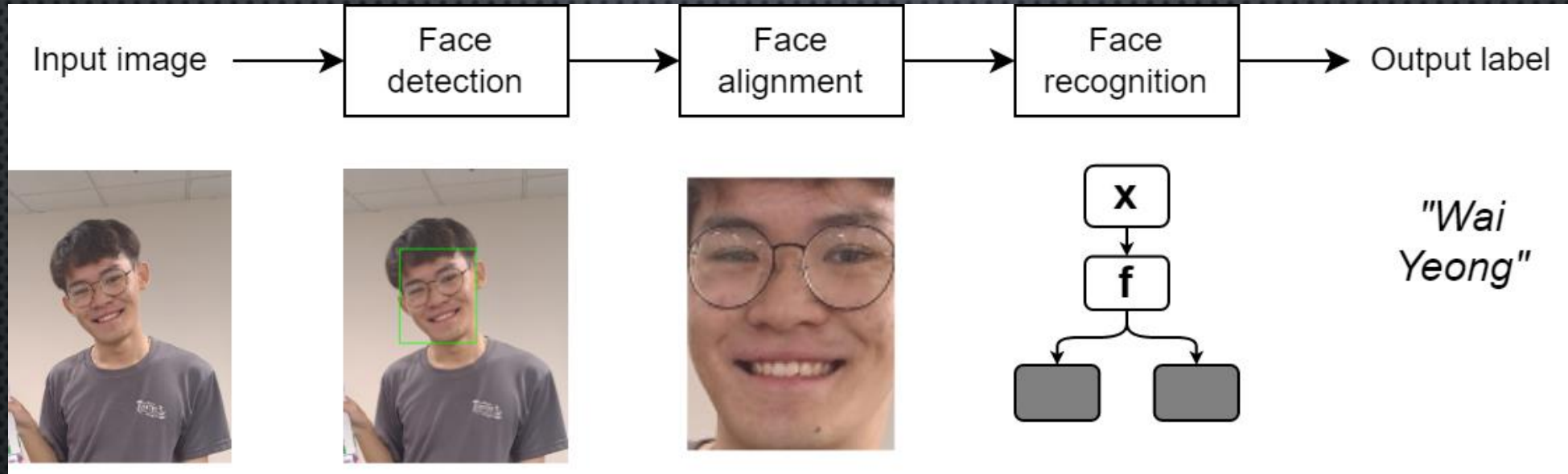


ASSIGNMENT 1: ONLINE FACE DETECTION AND RECOGNITION SYSTEM

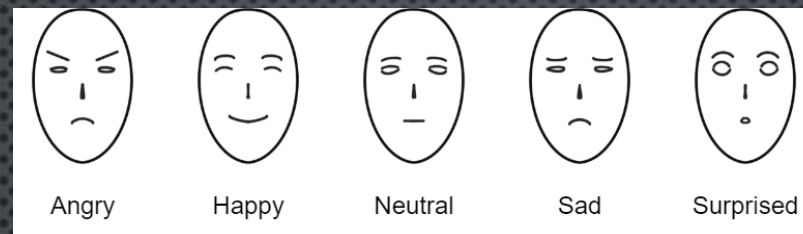
F42 GROUP 2 (HONEY, JANE, WAI
YEONG, PHILIP, VERONICA)

