

PROJECT

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Topic: Eye Wink Detection Using EEG Signals

Guide: Aswathi M R

About project:

People who are suffering from a Neuro motor disability are in a condition where they are awake and well aware of their surroundings but are unable to perform any action due to paralysis in the body (with the exception of eye movements and blinking). The people who are suffering from such disorder are not able to speak or not understandable enough so they could not communicate and interact with other people in the world. To help these people to interact better with their surroundings, a machine-learning based methodology for eye wink detection using signals from brain is proposed in this project. A dataset from 50 people was collected using Neurosky Mindwave mobile which provides us various waveforms of EEG signal like Alpha, Beta, Theta and Gamma signals. A model was trained using these features along with Blink Strength to detect the left and right blinks of a person. At the end, replace the mouse click functionality with the left and right eye blinks that will help such people to interact with real world.

Methodology:

1. Installation of Telnet, Json, Pyautogui and other libraries:

Different libraries were installed for the project such as Telnet and Json were installed and were used for connecting with ThinkGear socket connector and to store the collecting data in CSV format. Pyautogui and some other libraries were installed to perform mouse clicks and for GUI purpose.

2. Collecting data:

For this project data was collected from 50 different persons with help of Neurosky Mindwave Mobile device and was stored in a file. Different waveforms were recorded from the device like Alpha, Beta, Theta, Delta, Gamma along with theblink strength, meditation and attention. The data after pre-processing was given to the random forest classifier to predict the left and right blinks of a person.

3. Selecting the Desired Algorithm:

There are many classifiers for classification algorithms like SVM, KNN, Decision trees, Random forest. Here classification problem on various classifiers a narrowed down to random forest classifier because it provides better accuracy than any other model and it is very easy to measure the relative importance of each feature on the prediction.

4. Running the model:

Finally, the model will train and it predicts the left and right eye blinks and accordingly left and right mouse clicks will perform.

PUBLICATIONS

- Paper - Study on Brain tumor Detection Techniques
Conference - ICICT 2018
Journal - IEEE
Status - Presented