Face Recognition Service - Assignment Report

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Abstract

- This report documents an InsightFace-based face recognition microservice implemented with FastAPI, ONNX models, and
- The system supports face detection, embedding extraction, gallery management, and scalable matching.

Introduction

- Face recognition systems are widely used in surveillance, access control, and analytics.
- This assignment builds a production-ready microservice powered by InsightFace.

Methodology

- Data preparation: face cropping, 5-point alignment, normalization.
- Detection: RetinaFace/SCRFD to detect faces and extract landmarks.
- Embedding: ArcFace model converted to ONNX for CPU inference.
- Matching: Cosine similarity with Faiss for efficient nearest-neighbor search.

Results (Simulated placeholders)

- Detection precision: 0.94 (on small validation subset)
- Recognition top-1 accuracy: 0.91 (on gallery of sample images)
- Average embedding latency (CPU): 12 ms (simulated example)

Conclusion

- The system provides a modular, deployable solution for face recognition tasks.
- ONNX conversion and Dockerization make the solution portable and CPU-efficient.

Future Scope

- - Real-time video stream processing with tracking.
- - Liveness detection and anti-spoofing measures.
- - Integration with enterprise databases and dashboards.

Advantages

- - High accuracy with ArcFace embeddings.
- - Modular microservice architecture using FastAPI.
- - Easy deployment with Docker and ONNX runtime.

Summary of Work Done

- - Implemented detection, recognition wrappers and REST APIs.
- - Created scripts and Dockerfile for deployment.
- - Prepared documentation and sample data for testing.