

ABSTRACT

An evaluation and development of analytical techniques for interpreting electroencephalogram recordings in healthy volunteers and patients with brain dysfunctions

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The electroencephalogram (EEG) represents brain activity in the form of voltage fluctuations with time. There are many powerful tools that have been independently developed to conduct analysis of voltage sequences from different regions of the head, for example, correlation coefficient, spectral analysis and coarse-grained correlation dimensional analysis. This thesis addresses the general structure and function of the human brain and evaluates the applicability of these analytical techniques to the investigation of the EEG. The results of this evaluation indicated that these analytical tools provide important information about different aspects of the EEG.

Schizophrenia and depression are diseases that are known to cause considerable human suffering and these diseases are associated with a patient's mood and thought. This thesis compared the coarse-grain correlation dimension of EEG recordings obtained from a normal group, a schizophrenic group and a depressed group of patients. Results of this study indicated that the dimensional complexity of EEG from some patients with schizophrenia may be clearly distinguished from

a normal group, but no differences from the normal group was observed when the depressed group was considered. Also no significant changes in the dimensional complexity of the EEG were observed after volunteers were exposed to therapeutic magnetic fields.

Kew words: Coarse-grain correlation dimension; Schizophrenia; Depression.