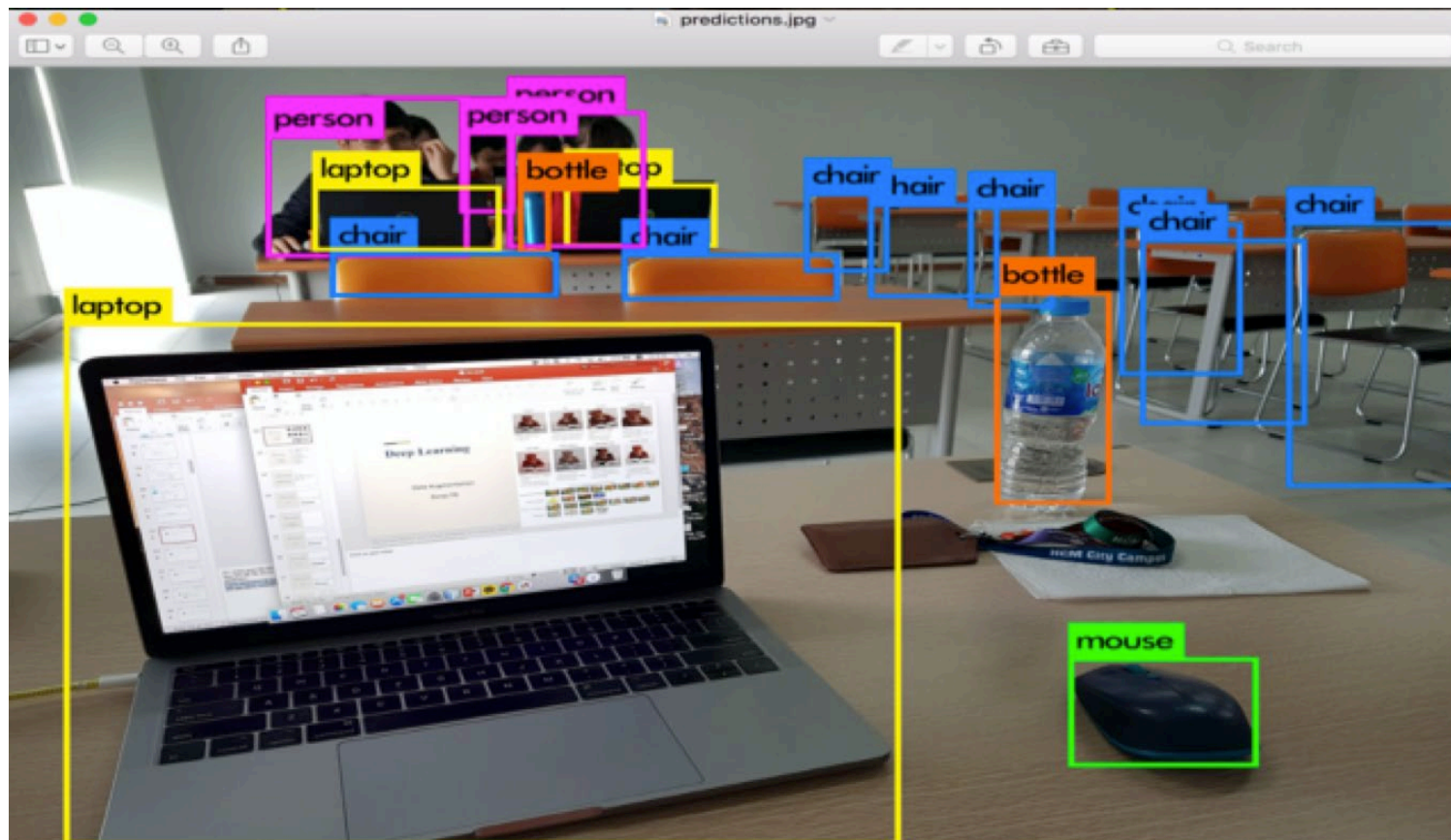


Face Recognition

Objectives

- What is Face Recognition?
- The techniques used in face recognition.
- What are the future of face recognition?
- Applications of face recognition

