

BRAINWAVE CONTROLLED ROBOT

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Abstract - *In the world number of people are handicapped. Currently they use different technologies which give physically impaired the ability to move around. But still there are numbers of people who are fully handicapped and paralyzed but their mind still work properly. So my task for those people who are physically handicapped and little disturb from mind site is to help them so that they can move around world using their mind power. For that I try to design one robot or wheelchair which is fully automated and control using Beta wave (human brain attention) using Mind wave sensor which detect brain signal and also use Arduino to control robot or wheelchair.*

Key Words: *Mind wave sensor, Beta Wave, Neuro Sky, Arduino*

1. INTRODUCTION

Numerous patients are alluded to a neurologist to have an electroencephalogram (EEG), which records electrical motivations from the nerves in the head. "Electro" alludes to the electrical driving forces sent starting with one nerve cell then onto the next. These motivations are the way nerves converse with one another and get data from the mind. "Encephalo" alludes to the head, and "gram" alludes to the printed record.

EEG exams are finished by putting cathodes on the scalp and seeing what the electrical motivations look like when the patient is alert, snoozing, in a room with a glimmering light or infrequently when the patient is requested that inhale profoundly again and again. At the point when the EEG is done, no power is put into or taken out of the patient. The electrical signs that the mind produces are essentially recognized and printed out on a PC screen or a bit of paper.

An EEG decides the understanding's level of readiness or awareness is normal, irregularities in particular piece of

the mind, propensity to have seizures or writhing and specific sort of epilepsy.

Some of the time a patient may tend to have seizures, however his or her EEG is ordinary at the specific time it is finished. That is on account of individuals with a seizure inclination may have variations from the norm that go back and forth from hour to hour or normal. In these cases, a rehash EEG or a more drawn out time of EEG observing may be valuable.

Signal intensity: This EEG action is little, measured in microvolts (μV).

Signal frequency: The fundamental frequencies of the human EEG waves are:

Delta: has a frequency of 3 Hz or below. It tends to be the highest in amplitude and the slowest waves. It is typical as the dominant beat in infants up to one year and in stages 3 and 4 of sleep. It is typically most prominent frontally in grown-ups (e.g. FIRDA - Frontal Intermittent Rhythmic Delta) and posterior in children e.g. OIRDA - Occipital Intermittent Rhythmic Delta).

Theta: has a frequency of 3.5 to 7.5 Hz and is classified as "moderate" movement. It is perfectly typical in children up to 13 years and in sleep however irregular in awake grown-ups. It can likewise be seen in generalized circulation in diffuse disorders, for example, metabolic encephalopathy or some instances of hydrocephalus.

Alpha: has a recurrence somewhere around 7.5 and 13 Hz. It is generally best found in the back districts of the head on every side, being higher in sufficiency on the overwhelming side. It shows up when shutting the eyes and unwinding, and vanishes when opening the eyes or alarming by any component (considering, figuring). It is the real cadence found in ordinary loose grown-ups.

Beta: Beta movement is "quick" action. It has a recurrence of 14 and more prominent Hz. It is generally seen on both sides in symmetrical conveyance and is most clear frontally. It is emphasized by narcotic trance-like medications particularly the benzodiazepines and the barbiturates. It might be non-attendant or lessened in

zones of cortical harm. It is large viewed as an ordinary beat. It is the prevailing cadence in patients who are ready or restless or have their eyes open.

Gamma: Gamma waves are in the recurrence scope of 31Hz and up. It is believed that it mirrors the instrument of awareness. Beta and gamma waves together have been connected with consideration, recognition and insight.

2. METHODOLOGY

To control the wheelchair, EEG and Eye-Blinking signals are needed. Here this paper describes EEG and Eye-Blinking signals through a BCI interface. In this system we have a tendency to use simple unipolar electrode to record EEG signal from the forehead to construct a Brain-Computer Interface (BCI) primarily controls electrical wheelchairs through Bluetooth for unfit patients. We have got two signals like meditation and attention. In addition, we also extract the eye-blinking signals from BCI. Therefore, attention and eye-blinking signals are collected as the management signals through a Bluetooth interface and therefore the electrically interface in electric chair. The experimental results confirmed that this system will offer a convenient manner to control an electrical wheelchair [1].

