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IOT based Home Automation

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***Abstract:** In IOT we are connecting and monitoring real word object.Currenty we are using switches for on and off light.The solution is convert it into centralized system.To automate this things we are using raspberry pi. The project is aimed at developing a system used for automate many appliances around the house like fan, lights etc. by using android app.It is distributed architecture, central database , storage. The entire system is distributed client- server computing technology in mind.*
***Keywords:** Raspberry Pi, Automation, Centralized, PIR, IOT, Architecture.*

I. INTRODUCTION

In a current day home automation plays a very important role in our daily life.Various home appliances are perform using [1,2] microcontroller. But microcontroller can not perform multiple program at a time. Raspberry Pi is use to overcome this problem. Raspberry Pi is single board, small computer. Raspberry Pi has processor speed upto 1.2GHz .Device has the memory range from 256MB upto 1 GB RAM and also has GPIO and 4 USB port.



Raspberry PI

II. LITERATURE SURVEY

In the literature survey, we found some projects with similar technologies used to achieve similar goals.

TABLE 1: LITERATURE SURVEY

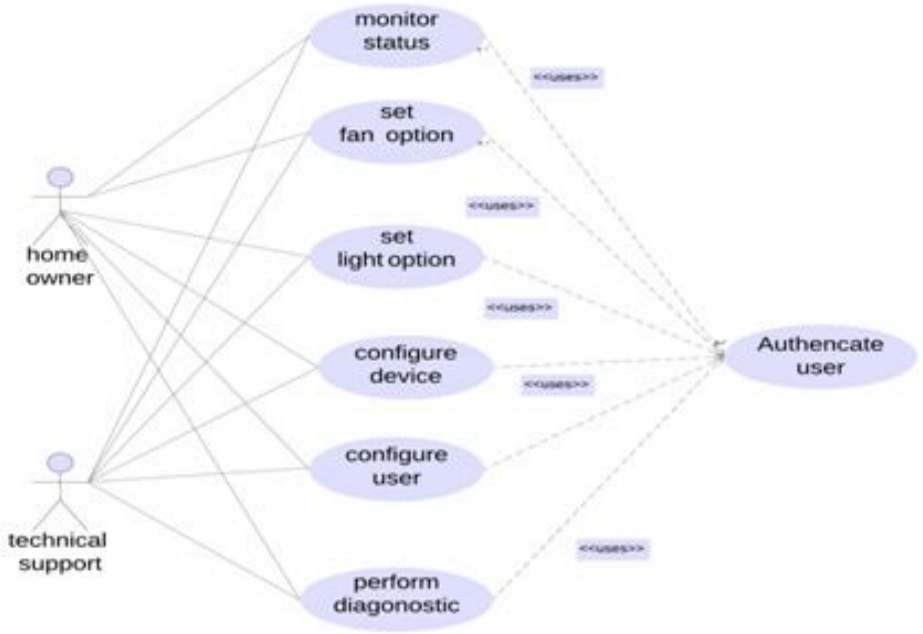
ID	TITLE	Name of Journal	Description	Advantages	Disadvantages
1	[1]Bluetooth based Home Automation	[1]International Journal of New Innovations in Engineering and Technology. Issue 3, April 2017	The commands are given over Bluetooth for performing actions. Pin check Algorithm is used.	No complexities. Less power required for operations.	Use for control the home appliances in the Bluetooth range of only 10m.
2	DTMF based home Automation	[2]International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering. Issue 3, March 2017	This is based on control through mobile phone based DTMF tones. Complex averaging algorithm was used.	Control home appliances from wide range. I	No security. Number of Appliances that can be connected is limited to 16 tones.
3	IOT based home automation	[3]International Journal of Scientific and Research Publications. 6, Issue 12, December 2016	It's designed and implemented by using embedded micro web server, controlling devices, smartphone and a software application.	Appliances can be remotely controlled and monitored using smartphone.	Compatibility and complexity are the disadvantages. Money is also a factor.
4	Voice recognition based H.A.	[5](IJARECE) Issue 10, October 2015	Bluetooth was used for communication between the hardware. Android's inbuilt Speech recognition was used to convert speech to text.	User can give the commands through his voice.	Limited Range due to use of Bluetooth.
5	SMS based home Automation	[4]International Journal of New Innovations in Engineering and Technology. Issue 27, August 2015	The commands are given via SMS. Controlling algorithm is used. PDU translation requires a non-linear algorithm.	No limitations on Range.	Complex alphanumeric commands sent for the system process.

