

IOT BASED HOME AUTOMATION SYSTEM

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ABSTRACT

Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet . The main purpose of this project is to control any load through the Internet network over cloud remotely on the basic principle of the Internet of things (IOT).For this real-time scenario we use webpage with user configurable front end to control and monitor the load. The data sent from a password protected webpage returns commands through allotted IP fed to it. A Wi-F Module is configured with any nearby wireless modem to access internet. The received internet commands are fed to the Wi-Fi module.The program within the Wi-Fi Module execute the received commands based on which the load gets activated through TRIAC and Opto-coupler interfaced to Wi-Fi Module. The status of the load also will be displayed on the webpage. Here in this project program in written within the Wi-Fi module, No extra microcontroller has been used to drive the load.

INTRODUCTION

Wireless Home security and Home automation are the dual aspects of this project. The currently built prototype of the system sends alerts to the owner over voice calls using the Internet if any sort of human movement is sensed near the entrance of his house and raises an alarm optionally upon the user's discretion. The provision for sending alert messages to concerned security personnel in case of critical situation is also built into the system. On the other hand if the owner identifies that the person entering his house is not an intruder but an unexpected guest of his then instead of triggering the security alarm, the user/owner can make arrangements such as opening the door, switching on various appliances inside the house, which are also connected and controlled by the micro-controller in the system to welcome his guest. The same can be done when the user himself enters the room and by virtue of the system he can make arrangements from his doorstep such that as soon as he enters his house he can make himself at full comfort without manually having to switch on the electrical appliances or his favourite T.V. channel for an example. Thus using the same set of sensors the dual problems of home security and home automation can be solved on a complementary basis.The alerts and the status of the IoT system can be accessed by the user from anywhere even where Internet connectivity may not be readily available (since it is not necessary for the mobile phone to be connected to internet only board is required to have an access to Wi-Fi).

COMPONENTS REQUIRED

- Arduino Uno Board
- Arduino Uno cable
- DHT11 Sensor – Temperature and Humidity

- PIR Sensor – Detecting motion
- LDR – Light intensity detection
- Breadboard
- Diode
- NPN Transistor
- Resistors
- LED
- Cooling Fan
- Jumper wires
- 9V battery and DC power jack

ADVANTAGES

- This low cost system with minimum requirements takes care of both home security as well as home automation
- This home security system does not use any smart-phone application or any type of user interface instead uses digits from the keypad on the phone, the system is platform independent and hence can be accessed from a wide range of phones with different operating systems.
- To operate home security system the user need not have data connection enabled in his phone. The system runs fine with the launchpad connected to wifi at home/office.
- The optional smart phone application takes care of the fact that the user may also wish to control his home appliances without sensors being triggered.
- To operate home security system the user need not have data connection enabled in his phone. The system runs ne with the launchpad connected to wi at home.

IMPLEMENTATION SETUP

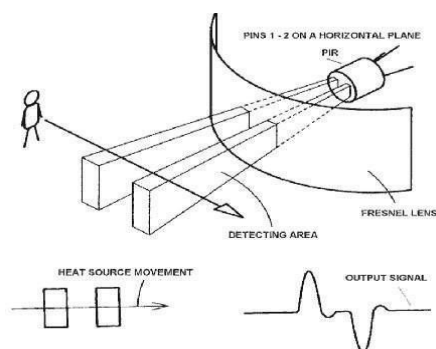
OPERATING PRINCIPLE OF PIR:

All objects with a temperature above absolute zero emit heat energy in the form of radiation. Usually this radiation isn't visible to the human eye because it radiates at infrared wavelengths, but it can be detected by electronic devices designed for such a purpose.

The term passive in this instance refers to the fact that PIR devices do not generate or radiate energy for detection purposes. They work entirely by detecting infrared radiation emitted by or reflected from objects. They do not detect or measure heat.

