bit Timers/External event counters, and 8 kB to 40 kB of on-chip static RAM .It gives high performance with low power consumption, It is simple and it's a RISC machine.

C. Pressure Switch/Limit Switch

Figure 2: Limit Switch

Pressure switch is used to check the presence of products in the refrigerator .Which has 3 terminals : C (Common), NO, NC. When leaf is not pressed then C and NC are connected and NO disconnected..When plunger is pressed C and NO connects and NC disconnects, so using this we will get notification about the presence of products in the refrigerator.

D. RF Module

RF module is used to check the expiry date of the products inside the refrigerator, it contains two parts: RF transmitter and RF receiver, whenever we place a medicine on the RF transmitter one timer will be activated, if we didn't take that medicine within the specified time next other timer will be activated, so we can conclude that medicine is expired.

E. Alcohol Sensor

Alcohol sensor used here is MQ3,it is mainly used to check the spoiled items in the refrigerator, it has 6 pins, along with the heating element, whenever the alcohol level is high then the value of resistance will vary, depending on the resistance value the analog output will be generated with range of 0-4v,this analog voltage will be given to lpc2148 ,it has ADC so we will get digital values from 0-1024

F. IR Sensor

IR Sensor is used for sensing the level of drinks in the refrigerator, it will be placed inside the refrigerator, it has to detect the level or target by reflection of infrared beam. If the level of drinks is below threshold level IR beam will be transmitted through the bottle, then we will a notification, If level of drink above the threshold level then we wont get any notification, It contains two parts: IR transmitter (IR LED) and IR receiver(TSOP)

