**PROPOSAL OF FACIAL RECOGNITION SYSTEM**

# *Abstract*

*This proposal outlines a real-time facial recognition system for identifying members of the AI/ML team in TAI. The system will take a live video feed as input and use MTCNN for facial detection. Following detection, the system will perform feature extraction using FaceNet. The extracted features will then be classified using an Artificial Neural Network (ANN) with a softmax activation function. The proposed system promises to deliver accurate and efficient recognition of faces in real-time.*

# Introduction

Real-time face recognition is a technology that allows a computer to identify and verify a person from a video source or a digital image. This technology uses deep learning techniques to detect and compare patterns based on the person's facial features. The result of the recognition process can be used for various applications, such as security systems, identity verification, or even virtual reality and gaming.

The proposed system will use MTCNN[][(Xiang and Zhu 2017)](https://www.zotero.org/google-docs/?H7KaBq) for facial detection, followed by facial alignment and feature extraction using FaceNet[4](Schroff, Kalenichenko, and Philbin 2015).The extracted features will then be classified using an Artificial Neural Network (ANN) with a softmax activation function. The dataset used in this project will be an image dataset of the members of TAI in the AI/ML team.

# Problem Statement

The TAI requires a facial recognition system that can accurately identify team members in real-time. Furthermore, the system should be able to handle a large number of team members and be scalable to accommodate future growth. The problem, therefore, is to develop a real-time facial recognition system that can accurately identify members of the AI/ML team, while also providing a high level of security, ease of use, and scalability. The major challenge is to build a model that can perform automated recognition of the faces with variations in lighting, facial expressions, and poses in real time.

Objectives

The objectives of this proposed system are:

* To successfully recognize members of the TAI-AI/ML team in real time.
* To Understand the various concepts of Computer vision Technique.

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# Literature Review

In order to recognize and compare human faces, facial recognition algorithms were first investigated in security systems. This technology has since been adopted by iris recognition, picture detection, and other applications. These techniques have recently been investigated in various academic domains and have evolved into commercial identification and marketing tools.[[1](#_8sxfylyv4x0t)] [(Paul and Acharya 2020)](https://www.zotero.org/google-docs/?nxz82I).

Facial recognition has made significant advancements in recent years, but its implementation in the real world still poses some challenges. Factors such as lighting, facial expression and pose can impact the performance. [[5](#_8sxfylyv4x0t)][(Zhang et al. 2016)](https://www.zotero.org/google-docs/?OOtk2O). Many methods have been created and developed in order to perform face detection.[[2](#_8sxfylyv4x0t)][(Rahmad et al. 2020)](https://www.zotero.org/google-docs/?JVWM2V). Some popular models are Haar Cascade classification, Histogram of Oriented Gradient(HOG)[[2](#_8sxfylyv4x0t)], Multi-Task Cascaded Convolutional Neural Network(MTCNN), and so on.

Likewise, several studies have been made on facial feature extraction with use of deep learning algorithms for feature extraction and classification. One notable example is the FaceNet architecture, which utilizes a deep convolutional neural network (CNN) to extract features from a face and compare them to a database of known individuals. This approach has been shown to achieve high accuracy rates in a number of facial recognition tasks.

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# Methodology

The Following figure explains the workflow of our project.

