

Face recognition attendance system Framework

Cos30082: Applied Machine Learning



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# 1. Introduction

In this project, we introduce an end-to-end face recognition system which is a crucial technique for wide range of applications, for instance, security, smartphones face id… We focus on building a face recognition system with liveness detection for anti-spoofing and emotion detection. The system using CNN (convolutional neural networks) for this face recognition task. This report discusses methodologies and results of the models, including training schemes, evaluation metrics and performance comparisons.

# 2. Methodology

The dataset has approximately 380k image of faces with a 64x64 size, considering the small size of image, ResNet-18 model was implemented as based model for embedding for 2 methods (self-supervised learning or metric learning using cosine similarity and Euclidean) and Classification based (supervised learning). The Resnet-18 model was replicated same as original paper, but we plugged a classification head with 512 dim to output the face embedding vectors. In this project, metric learning (cosine similarity and Euclidean) using Triplet loss and classification-based learning using categorical entropy loss were implemented.

**Method 1: Classification-based learning**

Using original embedding model of ResNet-18, a FC (fully connected) layer with 1000 dim was implemented to present the vector of face embedding, and one hot mapping to 4000 nodes layer (4000 people id)