

ABSTRACT

This study develops a multimodal biometric system that combines Electroencephalography (EEG) signals and Keystroke Biometrics to improve user identification accuracy. The research process begins with the acquisition of EEG and Keystroke Biometrics data, then a preprocessing stage is carried out to reduce noise and clarify the data. Next, feature extraction is carried out using user-adaptive methods and frequency domain techniques. Features from EEG and Keystroke Biometrics are then combined using the Scaled Manhattan Distance method, then classified with the Random Forest algorithm. Evaluation is carried out by analyzing accuracy, precision, recall, and efficiency. The results show that the proposed multimodal approach is able to achieve the best accuracy of 99.26% in classification using Random Forest with PCA for the EEG dataset. These results are significantly better than the approach using a single modality, demonstrating the effectiveness of the multimodal biometric integration proposed in this study.

Keywords: *Multimodal Biometrics, EEG, Keystroke Biometrics, Random Forest, Manhattan Distance*