



National University of Computer and Emerging Sciences, Karachi
FAST School of Computing, Spring 2025



Deep Learning for Perception Project Proposal

Project Title: Person Recognition Using Gait Matching

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1. Abstract

Human gait is a unique biometric feature that can be used for person recognition. Unlike traditional methods such as fingerprint or face recognition, gait recognition works from a distance and does not require physical contact.

This project aims to implement GaitSet, a deep learning-based model, for recognizing individuals based on their walking patterns. The model will be trained and tested on the CASIA-B dataset, a widely used dataset for gait analysis. The objective is to achieve high accuracy in identifying individuals under different walking conditions by extracting robust gait features from silhouettes.

2. Tentative Proposed Dataset

We will use the CASIA-B dataset (compressed). This dataset is publicly available and widely used in gait recognition research. It consists of gait silhouettes of 124 individuals captured under three different walking conditions:

- NM (Normal Walking): Regular walking without obstructions.
- BG (Walking with a Bag): Individuals carrying a bag, introducing variations in silhouette shape.
- CL (Walking with Different Clothing): Individuals wearing different outfits, affecting their gait silhouettes.

3. Tentative Proposed Model

We will implement GaitSet, as it extracts spatial-temporal gait features without requiring sequential input, making it faster and more accurate than CNN+LSTM models. It is Lightweight and efficient, making it feasible for training on Google Colab.

Model Architecture:

1. **GaitSet Preprocessing:** Converts gait sequences into a set-based representation, allowing for efficient feature extraction.
2. **Feature Extraction (CNN-based Backbone):** Extracts high-dimensional gait features from silhouettes.
3. **Feature Aggregation (Set-based):** Aggregates features from different frames to form a robust gait descriptor.
4. **Classification Layer:** Identifies individuals based on extracted features.