WORKING OF PIR MOTION SENSOR

Human Beings emits thermal energy of wavelength around 9-10 micro-meter everyday. Pyroelectric or Passive Infrared Sensor (PIR) [6], [7] is an electronic device which is designed to detect this IR wavelength when a human being is in its proximity. To have a wide range for detection a simple lens is used. Sensors may also be calibrated in such a way so as to ignore domestic pets by setting a higher sensitivity threshold, or by ensuring that the floor of the room remains out of focus.



EXISTING SYSTEM

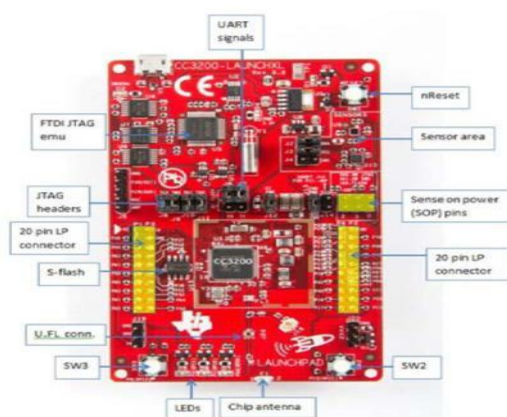
The existing infra-red (IR) or Blue-tooth remote controls present in the market are in general appliance specific and the same cannot be used interchangeably. Electrical appliances connected through Bluetooth making use of Blue-tooth enabled smart phones cannot be managed from a distant location . Thus functions such as being able to turn on an air-conditioner while returning home cannot be done with such systems. In contrast, this work gives a cost effective and simple solution for wireless home automation and home security systems.

SMART HOME AUTOMATION SYSTEM

This application of the module can be explained by an example. Suppose the owner is expecting a guest at his house but he is not available there. Now, as the guests reach at his house the owner will receive a video call. But now the owner can press digits other than 1 (such as 3 for lights, 4 for fan, 5 for A.C., and so on) or even can disable the security system. Similarly if the user or somebody leaves the house, the user will still receive a video call and this time he can switch Off the appliances or can enable the security system again by pressing proper digits known to him. Since the appliances are connected to mains supply through a relay they can be easily controlled using micro-controller.

TI CC3200 Launchpad

The TI CC3200 launchpad consists of applications micro- controller, wi-fi network processor, and power-management subsystems. It uses ARM cortex M4 core processor at 80 mhz. It has embedded memory including RAM (256 KB). The dedicated ARM micro-controller also has a network processing subsystem in it. Its features include USB interface using FTDI USB drivers the board is powered through USB for the launchpad and external boosterpack .it is operated from 2 AA- batteries standalone development platform provides features such as sensors, leds and push-buttons on-board antenna and U.FL connector can be selected using a capacitor re-work it supports 4 wire JTAG and 2 wire SWD



LDR

A LDR or a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation . Hence ,they are light sensitive devices. They are also called as photo conductors , photo conductive cells or simplify photocells. They are made up of semiconductor material having high resistance. There are many different symbols used to indicate a LDR,one of the most commonly used symbol is shown in the figure below .The arrow indicates light falling on it .

FURTHER SCOPE

As the system is dependent on the user's discretion and judgeability of the situation (whether it is a guest or an intruder entering his house) the use of a camera connected to the micro- controller might help the user in taking decisions whether to activate the security system or welcome the guest [9] The captured picture of the guest or intruder after face detection, can be mailed to the user. The user can further forward the same photograph to the police station if he wishes. Further the system may be made more synchronised by integrating the voice call feature within the same smart phone application through which the user can even control his home appliances without any voice call being triggered to his phone.

REFERENCES

- [1] VinaySagar K and Kusuma S, "Home Automation Using Internet of Things", International Research Journal of Engineering and Technology, Volume 2, Issue 3 on pp. 1965 – 1970, June 2015.
- [2] Su ZinZin Win, Zaw Min MinHtun, HlaMyoTun, "Smart Security System For Home Appliances Control Based On Internet Of Things" IJSTR, Volume-5, Issue 6, June 2016.