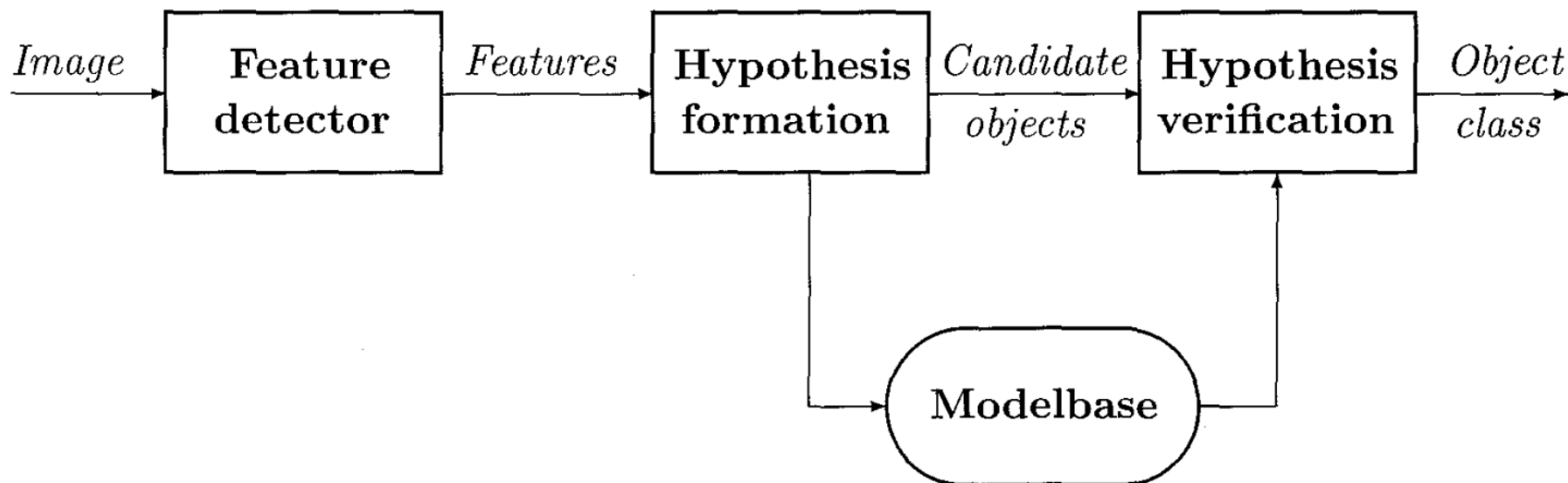
What is Object Recognition?



What is Object Recognition?

- Object recognition is the ability to recognize an object.
- Object recognition consists of recognizing, identifying, and locating objects within a picture with a given degree of confidence.
- This might be after the object has been previously seen or recognizing it from photographs.
- It is the ability to perceive an object's physical properties (such as shape, color, and texture) and apply semantic attributes to the object

Object Recognition



Object Recognition Steps

- Feature extraction: Which features should be detected, and how can they be detected reliably?
- Feature-model matching: How can features in images be matched to models in the database?
- Hypotheses formation: How can a set of likely objects based on the feature matching be selected, and how can probabilities be assigned to each possible object?
- Object verification: How can object models be used to select the most likely object from the set of probable objects in a given image?


