Survey on Automation system using Raspberry Pi-3 (IoT)

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Abstract: - Automation plays an important role in science fiction writing but has only become practical, since the early 20th Century, due to the introduction of electricity into the Office cabin and the rapid advancement of information technology. Automation can control application by using the Raspberry-Pi. The main aim is to control the electrical appliances in office cabin by using internet, so it is used to interface Raspberry Pi with Wi-fi. The Raspberry Pi is interfaced with Sensors to sense the atmospheric conditions. It is also interface with user which can be turned ON/OFF by the controller using the IT. Raspberry Pi has inbuilt Wifi. Wifi can be given from nearest broadband connection or mobile. IoT using raspberry pi to the user having the android app. The authentication is in our hands ,i.e if we want to send the specific person inside the house, standing in front of the door then we can give permission to open the door, Software system can be built in three various programming languages and can be controlled via the internet using webpage protected with a username and password to make sure that it cannot be hacked.

Key Words- Home Automation, Raspberry-pi-3, Internet of Things (IoT), PIR sensor

I. INTRODUCTION

In this project, we are designing a system which will control electrical appliances by using smart phone operated android app. There are three units in this project wi-fi unit, control unit, output unit. In this project there are components like PIR sensor, Web camera, Raspberry Pi-3, Smart phone for android app. PIR sensor is used to sense human ,i.e, when PIR sensor is sensed by a person standing in front of the door then web camera will be become on and then the image will be displayed on the user app who has the smart phone android app. He/she can control the electrical appliances by using smart phone operated android app. We are controlling three electrical appliances ,i.e, light, fan and lock. The controls of the specific appliances is given in the app. When the PIR sensor is sensed, web cam gets the signal and captures the image and sends it via IoT using raspberry pi to the user having the android app. The authentication is in our hands ,i.e if we want to send the specific person inside the house, standing in front of the door then we can give permission to open the door via the app otherwise not. We can control light and fan via the android app using the same procedure.


Fig -1: Overview of the system

Wifi range is between 10 to 100 meters. Raspberry Pi has inbuilt Wifi. Wifi can be given from nearest broadband connection or mobile. This project requires two Wifi connection one at raspberry end and other at user end. The control unit is used to control the electrical appliances via the smart phone.

II. EXISTING SYSTEM

Raspberry pi is a mini computer. Arduino and rasp2 are not having inbuilt wifi. If we make this project by using rasp 2 and arduino we have to connect wifi module. So it is better to use rasp3. In existing the IR sensor is used but it does not give proper results so we used PIR sensor.

III. PROPOSED SYSTEM
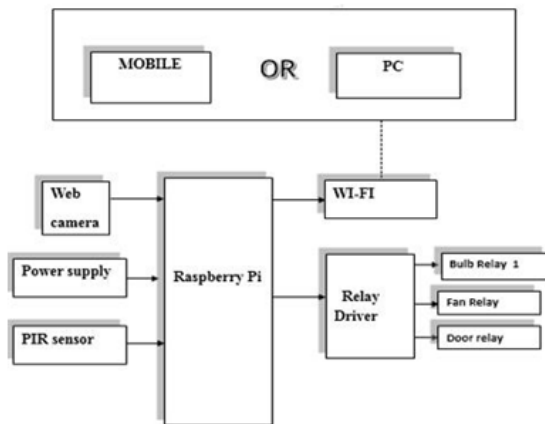
Fig -2: Block diagram of the system

The system works on 3.3v and 5v DC supply. Components connected to raspberry pi-3 are PIR sensor, relay driver IC ULN2803APG. The relay driver is connected to three electrical appliances such as light, fan and lock. When PIR sensor is sensed via a person then web camera captures the image and sends it to android app via raspberry pi. If the image displayed on the app is authenticated by the user having the app in his/her smart phone. Once the image is authenticated by the user having app in his/her smart phone then he/she can send that person inside the door by using the smart phone. After the door is opened the user having the app sends the signal to start the light and fan using smart phone operated mobile app.

IV. FEATURES OF THE PROPOSED SYSTEM

Raspberry pi-3:- The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi foundation. Raspberry Pi-3 Model B released in February 2016 is bundled with on-board Wifi, Bluetooth and USB Boot capabilities. As of January 2017, Raspberry Pi 3 Model B is the newest mainline Raspberry Pi. Raspberry Pi boards are priced between US$5-35. It includes various features such as ARM compatible central

processing unit (CPU) and an on- chip graphics processing unit (GPU, a videocore IV). CPU speed ranges from 700MHz to 1.2GHz for the Pi 3 and on board memory range from 256 MB to 1 GB RAM. Secure Digital (SD) cards are used to store the operating system and program memory in either the SDHC or MicroSDHC sizes. Most boards have between one and four USB slots, HDMI and composite video output, and a 3.5mm phone jack for audio, Lower level of output is provided by a number of GPIO pins which support common protocols like PC. The model B have an 8P8C Ethernet port and the Pi 3 and Pi Zero W have on board Wifi 802.11n and Bluetooth.

