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EYE BLINK CONTROLLED VIRTUAL KEYBOARD USING BRAIN SENSE

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ABSTRACT: In our society there are more people suffered by paralytic diseases causes them several disabilities like they're unable to speak and unable to maneuver physically and unable to specific their everyday basic needs, but they'll still use their eyes and sometimes move their heads. This Project is functioning under the principle of Brain-Computer Interface (BCI).Our model helps them to type the letters using the virtual keyboard, which is displayed within the monitor, designed using MATLAB programming. this method has core system as Brain sense. The virtual keyboard contains alphabets, numbers and a few punctuations. Mouse pointer gets automatically shifted through every key, characters are often chosen by making a watch blink at a specific position of mouse pointer at a specific character.

General Terms

BCI, NeuroEEGwaves, Bluetooth, MATLAB.

Keywords

BCI - Brain Computer Interface,

EEG-Electroencephalography

1. INTRODUCTION

The Brain-Computer Interface (BCI) is one altogether the road accustomed make an interaction between the human brain and an information processor. BCI which monitors EEG waves from the Brain. EEG – Electroencephalography which monitors an Electrical property of the Brain together with the Scalp (Non-invasive). The Neurosky Mindwave Brain Sense measures intentionally directed EMG activity (blink strength). we must always measure the target innate reflex rate to pick an object. A brain-computer interface (BCI) could even be a replacement line between the human brain and an information processor. The ambitious goal of a BCI is finally the restoration of movements, communication and environmental control for physically challenged people.

2. LITERATURE SURVEY

2. A. Brain Computer Interface based on SSVEP for Controlling a Remote Control Car.

This work presents the event of a Brain Computer Interface (BCI) supported Steady State Visual Evoked Potentials (SSVEP), that permits a user to manage a foreign control car. The visual stimulus conditions of area, frequency, amplitude, and shape were evaluated with the aim of obtaining the SSVEP signal with the foremost effective amplitude so on get the foremost effective performance of the developed BCI. a foreign control car was built and was controlled by a healthy subject using the developed SSVEP BCI, proving its proper functionality. Using this bci concept efficiency of the control car increase

2. B. EEG-based Hybrid BCIs and Their Applications.

In this paper, we presented two hybrid brain computer interfaces (BCIs), one combing motor imagery (MI) and P300 and another combing P300 and steady state visual electric potential (SSVEP), and their applications. a crucial issue in BCI research is multidimensional control. Potential applications include BCI controlled mouse, keyboard, document and email processing, application, wheelchair and neuroprosthesis. The challenge for EEG-based multidimensional control is to get multiple independent control signals from the noisy EEG data.

2. C. EEG Artefacts Handling in a Real Practical Brain–Computer Interface Controlled Vehicle.

One of the foremost issues restricting the sensible efficiency of brain-computer interface (BCI) systems is that the inevitable occurrence of physiological artefacts during electroencephalography (EEG) recordings the frequencies and amplitudes. the results of the artefacts are, however, mostly discarded in practical BCI systems,

due to the time-consuming and sophisticated computational processes. This paper presents the influences of the artefacts and thus the efficiency of reducing these influences in an exceedingly practical BCI. Ocular and muscular artefacts are considered due to the high-amplitude, high-frequent and wider bandwidth presence.

2. D. Single Versus Multiple Events Error Potential Detection in a BCI-Controlled Car Game With Continuous and Discrete Feedback

This work aimed to hunt out and evaluate a special method for detecting errors and losses in continuous brain–computer interface (BCI) applications. rather than classifying errors on a single-trial basis, the new method was supported multiple events (MEs) analysis to extend the high accuracy of error detection and rectification. Methods: in an exceedingly BCI-driven car game,car control, supported motor imagery (MI), discrete events were edge triggered whenever subjects collided with coins and barriers. Coins counted as correct events, whereas barriers were errors. we should always detect the errors and rectify it. Count the error and corrected events.

2. E. Neuro Based Racing Car for Cognitive Training

Various sorts of therapy are introduced to lower the amount of individuals attentively Deficit Disorder (ADD). Some available treatments don't seem to be suitable for the kids since medication is employed and requires them to meditate. the utilization of Neuro based physical game to perform cognitive training on ADD children has not been reported.

2.1 EXISTING SYSTEM

Communicate using wink since they'll still use their eyes and sometimes move their heads.

