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Smart Automation System for Controlling Appliances using Mobile Device

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Abstract: ***Electronic devices and appliances have become very common in this recent year of technology especially with fast development in smartphones. In this paper, the design of Home automation system with good feature of automation via mobile device are presented. Bluetooth Based smart Automation System Using Android and Arduino is design and implemented. Bluetooth Based Automation System Using Android application and Arduino is implemented and design. This paper describe about smart automation system which would use to enable home lighting, fan, cooler, water pumping motor using a smart phone application with Bluetooth wireless technology. The system included three main components an Arduino Uno for connecting the appliances, a Bluetooth module for signal transfer, and a smartphone with the Android application to control home appliances. The idea of paper is to control home appliances to avoid the dangerous of electric shock and convenience of decrepit physically disable people, who can easily access and control the home appliances by staying at particular place and access them through smart phone without the help of other people.***

Keywords: Android, Automation, Bluetooth module, Application, smart phone.

I. INTRODUCTION

Today, mostly smart phones are using in this world, which offers more advanced capabilities in connectivity issues than regular cell phones. Smart phone usually support one more short range wireless or technologies such as Bluetooth and infrared, making it possible to transfer data via these wireless connections. Smart phone can provide computer mobility, data access and intelligence for almost every aspect of business processes and people's daily lives. Home is increasing day- by-day with numerous benefits. This paper are working to build efficient and affordability automatic systems to monitor and control different machines like lights, fans, cooler, and other requirements with the use of Bluetooth technology in a smart phone. So, many manual actions are replaced by reducing human efforts and time saving. Bluetooth technology operate over unlicensed, it available at 2.4GHz frequency it also can link digital devices within a range of 10m to 100m at the speed of up to 3Mbps but it depending on the Bluetooth device class. In this paper, Arduino based smart automation system using android smart phones and relay board is used. Such a system will enable users to have control over home lighting, water pump, fan, in their home with Bluetooth application. The main requirement for user is an Android smart phone, which is present in almost every person hand nowadays, and a control circuit.

II. LITERATURE REVIEW

Smart automation is a challenging one not only to the developer but also to the consumer. Developer has to choose the component as per the customer requirement. Due to all the customer demands are not equal hence they have to compromise with the existing products. Through detailed study of “Arduino based smart automation system for controlling various appliances using mobile device” proposed by A.K. Kasim, A. Raheem, vinay sagar K N, Kusuma S M, Tyagi, C.S., aharwal,M., gola and A.B.H. Amirah, H.I.I. mohomad, K chan, it is found that they have module to connect ESP8266-01 module to the internet. Through this module they are controlling various devices through android application. In their paper have implemented Bluetooth module in Arduino through which they are controlling devices.

III. METHODOLOGY

Home automation describes a system of Bluetooth and mobile application controllable that make our life easy. In this device there are several main parts Arduino, Bluetooth module, Relay drivers, photo resistor, mobile monitor, temperature sensor, android application. Firstly, we provide power to the input voltage and given to the Arduino with VIN pin. The Bluetooth module is also connected with Arduino to Rx and Tx pin that provides the information to the microcontroller. Microcontroller reads the information and send to the relay drivers which work as a switch.

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In Arduino we upload the program as per requirement, then it performs some mathematical and logical operation to control the relay drivers. In the application we also set the light/fan button. Water motor on/off automatically by declaring water level. After giving power supply (5v) at first connect the Bluetooth module with android application. The second main component we used is temperature measurement sensor. When the room temperature will be greater than 31 degree Celsius then the fan speed will be high otherwise it will be normal speed. Also automatically on/off water motor define the range of water level in tank. With the help of photo resistor it light on the component surface.