Face Recognition

ASIC

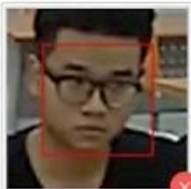
- Your groups
- Change requests
- Settings
- Logout

Currently taking attendance


Present attendees



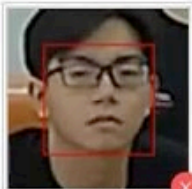
SE150819
Bùi Ngọc Huy




SE150854
Lê Hoàng Khôi




SE150905
Trần Bảo Minh




SE151082
Lê Tiến Thịnh




SE62486
Lê Quang Cường



SE62804
Nguyễn Tiến Thiên





SE63147
Nguyễn Hanh Minh
Châu



SE63559
Nguyễn Đức Thành

Unknown attendees





Face Recognition

- Facial recognition is a way of identifying or confirming an individual's identity using their face.
- Facial recognition systems can be used to identify people in photos, videos, or in real-time.
- Facial recognition is a category of biometric security
 - Voice recognition
 - Fingerprint recognition
 - Iris recognition.

How does it work?

- Step 1: Face detection: detects and locates the image of a face
- Step 2: Face analysis: image of the face is captured and analyzed
- Step 3: Converting the image to data: the face capture process transforms analog information (a face) into a set of digital information (data) based on the person's facial features.
- Step 4: Finding a match: Your faceprint is then compared against a database of other known faces

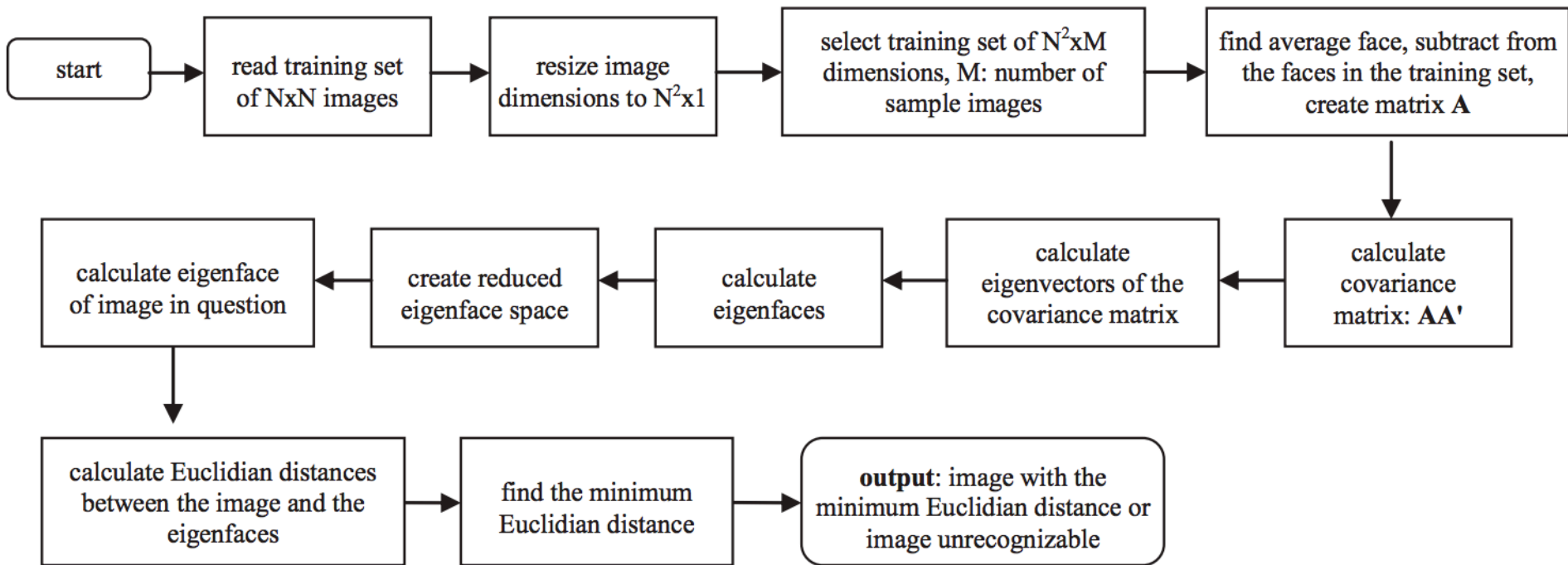
How does it work?