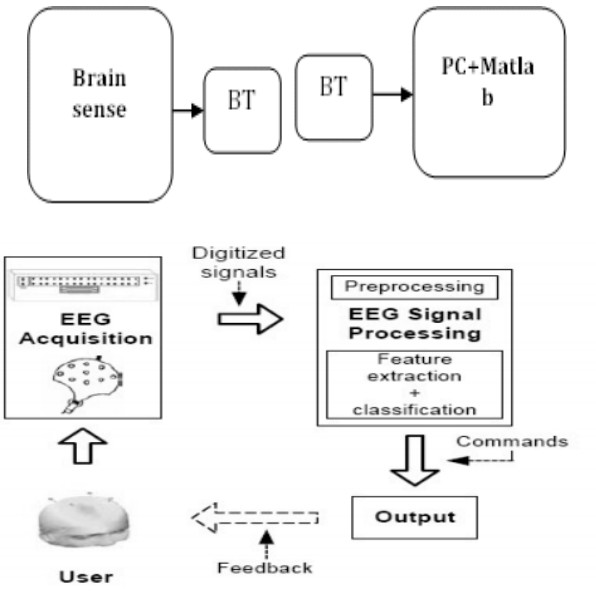
2.2 PROPOSED SYSTEM

EYE Blink Talk performs binary encoding and decoding of the blink patterns detected by a Brain sense or Neurosky Mindwave mobile device and translates those codes into pre-set phrases that through speech synthesis is chosen and spoken by the host computer. The Brain sense or Neurosky Mindwave mobile measures intentionally directed EMG activity (blink strength), which successively become numeric values or signals waves that ultimately manifest as communication from the user. The output with the voice outcomes for each character.

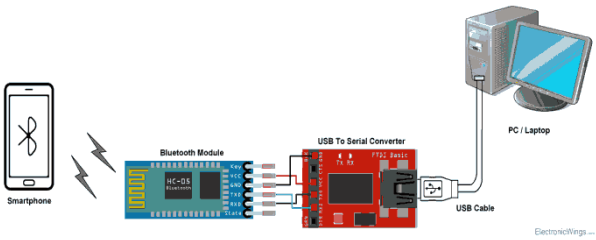
BCI (Brain Computer Interface) which monitors EEG waves from the Brain. EEG –Electroencephalography which monitors and scans the Electrical property of the Brain along the Scalp (Non-invasive). Onscreen keyboard keys highlights are occurring repeatedly as a loop when it's presupposed to detect the blink, the text gets selected (Observe the sound occurred while blinking, to point that secret's selected), this transmission is happening via Bluetooth communication. After typing desired sentence person can press the speak button to supply speech.

3. BLOCK DIAGRAM

3.1 ELECTROENCEPHALOGRAM BASED BCI BLOCK DIAGRAM



3.2 WORKING MODEL



4. PROJECT DESCRIPTION

In this system, Matlab acts as a core, it will process the signal by own. When the system begins to run, it opens the Virtual keyboard which contains alphabets, numbers and symbols. Then mouse pointer gets automatically move throughout every keys, whenever we make an eye blink at certain keys, letter got selected and got typed. Before opening that virtual keyboard, we have to place cursor at notepad or anywhere that where we have to type the sentence. After that by making eye blink at

every position of mouse pointer, character got chosed and got typed.

4.1 HARDWARE REQUIREMENTS

- Mind Wave Mobile or Brain sense
- Laptop or Pc with Bluetooth connectivity and speaker

4.2 SOFTWARE REQUIREMENTS

- Matlab 2018b (64 bit)
- matlab 2019b (64 bit)

4.3 BCI WORKING PRINCIPLE

Present BCI's use EEG activity recorded at the scalp to manage cursor movement, select letters or icons, or operate a neuro prosthesis. The central element in each BCI could even be a translation algorithm that converts electrophysiological input from the user into output that controls external devices. BCI operation depends on effective interaction between two adaptive controllers: the user who encodes his or her commands within the electrophysiological input provided to the BCI, and then the pc which recognizes the command contained within the input and expresses them within the device control. Current BCI's have maximum information transfer rates of 5-25 bits/min and eye blink rate.

The common structure of a Brain Computer Interface is that the following:

1) Signal Acquisition: the EEG signals are obtained from the brain through invasive or non-invasive methods (for example, electrodes). After, the signal is amplified and sampled.

2) Signal Pre-Processing: once the signals are acquired, it is a necessity to wash them.

3) Signal Classification: once the signals are cleaned, they'll be processed and classified to hunt out out which type of mental task the topic is performing.

4) Computer Interaction: once the signals are classified, they'll be utilized by an appropriate algorithm for the event of a particular application.

