



International Journal for Innovative Engineering and Management Research

A Peer Reviewed Open Access International Journal

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IJIEMR Transactions, online available on 27th May 2020. Link

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Volume 09, Issue 05, Pages: 48-54

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DEVELOPMENT OF AUTOMATIC SMART KITCHEN SYSTEM FOR REAL TIME APPLICATIONS

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ABSTARCT: In this paper the development of automatic smart kitchen system for real time applications is done. Entire system is controlled by ARM. Whenever gas is leaked then the gas sensor will detect and switch off the power in the home and send an SMS to the owner. In the same way if the fire is obtained in the kitchen then the fire sensor will detect and sends an SMS to the owner. At last I.R Sensor will detect when the rice is empty and in the same way SMS will be sent to owner.

KEY WORDS: ARM, Fire sensor, I.R Sensor, Gas Sensor, Relay, Socket, RS-232, GSM.

I. INTRODUCTION

Kitchen monitoring becomes more advantageous for safety, security and luxury of individuals. Every day the modem people expect new device and new technology to simplify their day to day life. The innovators and resembles are always trying to find new things to satisfy the people but the process is still infinite. Nowadays, kitchen automation became modern and precise to monitor the fields [1]. In the 2000s, Internet connectivity became the type for many applications and today is expected as part of many enterprise, industrial and consumer products to provide access to information. However, these devices are still primarily things on the interaction and monitoring through apps and interfaces. With the advancements in Internet technologies and wireless sensor network (WSN), a new trend in the era of ubiquity is being realized [2]. Enormous increase in

users of internet and modification on the internet working technologies enable networking of everyday objects. This system finds a wide application in areas where physical presence is not possible all the time. The system offers a complete low cost, powerful and user friendly way of real-time monitoring and remote control of kitchen [3]. Appropriate sensors are needed to measure the different elements and an Arduino board is used to connect the elements and to present the data. The data will be presented to the user in an android application format and the software should prove to be appealing to the user. One of the most important aspects in a home is the management of the kitchen. Presently the kitchen is managed by a person and he/she has to take all decisions including: whether to fill a container which is finishing, what

items are needed for the kitchen and also to monitor the gas level in the kitchen. In addition to this he has to check whether the income that is earned is enough to purchase the things needed [4-5]. The use of sensors to measure the kitchen items and recording them in a database to present them in an android application to the users is the main aim behind the project that is planned to be implemented.

Home automation has been increasing vastly in latest years due to much higher affordability and simplicity. Being able to control aspects of our houses, and for having the feature to respond automatically to events, it is becoming more and more popular and necessary due to security and cost purposes. S.Chattoraj proposes to implement an integrated home automation and security system. The project is low cost solution using off the shelf components to reduce cost and open source software to get around licensing requirements of software.

LPG scam is also increasing parallel with it. To avoid the frequently checking the gas physically and scam, the capacity of gas in cylinder is continuously monitored using a weight sensor load cell. The LPG Detection system presents how to detect the leakage using a gas sensor and book a new cylinder automatically by sending a message to the agency. Home automation plans to use computer and information technology to control home appliances and features. Home networking is the core in the implementation of an automation system for a smart home.

Hence every range prefers automated control systems most of the smart home applications

are accepted with wireless networking methods, such as ZigBee, Wi-Fi, or radio frequency wireless communication. The project discusses a low cost, secure, ubiquitously accessible, auto-configurable, remotely controlled solution. The approach analyzed here achieved the target to control home appliances remotely using the wireless technology to connect devices and satisfy user requirements. Wi-Fi technology has proved to provide remote control, home security and is cost effective as compared to the previously existing system.

II. LITERATURE SURVEY

Smart Home Monitoring and Controlling System Using Android Phone, in this project, it describes a zigbee module and android based home monitoring system for security, safety and healthcare for human [5]. This system is flexible and can be implemented in many research areas. This paper introduces a smart home system which could surprise household appliances remotely and realize real-time monitoring of home security status through mobile phone. The personal computer is used to monitor the various parameters in the proposed system. Android Phone is main advantage compared to personal computer for using any place.