5 APRIL 2023

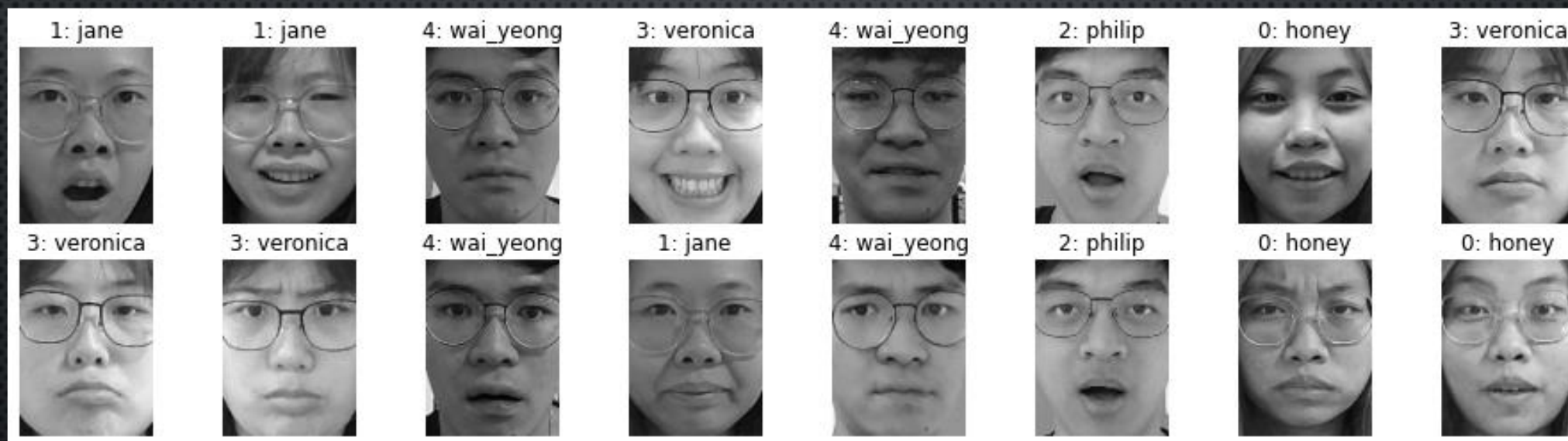
END-TO-END PIPELINE (3 MODULES)