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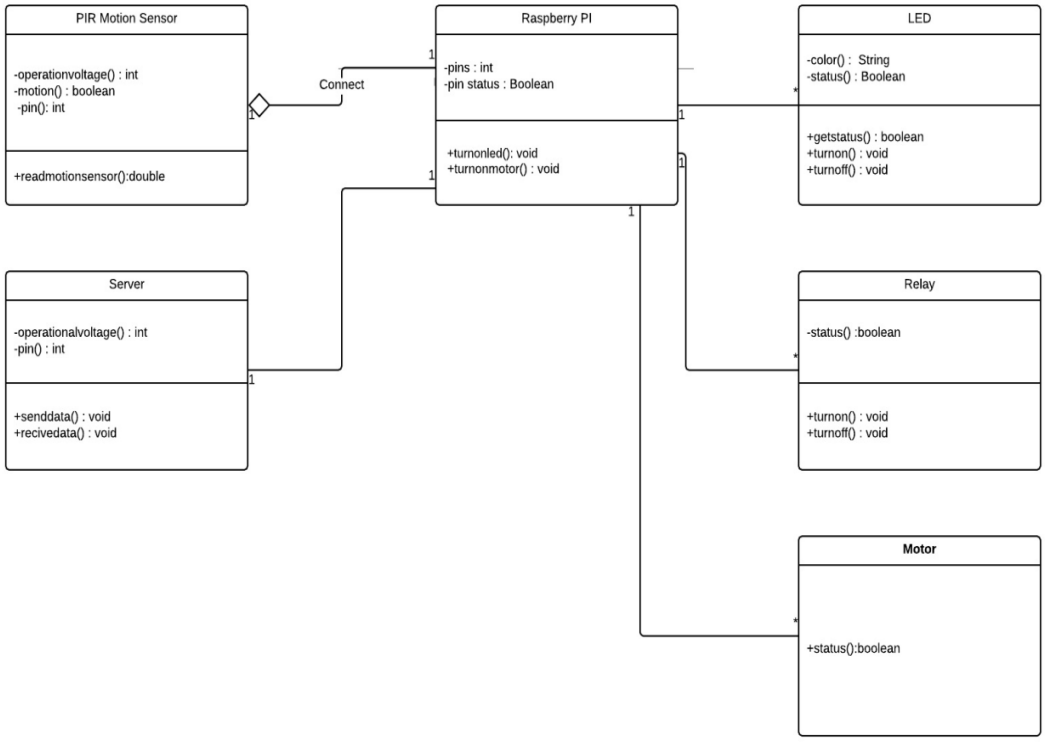
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III. UML DIAGRAMS

