UNIVERSAL REMOTE

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Abstract - The home automation system has become very popular in recent decades and increases comfort and quality of life. Home automation plays an important role in our daily lives to control devices with a single push of a button or click. In this case, users can check the devices from laptops, iPhone, iPod or other smartphone devices that support the exchange of devices.

The smart home system creates a more comfortable, secure, human and intelligent living environment. A smart home is a ubiquitous computer application in which the home environment is monitored by environmental information to provide context-sensitive services and to facilitate remote control of the home.The need for comfort and a comfortable life is particularly important in smart homes. Today, home automation plays a crucial role in our lives. With home automation, the user can control the house from his computer and assign actions that should be carried out depending on the weather or another sensor measured values such as light, temperature or sound from any device in the home automation network. It facilitates communication between many real objects by working with different technologies [1].

***Key Words*:** smart homes, automation, common remotes

1. INTRODUCTION

Special hardware is required to turn a mobile phone into a universal remote control that can be used to control IR-based devices. Automating the environment of a modern person enables more efficiency and comfort at work. There has been significant development in the area of routine tasks for individuals and those that can be automated [2]. In this paper we propose a cost effective remote control for household appliances using IR communication protocol. Therefore, many employees are trying to implement a universal remote control using intelligent mobile devices as part of the home automation system. Nowadays, most smart home devices are equipped with a remote control that contains multiple buttons and wireless transceivers. Generally, in a traditional appliance system, we use wall switches in different parts of the room that can be turned on and off by manual switches. . In general, people tend to forget things. Sometimes people forget to turn off the lights at home when not in use.This configuration offers increased operational complexity across the room with multiple devices. Therefore, the idea of the universal remote control is presented to integrate several functions of devices or home applications in a single remote control. This project deals with the universal remote control solution, which is based on a widely used hardware solution, with which one can connect not only current devices from different manufacturers, but also older devices that only support operation via a basic controller for infrared transmission.

2. OBJECTIVES

The main objective of this project is to develop a user friendly Universal Remote that can be very simple in construction and have manifold applications. [1] To build a multi-purpose remote using microcontroller: As mentioned in the above description multi-tasking is a vital requirement of any product. For the upcoming days of the future, comfort zone will be extended beyond the limits. So the design of such a remote will be a need of the hour.[2] To build a small and handy universal remote: The main objective of any product related to smart home application is that, its smaller size. It is a big deal to make those complex ideas in a small venture. Every product has to be easy in operation for all range of users. [3] To design a high state of art remote: Updated Technology has its own craze in any product. The final design and product demands all technological high end features. The communication oriented products needs a well reserved specification to give précised results for the customer. Finally, the product needs this feature to remain in a good position in the competitive market [4]. To design a remote with recharging function: Charging the battery creates a big deal in the past products. That disadvantage makes the product to lag in the competitive market. Nowadays rechargeable batteries are the better option for high end technological products even for E-Vehicles. And also rechargeable batteries ensure the longevity of the product for a longer period of time. [5] To implement a design with long time withstanding capacity: The long run capacity of rechargeable batteries is less compared to the normal batteries. Suitable technology has to be adapted in concern with this issue. Effective algorithms and methods are very essential is designing a product with long run capacity.[6] To implement modern charging techniques to the design: Modern charging techniques are very linear without any malfunctions. Usually charging creates several issues in these kinds of products. Novel methods for charging options have been identified already. Implementing the suitable technique is very important to ensure the withstanding capacity of the battery.

3. ARCHITECTURE DESCRIPTION

The proposed work is a simpler form of architecture for the Universal remote in comparison to the existing ones. Even though everyone could afford it, they cannot master it. So this universal remote will be very easier to use and simple to construct. The core part of this universal remote is the Wi-fi Processor (i.e. ESP-12F), used to integrate the signals from the receiver and send it back again with the suitable command as per the users wish. It also consists of Infrared receiver (TL 1838), a keyboard driver (TM1650) and a battery charging and protection circuit. The dilution of the proposed work corresponds to the remote of the projector which is in miniature in size. The light energy is converted to electrical pulse which is being fed to the controller for transmission purpose and again electrical pulse is converted to light energy and fed back to the respective household appliance. The Universal remote can also be used in Industrial areas where control of huge machine requires automation.

