

Weekly Report – Week 1

Project Name: Person Re-identification

Course Name: CSE623 Machine Learning Theory and Practice

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Team Members:

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Summary of Work Done This Week:

This week, our team focused on understanding the fundamentals of **Person Re-identification**, including key challenges and solutions from state-of-the-art research. We reviewed existing datasets, particularly **PRW (Person Re-identification in the Wild)**, which provides large-scale annotated pedestrian images captured from multiple cameras. Our main tasks included:

1. Understanding the Re-ID Pipeline:

- Explored the two key components: **pedestrian detection** and **person recognition**.
- Studied the impact of different detection and recognition models on re-identification accuracy.

2. Dataset and Benchmarking:

- Analyzed the **PRW dataset**, which contains **932 identities and 11,816 frames**.
- Reviewed benchmarking results for various CNN architectures such as **AlexNet**, **VGGNet**, and **ResNet**.

3. Methods for Performance Improvement:

- Examined **cascaded fine-tuning**, where a detection model is trained first, followed by a classification model.
- Understood **Confidence Weighted Similarity (CWS)**, which integrates detection scores into similarity measurements for better accuracy.

4. Challenges Identified:

- The need for **high-precision pedestrian detection** to improve re-ID accuracy.
- The trade-off between **detection recall and false positives**, affecting the quality of gallery images.
- The importance of **feature extraction techniques** for better representation learning.

Plan for Next Week:

Based on our findings, we will move on to **Feature Extraction and Optimization Techniques** for re-identification. Our key objectives will be:

1. Feature Extraction Methods:

- Implement **CNN-based embeddings** for better identity discrimination.
- Compare **hand-crafted features vs deep-learning features** in terms of accuracy.

2. Fine-tuning Detection Models:

- Train pedestrian detectors on **custom datasets** to improve performance.
- Evaluate different CNN architectures for feature extraction.

3. Metric Learning Techniques:

- Experiment with **distance metrics (Euclidean, cosine similarity, and learned metrics)** to improve person matching.

4. Preliminary Implementation:

- Start implementing **bounding box annotation and object detection** using deep-learning frameworks.

Conclusion:

Our team has gained a strong theoretical understanding of **Person Re-identification** and its challenges. Moving forward, we will focus on **feature extraction** and optimizing detection models to improve accuracy.