DATASET

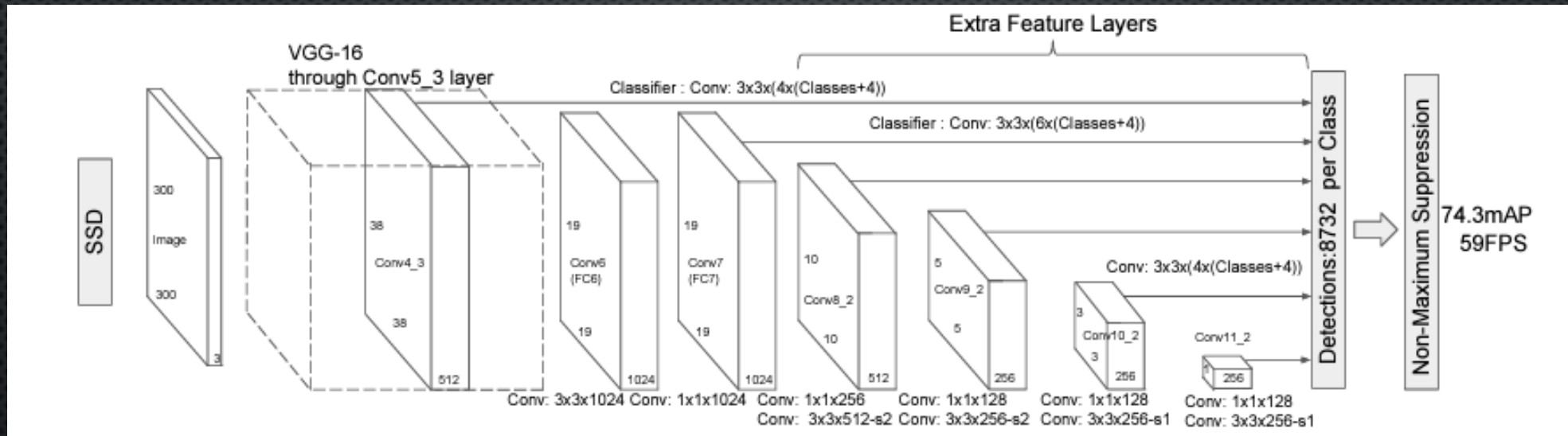


- 10 FACIAL EXPRESSION EACH PER PERSON



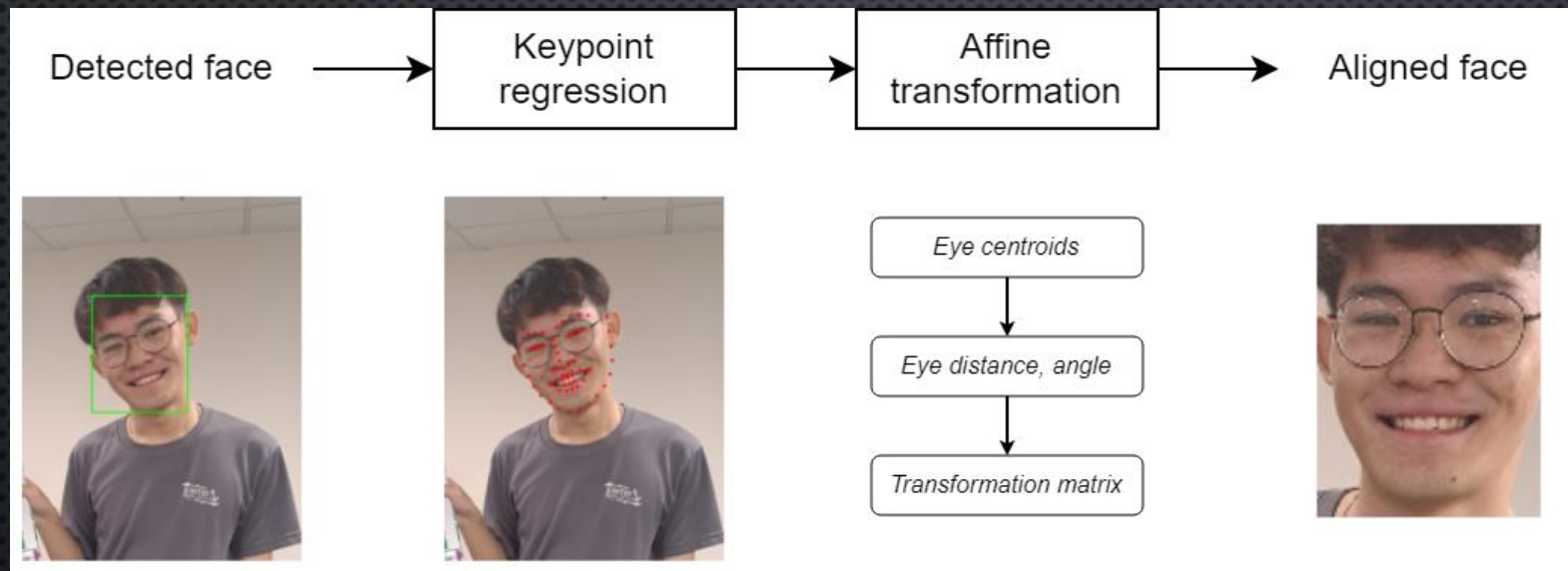
FACE DETECTION

- VIOLA & JONES CASCADE DETECTOR (VJCD)
- SINGLE-SHOT DETECTOR (SSD) w RESNET-10



FACE ALIGNMENT

- FACIAL KEYPOINT REGRESSION
- AFFINE TRANSFORMATION



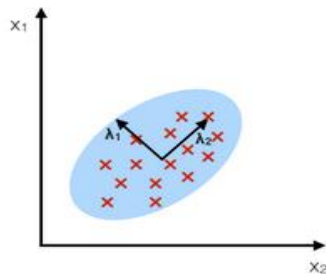
FACE RECOGNITION

FEATURE EXTRACTION

- PCA
- FISHERFACE (PCA + LDA)

