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EPILEPTIC SEIZURE PREDICTION using FIR, DWT and SVM

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ABSTRACT: Epileptic seizures occur because of brain abnormalities which will indirectly have an effect on patient's health. It happens dead with none symptoms and therefore will increase the rate of humans. virtually 1 Chronicles of world's population suffers from epileptic seizures. Prediction of seizures before the start of onset is useful for preventing seizures by medication. Nowadays, trendy procedure tools, machine learning, and deep learning strategies are wont to predict seizures mistreatment EEG. However, EEG signals might get corrupted with ground noise, and artifacts like eye blinks and physical movements of muscles might cause "pops" within the signal, leading to electrical interference, that is cumbersome to observe through visual review for extended length recordings. These limitations in automatic detection of interictal spikes and epileptic seizures as most well-liked, that is a vital tool for examining and scrutinizing the EEG recording additional exactly. These restrictions bring our attention to gift a review of machine-controlled schemes which will facilitate neurologists categorise epileptic and nonepileptic signals. whereas getting ready this review paper, it's discovered that feature choice and classification ar the most challenges in encephalopathy prediction algorithms. This paper presents numerous techniques betting on numerous options and classifiers over the previous couple of years. The strategies bestowed can provides a careful understanding and ideas concerning seizure prediction and future analysis directions.

KEYWORDS: Epilepsy, Seizure, EEG, SVM, DWT, filter.

I. INTRODUCTION

Epilepsy is one amongst the chronic severe non-infectious brain disorders globally, and anyone are often plagued by seizures at any age notwithstanding gender or group. encephalopathy subjects expertise several challenges in their daily routine life. they have to take comfortable care to match up with this ill health. once a seizure happens, it should bring some injury or perhaps create life risky to the patient or others, principally managing serious machinery industries or driving vehicles. virtually 1 Chronicles of the planet population has encephalopathy, and annually, new cases of eighty per a hundred thousand individuals develop the case of encephalopathy even in developed countries. a facet of an individual's life could also be extremely afflicted by encephalopathy for psychological and social reasons. it's additional common for young kids and adults. It happens slightly additional in males than in females. encephalopathy is incurable, however the disorder are often in check with medications and different methods..

Electroencephalogram (EEG) signals are primarily employed in encephalopathy studies to observe abnormality of the brain through seizure conditions. EEG may be a sensible, simple, not offensive technique typically used for brain activity checking and analysis of encephalopathy. this may be tired either manual or automatic manner. sleuthing AN expert's seizure and seizure length in EEG recording is sophisticated and long. One usually wants hours to days of knowledge to review EEG recordings for one seizure subject. If AN automatic seizure detection system is accessible, it might cut back the time needed by doctors to perform AN offline diagnosing by examining EEG knowledge. Therefore, automatic detection of seizure activity is of high connection. encephalopathy detection from input EEG signal involves many complicated examinations that need time and energy.

II. RELATED WORK

The following techniques are developed for diagnosing Earlier during this work, many authors have reviewed the strategies and approaches that take care of seizure detection and classification.

Prof. Sandhya Shinde.[1] having the ability to predict seizures and couple this data with state of the art technology can permit patients to require action before the incidence of the seizure and therefore, minimizing potential risk. A short comparison of various techniques used for seizure detection mistreatment options of the signals is reviewed by Mosheni et al. [2]. This work has compared strategies supported nonlinear statistic analysis, supplying regression, time-frequency distributions, and ripple remodel analysis. Tzallas et al. [3] mentioned machine-controlled seizure detection strategies supported multiple aspects like detection supported morphological analysis, mimetic techniques, guide matching, parametric, feature-based, and artificial neural network base. On the opposite hand, seizure detection mistreatment procedure intelligence techniques with around 278 patients was bestowed by Teixeira et al. [4]. The authors have compared multiple feature-based algorithms with completely different classifiers during this review Parvez and Paul [5] have bestowed a short review of literature on feature extraction from the attack and interictal signal mistreatment numerous established transformation strategies. The authors have projected completely different strategies used within the remodel domain and its corresponding feature used for classification. Lin et al. [6] planned extraction and classification of options from encephalogram signal to visualize the link among the encephalogram signal variations and corresponding emotions. Current brain activity will be noted victimization associate degree medical instrument to spot the relation between emotions and brain activity signals. Wu et al. [7] explained a framework of theorem for modeling multichannel encephalogram signals. Multichannel encephalogram at the same time measures synchronic brain actions at several sites on the scalp at time unit temporal resolution. tiny spatial resolution is that the issue of encephalogram signal so the signal received at each channel could be a combination of diminished actions from several brain regions, and it usually undergoes interference from varied artifacts (e.g., muscular, cardiac, and ocular). S/N (SNR) should be raised to get rid of the matter of this sort. Alotaiby et al. [8] given a criticism on convulsion detection. The seizure finding method will be done employing a single or multichannel conductor as a base. Ilyas et al. [9] given a technique of classification of encephalogram signals victimization completely different classifiers. it's perpetually troublesome to extract the options and helpful data from encephalogram signals of a colossal volume and inferiority, less organized information and artifacts.

III. METHODOLOGY

The sign or encephalogram signal is given to FIR filter and also the smoothed output from this filter is taken because the input to next stage i.e. DWT (discrete rippling transform). Since encephalogram signal is timedependent we've to use DWT that introduces a helpful illustration of a perform within the time-frequency domain. the most objective of rippling analysis is to decompose signals into many frequency bands. Then the third stage is SVM (support vector machines). it's an automatic machine learning algorithmic program supported the idea of call planes that decides call boundaries. options of encephalogram signals area unit extracted and limits of all the options area unit determined victimization

RESULT

Following figure shows output on LCD when epilepsy detected .



Figure. 4.9 : Output of LCD showing result “EPILEPSY DETECTED”

Following figure shows output on LCD when epilepsy not detected .



Figure. 4.10: Output of LCD showing result “EPILEPSY NOT DETECTED”

IV. CONCLUSION

In this paper the novel approach is presented to predict the epileptic seizure using power analysis in beta band of the EEG signals. The topographical map of the brain is divided into five region and the value of power is calculated from these five regions. So, the multichannel analysis of EEG signal is done with less computational complexity and fast speed. The particular time for the seizure prediction is the pre-ictal interval. Analysis with the EEG data shows the promising results. From results it is clear that the value of the power in beta band increases suddenly during the pre-ictal period. So, the epileptic seizure is predicted in advance and advance warning can be given to the epileptic patient. With the help of the advance warning and the medication on time the effect of the seizure can be aborted. Also, the particular region of the brain responsible for the epileptic seizure like temporal region in this work is also localized. Future work will be carried out to exactly predict the earliest time for onset of the epileptic seizure. Large sample size is required for the validation of findings of the result.

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