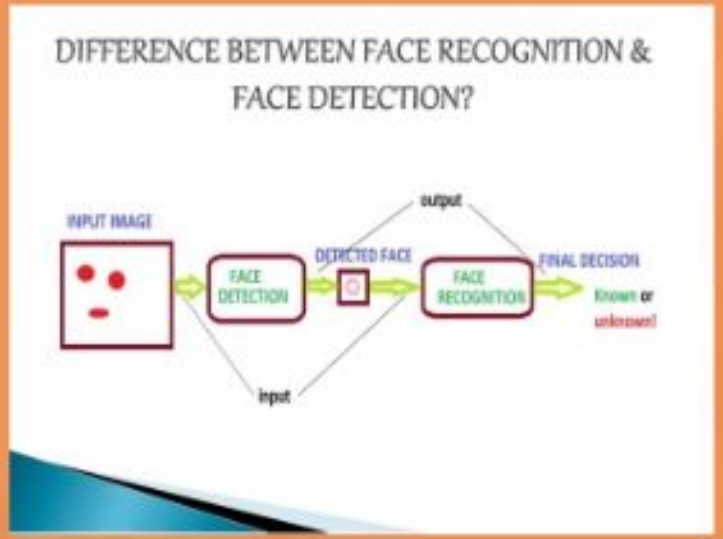
What is Machine Learning?

The machine learning from experience.
Experience = Data Feed
Results for future events

Overview

- Why face recognition over over biometric systems?
- Face Recognition
- Face Verification
- Face Identification



Biometrics

Biometric is a unique measurable quantity of a human being that can be used to automatically recognize an individual or verify an individual's identity.

Types of Biometrics:

Physiological
- Facial Recognition
- Iris Scan
- Retina Scan
- Hand Scan
- Finger Scan

Behavioral
- Voice-Scan
- Signature-Scan
- Keystroke-Scan

Software Requirements & Algorithm Used

Python with modules

- OpenCV
- PIL
- Pandas
- Numpy

Algorithms for facial recognition

- Eigenfaces
- LBPH
- Fisherfaces
- SIFT
- SURF

Applications

Unlock Phones

School Attendance System

Find Missing Person

Advantages & Disadvantages

Advantages

- Convenience and social acceptability.
- Easy to know.
- Not necessary for person to know.
- Inexpensive Biometric and prices are dipping.

Disadvantages

- Identical Twins.

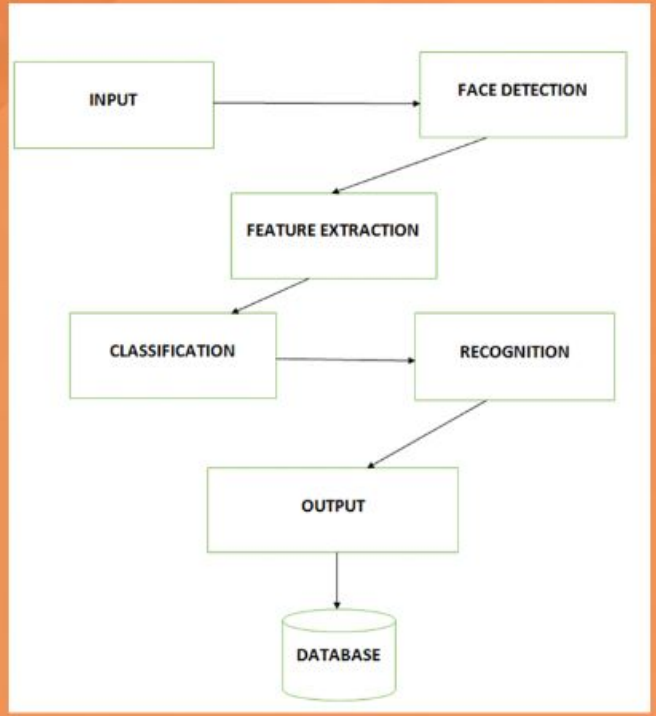
SCOPE

1-In Radio Frequency Identification(RFID) based Attendance system,an unauthorised person may place the ID card on the card reader and enter the organisation or mark attendance.