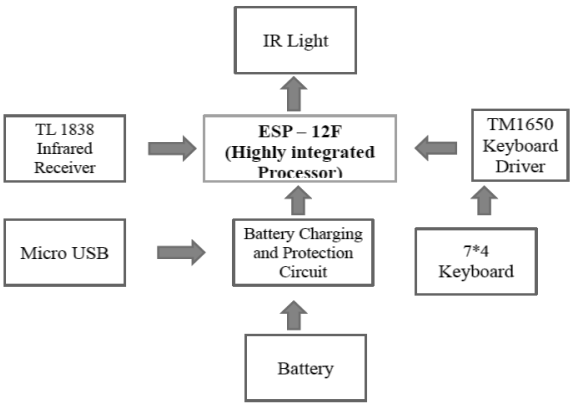

Figure.1. Block Diagram of the Universal remote

Whenever the remote requires a switch over from one device to another it definitely requires a reset option. And whenever a new configuration is operated through the remote it has to be programmed accordingly. Interrupts also play a major role in delay scheduling and signal inrush. Since these systems are based on communication protocols, signal transmission is very fast and cannot be interpreted.

4. HARDWARE METHODOLOGY

Whenever the user needs to operate the home appliance, the desired operation is just clicked on the remote. When the button is being clicked the Infrared Trans receiver from the remote gets the IR light from the respective appliance. The processor receives the light wave from the receiver and functions accordingly. The received light from the Infrared source is converted to electrical pulse and the processor process the pulse into desired function. Again the pulse is converted to light energy and sent back to the same IR source.

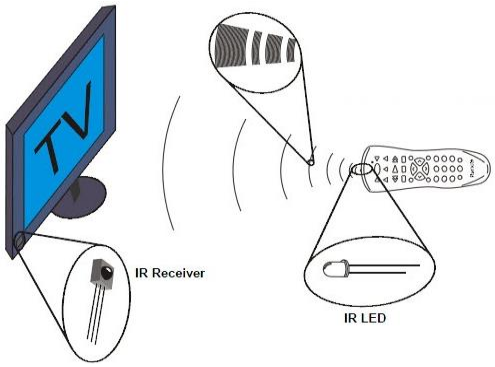

Figure.2.Generalised working of Universal Remote

Generally Infrared light is preferred in most of the household appliance because of its long range. The appliances may be fixed at any point of the building. To get access to those areas the Infra-red light is preferred. Technically they have larger wavelength and the light is highly intense. Complete working of the Universal remote with normal home appliance is shown in the figure.2. The working of a remote is generally simple. Whenever the user switches the buttons, it changes to the desired option. But, in this case the remote can be used for all the appliances in common. So, the remote can propagate a delay sequence in switching between the functions and there may be interruption in the Trans Receiver due to many infra-red sources within a single roof. Generally Infrared light is preferred in most of the household appliance because of its long range. The appliances may be fixed at any point of the building. To get access to those areas the Infra-red light is preferred. Technically they have larger wavelength and the light is highly intense.

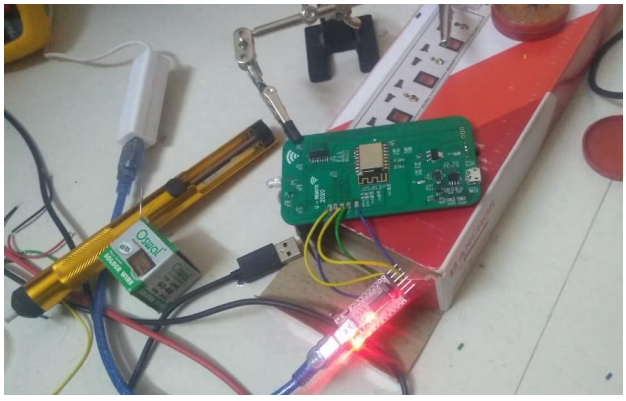

Figure.3.Hardware of Universal Remote

In the overall concept of Universal remote IR Trans Receiver plays a major role to the system. Because it acts as the trap for the IR waves and begins the function of the system. The proposed system is very common for single appliance remote, but it gets its own attraction when it comes to multi-purpose one. Since, it's a multi-purpose one processor behaves to be a heart for the system. The function may differ from one device to another. The processor has to change from instant to instant as per the requirement from the user.

