Performance Analysis Of RNN and LSTM for Epilepsy Prediction Using Intracranial EEG

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Abstract:

Epilepsy is the one of the most common neurological disorder in the world. Automatic detection of these Epileptic seizures can considerably improve the patient's quality of life. We propose a new framework that learns directly from the data, without extracting a feature set which automatically learns the discriminative EEG features of epileptic seizures. Long Short-Term Memory (LSTM) network and Recurrent Neural Networks (RNN) are developed as independent models to learn the high-level representations of the normal and the seizure EEG pattern, these two Deep learning models are trained and tested respectively and contrasted on various metrics for their performance analysis and coming out with Best Model to Classify Epileptic data.

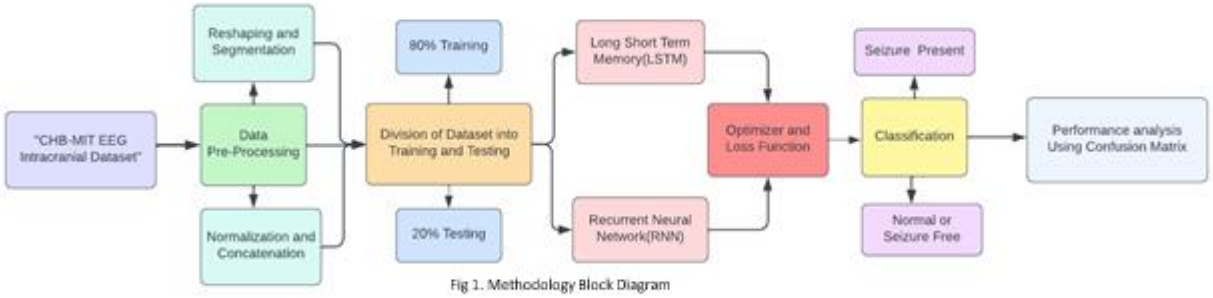

Fig 1. Methodology Block Diagram

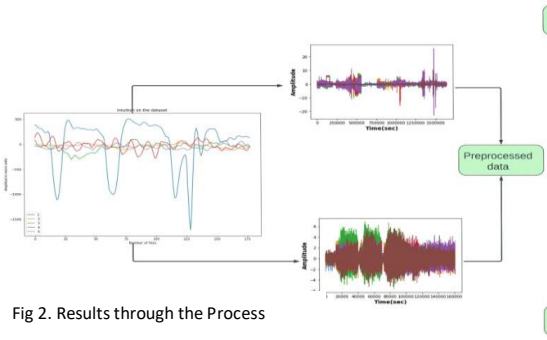

Fig 2. Results through the Process

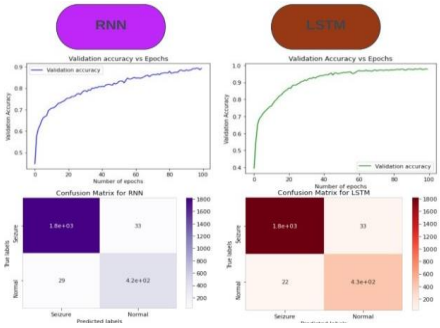

Fig 3. Performance Analysis Using Confusion Matrix

Conclusion: From all of the above analysis and modelling the two different neural networks of RNN and LSTM it is an established fact that LSTM network's performance is excellent as it has the additional time to store the previous output for a longer period of time in the memory which helps the neural network to predict accurately as this previous output which is stored in the memory can be effectively fed as the input to the next cell state thereby improving the sequential model resulting in a whooping Classification accuracy of 98.84%.