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## DESIGN AND ANALYSIS OF LDR AND IR SENSORS BASED AUTOMATION SYSTEM

**Prof. P. P. Patil<sup>1</sup>, Prof. M. B. Bhilawade<sup>2</sup>, Prof. Dr. D.B. Unde<sup>3</sup>, Mr. Suraj Sarnobat<sup>4</sup>,  
Mr Atharv Gurav<sup>5</sup>**

<sup>1</sup>Associate Professor, Department of Chemistry, Dr. J. J. Magdum College of Engineering, Jaysingpur, Kolhapur, Maharashtra, India.

<sup>2</sup>Head of Department, General Engineering, Dr. J. J. Magdum. College of. Engineering, Jaysingpur, Kolhapur, Maharashtra, India.

<sup>3</sup>Professor, Department of Mathematics, Dr. J. J. Magdum College of Engineering, Jaysingpur, Kolhapur, Maharashtra, India.

<sup>4,5</sup>Research scholars, Dr. J. J. Magdum College of Engineering, Jaysingpur, Kolhapur, Maharashtra, India.  
Email:hodfe@jjmcoe.ac.in

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### ABSTRACT

In today's busy world, every person wishes to reduce human effort. Nowadays Automatic systems are being preferred over manual system to make life simpler and easier in all aspects. Operating home appliances become aseasy as changing TV channels. Remote Controlled automation uses IR sensors to control home appliances using a TV/DVD/VCD remote. Home appliances like fan, light, radio, cooler, music system, home theatres etc can be turned ON/OFF using a remote. Remote Controlled home automation is expected to work in a range of 10 meters without barriers/walls in between. The IR rays transmitted by the TV remote control will be received by IR receiver installed in the circuit. A microcontroller accesses the appliance's mains and controls the load thereby controlling it. An LED would display the status of the particular appliance whether the device is ON or OFF. RC- automation would also consist of LDR dependent light control. Exterior light (light near the door way) needs to be switched on during night time, Light Dependant Resistor (LDR) is a type of sensor which actually senses the light as our eyes does. When the sunlight comes, visible to eyes it automatically switches OFF the lights. The LDR would turn on the light as soon as it senses darkness and will turn off in the morning. Remote Controlled home automation is a small step towards reducing human effort and to use technologies smartly and efficiently to human benefit.

**Keywords-** LDR-Light Dependent Resistor, IR-Infra Red, LED-Light Emitting Diode, RC-Remote Controlled, IC Integrated Circuit.

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### 1. INTRODUCTION

In today's world need of automation is become necessary not only to reduce human effort but also to utilize maximum of the technology and to do everything smartly and efficiently in order to reduce both energy and time consumption. so, the idea of home automation is basically deals with such problems and provide home a smart system to operate household appliances conveniently this helps to advance the living standards of new age people and also helps the old age aged or handicapped person to perform their task without any trouble. RC- home automation using LDR and IR sensor is a further step in home automation. The system uses IR sensors to control or to operate household appliances like TV, fans, music systems, tube light, radio within the range of 10 meters. Hardware requirement for RC automation are IR transmitter, IR receiver, transistors, IC, LED light, LDR sensor, batteries, bread board and connecting wires. The system works as soon as the IR rays by the IR transmitter are sensed by the IR receiver. In response the IR receiver will turn on or will turn off the device accordingly. The IR transmitter is nothing but Remote controller of TV or of media player, The IR receiver module of the circuit is been embedded with home appliance which the person wants to control for making the home automation easy, convenient and with good performance. The system is beneficial as the system using IR sensor which has a longer wavelength than visible light, so the human eyes cannot recognize or it is not seen through naked eye and can travel without any system barriers it can penetrate through the walls. The IR sensors are very effective and give the good coverage. RC- automation will also use the LDR sensor for the exterior night light. It will work as soon as it sense the light and turn off the light. LDR (light dependent resistor) is a light dependent sensor, it detect the light as the retina of a human eye does. The LDR in RC- automation is to eliminate the manual efforts. Using LDR to provide automation to exterior light is a very smart technique to avoid unnecessary usage of it as mostly in home many of the people forget to switch it off in day time so it is a very powerful approach in releasing such wastage of electricity.

## 2. LITERATURE SURVEY

It is a survey of existing work which can be taken as a reference for RC- automation. We surveyed around 11 different articles which can be explained as:

[1] Design & Implementation of Smart House Control Using Lab VIEW: It focuses on how computer device that provide with lab view software is the main controller unit for all systems in the house, but central receiver unit in the house is made using only RF Module.

[2] Microcontroller Based Remote Control of Home Appliances: It focuses on development of microcontroller based IR remote control signal decoder and used Sony IR remote as transmitter. But the output of the IR receiver is not very high.

[3] Remote Control of Home Appliances: RC automation allows the user to control the intensity of the light bulb and also allows the user to regulate the speed of the fan over the internet but the major drawback is that he appliances are connected to the web of objects and disconnects when no internet.

[4] RF based Remote Control for Home Electrical Appliances: The RF based wireless remote control system can change the state of electrical appliances either in on state or off state, it fails when Multiple devices can be control using different receiver with different addressing mode.

[5] Home Appliances Controlled by Infrared Remote Control System: It tells how the receiver uses an infrared sensors module for sensing the IR signals from the transmitter section, it fails when IR beams modulated at the same frequency needs a line of sight for control.

[6] Home Automation Using Remote Control System: Here the home appliances are switched on/off using IR without actually going near to the switch boards or regulators, , it fails when IR beams modulated at the same frequency needs a line of sight for control.

[7] Electrical appliances in home control through IR Remote: RC- automation provide Controls to the house appliances via any remote control device that is portable in the periphery of the room but this used Sony IR remote, connected with the AC mains, this may alter main connections.

