Universal Remote Control

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ABSTRACT :

With most pieces of consumer electronics, from camcorders to stereo equipment, an infrared remote control is usually always included. Today we all are using mobile phones, and in each mobile devices there is one common communication media through which devices communicate and that common platform media is Bluetooth Project is consisting of two main sections, which are as describe below

A. Mobile Android application: A phone application which help to transmit the signal through Mobile Bluetooth to the main circuitry. For different devices the library of the remote module of that device will be configure prior to use on it. The library module is of devices can be easily obtain via use of model number of that device.

B Central device: It will detect the signal transmitted by the android mobile application, based on the type of signal it will fetch the command and generate the IR signal, these IR signal will control various electronic device which works on separate remote. The source code and instructions is already be feed into the memory used.

1. INTRODUCTION

"IR" stands for infrared. Infrared light is invisible since its frequency is below that of visible Otherwise, it is like any other light source, operating under the same laws of physics. In most cases, the IR signals are produced by an LED source. TV remotes send commands only one way, in a low-speed burst for distances of up to 30 feet. They use directed IR with LEDs that have a moderate cone angle to improve ease-of-use characteristics. The IR signal sent out by those devices is generally modulated to around 38 kHz carrier using amplitude shift keying (carrier on or off). The data rate send is generally in range of 100-2000 bps. There are some IR systems which use other frequencies and other modulation systems. Generally infrared remote controls are a 32-40 kHz modulated square wave for communication. This square wave is then send to IR transmitter (IR LED). The carried frequency is amplitude modulated by the data, usually full on/off type modulation. The data rate is typically in 50-1000 bit/s range depending on the system used. Usually the transmitter part is constructed so that the transmitter oscillator, which is driving the infrared transmitter LED, can be turned on/off by applying a TTL voltage on the modulation control input

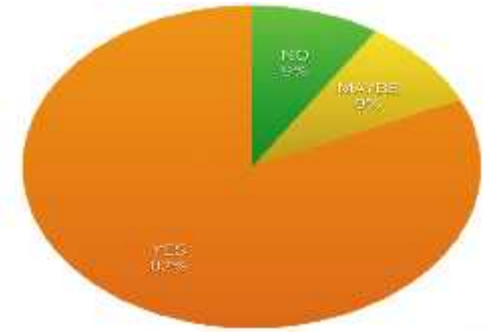
5. OBJECTIVE:

The objective of this project is to develop a functional Universal serial remote control software or program that will make it possible for all people to control any brand of their TV, DVD player, Satellite receiver and other remote control based electrical appliances from their personal computer or notebook.

6. MOTIVATION AND SCOPE:

In today's world many of us have different IR based devices like TV, Home Theatre, Projectors, DTH boxes, just to name a few.
These devices are controlled wirelessly using different remote controls which are unique to them respectively.

On an average a normal household/workspace has at least 3 remotes to control their electronic devices according to the survey conducted by us and if you like to keep up with the latest advances in technology, chances are you have at least one remote control per electronic devices.
Each remote requires maintenance like battery replacement etc. that can add up to a lot of remote control batteries if you own several remotes. Replacement of batteries can get to be quite expensive if they drain too quickly.
Thus we felt a need to create a device which can single handedly controls all these devices with just a smartphone application along with it.
But the main motivation behind this project is that, when we conducted our.



2. CURRENT SCENARIO:

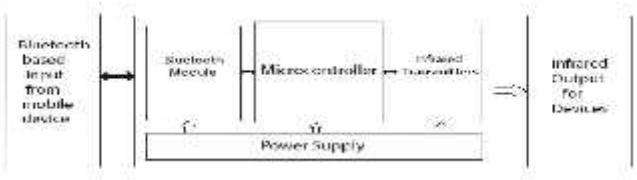
Smartphones and tablets such as those running Nokia's Maemo (N900), Apple's iOS and Google's Android operating system can also be used as universal remote controls. A number of devices from vendors such as Samsung, LG and Nokia include a built-in IR port that can be used as a remote, while others require a physical attachment, or 'dongle', be connected on to the phone when used as a remote. The dongle is required to convert the electrical control signals from the phone into infra-red signals that are required by most home audio visual components for remote control. However it is also possible to implement a system that does not require a dongle. Such systems use a stand-alone piece of hardware called a 'gateway', which receives the electrical control signals from the smartphone in Bluetooth or Wi-Fi form and forward them on in infra-red form to the components to be controlled. There are multiple universal remote apps available for Android. One of the first apps available to use the IR port was IR Universal Remote. It was released by Wave Spark in early 2013. The application is still available in The Google Play Store today. If you have a device with a built in IR Blaster then you can download it to use as a universal remote replacement. The developer Wave Spark has recently updated the application interface and re-released an IR Only Version.

3. HARDWARE AND SOFTWARE REQUIREMENTS:

1) Arduino IDE for developing the program for microcontroller.
2) Android Studio for developing the
3) Smartphone application.
4) Arduino Nano Microcontroller.
5) Infrared Transmitters.
6) Bluetooth Module.
7) Interfacing ATmega328P with Peripherals.
8) Knowledge of Embedded C and Java.