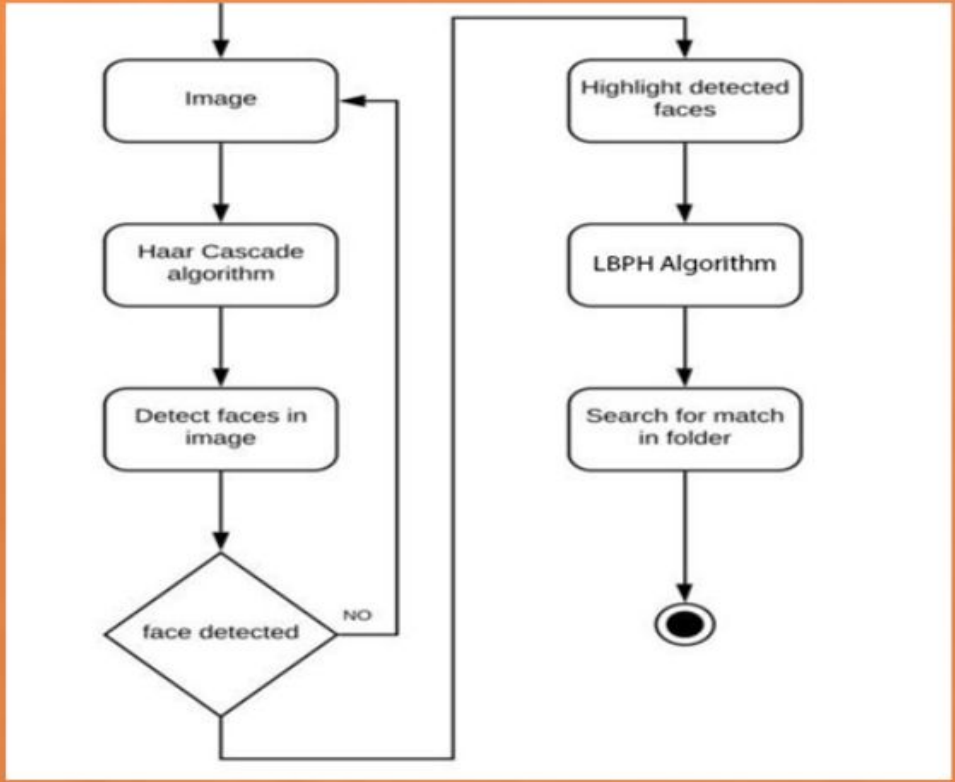
2-In a Fingerprint based Attendance system,a portable fingerprint device can be passed among the students to place their finger on the sensor during the lecture time without the instructor's intervention.

3-Face recognition guarantees a fool-proof method of marking the attendance.

ARCHITECTURAL DESIGN OF OUR SYSTEM



Working Flowchart of our System



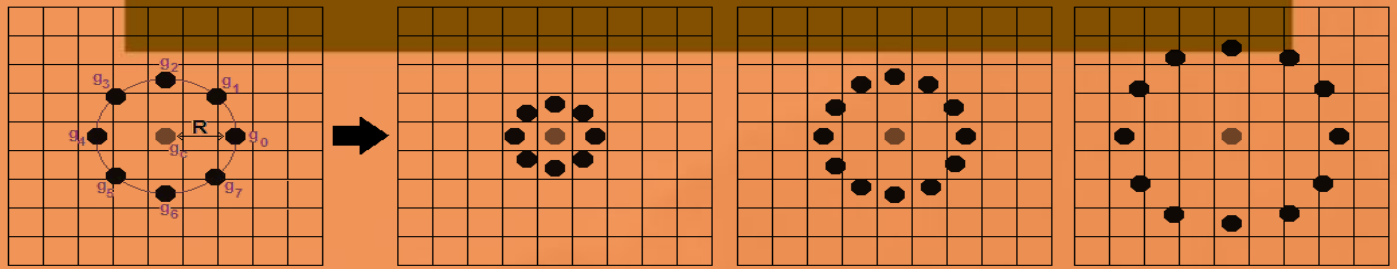
IMPLEMENTATION

ALGORITHM USED:

LBPH face recognizer-face recognition
Haarcascade_frontal_face-face detection
Haarcascade_eye-eye detection
Twilio-test mobile number
Smpt-mail protocol

LBPH(Local Binary Pattern histogram) ALGORITHM

LBP-labels a pixel by thresholding adjacent pixels and gives a binary pattern.
LBPH has 4 parameters(Radius,Neighbours,Grid X,Grid Y)
A. Radius- build circular LBP around central pixel.(R=1)
B. Neighbours-sample points to build LBP(N=8)
C. Grid X-number of cells in horizontal direction.(X=8)
D. Grid Y-number of cells in vertical direction. (Y=8)



P=8, R=2
(a)

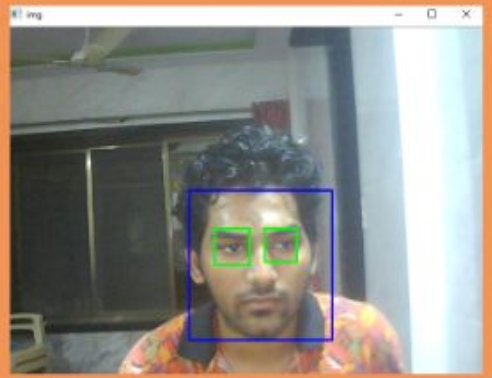
P=8, R=1
(b)

P=12, R=2
(c)

P=12, R=3
(d)

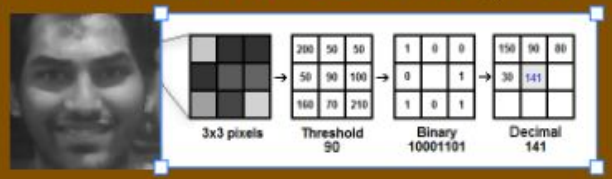
3. Training Algorithm requires Dataset of facial features.



4. Applying LBP operation:

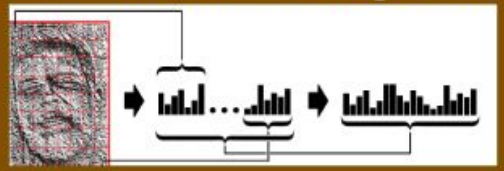
A.grayscale->3X3 matrix->threshold->set binary value->concatenate binary no.



B. After LBP procedure we have new image with better characteristics
C. It can be done using bilinear interpolation.

5. Extracting Histograms

A.Grid X and Grid Y parameters to divide the image into multiple grids



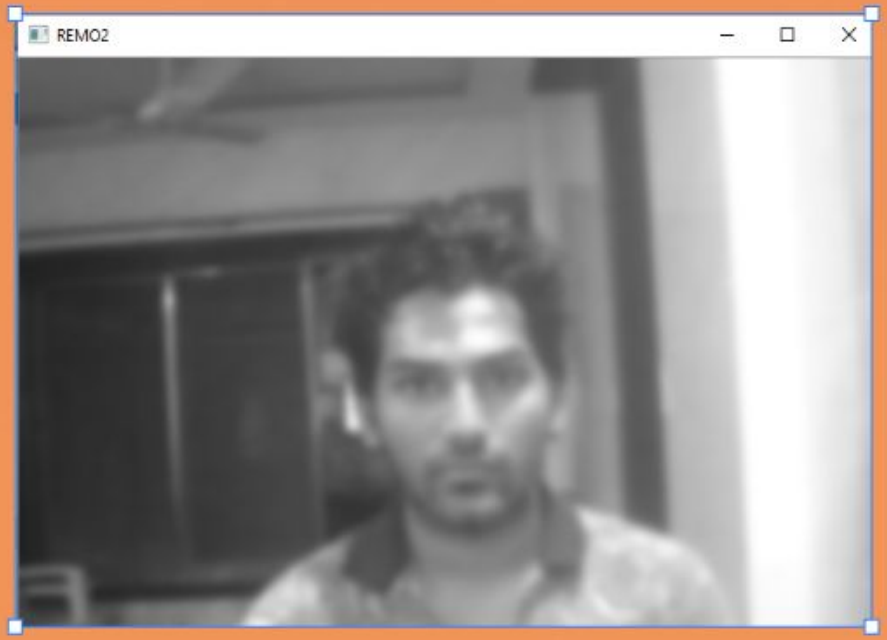
B. 256 positions (0~255) representing the occurrences of each pixel intensity.