- Step 2: Face analysis
 - Reads the geometry of your face.
 - Key factors include:
 - The distance between your eyes.
 - The depth of your eye sockets
 - The distance from forehead to chin
 - The shape of your cheekbones, and the contour of the lips, ears, and chin.
 - The aim is to identify the facial landmarks that are key to distinguishing your face.

The Approach

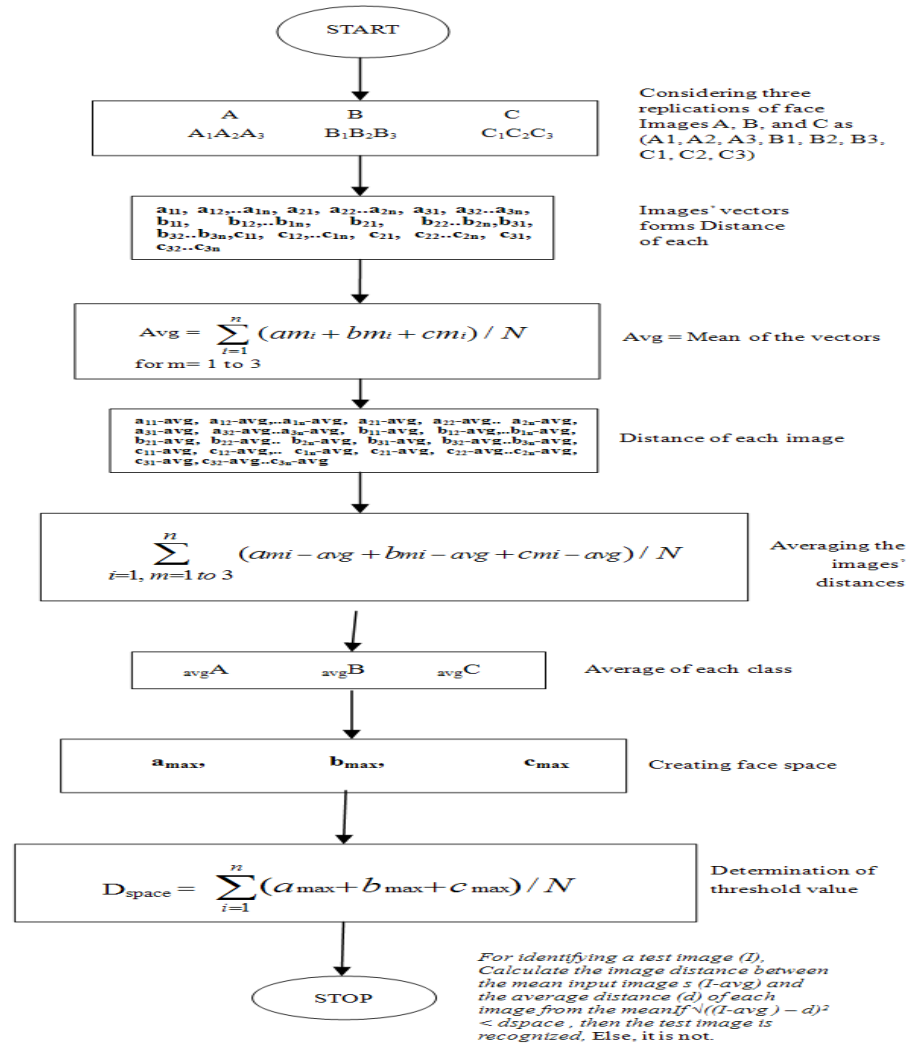
- **Type 1: Holistic Matching Methods:** The approach covers face recognition as a two-dimensional recognition problem. Example: Eigenfaces, Principal Component Analysis, Linear Discriminant Analysis, and independent component analysis
- **Type 2: Feature-based Methods:** In this method, local features such as eyes, nose, and mouth are first of all extracted and their locations and local statistics are fed into a structural classifier.
- **Type 3: Hybrid Methods:** use a combination of both holistic and feature extraction methods