[8] Home Automation Using IR (Infrared) Sensor & Arduino-nano Single Board Microcontroller: RC automation provides a wireless communication link of the home appliances to the remote user and provides convenience and ease of work with more cost, complex circuit, not user friendly.

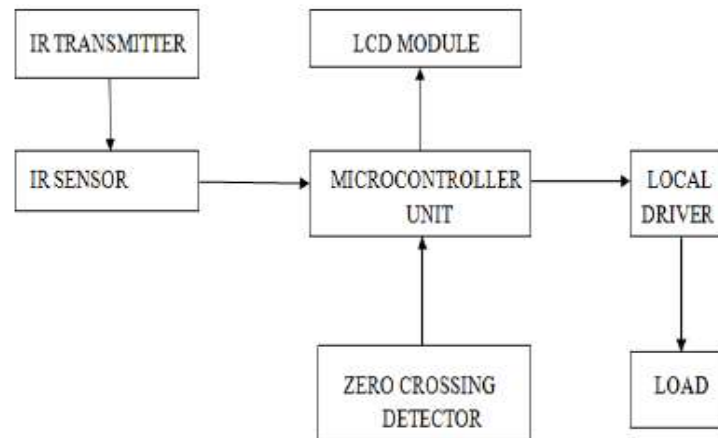
[9] IR Based Home Appliances Control System: Here the micro controller stores the bit pattern of IR receiver and compares with the predefined bit pattern matches act as a switch to turn on/off any appliance. The major drawback is that the IR remote works on different protocol. Each IR remote has its own protocol. Micro -controller stores the bit patterns for specific buttons of remote.

[10] Remote Control of Home Appliances with Smart Energy Efficient Model Using Android Application Based on Raspberry Pi Embedded Linux Board: it focuses on System controlling a remote Home appliance using a "Raspberry pi" card for receiving commands from an Android application on mobile phone in figure but the system may not be easy to work with for all people.

[11] Controlling Home Appliances by Using Universal Remote Control System (IoT and Bluetooth): The project Home automation system uses IoT, WI-Fi, Bluetooth technology. System consists of three main components; web server, which presents system core that controls, and monitors users but if the server goes down the whole system would crash.

## 3. SYSTEM ARCHITECTURE

The IR transmitter installed in the TV/VCD/DVD remote when pressed directed towards the appliance to be controlled, the IR receiver of the circuit would sense the rays. This data/information is forwarded to the microcontroller unit. The micro controller unit then instructs the local driver to start the load. This would affect the appliance and turn it on / off. The zero crossing detectors sense the status of the appliance and would instruct the microcontroller to change the status of the appliance on the LCD display of the respective appliance. The microcontroller is responsible for updating the LCD module displays.



**Fig: 1.1 Block diagram**

The given circuit diagram is the reflection of how the Proposed system is going to control all the devices which comes under the range of the sensors. The circuit basically consists of transistor, capacitors, resistors, IC CD4017, LED, and connecting wires. The appliance to be controlled is connected between the pole of the relay and neutral terminal of mains. It gets connected to live terminal of AC mains. As soon as the circuit senses the infrared radiation coming from the remote controller the control passes to the transistor and capacitors. Control than forwarded to IC CD4017. after the signal passes through integrated circuit according to requirement the appliance get switched off or switched on. The progress and work done can be shown through the status of Led.

The Result Of The Rc- Home Automation Using Ldr And Ir Sensors is based on the hardware and hardware requirements that are being used for the creation of RC- automation. An infrared sensor is an electrical device which is used to test certain attributes of its surroundings by emitting or detecting infrared radiation. Infrared sensors have the ability to measure the heat being emitted by an object and to detect its motion. An IR sensor can measure the heat of an object along with the detection of motion. Passive IR sensors measure only infrared radiation, rather than emitting it. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. The IR sensors being used in the first part of the system is for controlling home appliances. These sensors will be fitted in the home appliances so that they can be controlled via remote. RC- automation also consists of the use of LDR sensors. An LDR is a sensor that has a varying resistance that changes with the light intensity that falls upon it. They find their application in light sensing circuits. Light dependent resistors or photo resistors are mostly used in circuits where it is necessary to detect the presence or the level of light. The system consists of the working of an exterior light (of the house) through LDR. When light reflects onto the LDR its resistance decreases and current starts flowing into the base of the first transistor and then the second transistor. The preset resistor can be turned up or down to increase or decrease resistance thus making the circuit sensitive.

#### 4. PROPOSED METHODOLOGY

RC- automation tries to implement IR sensor for RC home automation. Using RC- automation all the home appliances which are directly connected to the mains can be operated using a TV remote. Basic operations like turning on/off of the lights, fans etc can be done via the remote, there is no need of going to the switch board for these operations. The circuit would work in a range of 10 meter. The range also depends upon the intensity and orientation of the infrared waves and can also be affected by different barriers. In the circuit the infrared rays generated by the remote controller are received by the IR receiver of the circuit. The appliance to be controlled is connected between the pole of the relay and neutral terminal of mains. It gets connected to live terminal of AC mains. RC- automation has been entirely focused on making an intelligent home using technologies which are going to helps in home automation. As known at present our TV remote emits IR rays. The same technology can be used to control home appliances around us. For signal transmission the remote control uses infrared waves which can helps to connect home appliances conveniently.

#### 5. CONCLUSION

RC- automation for the "Home Automation" has a vast and great scope with limitless applications in this technology driven world. The system can be made more and more efficient and handy by make it applicable for varied range of devices. The basic motive of the system is to access the home appliances smartly and to reduce human efforts. Few suggestions for future research work on the paper can be like the user to set an on/off timer for home appliances, automatic lighting etc.

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