Web-Cam:-
- 16 MP interpolated resolution

- Excellent quality & fashionable style
- True plug and play USB interface
- High quality CMOS sensor
- Clear, sharp still picture & motion video
- Support external microphone
- Auto white balance & exposure
- Adjustable lens

Relay Driver (IC ULN2803 APG)

Fig -3: IC ULN2803 APG 500-mA-Rated Collector Current

- High-Voltage Outputs: 50 V
- Output Clamp Diodes
- Inputs Compatible With Various Types of Logic

Relay;-
- RW Series Relay covers switching capacity by 10A is spite of miniature size to comply with user's wide selection.
- RWH is approved C-UL & TÜV safety standard.
- The employment of suitable plastic materials is applied under high temperature condition and various chemical solutions.
- Complete protective construction is designed form dust and soldering flux.

• 12A at 120VAC for RW & 12A at 240VAC for RWH are UL approved.

PIR sensor:-
• Simple three connections.
• Led indication.
• Module dimensions:- 25mm length, 32mm width ,25mm height.
• Supply voltage 5V.
• Detecting range upto 6 meters.
• Dual element sensor with low noise and high sensitivity.

Mobile:-
• Requires a android operated phone.
• Requires a mobile which has a feature of internet.

V.SOFTWARE DESCRIPTION

Steps of the project
1.START
2.Initialize Rasberry-pi-3, web-cam, PIR, Relay drive
3.PIR sensor detector=?
4.Web-Cam ON
5.Image Show in android application
6.Through android application user control the door open or close
7.User through application operate bulb and fan also.
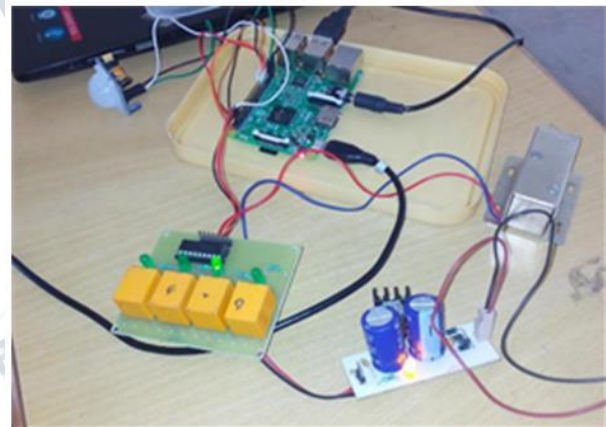8.Stop.
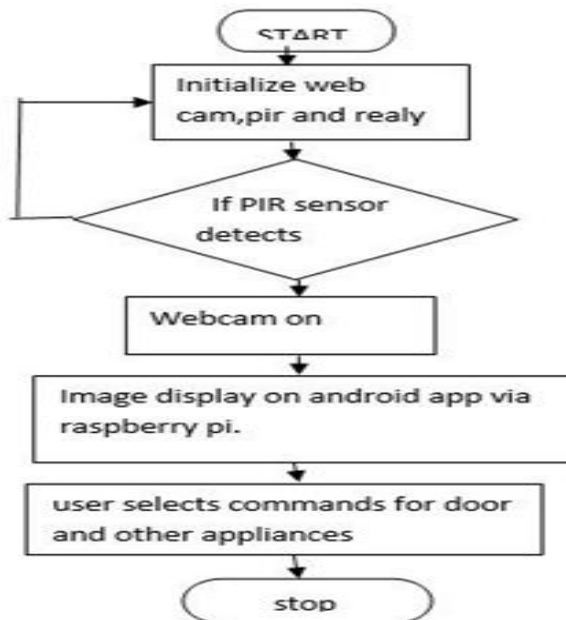
Fig -4: Flowchart of the system

VI. CONCLUSION

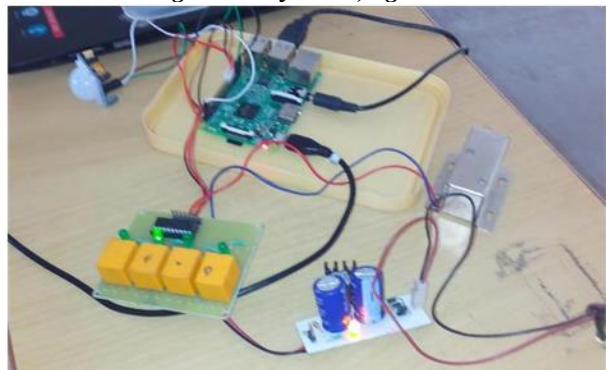We have designed this project to reduce human efforts and provide security.

VII. RESULT
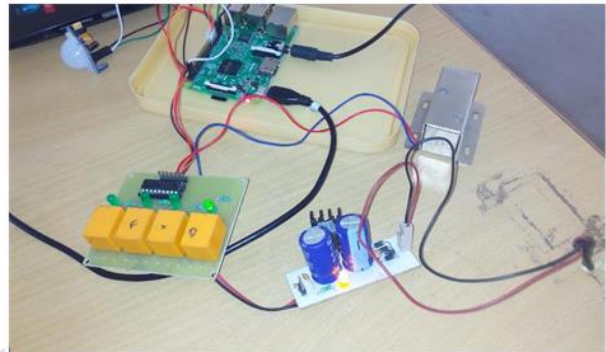
Fig -5: Relay 1 ON, door open

Fig -6: Relay 2 ON, light ON

Fig -7: Relay 3 ON, Fan ON

VIII. ACKNOWLEDGMENT

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