Eigenfaces method



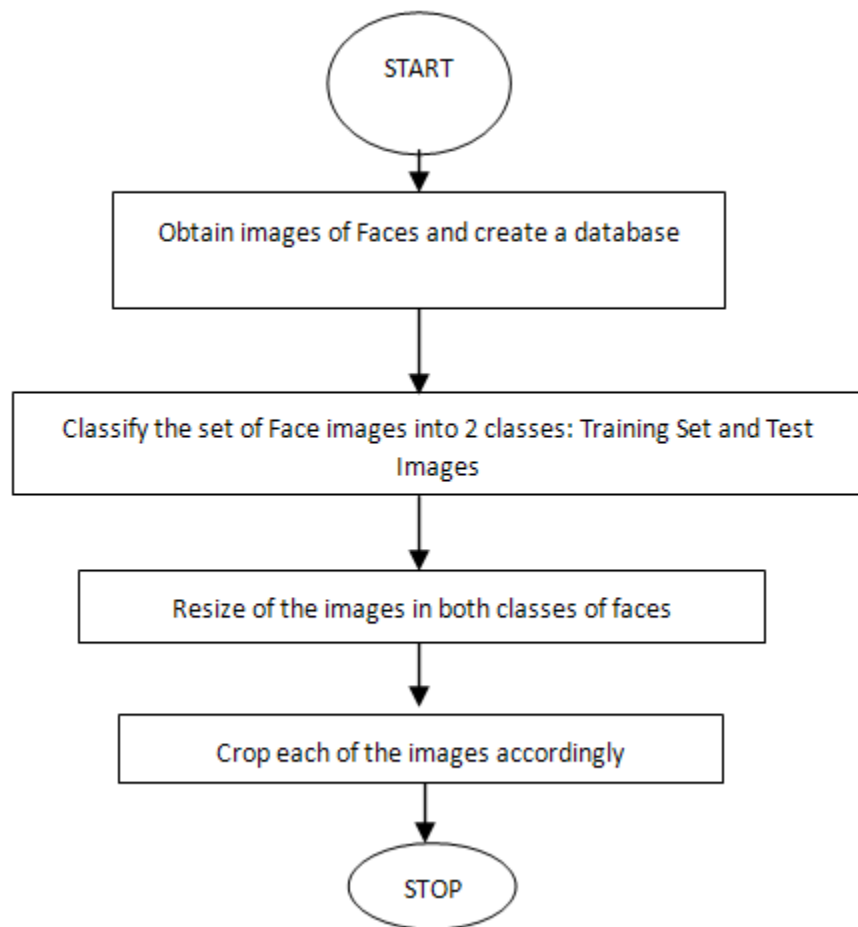
Eigenfaces method

- PCA Steps



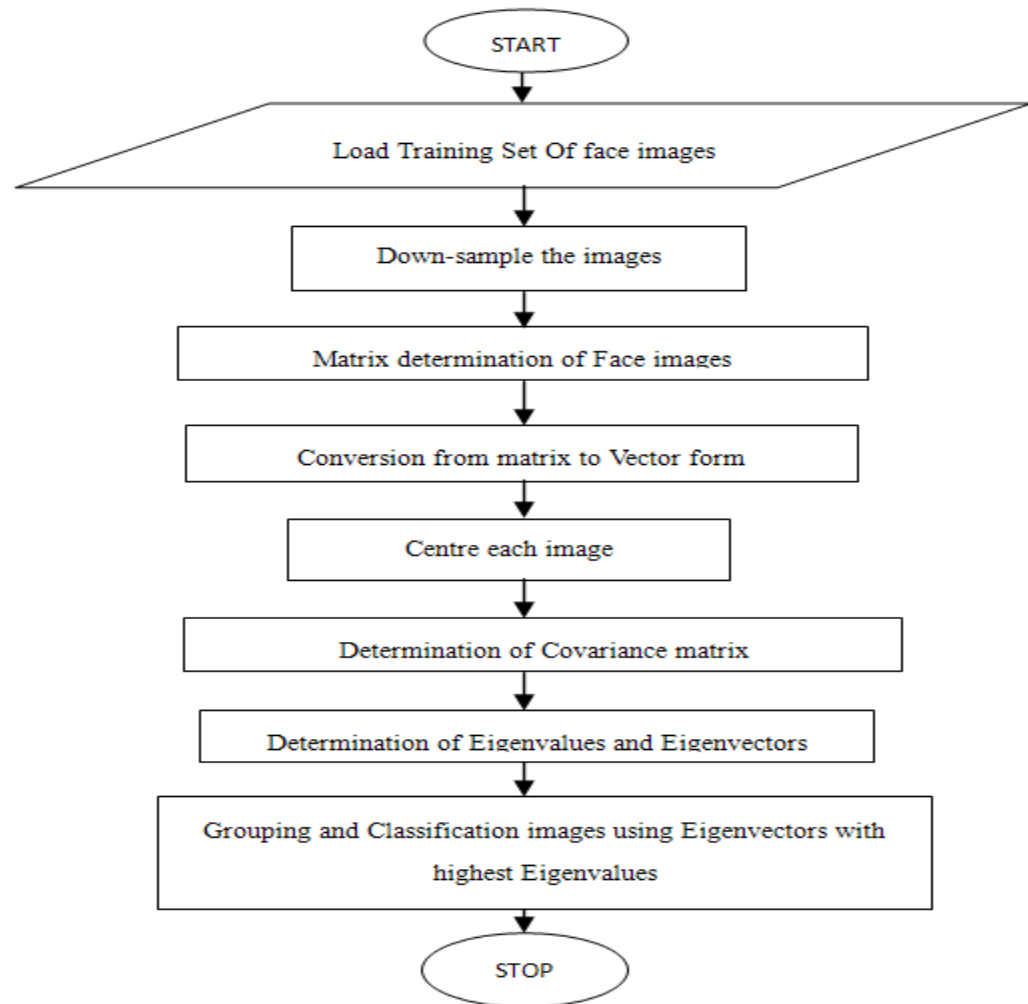
Eigenfaces method

- Pre- Processing Flowchart