A. Use Case

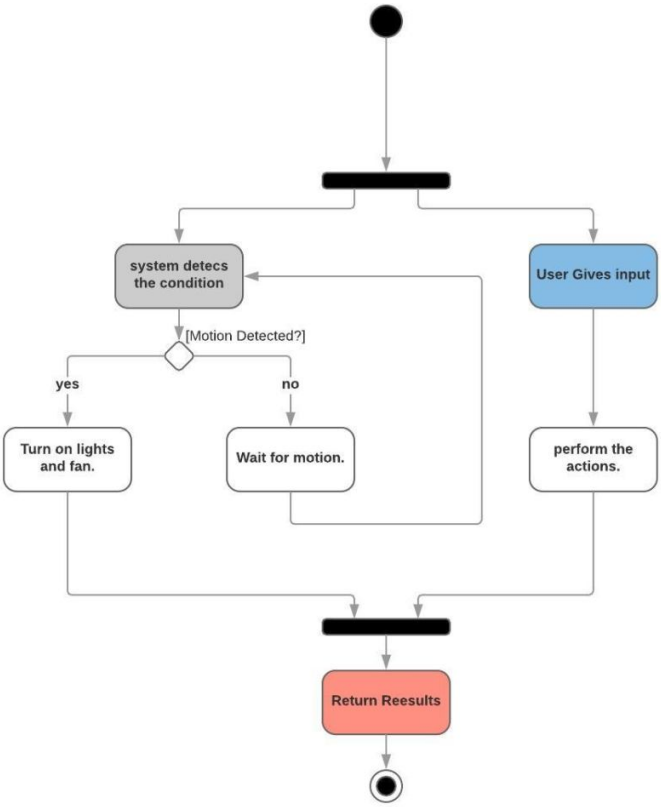


B. Class Diagram

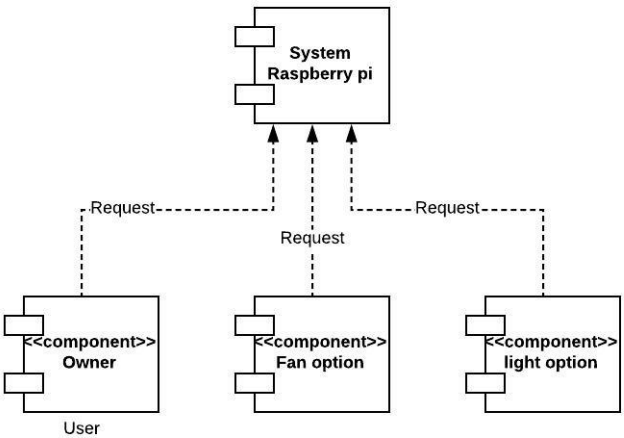


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C. Activity Diagram



D. Component Diagram



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IV.METHODOLOGY

Server side of our system is totally installed on the Raspberry pi. Created the server on the Raspberry pi using Python language. Raspberry pi is having 40 GPIO pins. Pins are used to control the appliances. Connect PIR sensor to the Raspberry pi which detects the presence of intruder along with a LDR sensor which is used to detect the intensity of light. To detect the humidity in the surrounding environment DHT11 sensor is used which is also connected to Raspberry pi.

Client side is nothing but a user side. Users use mobile device to access the Raspberry pi with the help of an internet. Once the user connects mobile device in network and after putting the IP address of the Raspberry pi in the browser of mobile device will be see the web page which contain UI to control home appliances in each room. GUI represents the number of rooms and home appliances present in each room.

A. Raspberry PI

Raspberry Pi was introduce in 2012 which is use for home automation and various system. It is develop by Raspberry Pi Foundation. Raspberry Pi has processor speed upto 1.2GHz .Device has the memory range upto 1 GB RAM and also has GPIO and 4 USB port. we store operating system and prodrams in (SD) Secure Digital card. Some operating systems are Raspbian OS,RISC OS, Diet Pi,Kali Linux
can run on Raspberry Pi.



Raspberry PI

B. PIR Sensor

It is passive infrared sensor use to measures infrared light from objects. They are basically used in PIR based motion detectors.The PIR sensor don't detect or measure "heat" instead they detect the radiation from an object.

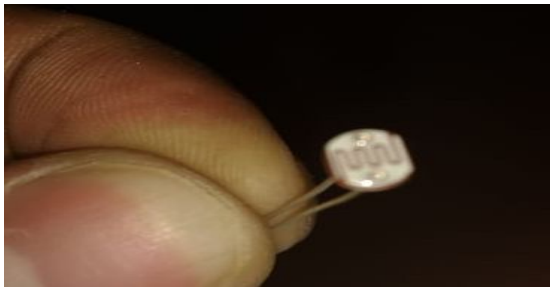


PIR Sensoe

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C. LDR Sensor

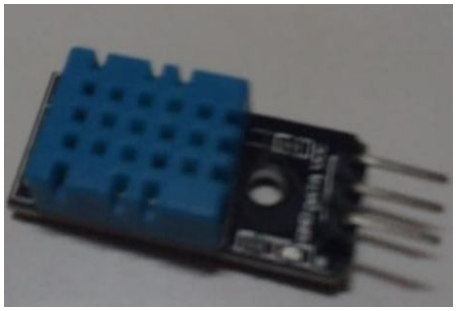
It is Light Dependent Resistor.It changes the resistance base on intensity of light that fall on it.It converts light energy to electrical signal.It generates signal which measure light intensity.



