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Epilepsy Seizure Alert System using IoT

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ABSTRACT

The main objective is to detect the epilepsy seizure in advance, by implementing hardware devices for detection. We are using arduino to monitor the epileptic disease in human and prevent it at its early stage of the disease. In our method we are proposing ECG sensors to monitor the human cardiac signals and update it in the LCD monitor using IOT. We have analyzed the predefined data set of diseased cardiac signal using arduino. If the human cardiac signal is same as the data set signal and then it provides the information that the human is epileptic and the patient's database is sent through IOT to authorized doctor. We are also using a heart beat sensor to monitor the pulse rate of the human. Every change in the patient will be monitored updated through IOT.

Key words : ECG Sensors, Heart Beat Sensors, Arduino, Internet of Things, LED display.

1. INTRODUCTION

Textual Epilepsy is a neurological illness that is alluded to as a confusion of the focal sensory system described by the loss of cognizance and spasms. There is no legitimate mindfulness about epilepsy infection endless individuals were dead as of late. Epileptic patients are dependent upon epileptic seizures brought about by anomalous electrical releases that lead to wild development, spasms and loss of awareness. Roughly 50 million individuals around the globe are determined to have epilepsy, kids and grown-ups in the age scope of 12-25 years of age are affected the most. Epileptic patients are dependent upon seizures that cause wild developments and loss of awareness which can prompt genuine wounds, and some of the time passing. Thus, modernized seizure recognition strategies are imperative answers for epileptic patients to shield them from perils at the hour of a seizure. In this paper, we propose an epilepsy seizures identifying technique that can be actualized in an equipment gadget to support epileptic patients. In addition, we applied some broadly utilized classifiers for epilepsy seizure discovery, and contrasted our outcomes and different methodologies. It is valuable for epileptic patients before counseling a specialist. Epilepsy patients may control their illness by taking the correct medicines. It has two kinds of seizures they are central seizure and summed up seizure.

2. LITERATURE REVIEW

Neural mass model driven strategy and its application in early epileptic seizure discovery [1] depicts about a novel model-driven seizure identification strategy dependent on powerful highlights in epileptic EEGs, where the basis for dynamic highlights in epileptic EEGs can be explained in principle by portraying the variety of boundaries of the model. Hearty seizure strategy is utilized as a proposed technique it is likewise utilized for identifying epileptic seizure through investigation of the electroencephalography (EEG signals). In this strategy programmed seizure discovery technique is utilized. A helpful endeavor to early distinguish epileptic seizures by joining the neural mass model with information examination. The data analysis that should not be accurate.

Identifying Abnormal Pattern of Epileptic Seizure through Temporal Synchronization of EEG Signals [2] describes a complex system model is utilized for speaking to the repeat example of EEG signals, in light of which the transient synchronization designs are measured utilizing otherworldly diagram hypothetical features. A factual control graph is applied to the removed highlights after some time for checking the travels from typical to epileptic states in multivariate EEG systems. Temporal Synchronization technique is empowered for a patient to devour a less time. It is also used for diagnosis and further more treatment process. The major drawback of this method is it is not accurate for the detection process because if 23 patients were tested by using CHB-MIT scalp database only 18 patients were detected properly.

Epilepsy Monitoring Using Accelerometer Sensor based on IoT [3, 6] depicts about an approach for epilepsy person which utilizes sensor to assess the boundaries of the patients like temperature, fall of the patients, shaken of the hand and sound of the patient. It utilizes a Green assignment based detecting system. The fundamental point of the Green errand based detecting framework is that the correspondence occurs over the system just when new information is available. It also detect the four different types of seizure such as a Atonic seizure, Myoclonic seizure, simple Focal seizure. The significant downsides of this strategy is model of structure created used for epilepsy suffers, however require also testing in a veritable circumstances.

A Robust seizure Deep learning approach for programmed order of seizure [4] describes about distinguishing the epileptic seizure through investigation of the electroencephalography (EEG) signal turns into a standard technique for the determination of epilepsy. In a manual manner, checking of long haul EEG is repetitive and blunder inclined. Along these lines, a dependable programmed seizure recognition technique is alluring. A basic test to programmed seizure identification is that seizure morphology show impressive inconstancy. So as to catch fundamental seizure designs, this paper use a consideration instrument and a bidirectional long transient memory (BiLSTM) model to misuse both spatially and transiently separating highlights and record for seizure changeability. The consideration component is to catch spatial highlights all the more successfully as indicated by the commitments of cerebrum regions to seizures. The BiLSTM model is to extricate additionally segregating fleeting highlights in the forward and the retrogressive bearings. By representing both spatial and worldly varieties of seizures, the proposed strategy is more vigorous across subjects. The testing results over the boisterous genuine information of CHB-MIT show that the proposed technique beats the present status of-the-workmanship strategies. In both blending patients and cross-understanding investigations, the normal affectability and particularity are both higher while their relating standard deviations are lower than the techniques in correlation.

