

# USING BRAIN WAVES FOR CONTROLLING DEVICES

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## ABSTRACT

Controlling various Electronic Device(s) remotely by using the Brain Waves is the project that is used for controlling the different home appliances or wheelchair remotely. System is intended to be used by any people but more preferably be used to help and provide to elderly and disabled people care in order to fulfill their needs. This design is based on the standalone Arduino microcontroller board and home appliances are attached to input-output ports of the board via multiple relays. The main part is 'mind control' that use brain signals to control a wheelchair from a window platform. The signals are captured by using a headset Epoc+. After capturing those signals are then converted into actions.

**KEYWORD:**Brain waves, Arduino, epoc+, smart-home, relays

## INTRODUCTION

Through growing requirement of the mankind on use of various electronic devices in these day to day life, the man wants an easiest handling to electronic devices. This is what called as a smart home or a home automation. The home automation system(s) or the smart-home technologies are the system(s) and the device(s) that can be used to control multiple elements of the home [1], [2]. The typical home-automation system that allows one to control the household appliances such as lights, television, fans, air conditioners, refrigerator, etc. from the centralized control module [3], [4]. This Project comes to allow the people with extra special needs like elderly and disables people to control things autonomously.

Mind Control/brain waves control is main objective of this project. Several programs were evaluated to control the numerous interfaces by using the Electroencephalography that is EEG data [5]. The EEG data is constantly being recorded while the user(s) are putting attention on the given tasks through the headset called Epoc+[6]. The activity on various regions of brain are measured. By using these measurements, the EEG data is then classified for the dissimilar cognitive actions to control a wheelchair.

## MIND CONTROL

The wireless communication is frequently required in the fields like health, home security, industrial safety, smart home automation, etc. [7]. The Bluetooth module is selected as way of

communicating mobile/computer with the central system. In this project, home appliances and wheelchair is going to be controlled by the remote control system based on the Bluetooth; and the two operating systems, a mobile and a computer. Appliances such as lights, television, air conditioner, digital satellite transceiver, etc. System can remotely switches on or off any home appliance using the prototype of the microcontroller Arduino Uno to accomplish simplicity and the Bluetooth unit to get feedback from a computer/phone device to change the state of the switch [8][9]. To control electrical appliances and wheelchair, an electronic circuit is developed, that contains Bluetooth unit (HC-05), an Arduino Uno as a microcontroller, an infrared signal transmitter/receiver (to control TV and other digital satellite), and multiple relays for switching. Those modules are all linked together and can be controlled by two devices that are the computer and the phone. This circuit powered by an AC supply. Figure 1 shows an Arduino microcontroller circuit to control AC lamp by relay and Bluetooth module.

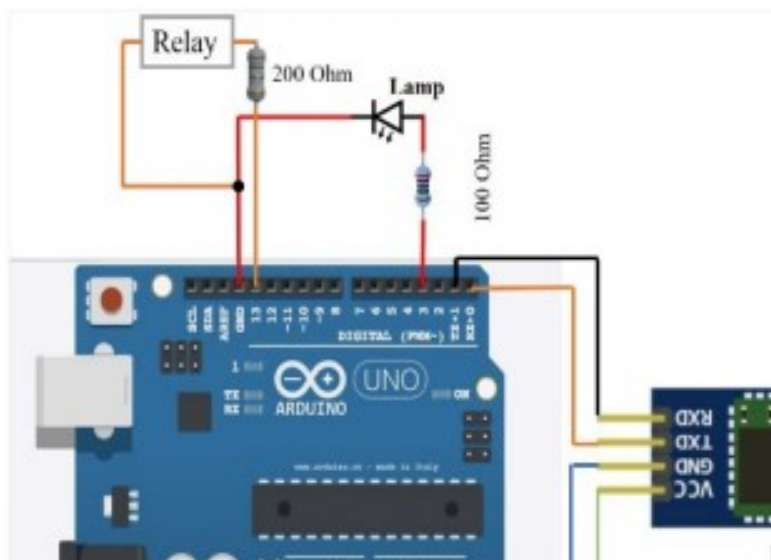


Figure 1: An Arduino circuit for controlling a lamp using a relay and a Bluetooth module

The brain control's circuit unit is used to extract brain signals. The unit is called Epoc+ headset (Figure 2). There are mainly four types of brain wave patterns that are delta, alpha, theta and beta, these can be used to detect and interpret the signals that is sent wirelessly to the devices for controlling them.



Figure 2: EPOC+ Headset

Sensor	Function	Sensor	
AF3	Attention	FC6	
AF4	Judgment	T7	
F3	Motor planning	T8	
F4	Motor planning for left upper	P7	ur
F7	Verbal Expression	P8	l Ur l
F8	Emotional Expression: Anger, Happy	O1	l

Table 1: Channels with their functions

## METHODOLOGY

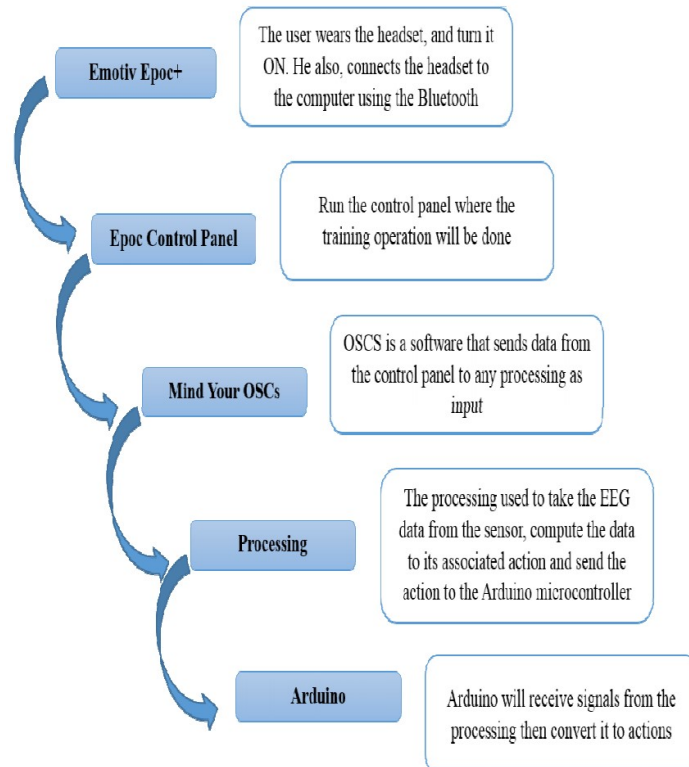


Figure 3: Working Flowchart

The diagram as shown on the Figure 3 shows the flowchart of the working of the present project. The basic idea is to allow a person to communicate to a computer with a brain wave sensor and control other different types of objects like wheelchair and other electrical appliances.

## RESULT

The controlling application is developed using a processing programming language. Processing software uses EEG data from EEG sensor and compute data to its related action and then send it to the Arduino, which then in turn send a voltage to a potentiometer to control wheelchair. The connection between the Processing and the Arduino is done by a library called a processing serial. A library called OSCp5 is used to communicate between Epoc and the processing through mind OSCS software.

## CONCLUSION

This project develops a control using a platform and method and two electrical circuit one for the home and other for the wheelchair by using mind control. This project reduces the cost of change in the home infrastructure for converting it into smart home. The circuit can control everysmart home devices with very smallchanges in home electrical infrastructure.

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