The Proposed Structure

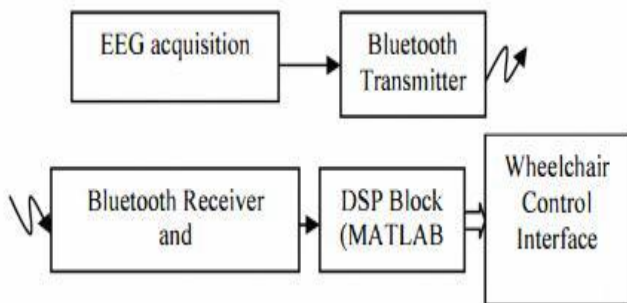


Fig.1 The framework for the signal processing of EEG Signals with Blue-tooth interface

In Fig.1, the framework for the signal processing of EEGs with Bluetooth interface is explained. The EEG signal was extracted from EEG securing. In this system, we use the NeuroSky’s headset Mindset to record EEG and eye blinking signals with headphones on the sensor to read brain waves, the brainwaves are transmitted by the Bluetooth wireless modules. In the receiving part, we use a Bluetooth module in a personal computer with a software interface organized by using of MATLAB. Two types of EEG signal are classified, for example, raw EEG and long EEG. The raw EEG signal is used to convert electrical voltage to control the electric wheelchair. Then we classified two

kinds of digital signal, for example, Attention and Meditation from long EEG brainwave [1].

In below Fig.2 We can see the experimental system.

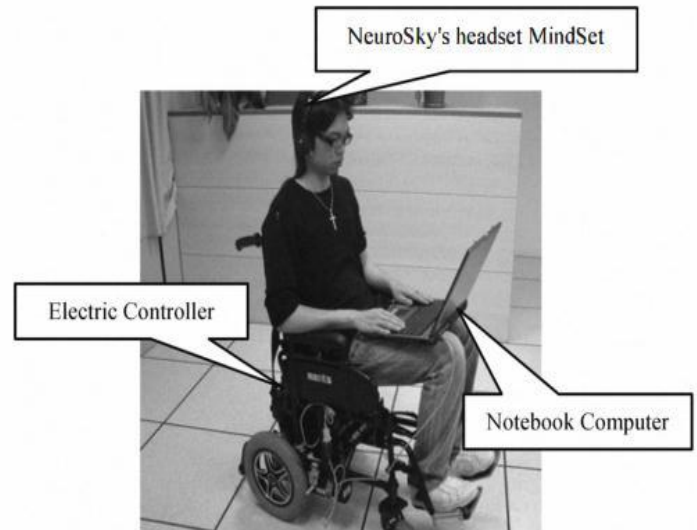


Fig.2 The experimental system

Commands	Extracted signals
Turn to a direction	1 eye-blinking pulse
Moving forward	Attention
Stop	2 eye-blinking pulse

Table-1 The commands for the proposed electric wheelchair

The seat is controlled trough 2 motor drivers. The 24 V is directly connected to the motor driver to produce the main power.

3. IMPLEMENTATION

One major difference that we are working on EEG wave and they are working on EOG wave after that eye rotation and fluctuation continues and mind we can put it stand on meditation way. We can also operate whole body in paralysis because mind is continues operated.

Simple example scenario is as follows:

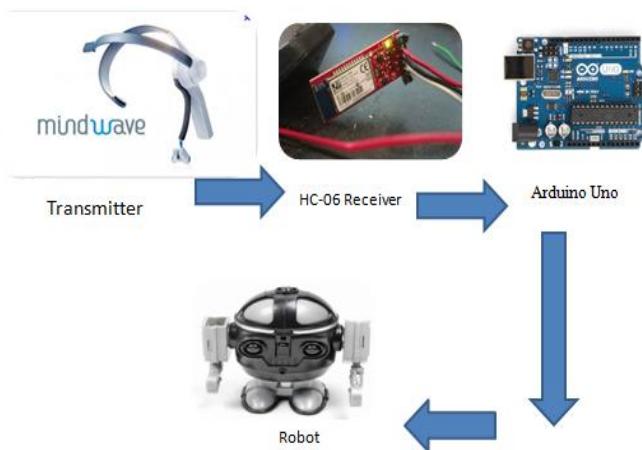


Fig.3 Block diagram of project

NeuroSky Mind wave device forwards brainwave signals to the software application. This information will then be used to train a classification system. It can learn to recognize and thus map different brain patterns to action and the classification system will continuously analyze the incoming brainwaves and map them into the appropriate actions.