MRI-Guided Epilepsy Detection [5] portrays around one of the most well-known neurological cerebrum issue is epilepsy that occur as an unexpected seizure. Around 30% of patients with the epilepsy oppose to all types of clinical therapies and, consequently, the expulsion of epileptic cerebrum tissue is the main answer for get these patients free from chronical seizures. Finding the epileptic locale is an initial key into the treatment. In this paper, we presented the technique for epilepsy location. In this strategy it is given Super Para Magnetic Nano-particle, (SPMN) is utilized as a detecting material so as to research the epileptic region. In light of the attractive field, first they are crossed through the Blood Brain Barrier (BBB). They can cross the blood-cerebrum boundary in the mind by methods for attractive powers. In this examination, the ideal power for intersection to the mind and nanoparticles accumulation by methods for MRI attractive field for intersection and feeble attractive field inside the cerebrum has been thought of. Nanoparticles accumulation can be utilized as a marker to build the differentiation of MRI pictures in the epileptic cerebrum in human [7, 8]. The MRI images are detected in this method which has explained clearly in this paper.

3. HARDWARE ARCHITECTURE OF EPILEPSY DETECTION DEVICE

The Circuit diagram consists of ECG sensors,heart beat sensors and LCD display.The ECG sensors is used to record the pathway of electrical impulses through heart muscle.Heart beat sensors is used to measure the heart Rate of the human. LCD display is used to display the Output in the monitor.

The micro controller is used to compare the predefined data set and human cardiac signal to show the accurate percent of the abnormal person for epilepsy disease.The ECG consists three electrodes that is fixed in the body to get the result of human cardiac signal. Figure 1 shows the ECG based Epileptic Hardware Module.

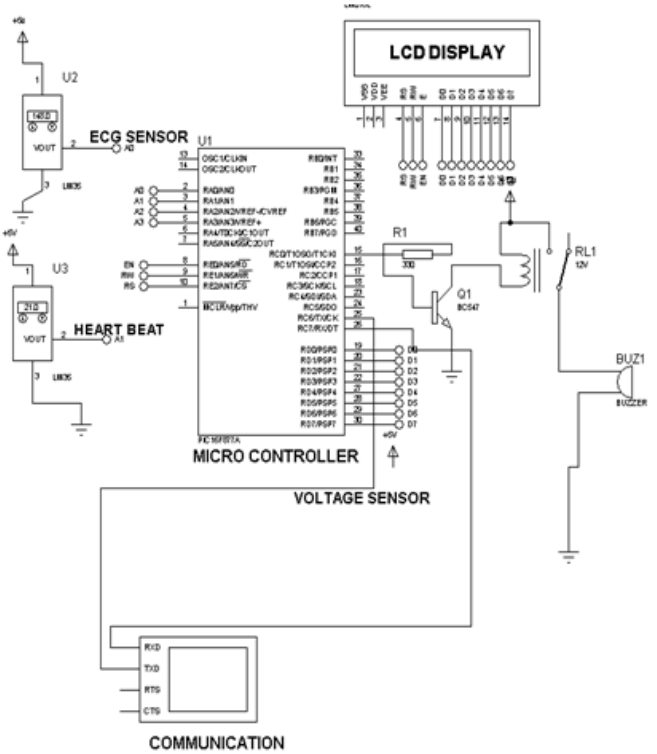

Figure 1: ECG based Epileptic Hardware Module

4. PERFORMANCE ANALYSIS OF ECG

Atrial Fibrillation (AF) is the practically basic supported cardiovascular arrhythmia, happening in 1-2% of everybody and is related with significant passing. It is additionally liable for 15% to 20% of all strokes. Existing AF discovery calculations are now and then unfit to segregate AF from some other arrhythmia and may mis-arranges other

unpredictable rhythms or boisterous ECGs as AF, bringing about bogus cautions

The primary target of our work is to build up a calculation to recognize AF with high exactness which influences pulse fluctuation and ECG morphology, the proposed technique joins the grouping based pulse changeability highlights and formats of the ECG waveform.

