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An Electronic Device to Aid the Physically Challenged People using Brain Waves

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Abstract:

Brain computer interface is a technique used to capture the emotions and thoughts of a brain activity using Electroencephalogram(EEG). So it is useful to communicate with humans.In this paper, it deals with a Neuro sky mind wave to detect the signals for physically challenged people. If the brain activity of a signal and already attained signals are matched it displayed on the PC then it converted into an audible signal.

Keywords — **EEG, BCI, Neuro sky mind wave,speech synthesizer.**

Introduction:

Human beings need a speech and gestures to communicate. Brain computer interface provides a direct communication between brain and human being. In human computer interface the speech and gestures are coordinated. Amyotrophic lateral sclerosis is a disease which cannot express their thought for a particular patient communication can also be done by using the movement of the eyes.EEG technique can convert the brain activity into machine code for communication between the external world and brain.

The acquisition can be divided into Invasive and Non Invasive. Invasive-Based on sensor we can identify the brain activity signals. Non Invasive-EEG based brain computer interface can calculate the electrical activity of the brain using electrodes. Based on EEG we can also detect the emotions of a particular person. And evaluate with the brain disorders and brain functions.

Literature Survey:

I) An exploration of brain computer interface and its recent trends

Based on different types of neurons,brain is covered in humans. With the help of threshold value neurons can calculate the activities of electrodes inside the brain. Then neurons perform and generate the electric pulses and magnetic field to perform the activities of the brain.
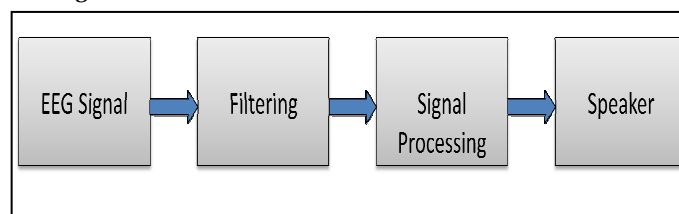
Block diagram

Fig. 1 Block diagram of audible signal

Methodology:

A.Signal Acquisition
B.Signal preprocessing
C.Signal Classification
D.Signal Interaction

A. Signal acquisition

Neurons which generate the electrical signals and collected electrodes

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should be placed on the surface of the scalp. So brain can automatically detect their electrodes activities. If the acquired EEG based BCI technique is too weak. We need to amplify with a wireless device (Neuro sky mind wave) used to detect the activities of the brain.

Fig. 2 Neuro sky mind wave

B. Signal preprocessing

To remove noise like EMG,ECG,EOG is used in the form of the signals. The Classifier can translate the features into commands. With filtering technique we can remove noise in preprocessing.

C. Signal Classification

EEG can capture the numerous electrodes.

It includes five types of signals

1)Alpha waves-Frequencies between 8-13HZ,brain is in relaxed or empty state.

2)Beta waves -Frequencies between 13-30HZ,brain is in active.

3)Gamma waves-Frequency in 35HZ,brain is in consciousness.

4)Theta waves -Frequencies between 4-7HZ,brain is in emotion, stress.

5)Delta waves -Frequencies between 0.5-4HZ,brain is in deep sleep.

D. Computer Interaction

Based on programs in MATLAB or LAB VIEW we can implement an application.

Limitations

Different types of EEG signals captured from the same person are difficult to record.So the activities of mental tasks for each person are complex to design in Brain computer interface(BCI).Brain signals cannot be calculated easily with the detection of video or image is complicated.It is also not possible to reconstruct the image.

Proposed System

A Neuro sky mind wave is a technique used to rectify the activities of brain signal.In EEG signal is automatically captured based on the electrodes and it is stored in the matrix format.If the frequencies are matched it displays the EEG signal of the particular person.Signal acquisition and signal processing is easy to calculate all the waveform signals.

II) Mind wave-A new way to detect eye blink

EEG gel electrode and EEG cap is a technique to capture the activities of brain in Neuro sky mind wave reader.

Methodology

A.EEG

B.Image processing

A. EEG

Recording of electrodes on the scalp is based on EEG. It attached to an individual wire for the system. Measurement of Neuro signal can also be carried out. By using letters we can position the electrodes placed on the scalp and montage are also used to refer the placement of electrodes.

Fig. 3 Navigation Bracelet

B. Image processing

Blink detection is done by using a camera.

1)Frame capturing   -Capture the frame using a camera
2)Face detection-Facial region can be identified
3)Eye detection-Detection of facial region can locate the eyes.

Limitations

Detection of eye blink and calculation of every part of the retina is difficult in capturing the EEG signals.Implementation is done by using only one hardware component so it is not sufficient to use the EEG signals

Proposed System

Navigation Bracelet and internet connection is a technique to monitor the person using GPS and give an alert and commands if the physically challenged people can't communicate with others.If the particular person is comfortable with placing the vibrating alert we can use more to identify all the notifications.Battery lifetime is depends on the motor and commands.

Conclusion

In recent years capturing the signals of the brain can be done by using a Neuro sky mind wave.So the brain can be detected and automatically calculate the number of electrodes in brain so there are no damage and repair. Signal processing and analysis is a research work on this brain. By using image processing technique we can detect the face detection and blink detection to overcome.

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