

A Smart Kitchen Device using Ultrasonic Sensor for storage of food ingredient in mega kitchens

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Abstract- Now a days, Computer technology has emerged to a larger extent and due to this there is a wide use of Internet and intelligent applications with multimedia capability in our day-to-day life. In this paper we introduce containers which can be used in kitchens which are instrumented with sensors and microcontroller to determine volume of goods commonly stored. It is designed for managing items stored in it and allowing its user to shop online. Sensor is deployed on the container which is used to sense the level of the remaining item in the container. If it is found that the level of the content is below the threshold, then message is send to the user using GSM module. An android application organizes the shopping list for both inventoried and non-inventoried items. We are confident that such container will be an effective product in future.

Keywords - Smart kitchen, GSM, Arduino ATmega328P, Android Application.

I. INTRODUCTION

1.1 Motivation and Objective

Due to the development of computer technology and the wide use of the Internet, intelligent appliances with multimedia capability have been emerging into our daily life. Kitchen is one of the places where such intelligent appliances have been used. Since modern life style is driving people spending less time in kitchen, an enjoyable life style can be assisted with an intelligent smart kitchen device. The "Home Automation" concept has existed for many years. The terms "Smart Home", "Intelligent Home" followed and has been used to introduce the concept of networking appliances and devices in the house.[3] Home automation Systems (HASs) represents a great research opportunity in creating new fields in engineering, architecture and computing (Huidobro and Millan, 2004). HASs becoming

popular nowadays and enter quickly in this emerging market.

1.2 Basic Concept

We are proposing the Smart Kitchen Device system in which ultrasonic sensors are attached on top of container which helps us to monitor the level of ingredients in container. The sensor sense the level of ingredients in container and if level goes below the threshold value then distance of ingredients from top of container is notified to Microcontroller then with the of GSM module from which message is send to home owner or manager .

We are providing an android application to user where user can select quantity and category of item that he wants to purchase. The contact numbers of nearby shopkeeper with whom user can easily contact and order the purchase list and get delivery of his order faster. Then as smart home is "a dwelling incorporating a communications network that connects the key electrical appliances and services, and allows them to be remotely controlled, monitored or accessed". [5]

Rest of this paper is organized as follows. In Section II we will give a Literature Survey followed by section III which puts up the proposed system and section IV technical specifications are notified. In section V conclusion of the paper followed by section VI which highlights the future scope.

II. LITERATURE SURVEY

In literature survey we have studied similar existing system which are widely come up in the smart home and kitchens which help us to understand many technical aspects of system.

The work of [1] presents the basic introduction of internet of things. IOT is a network of physical objects or things embedded with electronic, software, sensors and connectivity to enable objects to exchange data with manufacturer, operators and connected devices. It can be described as connecting everyday objects like smart

phones, sensors and actuators to the Internet where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves.

The design of a gas leakage monitoring system is proposed for home safety is explained in this paper. System detects the leakage of the LPG and alerts the consumer about the leak by SMS and as an emergency measure the system will turn off the power supply, while activating the alarm. They used load sensor and if the gas level reaches below the threshold limit of gas around 2kg so that the user can replace the old cylinder with new in time and automatically books the cylinder using a GSM module. The device ensures safety and prevents suffocation and explosion due to gas leakage and software monitors all the functionality of software.

The work of [2] presents the overall design of Home Automation System (HAS) with low cost and wireless remote control. This system is designed to assist and provide support in order to fulfill the needs of elderly and disabled in home. Also, the smart home concept in the system improves the standard living at home. The main control system implements wireless Bluetooth technology to provide remote access from PC/laptop or smart phone. The design remains the existing electrical switches and provides more safety control on the switches with low voltage activating method. The switches status is synchronized in all the control system whereby every user interface indicates the real time existing switches status. The system intended to control electrical appliances and devices in house with relatively low cost design, user-friendly interface and ease of installation.

