Industrial Engineering Journal
ISSN: 0970-2555
Volume : 49, Issue 1, No. 1, January 2020

AN ENHANCEMENT IN FINDING EPILEPSY USING IOT MECHANISM WITH HELP OF EEG IMAGES

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Abstract:- Epilepsy is only neurological issues influencing a noteworthy segment of the total populace and roughly 2.5 million individuals in the United States. We propose a product based mechanized seizure discovery framework which will distinguish a seizure from electroencephalography (EEG) signals utilizing AI calculation. The propose framework approve or test the qualities or signs given by client (Doctor) and afterward it predicates regardless of whether the epilepsy is recognized or not. There are a few different ways to analyze epilepsy by clinical assessments. In any case, the analysis can be best performed by electroencephalography (EEG) due to its high worldly goal. EEG is a cycle of estimating electrical action in the cerebrum. The manual seizure location measure is a repetitive and tedious errand, which requires computerized seizure discovery frameworks which can identify seizures rapidly. We are utilizing Support Vector Machine calculation for arrangement. It will foresee whether the epilepsy is identified or not. After expectation of epilepsy message will be send to patient's family members.

Index Terms: EEG. Epilepsy, Support Vector Machine, IOT

I.INTRODUCTION

The motivation behind this archive is to introduce definite portrayal of programming for precise epilepsy seizure discovery. It will recognize epilepsy seizure. The purposed programming take input from client and approve by utilizing preparing dataset and recognize the epileptic seizure. Seizures brought about by epilepsy are unmerited, they disturb the shelf movement of the patient and debilitate their typical engine and sensorial capacities, jeopardizing the patient's prosperity. Misusing the present innovation it is conceivable to make programmed frameworks to screen and assess patients. An region of uncommon intrigue is the programmed examination of EEG signals. This paper presents broad investigation of highlight extraction and characterization strategies that have announced great outcomes in Other EEG based issues. A few strategies are itemized to extricate 52 highlights from the time, recurrence and time-recurrence spaces so as to portray the EEG signals. Furthermore, 10 unique arrangement models, along with an element determination strategy, are actualized utilizing these highlights to recognize if a sign compares to an epileptic state. The analyses were performed utilizing

the standard SVM and the proposed strategy accomplish results practically identical to those in the best in class for the three and four classes issues. Along these lines in this task we will foresee epilepsy seizure. For that forecast here we are applying or utilizing uphold vector machine calculation. There are numerous characterization calculations yet we are utilizing support vector machine since it gives precise re-sults.it requires additional time for handling however it is more exact. In clinical field precision is significant consequently it is a lot of better calculation for epilepsy identification.

II. RELATED STUDY

Wireless sensor network-based e-health system - implementation and experimental results With the increasing number senior citizens, E-health is targeted for home use with the special requirements of being usable in everyday life and low cost. A wireless sensor network application is proposed here for 24-hour constant monitoring without disturbing daily activities of elderly people and their caretakers.

In the system proposed, both fixed and body (mobile) sensors are used. Since not every elder likes to have a sensor board attached to him/her, and in many cases, he/she may not carry the sensor; the home sensor network independently would have the ability to monitor the health status and living environment based on the multisensory data analysis and fusion. A mixed positioning algorithm is proposed to determine where the elderly person is.

The purpose of the positioning is to help the system to determine the persons activities and further to make decisions about his/her health status. The system could take care of two types of the basic needs of an elderly person: everyday needs as abnormal events and emergency alarms to doctors and caretakers through telephone, SMS and e-mail, and day to day requirements such as taking of medicine, having lunch, turn off the microwave oven, and so on. At same time, the system is sensitive to security and privacy issues. IoT Privacy and Security Challenges for Smart Home Environments Often the Internet of Things (IoT) is considered as a single problem domain, with proposed solutions intended to be applied across a wide range of applications.

However, the privacy and security needs of critical engineering infrastructure or sensitive commercial operations are very different to the needs of a domestic Smart Home environment. Additionally, the financial and human resources available to implement security and privacy vary greatly between application domains. In domestic environments, human issues may be as important as technical issues. After surveying existing solutions for enhancing IoT security, the paper identifies key future requirements for trusted Smart Home systems. A gateway architecture is selected as the most appropriate for resource-constrained devices, and for high system availability.

Two key technologies to assist system auto-management are identified. Firstly, support for system auto-configuration will enhance system security. Secondly, the automatic update of system software and firmware is needed to maintain ongoing secure system operation. IoMT (Internet of Medical Things) or healthcare IoT The Internet of Medical Things (IoMT) is the collection of medical devices and applications that connect to healthcare IT systems through online computer networks. Medical devices equipped with Wi-Fi allow the machine-to-

machine communication that is the basis of IoMT. IoMT devices link to cloud platforms such as Amazon Web Services, on which captured data can be stored and analyzed. IoMT is also known as healthcare IoT. Examples of IoMT include remote patient monitoring of people with chronic or long-term conditions; tracking patient medication orders and the location of patients admitted to hospitals; and patients; wearable mHealth devices, which can send information to caregivers. Infusion pumps that connect to analytics dashboards and hospital beds rigged with sensors that measure patients; vital signs are medical devices that can be converted to or deployed as IoMT technology.

