Development Of Smart Home security system using Raspberry Pi

Pragati Ukey[1], Anita Shinde[2],Sneha Kasrung[3], Satish Kamble[4] ,Jidnyesh Kadu[5]

[1,2]Professor, Dept. of EXTC Engineering, MGM College, Maharashtra, India
[3,4,5] Dept. of EXTC Engineering, MGM College, Maharashtra, India

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Abstract - *Home Security System is a mobile web based application that allows the user to monitor and control their home using their mobile device. Proposed system requires a micro SD card with an OS for the Raspberry Pi.The OS Raspbian is selected for this system ,which is commonly used for projects, before copying the OS on the micro SD card we need to copy a file named NOOBS this will help to download the latest OS's for the Raspberry PI as well as works as an interface like BIOS in windows. After booting the OS we have installed Linux for programming. For result BLYNK App. is used which gives authentication code which is used in program which connect Mobile and Raspberry Pi and inform user about the changes in the house, with the help of a file name such as Open or Closed for Doors & Windows and High & Low for Gas and Water Leakage .With the help of BLYNK App we can ON/OFF home devices like Fan ,Light, Motor. The system can also be used for various other purposes in society offices where the security guard can have the access in his smart phone and when he is on his rounds if a person comes then he can allow him to enter & in his absence he can check for water level also .*

The Raspberry Pi is a low cost single-chip computer which has recently become very popular. This paper showcase attempt at building a low cost self containt security device. This paper aims at designing a basic home automation application on Raspberry Pi

Key Words: Home Security, Raspberry Pie, linux ,Home Automation.

1.INTRODUCTION

The Smart House is an evolution of the existing electricity. It comprises of a two-way communication where electricity and information is exchanged by the consumer and utility to maximize efficiency. Raspberry Pi is a credit-card-sized single-board computer developed in the UK by Raspberry Pi foundation. Home automation is an important milestone in achieving smart grid. Advancement in technologies have made homes more convenient, efficient and even more secure.The Raspberry Pi provides numerous customizations to turn a regular home into a smart home. Raspberry Pi provides a low cost platform for interconnecting electrical/electronic devices. The inbuilt sensors can be accessed easily. We have built an application with following features such as, Gas sensors, Limit switch ,water sensor it will sound the alarm for any changes in home security device. IP camera can be used in various places, such as warehouse, office, supermarket, and doorkeepers and so on.

Due to the wireless technology, there are several different type of connections are WIFI, Bluetooth and Each of the connection has their own remarkable specifications and applications., WIFI is being chosen with its suitable capability. The capabilities of WIFI are more than enough to be implemented in the design. Also, most of the current laptop/notebook or Smartphone come with built-in WIFI adapter. It reduce the cost of this system indirectly

Fig -1: Raspberry Pi 3 Model B

1.1 Literature Review

As per survey there exists many such systems that could control home appliances. Each system has its own unique feature. Following model describes the work performed in project. Raspberry Pi itself act as a minicomputer. Design and implementation of low, smart and real-time monitoring of home security using R-Pi. Most Raspberry Pi system handles motin detection and face detection that provide precaution to potential crime.R-Pi allows live monitoring for users from any place in world. Some system provide security alarm using low processor chip. R-Pi would exchange data or would communicate with the help of Bluetooth, Wi-Fi and Ethernet. These systems have their own disadvantages. For example, system-implementing must requires Wifi/Ethernet for the data communication. These system also proficient for home automation.

Existing System

The existing system for our project is as follows Sensors, camera interfacing. We have implemented the Sensors like humidity sensors, proximity sensors.

a)Gas sensor:

Gas sensor is a device that detects the presence of gases in a area, often as a part of security. It detects gas leakage and

other emission and control system so the process can be automatically shut down. In this project MQ-6 LPG gas sensor is used. It can detect gas concentration anywhere from 2000 to 10000ppm.

b)Limit Switch:

Limit switch is a switch which is operated with the help of presence of object. Limit switch is a device that consist of actuator linked to a contact mechanically. When an object comes in contact with actuator the device operates by making and breaking an electrical connection. In this project two limit switch which is used at door and window.

2. Proposed System

In this paper, we are going to interact with component with the help of Wi-Fi (Wireless Federation). The main advantage of this system is that it can be controlled anywhere with a wider range application. It's easy and allows communication with set up without wired connection. This system can be further extended for a proper Surveillance of home system.