In the case of a sensory input BCI, the function analysis happens in reverse. A computer converts a sign, like one from a video camera, voice outcomes, into the voltages necessary to trigger neurons. The signals are sent to an implant within the right area of the brain, and if everything works correctly, the neurons fire and then the subject receives a visible image like what the camera sees.

Achievement of greater speed, efficiency and accuracy depends on improvements in:

• Signal acquisition: Methods for increasing ratio (SNR), signal-to interference ratio (S/I)) still as optimally combining spatial and temporal information.

• Single trial analysis: Overcoming noise and interference so on avoid averaging and maximize bit rate.

• Co-learning: Jointly optimizing combined man-machine system and taking advantage of feedback.

• Experimental paradigms for interpretable readable signals: Mapping the task to the brain state of the user (or vice versa).

• Understanding algorithms, concepts and models within the context of the neurobiology: Building predictive models having neurophysiologic ally meaningful parameters and incorporating physically and biologically meaningful priors.

4.4 ADVANTAGES

- Allow paralyzed people to control prosthetic limbs with their limbs
- Transmit visual image to mind of blind person
- Transmit auditory data to mind of deaf person
- Allow persons to control virtual keyboard with their mind

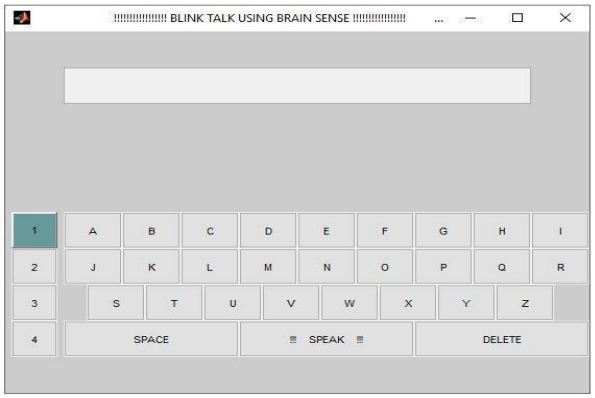
4.5 DISADVANTAGES

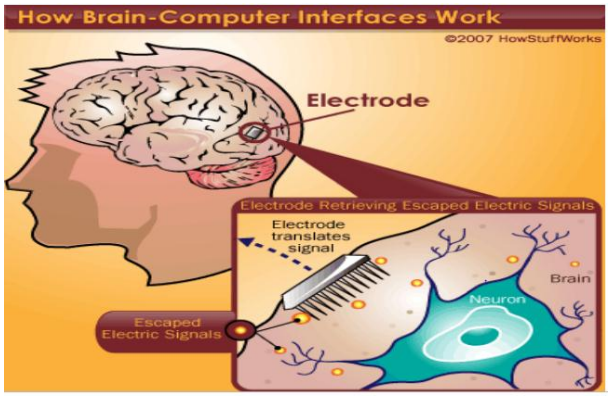
- Multi electrode sensor hence the cost is high.
- Slow interact.
- Needs an android device.

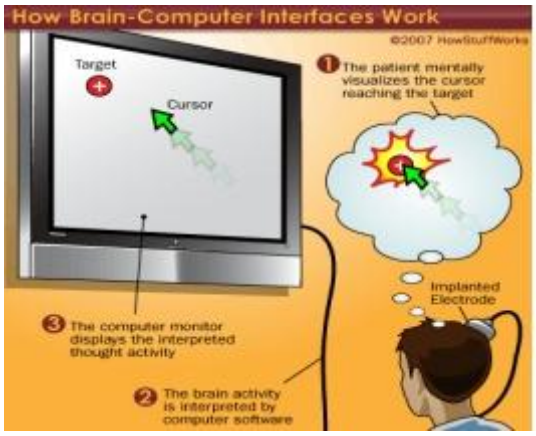
4.6 APPLICATIONS

- Home applications
- Industrial applications.
- Texting purposes.

5. EXPERIMENTAL RESULTS







6. CONCLUSION

This system is easily reconfigurable for further more keys and systems. Further, we will develop by including dictionaries with it, similarly as we will develop this application with voice output. The intensity of Eyeblink differs for each human, we will reconfigure the code for top accuracy for blink detection. Winking controlled virtual keyboard using brain sense it's useful to the physically controlled people.

7. FUTURE SCOPE

This neuro-based physical game is suitable for ADD children and can be used to train them to perform tasks with full concentration. Smart portable assistant system.

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