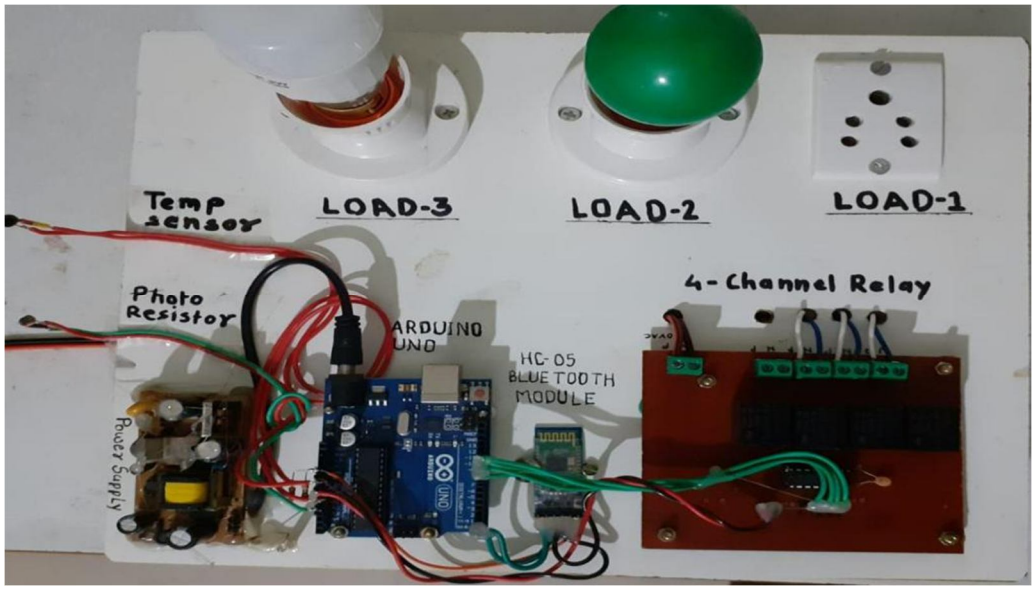

Fig 1

Experimental setup shown in fig. where we used Arduino Uno as a main controlling unit and a four channel relay board to control electrical home appliances.

Automation system control following appliances

1) Bulb direct on/off
2) Bulb automatically on/off
3) Fan on/off
4) On/off different appliances

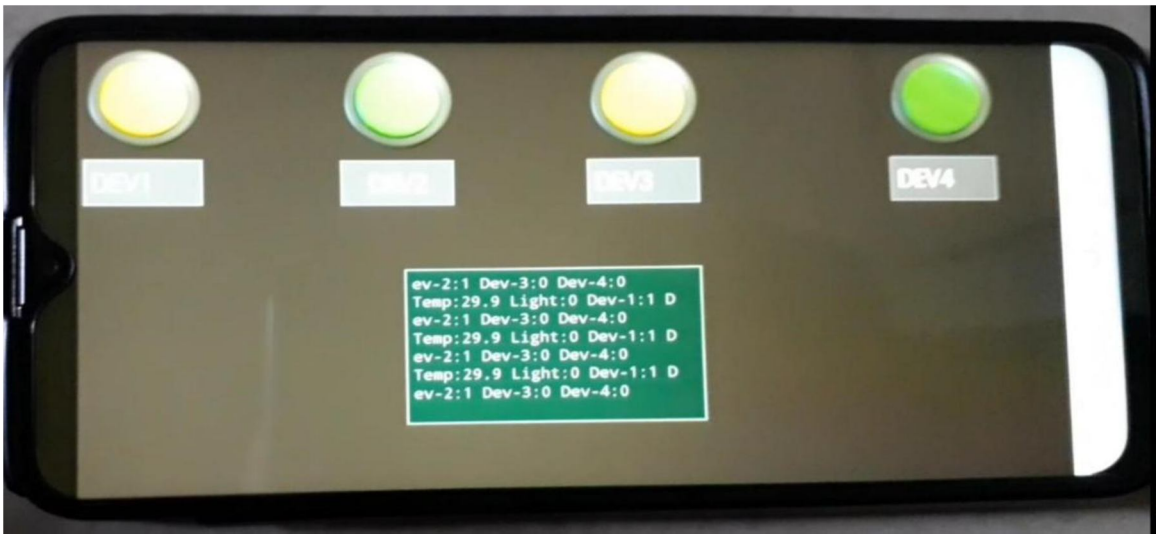

Fig 2

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The application we used is Bluetooth electronic as shown in above fig. in which device are shown on the screen, if we want light turn on just press 'DEV 1' button on the screen. Then the light will turn on. It will work another light and fan also by pressing another button. 'DEV 3' is for fan and 'DEV 4' is for other different appliances. According to condition we replace load. This application is very simple to use. DEV 1,2,3,4 are available on mobile screen they are connected to Bluetooth module so we can easily on/off appliances with our requirement. This android application is very simple and easy to understand with good result. Anyone should install this application and take benefits of it. When we want to off any device simply tap on the screen.

IV. RESULT ANALYSIS

According to the proposed plan the final outcome of this paper leads to the development of a smart automation. Through this project, an automated system has been created so that we can easily control home appliances like as light, fan, AC, Water motor, Door lock, etc. One of the objectives of this project is also to get us a smart automation and low-cost project. Android application shown in above figure. This is the mobile monitor views. This provides all connections and components. When power is supplied to Arduino board, the room temperature and water level are displayed on the mobile monitor. After giving power supply (5V), at first connect the Bluetooth module with android application. If we want light turn on just press the "Light On" button on the application then the light will turn on. It will work another light and then 38 degree Celsius, then the fan speed will be high otherwise it will be normal speed. Also, water motor on/off automatically by define the range of water level in tank.

