INTERNET BASED MONITORING SYSTEM FOR SMART KITCHEN

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1. Abstract

The kitchen is very important place in a house. Safety factor is the main aspect that must be taken into account during the activity in the kitchen. The existence of gas leakage, uncontrolled fire and excessive temperatures must be quickly identified and addressed. The purpose of this research is to make prototype of kitchen security system using Internet of Things. The system is designed using 4 types of sensors. IR Flames sensor is used to detect fire, MQ2 sensors are used to detect gas leakage, and Load cell is used to detect level of grocery items. The sensors output are then connected to the Arduino which will control the relay. The relay acts as a fan switch in the event of a gas leak, uncontrolled fire and excessive temperature increase. Under these conditions, Arduino will also turn on the alarm and the led, and send SMS to the user by GSM module.

2. Keywords

ESP32, GSM 800L, Load cell, MQ2 IoT, Arduino.

3. Introduction

Kitchen environment monitoring is one of the important measures to be closely monitored in real time for safety, security and comfort of people. 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 infiniteWith the advancements in Internet technologies and Wireless Sensor Networks (WSN), Web-enabled systems have offered great Convenience and safety that comes with the ability to monitor the status of a smart house and to control Internet appliances when away from home.

This project is compact wireless sensor network with internet capability. The system can monitor the status of kitchen and send alert SMS via GSM network automatically to users. The system has the capability to control through internet, and then the system responds to the corresponding instruction with high security.

4. Literature Survey

We need a system that can monitor and send various information about the condition of the kitchen continuously, even though we are in a place far from the kitchen.

This project will create a system which can detect changes in temperature and fire caused by the use of gas stoves in the kitchen. In the system, the temperature sensor will be mounted to detect temperature changes, gas sensor to detect Liquefied Petroleum Gas (LPG) leak, IR flame sensor to detect fire. In this system, there is also a relay to control the fan that serves to control the temperature and blow out of gas in the event of a gas leak or smoke from the kitchen in case of fire. This system can be controlled and monitored via the internet directly from laptops or smartphones anytime, even from a place far from the kitchen The load cell measure the weight or the level of the items which in updated to the database whenever grocery items are placed or taken. When the items reach the predefined threshold level, the system generates an alert

4. Component description

MQ2 SENSOR:

A gas detector is a device that detects the presence of gases in an area, often as part of a safety system. Gas Sensor (MQ2) module is useful for gas leakage detection (in home and industry). It is suitable for detecting LPG, Smoke or Propane. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible.

LOAD CELL:

The change in resistance of the strain gauge provides an electrical value change that is calibrated to the load placed on the load cell. It is used to detect the level of grocery items if fall below threshold level.

SIM800L

SIM800L is a miniature cellular module which allows for GPRS transmission, sending and receiving SMS and making and receiving voice calls. Low cost and small footprint and quad band frequency support make this module perfect solution for this project that require long range connectivity. After connecting power module boots up, searches for cellular network and login automatically.

ESP32

ESP32 is a low power Wi-Fi enabled microcontroller created and developed by Espressif Systems. The ESP32 is an advanced IoT microcontroller board possessing Wi-Fi and Bluetooth Low Energy capabilities, as well as limited compatibility ESP32 is highly-integrated with in-built antenna switches, power amplifier, low-noise receive amplifier, filters, and power management modules. ESP32 adds priceless functionality and versatility to your applications with minimal Printed Circuit Board (PCB) requirements.

ESP32 can perform as a complete standalone system or as a slave device to a host MCU, reducing communication stack overhead on the main application processor. ESP32 can interface with other systems to provide Wi-Fi and Bluetooth functionality through its SPI / SDIO or I2C / UART interfaces.

5. Software Description

ARDUINO:

The software needed to run the control process of this system is developed using assembly language .The program code was

then written by using arduino IDE.

into Ambient Intelligence Systems", pp.1-3.

7. Conclusion and Future work

Conclusion

Based on the design and test of this system, the following conclusions can be taken:

- Based on the test, each of sensors contained in this system works well. The delivery of information, is strongly influenced by the quality of Wi-Fi networks used and GSM network
- In simulated fires and gas leaks, the fan can function properly. A warning system can work. SMS can be received directly by the mobile device.
- Alert SMS is send to user for grocery level reached to prescribed level.

Future Work

Various sensors can added to measure various information about the kitchen like passive infrared (PIR) sensors to detect human activity in the kitchen. The addition of security systems also needs to be improved. One of the security systems that can be embedded in this system is a fire extinguisher or automatic gas lock.

11.References

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