A Micro-Power EEG Acquisition SoC With Integrated Feature Extraction Processor for a Chronic Seizure Detection System low-power SoC that performs EEG acquisition and feature extraction required for continuous detection of seizure onset in epilepsy patients. The SoC corresponds to one EEG channel, and, depending on the patient, up to 18 channels may be worn to detect seizures as part of a chronic treatment system. The SoC integrates an instrumentation amplifier, ADC, and digital processor that streams features-vectors to a central device where seizure detection is performed via a machine-learning classifier. The instrumentation-amplifier uses chopper-stabilization in a topology that achieves high input-impedance and rejects large electrode-offsets while operating at 1 V; the ADC employs power-gating for low energy-per-conversion while using static-biasing for comparator precision; the EEG feature extraction processor employs low-power hardware whose parameters are determined through validation via patient data.

The integration of sensing and local processing lowers system power by 14× by reducing the rate of wireless EEG data transmission. Feature vectors are derived at a rate of 0.5 Hz, and the complete one-channel SoC operates from a 1 V supply, consuming 9 ¿ J per feature vector. Detection of epileptic electroencephalogram based on Permutation Entropy and Support Vector Machines The electroencephalogram (EEG) has proven a valuable tool in the study and detection of epilepsy. This paper investigates for the first time the use of Permutation Entropy (PE) as a feature for automated epileptic seizure detection. A Support Vector Machine (SVM) is used to classify segments of normal and epileptic EEG based on PE values. The proposed system utilizes the fact that the EEG during epileptic seizures is characterized by lower PE than normal EEG. It is shown that average sensitivity of 94.38% and average specificity of 93.23% is obtained by using PE as a feature to characterize epileptic and seizure-free EEG, while 100% sensitivity and specificity were also obtained in single-trial classifications. Classification of epileptiform EEG using a hybrid system based on decision tree classifier and fast Fourier transform The aim of this study is to detect epileptic seizure in EEG signals using a hybrid system based on decision tree classifier and fast Fourier transform (FFT). The present study proposes a hybrid system with two stages: feature extraction using FFT and decision-making using decision tree classifier. The detection of epileptiform discharges in the electroencephalogram (EEG) is an important part in the diagnosis of epilepsy. All data set were obtained from EEG signals of healthy subjects and subjects suffering from epilepsy diseases. For healthy subjects is background EEG (scalp) with open eyes and for epileptic patients

correspond to a seizure recorded in hippocampus (epileptic focus) with depth electrodes. The evolution of proposed system was conducted using k-fold cross-validation, classification accuracy, and sensitivity and specificity values. We have obtained 98.68% and 98.72% classification accuracies using 5- and 10-fold cross-validation. The stated results show that the proposed method could point out the ability of design of a new intelligent assistance diagnosis system.

III.OBJECTIVE OF THE STUDY

To Overcome the problem of Epilepsy.

To detect the Seizure at earlier stage.

Creating People Awareness about Health.

IV. SCOPE OF THE STUDY

Epilepsy seizure location programming that specialist can use to identify epilepsy seizure at beginning phase. In that product patient's information can be put away. It will be utilized for recognition. With the assistance of different boundaries of patient's information, programming can distinguish epilepsy seizure. After recognition of epilepsy seizure Results will be send to family members of patient's through the message. It will be useful for family members to deal with patients or for appropriate treatment of patients at perfect time.

Seizures, affects approximately 1 of the world population.

30 to 40 percent of patient, antiepileptic drugs cannot effectively control seizures.

Uncontrolled epilepsy can lead to depression.

Uncontrolled epilepsy can lead to Higher cost.

k-means clustering algorithm

k means is one of the simplest unsupervised learning algorithms that solve the well-known clustering problem. The procedure follows a simple and easy way to classify a given data set through a certain number of clusters (assume k clusters) fixed apriori. The main idea is to define k centers, one for each cluster. These centers should be placed in a cunning way because of different location causes different result. So, the better choice is to place them as much as possible far away from each other. The next step is to take each point belonging to a given data set and associate it to the nearest center. When no point is pending, the first step is completed and an early group age is done. At this point we need to re-calculate k new centroids as barycenter of the clusters resulting from the previous step. After we have these k new centroids, a new binding has to be done between the same data set points and the nearest new center. A loop has been generated. As a result of this loop we may notice that the k centers change their location step by step until no more changes are done or in other words centers do not move any more. Finally, this algorithm aims at minimizing an objective function know as squared error function given by:

$$J(V) = \sum_{i=1}^{c} \sum_{j=1}^{c_i} \left(\left\| x_i - v_j \right\| \right)^2$$

where,

'||xi - vj||' is the Euclidean distance between xi and vj.