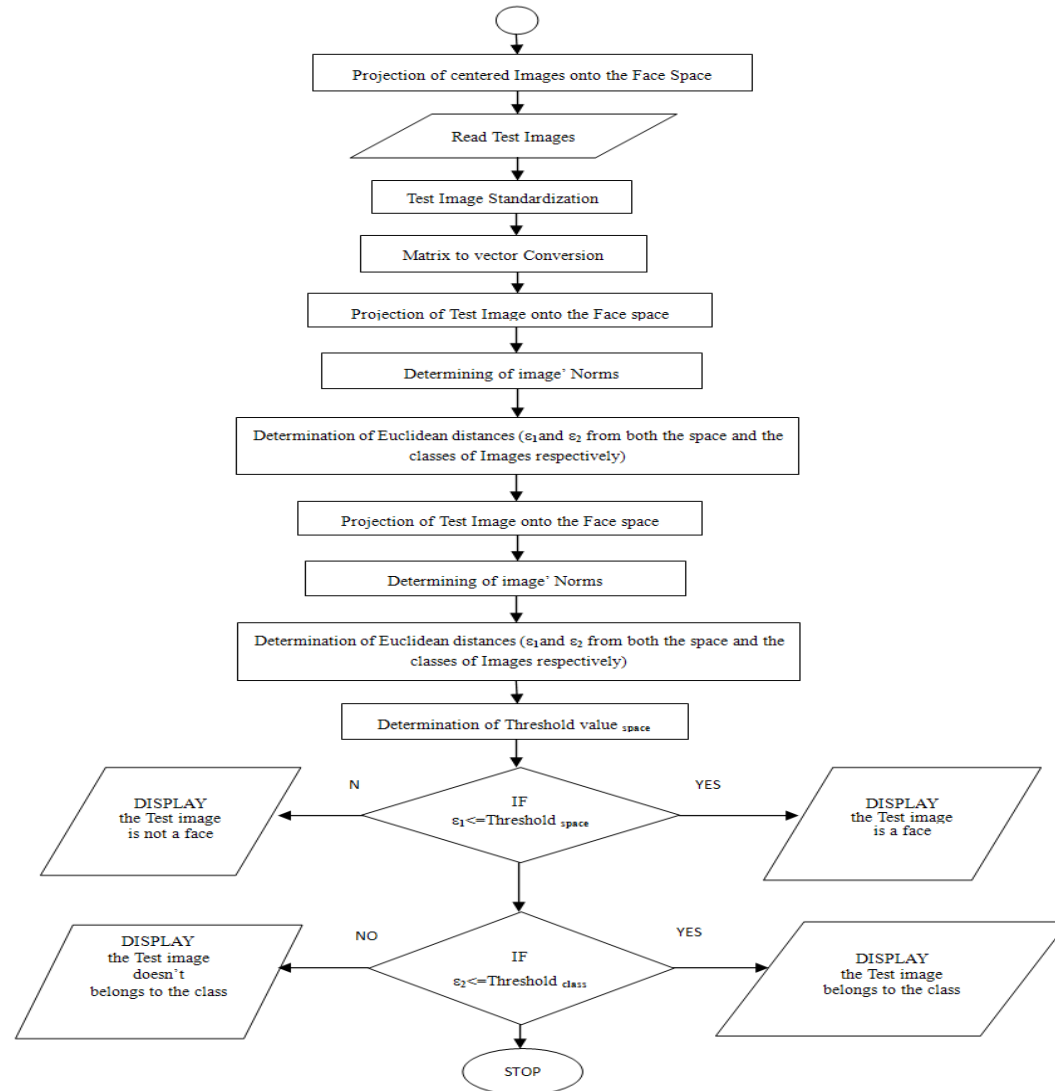
Eigenfaces method

- Training of face images



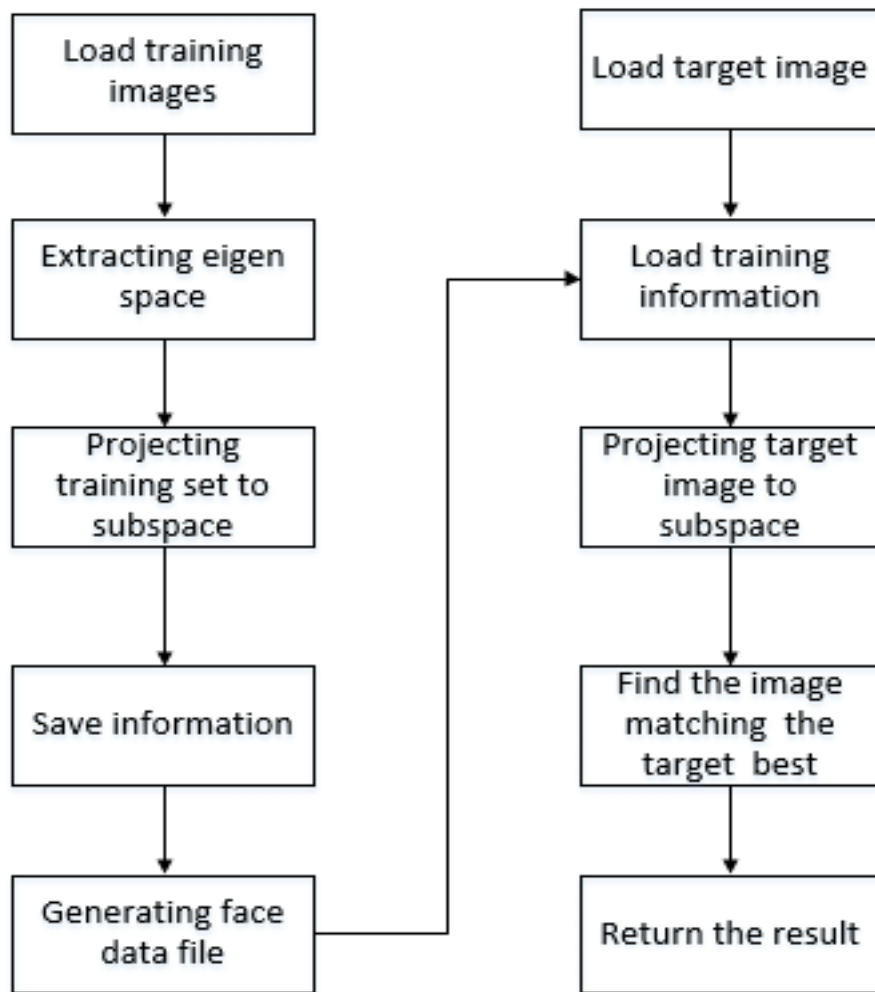
Eigenfaces method

- Recognition



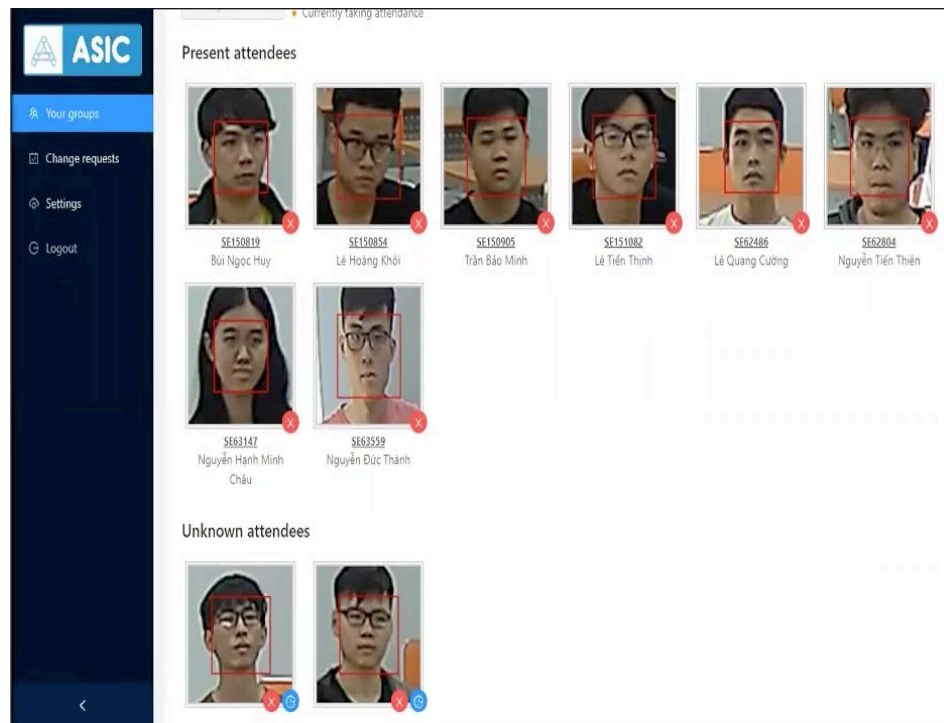
Eigenfaces- Face Recognition

- Summary



Applications

- Prevent Retail Crime.
- Unlock Phones.
- Smarter Advertising.
- Find Missing Persons.
- Help the Blind.
- Protect Law Enforcement.
- Aid Forensic Investigations.
- Identify People on Social Media Platforms.



Summary

- What is Face Recognition?
- The techniques used in face recognition.
- What is a feature of face recognition?
- Applications of face recognition