LDR Sensor

D. DHT11 Sensor

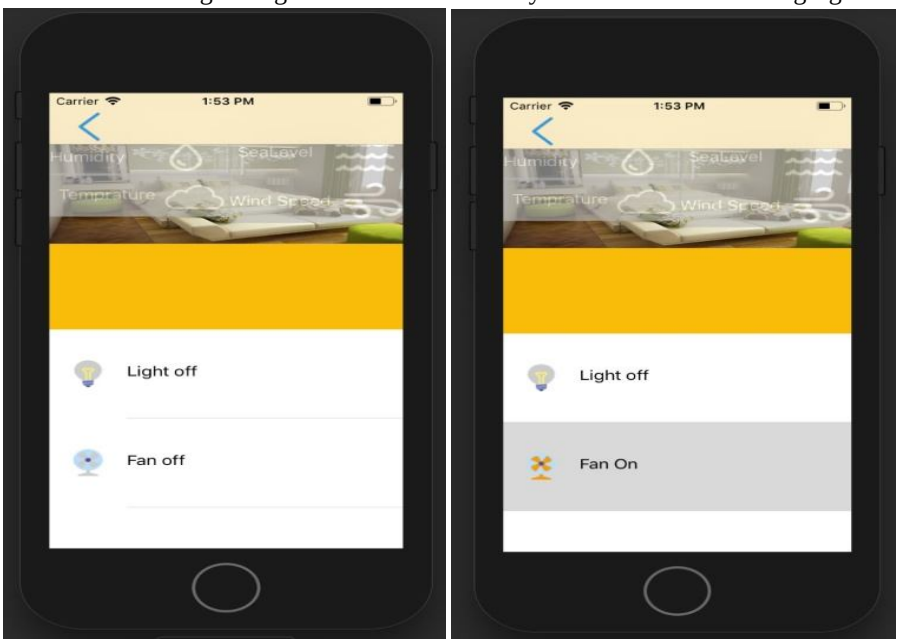
DHT11 is a temperature and humidity sensor which generates calibrated digital output. DHT11 can be interface with Arduino, Raspberry pi etc. and get instantaneous results. DHT11 is a low cost temperature and humidity sensor.It provides very high reliability and stability.



DHT11 Sensor

V. RESULT

User can control the system from wide range using an internet.Result of system are shows following figures.



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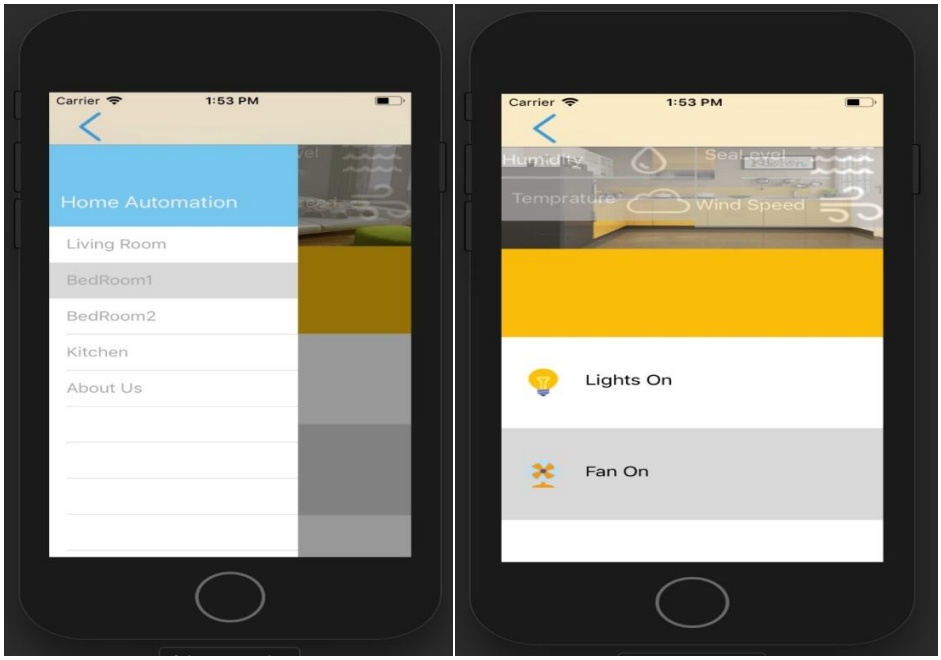


Fig5.1 GUI of application

VI.CONCLUSIONS

In this system we are automate home appliances. The PIR sensor detects human at that time by using the LDR sensor system shows the intensity of light,If it less than threshold then turn light otherwise off.AT the same time temperature sensor check temparature ,if it is greater than threshold then turn on fan otherwise off. It is low cost system that makes human life easy and also can access from wide range.