The work of [3] presents a smart home system which monitors household appliances remotely and through mobile phone it can realize real-time monitoring of home security status. This System combined embedded technique with GSM. GSM module communicated to transmit all the information gathered by this system.

Design also realized the video data acquisition, which can be transmitted via wireless or cable network to monitoring center to remotely understand the house condition. The paper describes working of Liod platform main controller, MCS-51 Microcontrollers expansion module, USB camera, sensor etc interface equipments. In given system Liod act as main platform, which mainly completes video data acquisition, analyses and processes the short messages that were received by GSM module Expansion module is mainly responsible for collecting sensor data, controlling household appliances switch, receiving and processing the control information from Liod platform, and sending feedback of sensor alarm information, household appliances switch state information to Liod platform; GSM module is used to receive short message; USB webcam is responsible for video data collection. All the surveillance information

gathered by this system can be transmitted to the monitoring central server via a wireless network or cable network. Like this way system achieve effective monitoring of these statuses which endanger the safety of life and property of the people such as fire, gas leakage and illegal invasion of stranger.

III. SYSTEM OVERVIEW

System architecture can be defined as the representation of a system, including a mapping of functionality onto hardware and software components, and human interaction with these components. The control flow of the system and the communication between different modules is shown in Fig.1

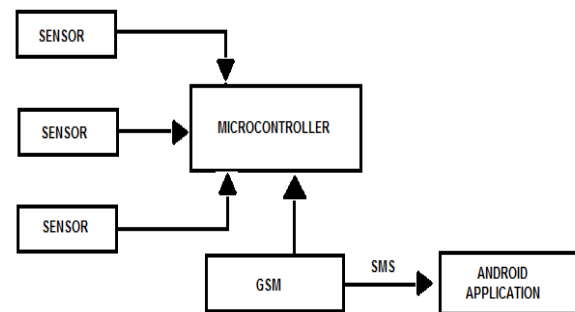


Fig.1 System Overview

This system consists of the microcontroller which can be connected with multiple ultrasonic sensors the readings of the contents in container are sensed by them. All sensors send the information to the microcontroller which further does its computation. This analog data is converted into digital data and then microcontroller sends a message on the users phone about the low availability of the goods in the respective container. GSM Sim900 is used in order to send message from the Arduino to the mobile. Further the mobile application would read this message and provide various options to the user.

The sensors are identified by respective address at the microcontroller which collects the data and analysing it for further computations.

The system is directly deployed on the bottom of the container led in a precise manner. In order to simplify the living of user many possible options are provided to the user such as online order, list view, current status of the containers, availability of the stores nearby etc. Power supply is not a sever issue for the system as its requirement is of moderate level.

IV. TECHNICAL SPEACIFICATION

The proposed system consists of level sensing module, processing module and notification module. Arduino Ultrasonic sensor HCSR04 is used to sense the level of item in the container. The microcontroller used is Arduino Uno R3 Atmega328P.GSM Sim900 is used to

notify the user when the sensed distance is below the threshold value [7].

The proposed system consists of an android application. Android Studio platform is used for developing the application. This Smartphone application provides different kind of options for automatic shopping to the user. Arduino IDE (1.3.16) is used for coding of Arduino. It is an open source platform and its environment is built in java.

For Server Application Operating System used is Windows operating system. Application Server used is Glassfish server. Java is used as a Front End and Mysql is used as backend.

V. CONCLUSION

Thus a low cost system is designed to improve the standard living of users. This smart container provides comfort, and leisure for user, as it reduces the efforts required for maintenance of the kitchen. This container would prove to be compatible with current household appliances. This affordable container can prove a valuable market product for the business, nutrition and health, it is still in its preliminary stage. The intention of this paper is to draw more interests of the rapidly developing field smart home system, and expects to do contribution to it.

VI. FUTURE SCOPE

There are many features and areas that can be improved and explored further to enhance the system design and functionality. Possible extensions include:

- RFID tag scanning system

- Voice to text conversion in android application along with other advance features.
- Extracting Knowledge from the database and predicting useful patterns.

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