2.1 Hardware and Software Requirement

i)Hardware:

A)HDMI to VGA Convertor

High density media interface. HDMI to VGA convertor allows to connect HDMI output from laptop, computer onto a VGA monitor or projector saving the cost of updating to HDMI compatible

B) Relay Interface Circuit

The household electronic or electrical appliances are connected to R-Pi board with the relay interface circuit . The circuit comprises of a relay (12v, 50A), a transistor and freewheeling diode are used to drive the relay input.

C) Controller:

4 Relay control the input power for home appliances with the help of R-Pi controller.

D)SD Card

The R-Pi has no internal storage so it requires an SD Card that is used to store the operating system of the R-Pi as it doesn't have inbuilt operating system built in them. Preloaded SD-Card are available which can be used for start-up purpose.

E) Additional Connectivity: (Internet)

This may be an Ethernet/LAN cable standard RJ45 connector or a USB WiFi adaptor.

ii)Software:

Operating system:

Raspberry Pi requires Linux for installing an operating system on a Windows/Computers. By installing operating system it's easy to operate on raspberry pi and displaying of raspberry home page is done.

Programming languages:

R-Pi has interfaces too many system calls and libraries, as well as to various window systems, and is extensible in C or C++. The programming language used in this project is C language. It is also usable for applications that need a programmable interface. Python, C++, Java and Ruby have their library installed in R-Pi Library.

Raspbian :

Raspbian is based on Debian. Optimized for the raspberry pi hardware a free Operating System. Raspbian provide more than just pure OS, it comes with pre-combined software, more than 35000 packages bundled in a nice format for easy installation on Raspberry pi.
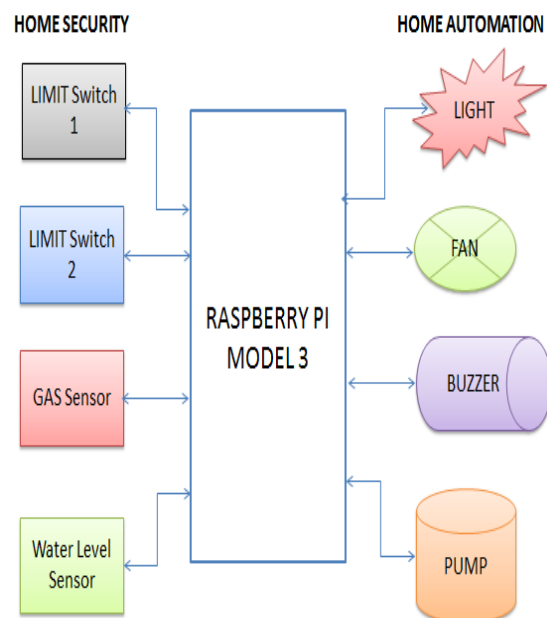
2.2 Design and System Architecture

Fig -2: Block Diagram.

Home security and home automation component are connected to Raspberry pi GPIO pins. In home automation we make use of lights, fans, pump and water sensor and in home security we make use of Two limit switch and gas sensor. Door limit switch is connected to pin no 23, window limit switch is connected to pin no. 24, gas sensor is connected to pin 25, water sensor is connected to pin no. 12, pump is connected to pin no. 17, fan is connected to pin no. 22, light is connected to pin no. 27 and buzzer is connected to pin no. 4 of R-Pi.
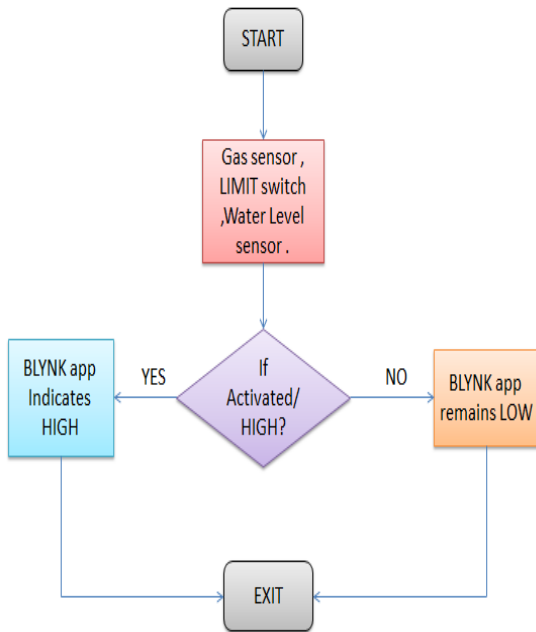
2.3 Flow-Chart

Fig -3: Flow Chart.