V. CONCLUSION

Following are the main features of the designed unit that make it unique compared to the existing smart automation systems. . Additionally, this technology can be developed with low cost and more efficient way by using the technologies like temperature measurement, photo resistor, relay, Bluetooth module. Another achievement of this study is the design and development of an activity based color mode LED lighting and dimming system. Therefore, this is commercially valuable for the fields like residential developments, tourism, hotel industry and farming. Connecting simple appliances to it and application successfully controlled from mobile device. Thus the low cost automation system was designed, implemented and tested. This project propose a low cost, secure, auto-configuration controlled solution. It has achieved the target to control home appliances using Bluetooth technology to connect system parts. Satisfying user needs and requirement.

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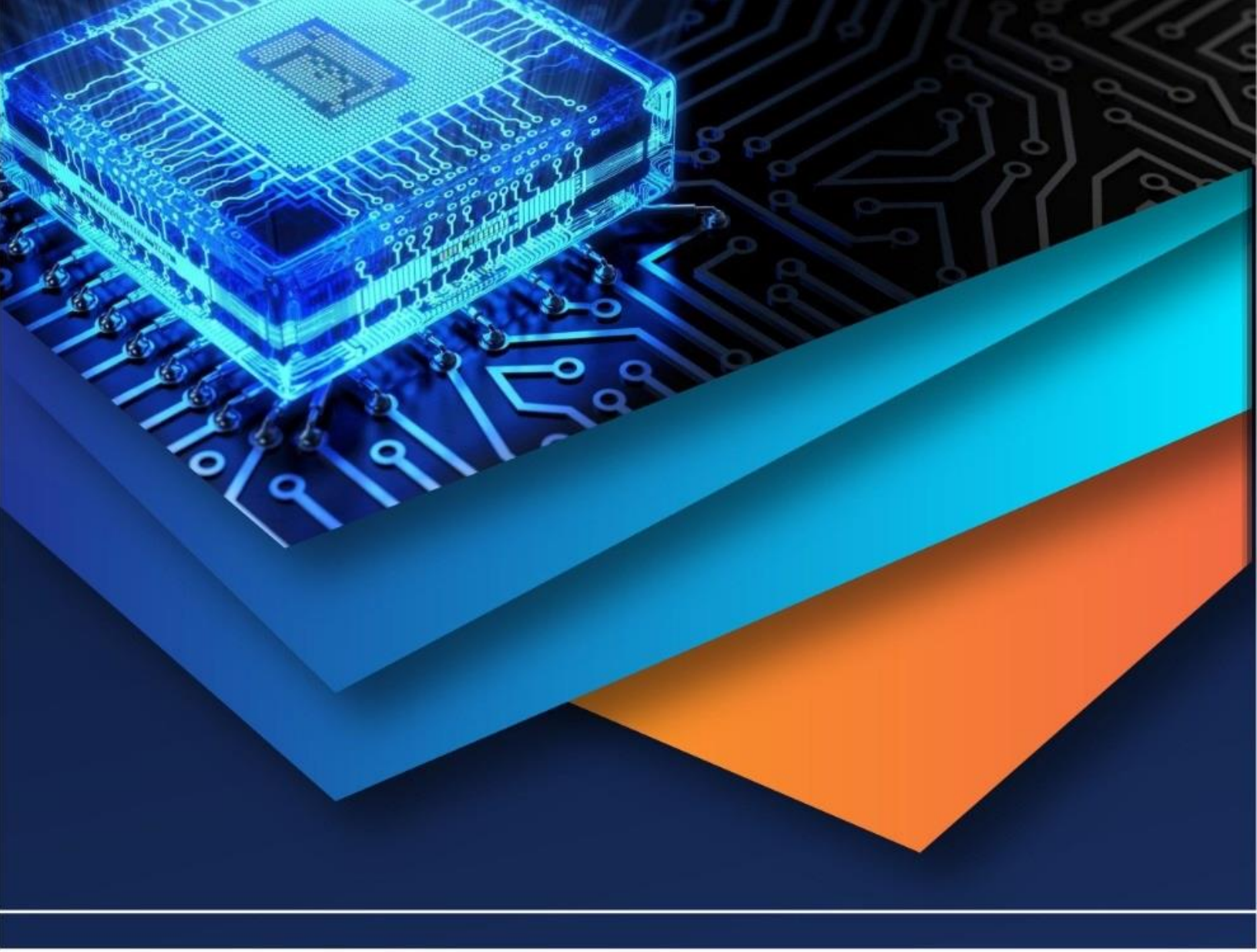

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