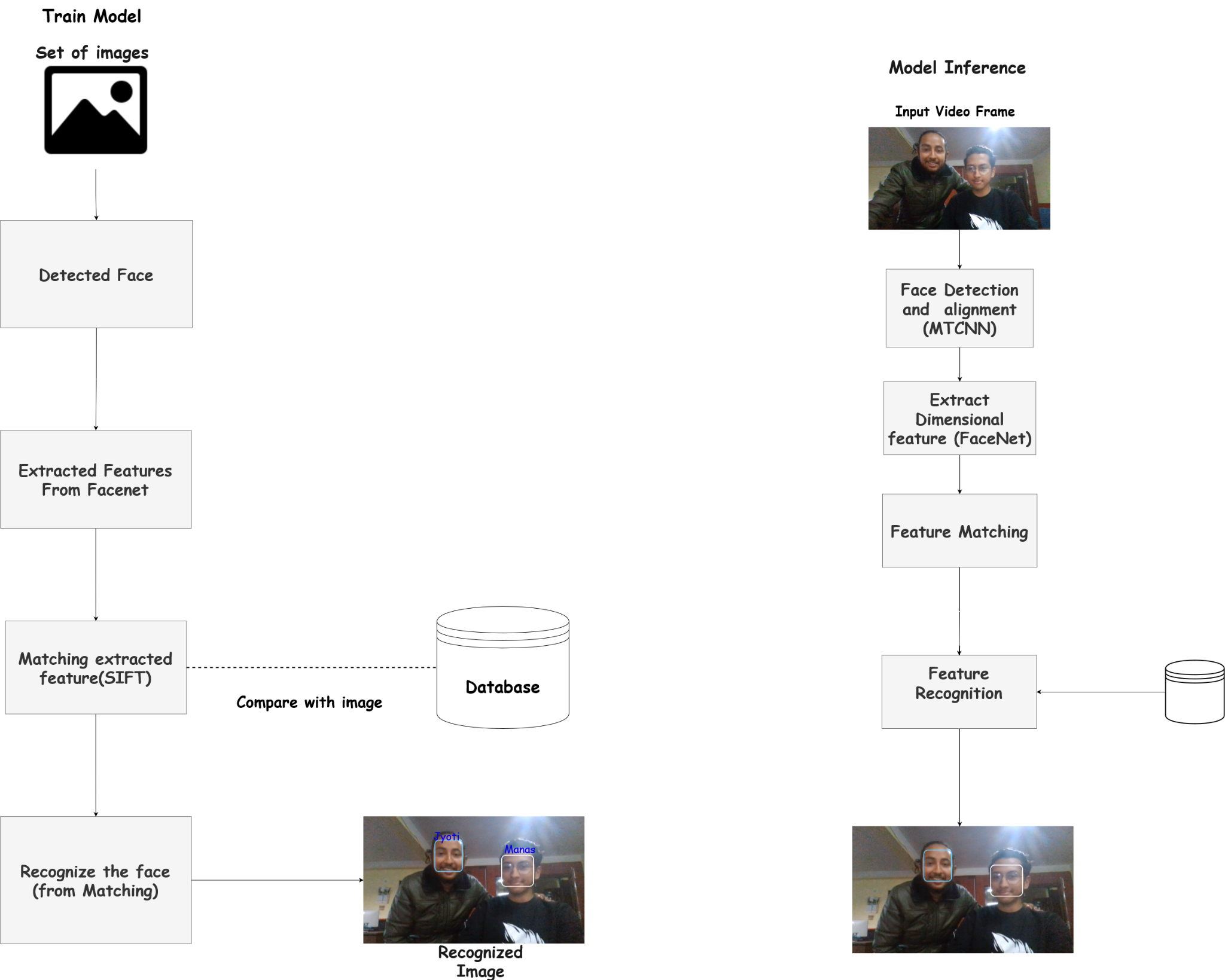


Fig 1: Flowchart of Face Recognition

## Steps for facial recognition with different implementation techniques is mentioned below:

1. **Face detection and alignment**

MTCNN

1. **Feature Extraction**

Face Net model

1. **Feature Matching**

SIFT

# Task Division

In our team, tasks will be divided evenly and both members will work interchangeably without any specific task allocation. This approach allows for flexibility and ensures that all responsibilities are shared equally.

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# References

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2. [Rahmad, C., R. A. Asmara, D. R. H. Putra, I. Dharma, H. Darmono, and I. Muhiqqin. 2020. “Comparison of Viola-Jones Haar Cascade Classifier and Histogram of Oriented Gradients (HOG) for Face Detection.” *IOP Conference Series: Materials Science and Engineering* 732(1):012038. doi: 10.1088/1757-899X/732/1/012038.](https://www.zotero.org/google-docs/?Chw78k)
3. [Schroff, Florian, Dmitry Kalenichenko, and James Philbin. 2015. “FaceNet: A Unified Embedding for Face Recognition and Clustering.” Pp. 815–23 in *2015 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*.](https://www.zotero.org/google-docs/?Chw78k)
4. [Xiang, Jia, and Gengming Zhu. 2017. “Joint Face Detection and Facial Expression Recognition with MTCNN.” Pp. 424–27 in *2017 4th International Conference on Information Science and Control Engineering (ICISCE)*.](https://www.zotero.org/google-docs/?Chw78k)
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