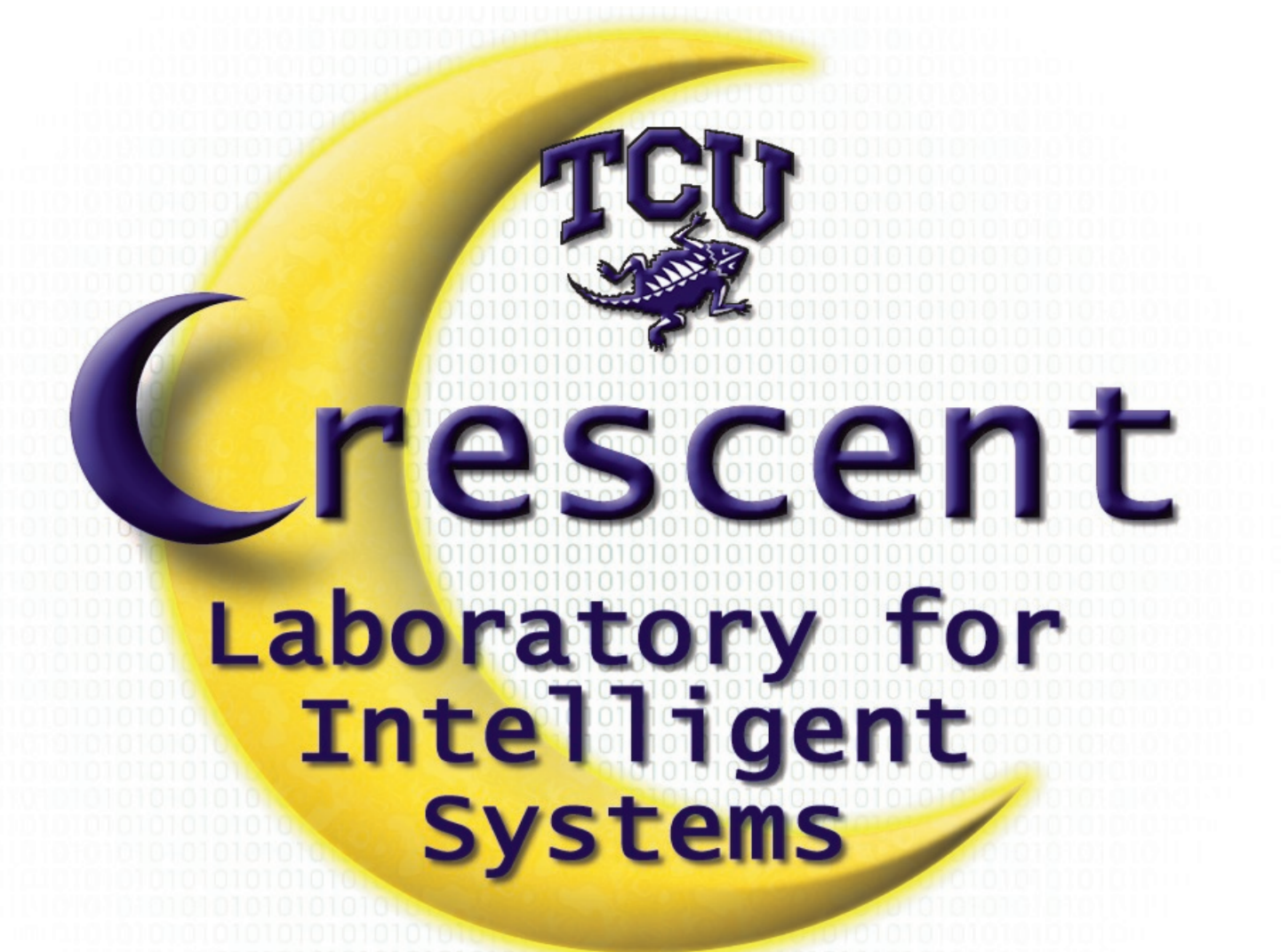




Integration of Texture and Shape Algorithms with Face Recognition using Eigenvectors

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Motivation

- Develop an approach to detect and identify human faces in video footage
- Integrate texture identification of skin with shape detection of faces to find faces and further recognize them
- To our knowledge, first method that uses texture and eigenfaces to identify faces