'ci' is the number of data points in ith cluster.

Industrial Engineering Journal
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'c' is the number of cluster centers.

Algorithmic steps for k-means clustering

Let X = {x1,x2,x3, …….,xn} be the set of data points and V = {v1,v2,…….,vc} be the set of centers.

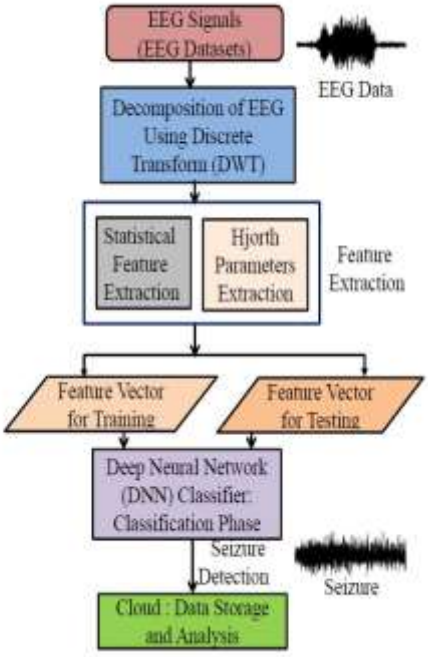
1) Randomly select 'c' cluster centers.

2) Calculate the distance between each data point and cluster centers.

3) Assign the data point to the cluster center whose distance from the cluster center is minimum of all the cluster centers.

4) Recalculate the new cluster center using:

$$v_i = (1/c_i) \sum_{j=1}^{c_i} x_i$$



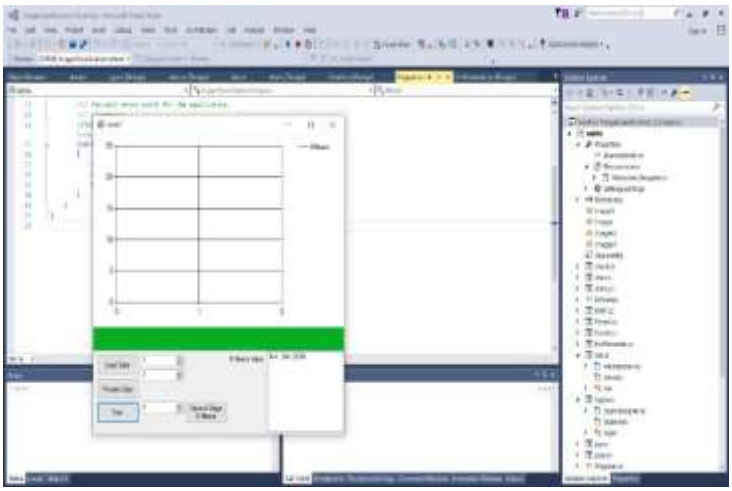


Fig: Performing K-Means Clustering Process First stage

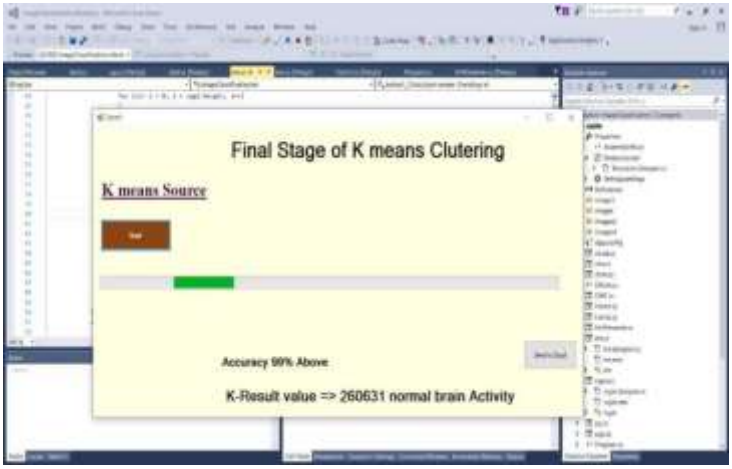


Fig: Performing K-Means Clustering Process Secondary Stage

V. CONCLUSION

We have proposed an epilepsy seizure discovery programming, which foresee seizure at prior stage. This system take input which are the signs or boundaries of patients, and afterward Predict regardless of whether Epilepsy is recognized or not. This framework utilizes Support vector machine calculation for grouping. We are going to utilize Support vector machine. We can look at them and figure out which calculation

gives better outcome. As we realize that help vector machine required additional time for calculation however it gives better outcomes. it is more exact than different calculations. henceforth our framework will give better or precise outcomes. After recognition of epilepsy ready sign in the type of message will be send to family members of patient from specialist. At that point they can deal with that patient and make treatment for that quiet at beginning phase.

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