VII. ACKNOWLEDGEMENTS

I would like to express my special thanks of gratitude to our guide Prof. Vandana Rupnar as well as our Head of Computer Engineering Department Dr. S.M. Chaware who gave us the opportunity to make this project on the topic IOT Based Home Automation Using Raspberry Pi which helped me in doing research and I came to know about many new things so i am very thankful to them.

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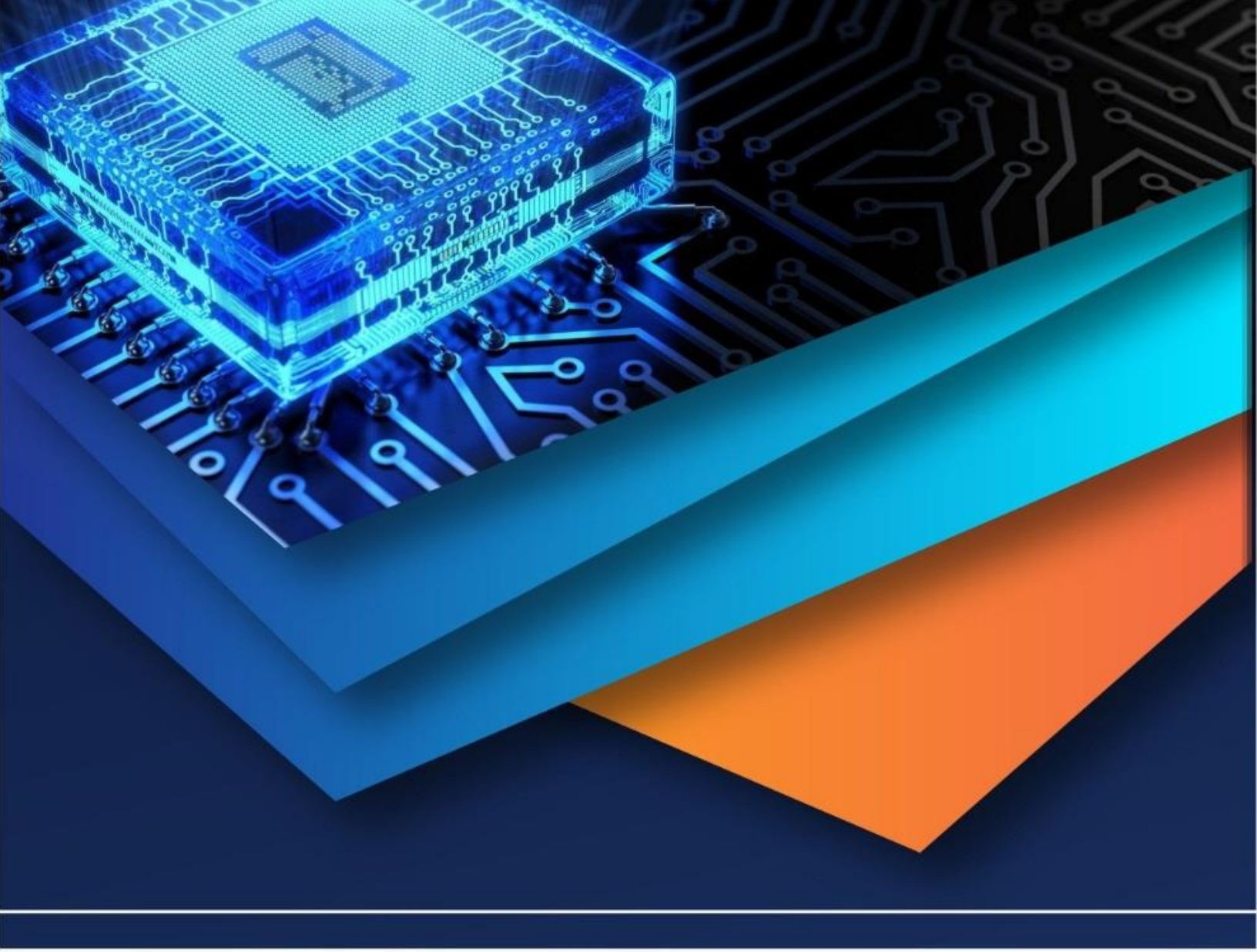
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