4. PROBLEM DEFINATION:

The use of remote control to operate wireless device has become an integral part of our life. Due to advancement in technology in embedded systems and availability of various machines to our comfort, there was a need felt for a smart remote control which could single handedly control the IR based device present, thereby reducing the need of multiple



7. SURVEY:

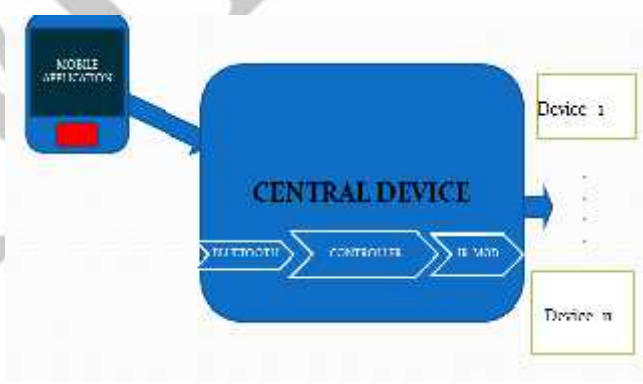
A stupefying 82% people desired for a single remote control.
We can modify this project for the betterment of the product and to increase its usability and efficiency. We can add voice control to control the application and also use it as authentication for access of the application. We can further reduce the overall area used by the hardware by making it more compact using latest design technologies.
Further we can also operate the application with gesture controls Using the motion sensor in the smartphone.

8. THE PROPOSED SYSTEM:

Our proposed system is a universal remote control that will operate via Bluetooth using smartphone application. Basically, the Graphical User Interface (GUI) for the Universal Remote Control program which is going to be develop by using android studio. The circuits will be constructed from two modules i.e. one to capture the signal and provide timing functions, and the second as transmitter placed somewhere near the target equipment. The hardware will be interfaced to smartphone application on the communication port .The remote can be operated on any standard TV, DVD player, satellite receiver and air-conditioner, operated over a range of 15 feet which will be easy to use, and also reliable.

9. DESIGN PHASE: BLOCK DIAGRAM AND FLOWCHART.

BLOCK DIAGRAM:



PROBLEM DEFINATION STAGE'S:

The use of remote control to operate wireless device has become an integral part of our life. Due to advancement in technology in embedded systems and availability of various machines to our comfort, there was a need felt for a smart remote control which could single handedly control the IR based device present, thereby reducing the need of multiple Remote controls, Energy consumption and E-wastage.

DESIGNING BLOCK DIAGRAM:

The designing of the block diagram plays a very important role as it visually describes the system as a whole displaying the significant elements of the system. The diagram below is the block diagram of the project.

IMPLEMENTING CIRCUITS AND COMPONENTS:

This is the actual implementation of each block. At this Stage we have designed each block separately and Finally integrated them into the complete working system.

DEVELOPING FLOWCHART AND SOFTWARE:

To get the logical flow of the software the development Of flowchart is having a prominent role. So we have to analyses the complete system and organize the flowchart in such a manner that one can understand the Complete working of the software.

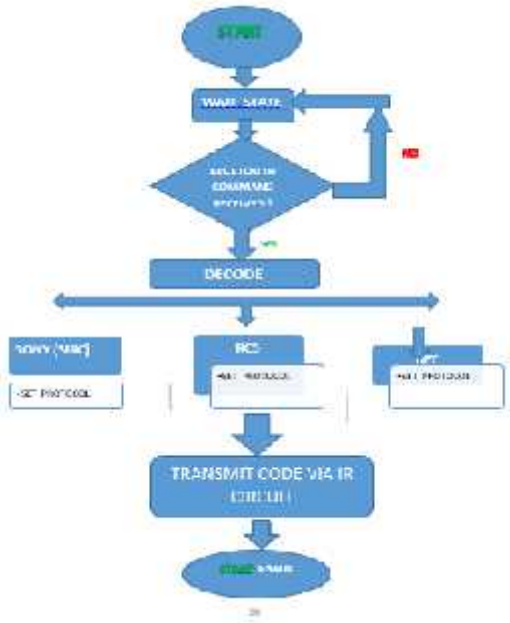
WRITING ACTUAL CODE FOR MICROCONTROLLER:

After the development of the algorithm and flowchart we have actually translated them in C language for Arduino Nano microcontroller so that it can understand the instruction and run as per our requirement. The instructions are in Embedded C language.

DESIGNING THE ANDROID APPLICATION:

The working mechanism of the application was finalized and the algorithms were implemented in Java language using Android libraries on the Android Studio platform. The UI of the application was designed along with media resources required for the same.

FLOW CHART:



10. APPLICATIONS AND ADVANTAGES:

1. Eliminate use of remotes for every devices
2. Pencil cell use will be completely eliminated.
3. Bluetooth Devices have a range of Upto 100 feet
4. Central device is smaller in size and light weight.
5. By the realization if the above proposed system we can Eliminate the use of remotes for every devices. It make use of mobile as mode of communication with All the devices and so traditional remote is replace With mobile phone.

11. CONCLUSION AND REFERENCES:

CONCLUSION:

The main purpose of making this project is to develop such a system which will provide to eliminate use remotes of every devices. In designing this project we learn various aspects involved in Arduino and java programming and about the entire system. It also involved analysis and study of IR sensors and how to maintain a protocol in order to control devices. Thus, in this work we proposed to design a project named Universal Remote control which will help a student understand the output of a device which he can use in practical applications.

REFERENCES:

1. **"Applications for Android Smartphones and Tablets using Arduino Bluetooth IR". By link www.superir.net/*Arduino_Bluetooth_Remote.***

2. IEEE paper subject," Wireless Infrared Remote Controller for Multiple Home Appliances" published by Santosh .M. Nejkar at International Journal of Electrical and Electronics Research (IJEER) in 2014