Smart Kitchen Cabinet for Smart Home, this paper describes a conceptual design of a smart kitchen cabinet. This system incorporates grocery item identification, inventory management of grocery items and automatic generation of shopping list. The smart kitchen cabinet consist of two different sections each leveraging two

sensing mechanisms: weight sensing section consist of fixed size container having RFID tag defining container size with product description RFID tag reader, and ultrasonic level sensor for measuring the level of contents in the container. RFID tag reader, and weight sensor meaning all the contents on that shelf. The embedded sensor measure the weight or the level of the items which in updated to the database whenever grocery items are placed or taken out for cooking. When the items reach the predefined threshold level, the system generates the automated shopping list [10].

Design & Implementation Of Kitchen Monitoring System By Using Wireless Sensor Network. The design and development of a smart monitoring and controlling system for kitchen environment in real time has been reported. The system detects kitchen parameters each as room temperature, fire detection, motion detection has been developed. The system can detects the status of kitchen and send alert message via network automatically. If the conditions get abnormal, the concerned authority can controls the system though this mobile phone by sending proper decision in user GSM. Users can monition and control. The system offers low cost, complete powerful and users friendly way of real-time monitoring and remote control of kitchen.

Wireless Sensor Network Based Smart Home: Sensor Selection, Development and Monitoring This paper details the installation and configuration of unobtrusive sensors in an elderly person's house - a smart home in the making – in small city in

New Zealand. The novelty of thin project is that instead of setting up an artificial test bed of sensor within the University premises. The sensors have been installed in a subject's home so that data can be collected in a real, not artificial environment. The applications are not limited to solely monitoring but can be extended to behavioral recognition. The methods of collecting data efficiently and have to led to novel applications for indoor wireless sensor networks.

III. PROPOSED SYSTEM

The below figure (1) shows the block diagram of proposed system. In this mainly GAS, Sensor, I.R Sensor, and Fire sensor, ARM, RS-232, GSM, Relay, Socket and LCD Display are used. Here first when ever gas is leaked then the gas sensor will detect and switch of the power in the home and send an SMS to the owner. In the same way the fire is obtained in the kitchen in the same way the fire sensor will detect and sends an SMS to the owner. At last I.R Sensor will detect when the rice is empty and in the same way SMS will be sent to owner.

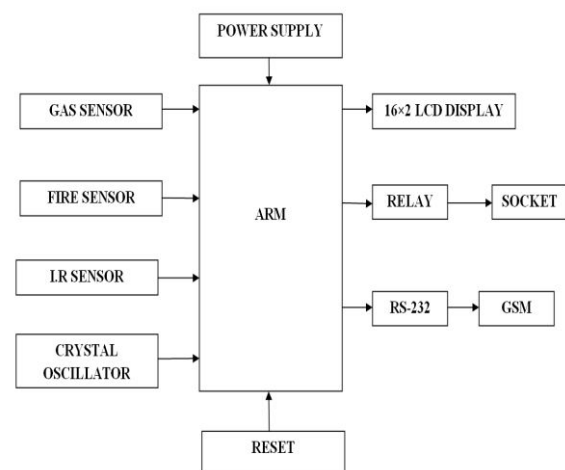


Fig. 1: PROPOSED SYSTEM

A. CRYSTAL OSCILLATOR

An oscillator gives a wellspring of tedious A.C. motion over its yield terminals without requiring any contribution (aside from a D.C. supply). The flag produced by the oscillator is more often than not of steady sufficiency. The wave shape and sufficiency are controlled by the plan of the oscillator circuit and decision of segment esteems. The recurrence of the yield wave might be fixed or variable, contingent upon the oscillator structure.

B. POWER SUPPLY

Power supplies in recent times have greatly improved in reliability but, because they have to handle considerably higher voltages and currents than any or most of the circuitry they supply, they are often the most susceptible to failure of any part of an electronic system. Modern power supplies have also increased greatly in their complexity, and can supply very stable output voltages controlled by feedback systems. Many power supply circuits also contain automatic safety circuits to prevent dangerous over voltage or over current situations.

C. LCD DISPLAY

LCD is used to display the data. 16x2 is the LCD that has been used i.e. 16 characters in 1 line, total 2 lines are there. It requires +5V to operate. It is connected to port 2 of microcontroller. It acts as an output to microcontroller. It uses ASCII values to display the character.

