Enhancing ECG-Based Biometric Authentication using High-Quality Training Data and Novel Measurement Metrics for Improved Accuracy

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Abstract: Electrocardiogram (ECG)-based biometric authentication systems rely on machine learning (ML) techniques for accurate identification and verification of individuals. This paper presents a comprehensive methodology for effectively adopting and modifying ML approaches in ECG-based biometric authentication, with a particular focus on acquiring high-quality training data using Python. The suggested methodology assists researchers and developers in defining dataset parameters and obtaining precise and representative training data. Use case analysis is employed to establish dataset boundaries, categorizing ECG-based authentication into three distinct categories based on diverse application scenarios. This categorization helps in tailoring the data collection process to suit the specific requirements of each use case.

To ensure the quality of the ML training and testing data, four additional measure metrics are introduced in the proposed methodology. These metrics serve as indicators of the data's quality, allowing researchers to evaluate the suitability of the collected dataset for ML model training.

By emphasizing the acquisition of high-quality training data and introducing novel measurement metrics, this research contributes to enhancing the precision and reliability of ML-based ECG biometric authentication systems. The proposed methodology enables the creation of accurate and robust ML models for ECG-based biometric authentication.

Keywords: Electrocardiogram (ECG)

REFERENCES


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