

Contactless Check-In System Using Gait Analysis

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Overview

This project aims to create a contactless employee check-in system using gait analysis from smartphone accelerometer data. The goal is to replace traditional keycards with a secure and convenient solution that identifies employees based on their unique walking patterns.

Problem Solution

To solve this problem:

1. **Data Collection:** Used the Human Activity Recognition (HAR) dataset, which contains accelerometer and gyroscope data from 30 subjects.
2. **Feature Engineering:** Extracted meaningful features like the mean and standard deviation of the accelerometer signals.
3. **Model Selection:** Chose a Random Forest Classifier for its robustness and ability to handle complex patterns in the data.
4. **Model Training:** Trained the model on labeled data of walking patterns and validated it using unseen test data.
5. **Authentication:** The system compares incoming gait patterns with pre-stored patterns for each employee. If a match is found, the doors open automatically.

Results

The trained model achieved high accuracy, successfully identifying employees with a reliability of 94%. This confirms the feasibility of using gait analysis for secure authentication.

Conclusion

The project demonstrates a secure and efficient way to implement contactless check-ins. This approach reduces dependency on physical keycards while leveraging machine learning and smartphone technology for seamless employee authentication.