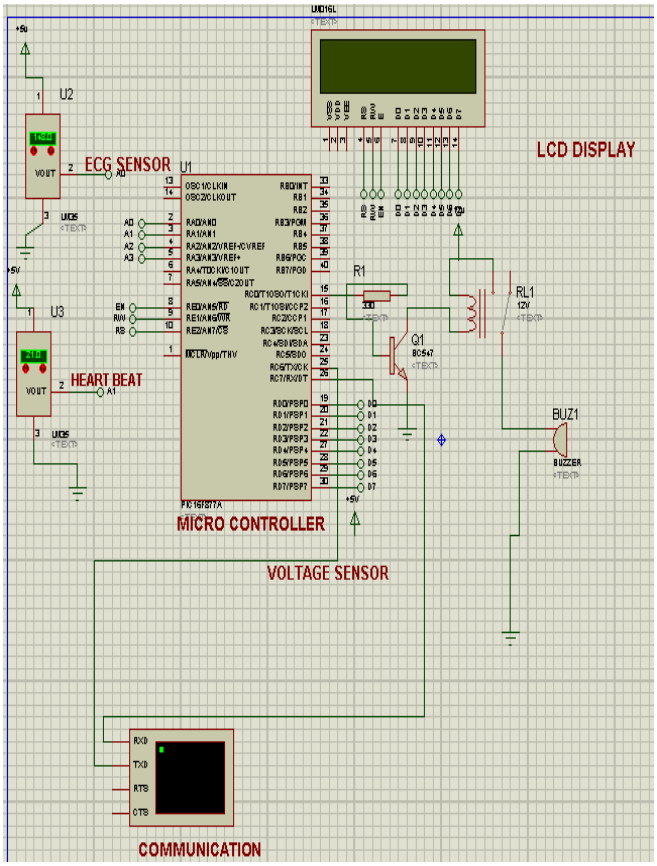

Figure 2: Simulated diagram of the detection device

1. Figure 2 represents the graphical view of the ECG waveform for detecting the epilepsy disease by using hardware system.

2. From the above mentioned graph it shows that the person he/she suffering from the epileptic disease in percentage wise.

3. The ECG waves are obtained by the ECG sensors and IoT is used to get the affected percentage of epileptic disease in the patient.

4. Comparative study is taken between the predefined data set of diseased cardiac signal and normal human cardiac signal.

5. Figure 3 gives the Stimulated ECG waves, taken from different type of Atrial Fibrillation (AF)

6. Stimulated ECG waves for the epileptic disease were obtained.

Figure 3 shows the simulation of the hardware device where the micro controller is used to implement the monitoring system to monitor the ECG signal which represents the human cardiac signals which gives the electrical activity of the human's heart. The arduino system is highly used to compare the predefined data set and normal human cardiac signal.

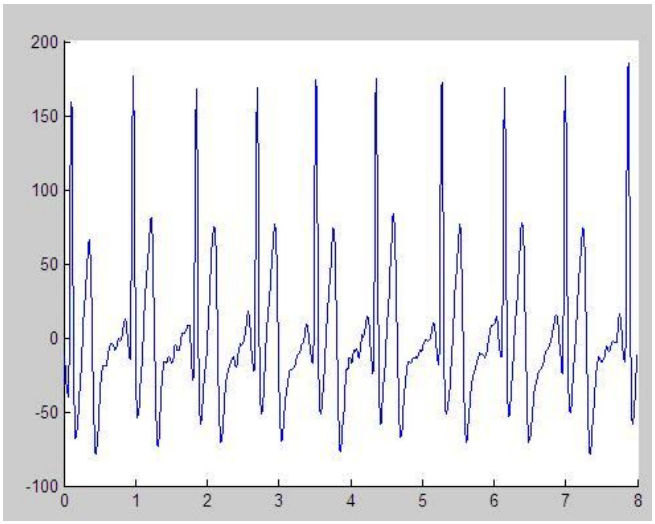

Figure 3: Simulated output of ECG waves as Atrial Fibrillation (AF)

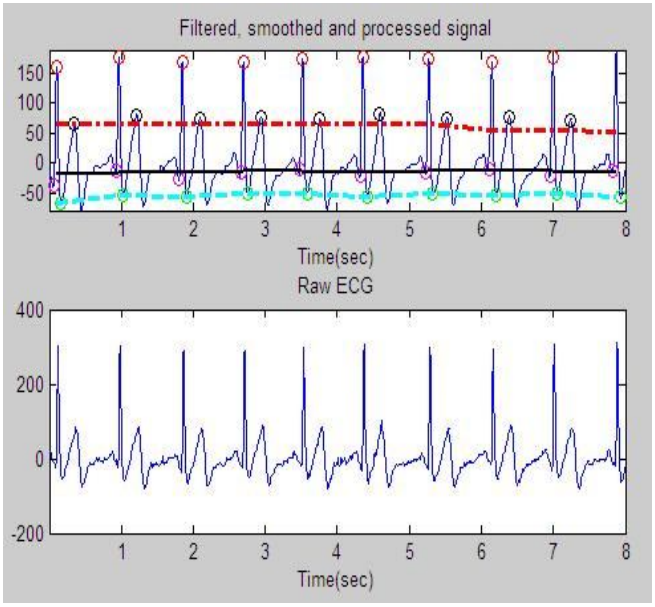

Figure 4: Simulated output of ECG waves as a signal

5. CONCLUSION

In this work, we have given a proposed method for detecting the epilepsy disease using ECG.The heart beat sensor is used to sense the human pulse, which is also a part of detecting the disease. By using ECG sensors the predefined data set that has to compare with the human data set if it is defined with a low percentage evolved then the person is given by the epilepsy disease. To detect the epilepsy disease the most common method is EEG. But compared to EEG, ECG consumes less

amount of time to detect the disease. It also consumes less amount of cost compared to EEG. The doctor can prefer ECG because it gives accurate results. In future the experts can also prefer this method because of its efficiency.

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