C. 8x8 grids, we will have 8x8x256=16.384 positions in the final histogram.

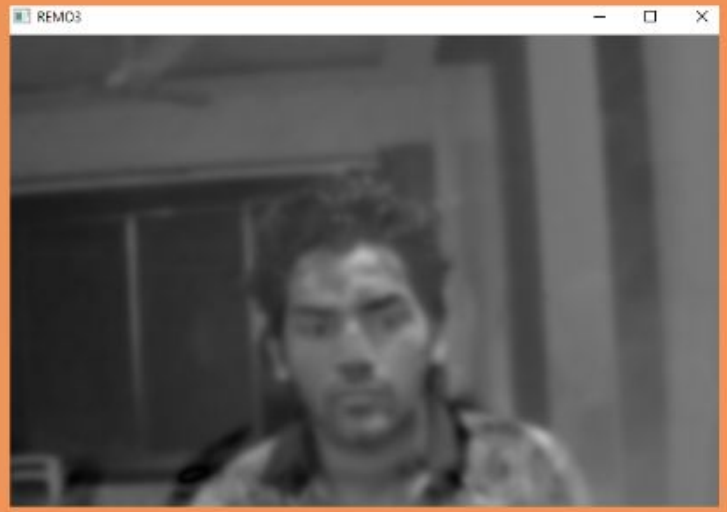
OUTPUT

FRAME- frames are individual pictures in a sequence of images.

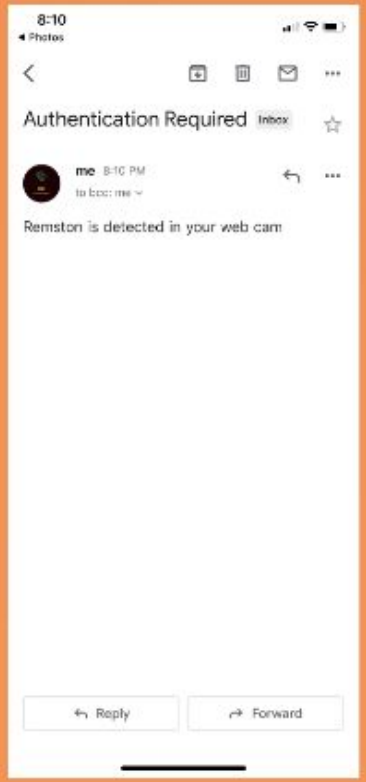
GRAY FRAME-2x2 image matrix without RGB complexity or dimensionality.



C.DELTA FRAME-storing or transmitting data in the form of differences (deltas) between sequential data rather than complete files; more generally this is known as data differencing



SMTP-mail protocol



CONCLUSIONS

LBPH is one of the easiest face recognition algorithms.
It can represent local features in the images.
It is possible to get great results (mainly in a controlled environment).
It is robust against monotonic gray scale transformations.
It is provided by the OpenCV library (Open Source Computer Vision Library).

ACCURACY

LBPH algorithm produces a recognition accuracy of 99.2% for still images and 99.3% from video recordings and Eigen faces produces an accuracies of 98.8% and 99.1% for the same have been obtained.

FUTURE SCOPES

Identifiable online daters.
Better tools for law enforcement
Full body recognition
A face scan for your phone. “Face Unlock”devices
Your face as currency.
Investing in these custom t-shirts