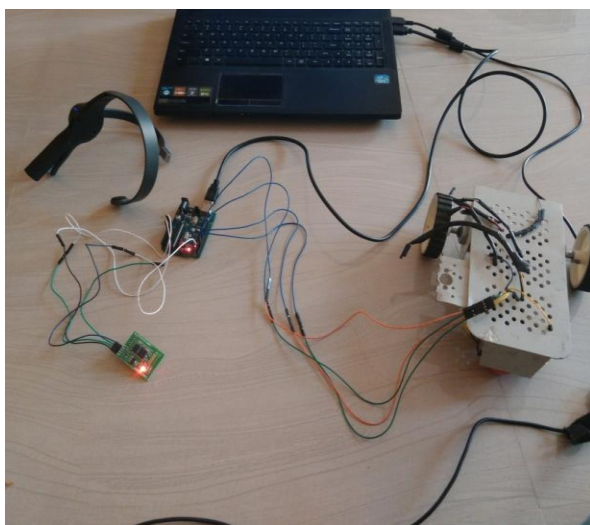


Fig.4 Project components

Simple Block diagram is shown in Fig.5:

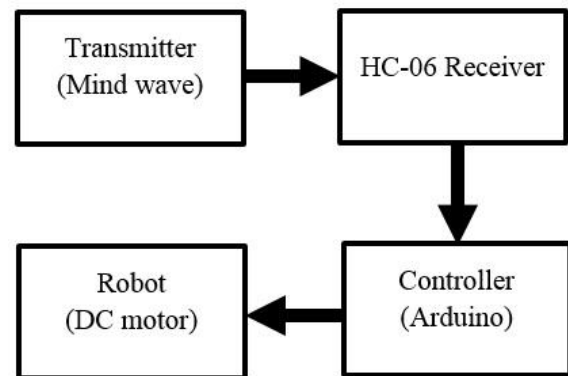


Fig.5 Simple Block diagram

Working of Mind Wave device is shown in Fig.6:

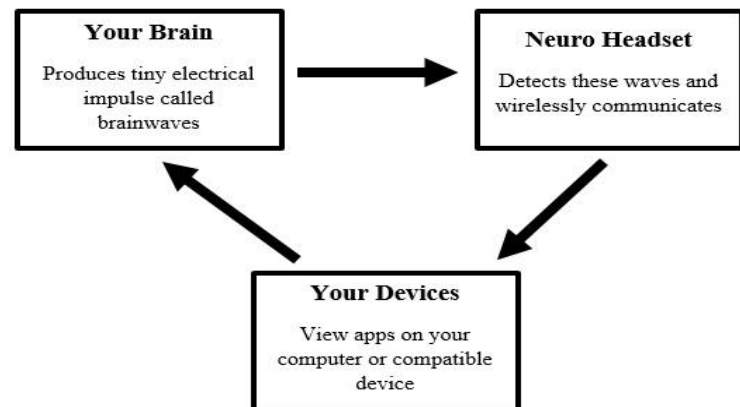


Fig.6 Working of Mind Wave device

NeuroSky gadget catches the Beta wave signals which are originated from our mind then it is sent to Hc-06 Bluetooth beneficiary module. This HC-06 module interfaces with Arduino and robot is associated with Arduino.

4. CONCLUSION

In this paper I have described my application. I designed one robot or wheelchair which is fully automated and controlled using Beta wave (human brain attention) of Mind wave sensor which is detected from brain signal. It uses Arduino to control robot or wheelchair.

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