Till that, the function of the processor continues as per the appliance connected. Nowadays, most of the appliances

have digital displays to show their working conditions. The resource allocation for each and every appliance is the intelligent part of the system. The transmission delay of signals can also be avoided using appropriate filters and system can be made to attain maximum efficiency.

5. HARDWARE RESULTS AND DISCUSSION

The results of the hardware are most prominent to the expected results. The microcontroller behaves in its specified manner. At execution part, for the primary results five appliances were controlled at a time. The signals sent by them have no delay and transmission speed is also permissible. The battery power is sufficient for the execution of the firmware. The setup is executed according to the instruction. The remote is handy and easy to use. The battery also assured a longer lifetime with good withstanding capacity. Its charging and discharging characteristics were also found to be in optimal range. The main advantage of the proposed system is the cost. For every normal application, every application will have its own remote. If the remote is lost or misplaced, there is a need to buy the remote for it. But in that case a universal remote could be purchased, so that it can be used for all other applications in the utility area.Web application finds a major role in the modern electronics sector. Every system being proposed has an intrusion of Web in it. Because, the ultimate place to store data in this period is web. The analysis and interpretation could be easily performed within web. So, this system also consists of web application in it. It is supported by windows. The web provides the regular updates of the proposed system and also the rectifications in the existing systems. Because, nowadays people are more familiar with the web usage and they are also common with their uses.

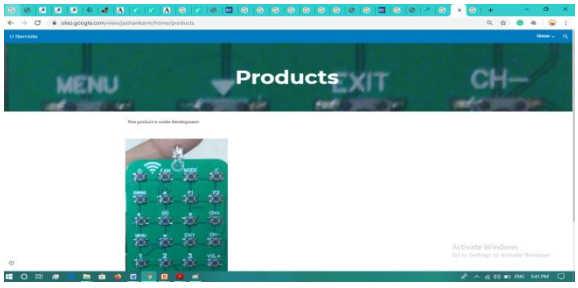

Figure.4.Website Application of Universal Remote

Regular updates are very indispensable for the updating every proposed system. The updates will be made readily available in the website developed. The user can afford on free of cost. The website for the proposed universal remote is shown in the figure.4.

Features/ Research Ideas	Technology being used	Possibility for practical usage	Preferable for automation	Type of application
NB-IoTtalk: A Service Platform for Fast Development of NB-IoT Applications [5]	Bluetooth	Medium	Yes	Industrial
NFC-Based universal touch and control platform [6]	Entocean	Complex	May be yes	Industrial
Microcontroller Based Remote Control of Home Appliances [7]	Bluetooth & Wi-fi	Easy	Yes	Domestic
Android and Bluetooth Technology Enabled Remote Control Using [8]	Bluetooth	Medium	Yes	Domestic/ Industrial
Home Automation System with Universally used Mobile Application Platform [9]	Cordless telephones	Practically impossible	May be yes	Industrial
Advanced universal remote controller for home automation and security [10]	Zigbee	Hard	Yes	Domestic
Universal Remote	Wi-Fi	Easy	Yes	Domestic/ Industrial

Table.1. Comparison of Universal remote with other research remotes

The table.3 compares the proposed universal remote with existing research papers.The other research based universal remotes have advanced technologies in them. The advanced technologies like Entocean, Cordless telephones require highly skilled personnel to operate them. So their practical existence is little complex.

6. CONCLUSION

The prototype of Universal remote was constructed and was found to be working with satisfactory performance. The future work to be done would be to add wireless capabilities. The design of the system can be made very user friendly and lots of features to easily manage all devices can be added. The future scopes of this system are endless. The system can also be tweaked to needs of elderly people as and when needed to provide hazard free service.

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BIOGRAPHIES

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