B. Language and Platform used are:

1) Embedded c
2) Keil micro vision 4

IV. PROCESS FLOW

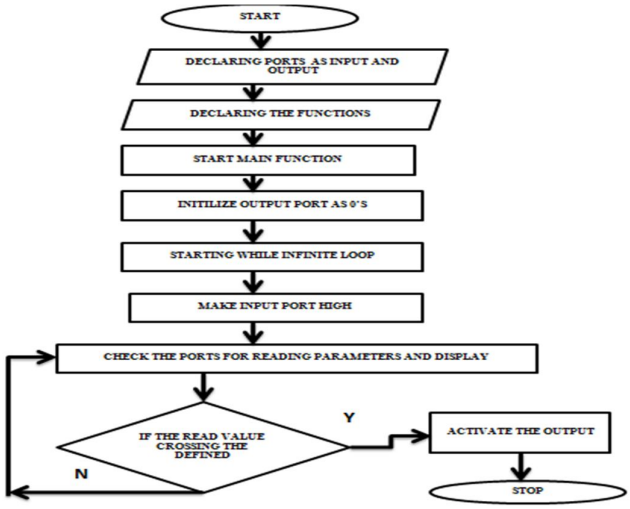

Figure 3 : Flow diagram

V. RESULTS

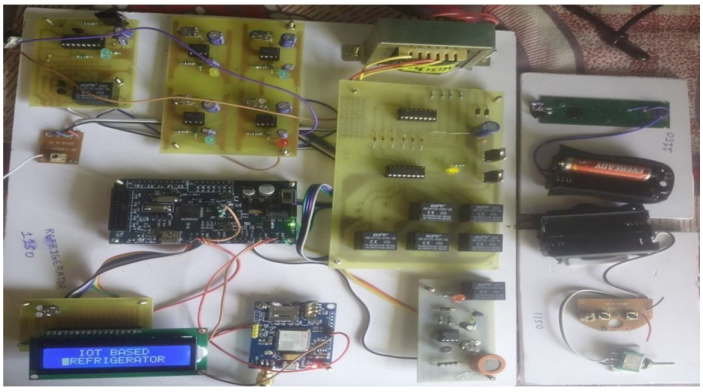

Figure 4: Advanced Refrigerator Stalk Management Module

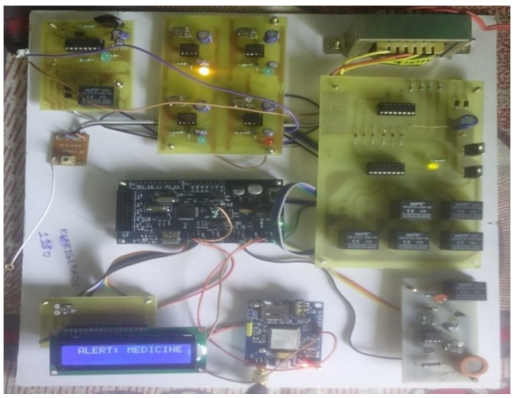

Figure 5: Message Sending About Expiry Of Medicine

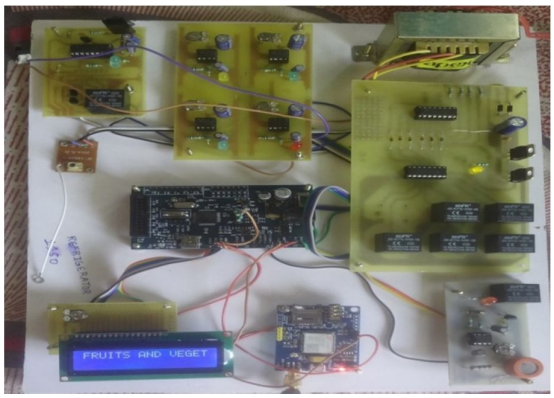

Figure 6 : Message Sending About Low Quantity Of Fruits And Vegetables

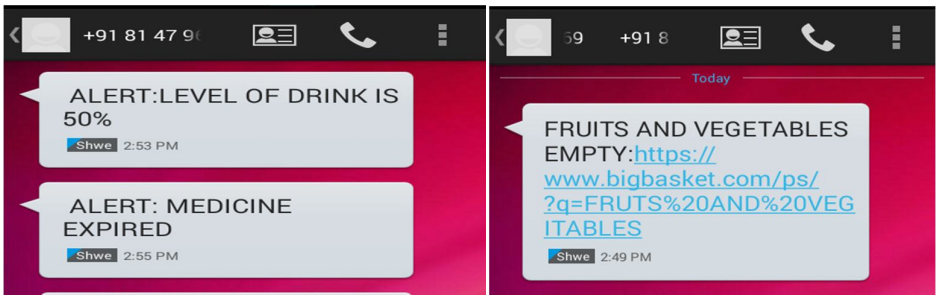

Figure 7 : Message Received On User's Mobile

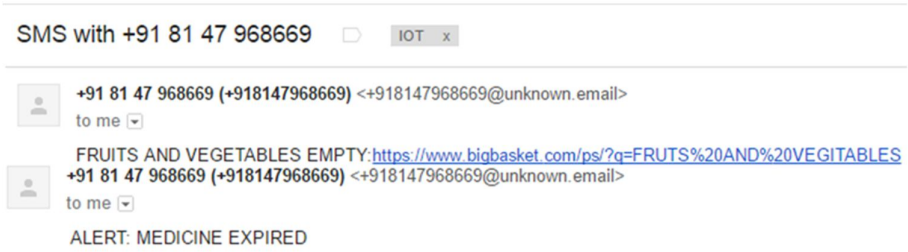

Figure 8 : Mail Received On User's Mobile

VI. CONCLUSION

The advanced refrigerator stalk management module can remotely advise the user about the low amount of items inside the fridge, it likewise facilitates buy of the rare sustenance things from an online vendor, the link is consolidated inside the notification that is sent to the user by means of SMS and email. It makes way of life simpler, quick and effective and of good quality as menu can be planed effortlessly, short or no time is spent organizing thing in refrigerator, In this manner it will save the cash and sustenance wastage and also help us to carry on with a more beneficial way of life.

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