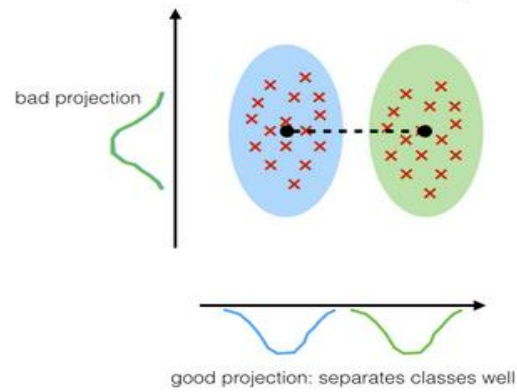
PCA:

component axes that maximize the variance



LDA:

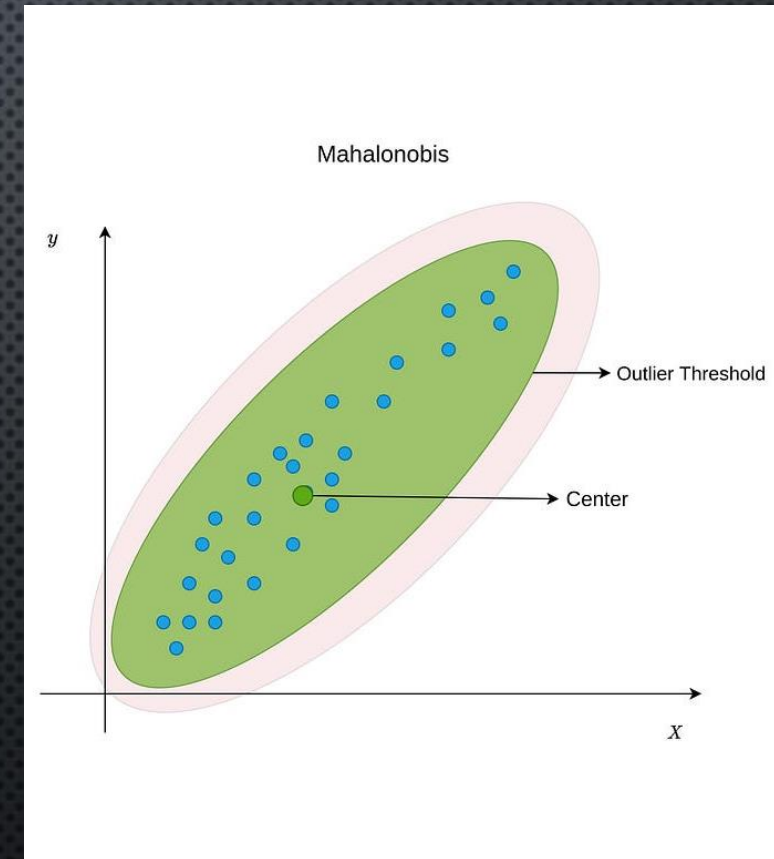
maximizing the component axes for class-separation



