Your Brainwave Is Your Password: Exploring EEG-Based Authentication for a Safer Cyber World

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Password-based systems have been the primary method for user authentication and access control for many years. However, average users do not follow stringent password composition and update rules because they are burdensome. As a result, it is estimated that 90% of passwords are vulnerable to compromise, which poses a great threat to cyber security. This project explored the novel idea of using EEG brainwaves as a possible new biometric for human authentication. The feasibility of using EEG data for human authentication was first examined using analytical tests performed on the acquired EEG data in order to better understand its statistical properties, and determine whether EEG is suitable for human authentication. The similarity measure was calculated to determine the authentication performance. A support vector machine learning algorithm was then adopted to build a proof of concept system.The experiment results showed a high level of classification accuracy, and successfully confirmed the validity of using EEG-based human authentication to replace passwords, or be combined with passwords as two-factor authentication.