A Novel approach to user authentication using Cognitive biometrics and deep learning

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Abstract

Authentication is a cornerstone of the field of Information Security. Authentication is the verification of a user's identity or the nature of a resource. User authentication is where the identity of a user of a particular system is verified. There are many methods of verifying a user's identity. Traditional modes of user identification include passwords and PIN numbers. However, these methods are much prone to be compromised by various kinds of security breaches. To minimize the likelihood of security breaches, biometric authentication methods were developed and integrated into many systems. Biometric authentication uses physiological characteristics which are unique to an individual for identification. The use of EEG signals for the confirmation of a user's identity is a trending, yet experimental mode of biometric authentication. There's substantial research which suggests that Machine Learning, a major branch of Artificial Intelligence, can be used to significantly improve the accuracy of EEG based authentication and minimize the risk of fraudulent access.

An EEG (Electroencephalogram) is a test used in the medical field to detect electrical activity in a human brain. An EEG signal reading provides various features and parameters which are used to interpret brain activity. Several such features of an EEG signal can be used to uniquely identify an individual. This research project proposes a novel approach which incorporates deep learning, a branch of machine learning, for analyzing a user's EEG signal, verification of the said user and the minimization of erroneous classification of EEG signals.

Keywords: Deep Learning, EEG, Biometric Authentication