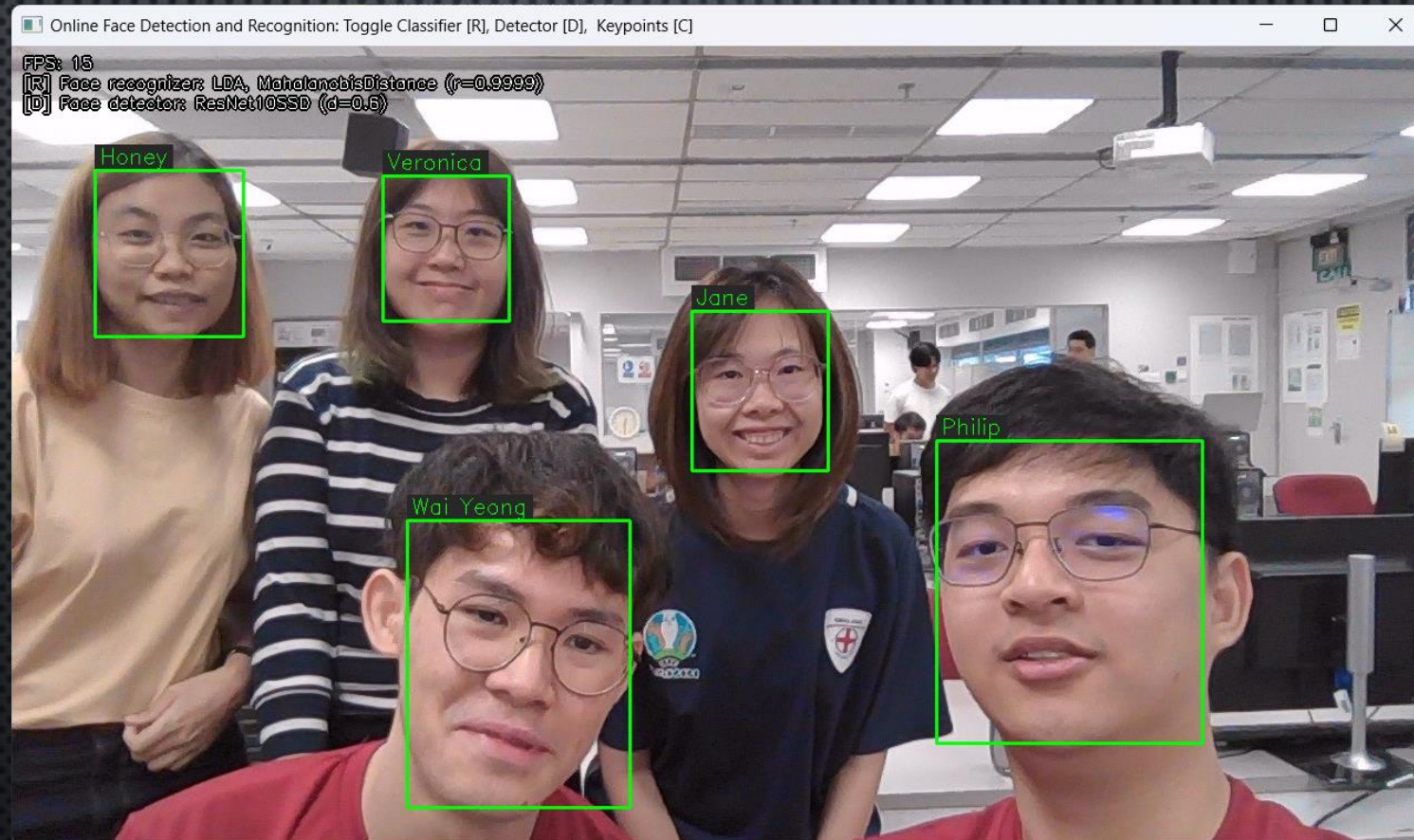
FACE RECOGNITION

FEATURE CLASSIFICATION

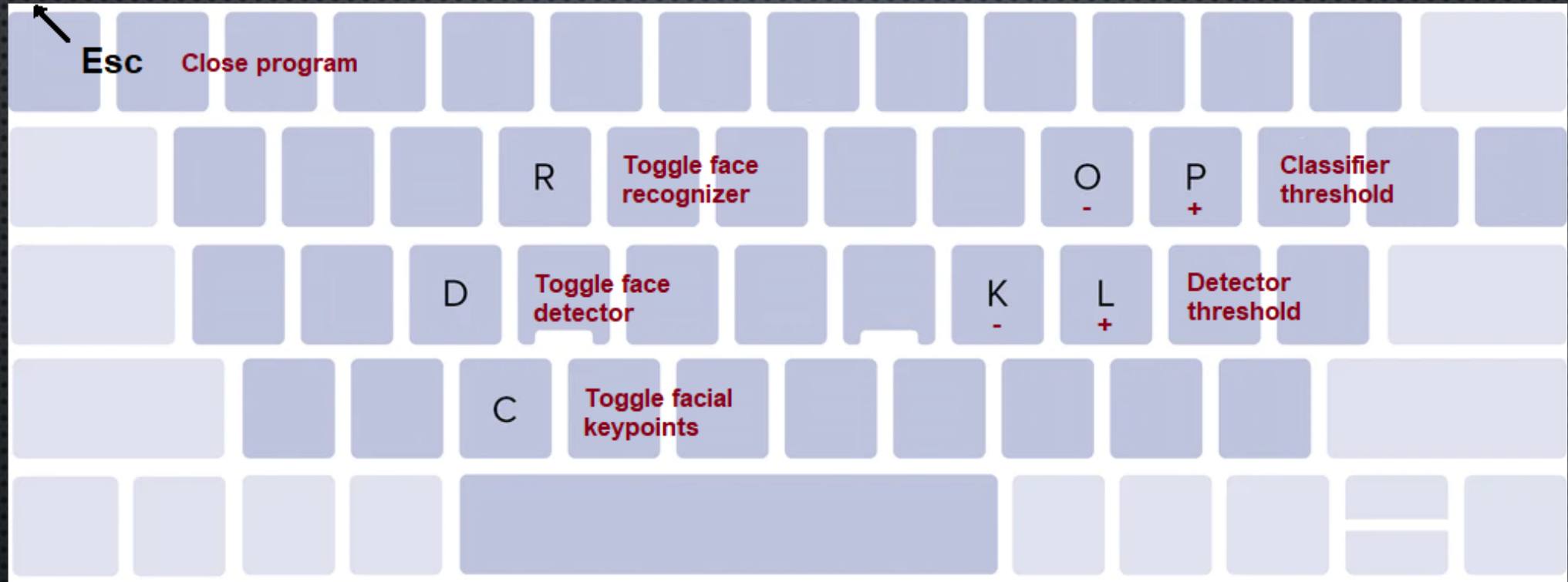
- DISTANCE-BASED
 - MAHALANOBIS DISTANCE
 - CHI-SQUARED DISTRIBUTION THRESHOLD VALUE
- PROBABILITY-BASED
 - LOGISTIC REGRESSION
 - MULTI-LAYER PERCEPTRON



INTEGRATED GUI



KEYBOARD BINDINGS



THANK YOU






CLASSIFIER RESULTS

Table 5-1: Summary of classifier scores on the train and validation sets using PCA or Fisherface as the feature extractor

Classifier (Threshold)	PCA		Fisherface	
	Train	Validation	Train	Validation
Mahalanobis Distance (0.999 confidence)	97.3	96.3	99.9	96.3
Logistic Regression (0.5 probability)	100.0	99.0	100.0	98.7
Multi-layer Perceptron (0.5 probability)	100.0	99.0	100.0	98.7

CONTRIBUTION

- WORKING COLLABORATIVELY, MEMBERS WERE ABLE TO LEVERAGE EACH OTHER'S STRENGTHS AND CONTRIBUTE VALUABLE INSIGHTS TO EACH OTHER'S SECTIONS, WHICH ULTIMATELY LED TO THE ACHIEVEMENT OF OUR COMMON GOAL. ALONG THE WAY, WE LEARNED A GREAT DEAL FROM EACH OTHER AND DEVELOPED A DEEPER UNDERSTANDING OF THE SUBJECT MATTER.

Name	Matriculation No.	Contribution
Honey Win Naing	U1922724E 	PCA (visualisation, n components) FisherFace
Jane Kho Shwu Tyng	U1920875K 	PCA (visualisation) Classifiers (Keras, Logistic Regression)
Lee Wai Yeong	U1923582J 	SSD face detection Data augmentation FisherFace Classifier (Mahalanobis distance)
Philip Lee Hann Yung (Group Leader)	U1923382D 	System overview and live integration Face alignment Pre-processing PCA (scratch implementation) Classifier (Mahalanobis distance)
Veronica Tan Yun Qi	U1921775E 	Viola & Jones cascade detector Dataset preparation and construction