Texture Classification

- Texture Module - ALISA - Adaptive Learning Image and Signal Analysis
- Detects anomalies and classify textures of images
- Represents features of pattern in image in structurally identical histograms
- Returns image with highlighted skin areas

Face Recognition

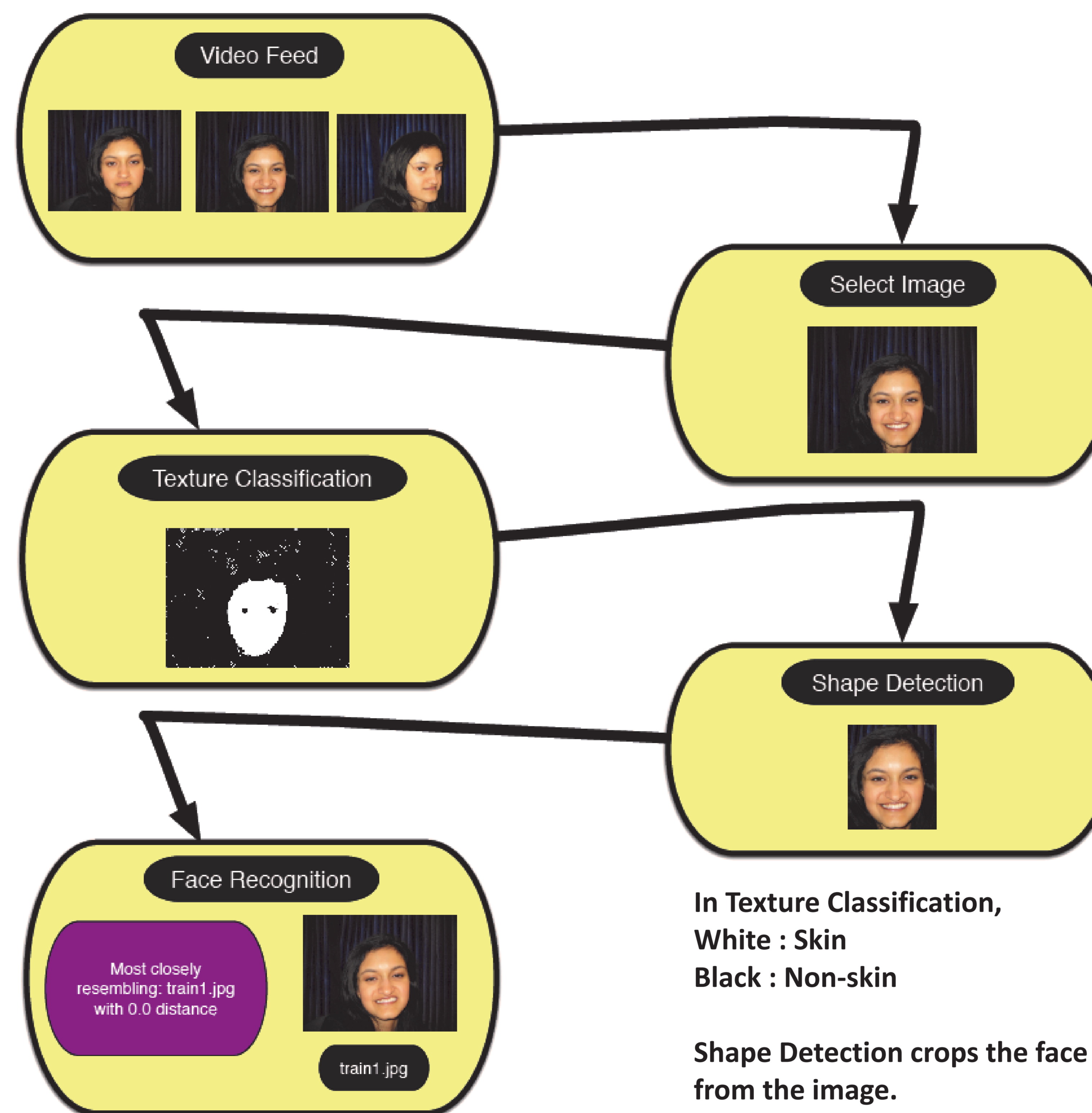
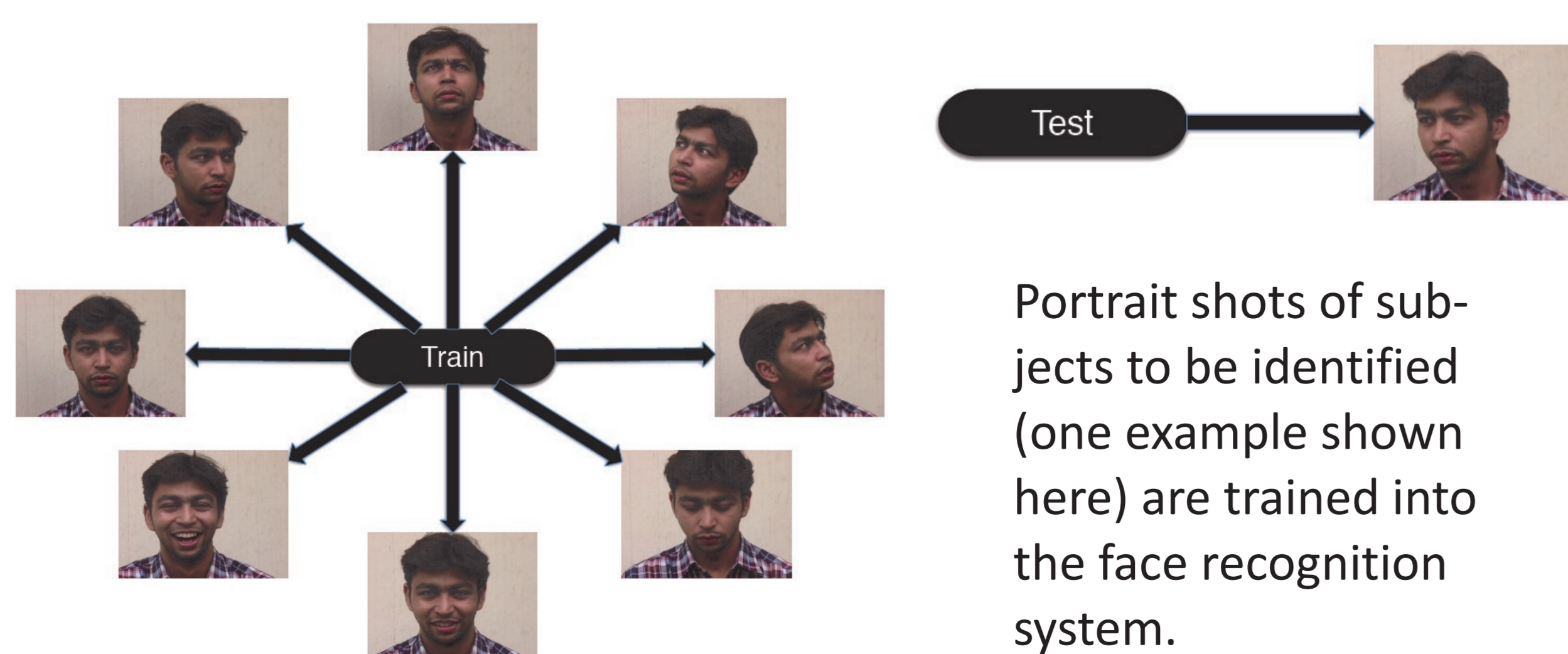
- Eigenfaces : Face recognition from vectors from decomposition of training faces
- Decomposition accentuates certain facial characteristics
- Result: "Most closely resembling: train1.jpg with 0.0 distance."

Task

- Question: "Is there a face in this image? If so, can we recognize it?"
- Used 1) texture classification - ALISA
2) shape detection - GHT
3) matrix manipulation - Eigenfaces

Theory

- Texture classification is used to highlight skin in images
- Shape of the skin can assist to detect the face
- Area of the face, when cropped, serves as input to facial recognition software
- Cropped image improves performance by reducing area analyzed for recognition



Shape Detection

- GHT - Generalized Hough Transform
- Detects arbitrary shapes in images
- Stores shape information in vector format in a reference table (R-table)
- Returns cropped image with the face

Applications

- Smart Home Environment (video facial recognition)
- Access Monitoring and Restriction (security)

Results

- Most confident about portraits
- Matched action images with less certainty
- Increase in image testing interval increased performance without significant quality loss

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