Project synopsis1

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Classification of EEG Signals into Normal and Abnormal

PROJECT SYNOPSIS

OF MAJOR PROJECT

BACHELOR OF TECHNOLOGY
Computer Science and Engineering

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ABSTRACT

An electroencephalogram (EEG) is a test that detects several electri activities in our brain and records them as brain signals which is majorly wave patterns. Small metal discs with thin wires (electrodes) are placed on the scalp that sends the brain signals to the computer to record. Normal activity would have the usual pattern but abnormal EEG has some distinguishable features. Doctors can identify abnormal EEG from the normal ones after some observation.

The EEG signal look Like:

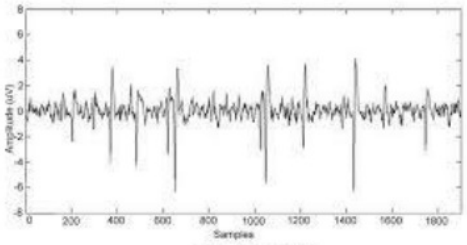
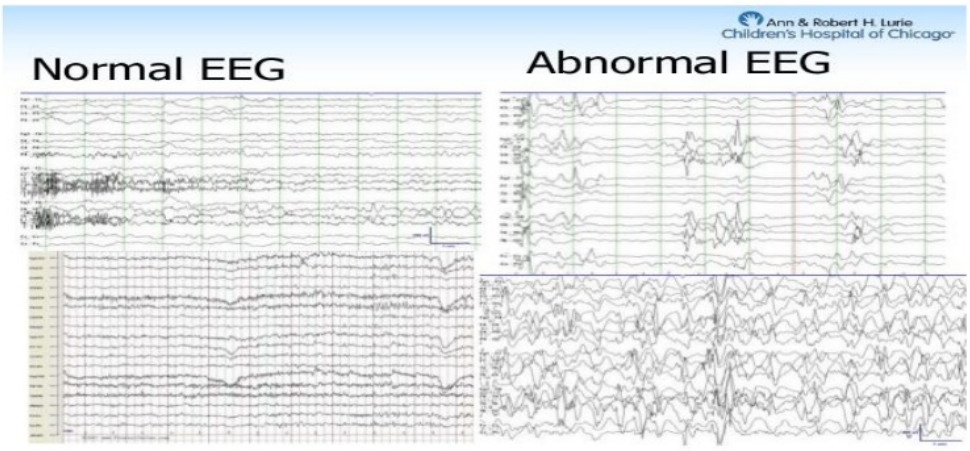


Figure 1: 1D EEG Signal

Although EEGs helps us differentiate between Normal and Abnormal, it is still heavily dependent upon the examiner to give the last judgement. In order to interpret the signals captured by EEG, we need the help of an expert in this field. Our main objective is to lessen the burden on examiner and reduce the time of examination.

Normal EEG vs Abnormal EEG look like:



The final goal of this project is to automate the whole process of examination of classifying EEGs. We have now focused only on classifying an EEG record into either abnormal or normal type. This is one of the first steps in EEG data interpretation and successfully automating this procedure will not only substantially reduce time required to read EEG but also act as an aid to human investigators.

METHODOLOGY

The main aim of this Project is to reduce time required for EEG classification. We want to explore various pre-processing techniques, traditional machine learning algorithms, and modern deep neural networks to solve this problem such as converting EEG's into Kurtogram, Spectrogram, mel-Spectogram.

The various pre-processing techniques and learning algorithms we want to use are:

Logistic Regression: Logistic regression is a linear classifier that predicts the probability of occurrence of an event by fitting input data to a logit function. It is a simple and widely used machine learning technique.

convolutional neural network (CNN): CNN is a multi-layered architecture where each layer consists of a few convolution filters. The filters operate on short consecutive subsequences of the input for extracting meaningful features. Hence it is well-suited for time-series classification we used VGG-16 and VGG-19 model for feature extraction.

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ORIGINALITY REPORT

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SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Subhrajit Roy, Isabell Kiral-Kornek, Stefan Harrer. "Deep Learning Enabled Automatic Abnormal EEG Identification", 2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2018 Publication	39%
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