D. ARM

The LPC2148 microcontrollers are focused around a 16-bit or 32-bit ARM7TDMI-S

CPU with constant imitating and implanted follow help, which consolidate microcontroller with inserted high velocity streak memory extending from 32 kb to 512 kb. A 128-bit wide memory interface and one of a kind quickening agent building design empower 32-bit code execution at the most extreme clock rate. For discriminating code size applications, the option 16-bit Thumb mode decreases code by more than 30 percent with negligible execution punishment.

Because of their little size and low power utilization, LPC2148 are perfect for applications where scaling down is a key prerequisite, for example, access control and purpose of-offer. Serial interchanges interfaces running from a USB 2.0 Full-speed gadget, various UARTS, SPI, SSP to I2c-transport and on chip SRAM of 8 kilo Bytes up to 40 Kilo Bytes, make these gadgets extremely appropriate for correspondence entryways and convention converters, delicate modems, voice distinguishment and low end imaging, giving both extensive cradle size and high transforming force. Different 32-bit clocks, single or double 10-bit ADC(s), 10-bit DAC, PWM channels and 45 quick GPIO lines with up to nine edge or level touchy outside intrude on pins make these microcontrollers suitable for mechanical control and restorative frameworks.

E. FIRE SENSOR

Fire Sensor (Thermistors): A Thermistors is a type of resistor whose resistance varies significantly with the temperature, more so than in standard resistors. The world is a

portmanteau of thermal and resistor. Thermistors are widely used as in rush current limiters, temperature sense resetting over current protectors, and self heating elements.

Thermistors differ from resistance temperature detectors (RTDs) in that the material used in Thermistors is generally a ceramic or polymer, while RTDs use pure metals. The response is also different, RTDs are useful over larger temperatures ranges, while Thermistors typically achieve a higher precision within a limited temperature within a limited temperature range, typically -900C to 1300C.

F. GSM

Global System for Mobile Communications (GSM) modems are specialized types of modems that operate over subscription based wireless networks, similar to a mobile phone. A GSM modem accepts a Subscriber Identity Module (SIM) card, and basically acts like a mobile phone for a computer. Such a modem can even be a dedicated mobile phone that the computer uses for GSM network capabilities.

G. RS-232

RS-232 is a standard protocol used for serial communication, it is used for connecting computer and its peripheral devices to allow serial data exchange between them. As it obtains the voltage for the path used for the data exchange between the devices.

H. I.R SENSOR

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the

motion. These types of sensors measure only infrared radiation, rather than emitting it that is called as a passive IR sensor.

I. GAS SENSOR

A gas sensor is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage.

MQ2 is a metal oxide semiconductor type gas sensor. Concentration of gas is measured using a voltage divider network present in the sensor. This sensor works on 5V DC voltage. It can detect gases in the concentration of range 200 to 10000ppm.

IV. RESULTS

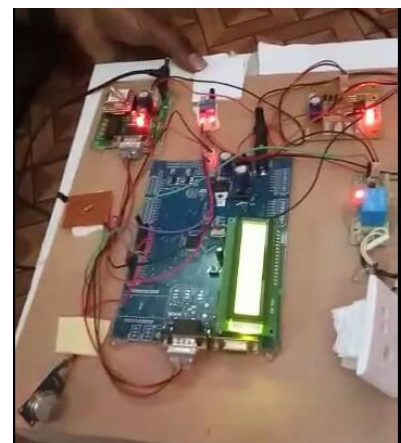


Fig .2: EXPERIMENTAL KIT OF PROPOSED SYSTEM

Fig 2 shows the proposed system for Smart Kitchen. In this Gas sensor, Fire Sensor, I.R. Sensor, GSM Module are incorporated in this circuit.



Fig. 3: VIEW OF SENT MESSAGE

Fig 3 discusses about whenever gas is leaked, the Gas Sensor will detect and switch off the power in the home. In the same way if the Fire is obtained in the kitchen then the Fire Sensor will detect and sends an SMS to the owner. At last I.R Sensor will detect when rice is empty and in the same way SMS will be sent to owner.

V. CONCLUSION

Rapidly increasing population, urbanization, and industrialization have made Kitchen management a global challenge. The Smart Kitchen system provided comprehensive solutions to the people those who are in the urban area. This system could read and transmit the weight data to the server. Finally, the project successfully achieved to fulfill all the objectives of this system and hope this research would be of benefit.

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