The flow chart of this project is very easy to understand. In project if any of the home security application becomes high the blynk app used in the project will show high indication, indicating that the device is active and what steps should be taken is the host decision further.
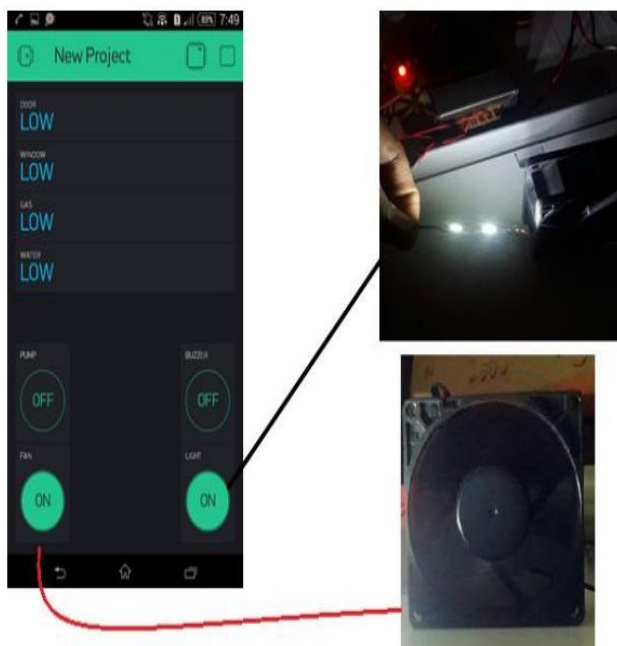
2.4 Result and Analysis

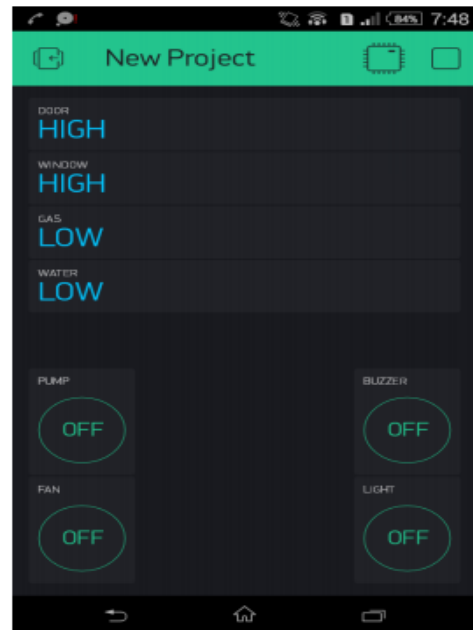**Fig -4** When we press fan and light button system gets activated

Fig -5: On BLYNK App we see that the device is activated.

3. CONCLUSIONS

The ultimate aim of the paper was to design a home security system using Raspberry pie. So, it helps people feel safe about their home whether they are away from are in the house. This project is based on the latest version model B of Raspberry pi 3, and the language used for communication of kit is C language. The overall cost is low and can be easily operated. Even our home will undergo its own transformation towards the smart homes that will be in constant interaction with the grid in an effort for better energy management and full home automation to ensure comfort, security and privacy.

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Biography:

Prof. Pragati Umesh Ukey
She received Master's degree in
Electronics and Telecommunication
Engineering in 2010 from VJTI of
Mumbai University and is currently
working in   MGMCET, Kamothe,
Navi Mumbai from 2012 to till date.

Prof. Anita Pradip Shinde
She received Master Degree in
Electronics and Telecommunication
Engineering in 2012 from VESIT of
Mumbai University and is currently
working in MGMCET, Kamothe, Navi
Mumbai from 2014 to till date. She
has 2 international jourenl publication.

Ms. Sneha Rajaram Kasrung.
Student of MGMCET, Kamothe.
EXTC Department, BE.

Mr. Satish Sadashiv Kamble.
Student of MGMCET,Kamothe.
EXTC Department, BE.

Mr. Jidnyesh Jaydas Kadu
Student of MGMCET, Kamothe.
EXTC Department, BE.