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ISMB 2018 Abstracts Submission 16

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Paper 16

Title:	Deep Residual Learning for Automatic Seizure Detection
Track:	MLCSB COSI: Machine Learning in Computational and Systems Biology
Author keywords:	<p>electroencephalogram (EEG)</p> <p>deep residual learning</p> <p>seizure detection</p> <p>deep learning</p>
Abstract:	<p>Automated seizure detection using clinical electroencephalograms (EEGs) is a challenging machine learning problem due to several factors such as low signal to noise ratios, signal artifacts and benign variants. Commercially available seizure detection systems suffer from unacceptably high false alarm rates. Deep learning algorithms, like Convolutional Neural Networks (CNNs), have not previously been effective due to the lack of big data resources. A significant big data resource, known as TUH EEG Corpus, has recently become available for EEG interpretation creating a unique opportunity to advance technology using CNNs. The depth of a CNN is of crucial importance. State of the art results can be achieved by exploiting very deep models, but very deep models are prone to degradation in performance with respect to generalization and suffer from convergence problems. In this study, a deep residual learning framework is introduced that mitigates these problems by reformulating the layers as learning residual functions with reference to the layer inputs, instead of learning unreferenced functions. This architecture delivers 30% sensitivity at 16 false alarms per 24 hours. This architecture enables designing deeper architectures that are easier to optimize and can achieve better performance than prior state of the art.</p>
Submitted:	Feb 27, 20:50 GMT
Last update:	Feb 27, 20:50 GMT
Submission Type	Poster Only

Abstract Presenting Author Name	Meysam Golmohammadi
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