

# A Review Paper On Automated Real Time Face Recognition System Using Python and Open CV

KAVYA.N

*Department of Master of Computer Applications  
R.V. College of Engineering, Banglore-560059, Karnataka, India*

Dr.JASMINE K.S

*Associate Professor, of Department of Master of Computer Applications  
R.V. College of Engineering, Banglore-560059, Karnataka, India*

**Abstract:** Automated Real-time face recognition system is the capability to detect faces based on active facial images automatically. Face recognition is a trending area in computer-based application development in the past few decades; this is because of its usage on large scale. Face recognition can be done by Real data, Database images, Sensor images, and Capture images. This system is very necessary which can be implemented in various fields like security, forensic, user access control, user verification, etc. The paper proposes an easier and simple method used to detect the faces with the aid of a dataset containing the similar kind of matching appearance of a person.

**Keywords-** Computer vision, Open CV, Face recognition, Real Time Face Recognition, Advantages, Applications.

## I. INTRODUCTION

An automated Real-time face recognition system is the capacity of a system to detect a person's face from an active video frame. It is a way of presenting optimistic detection along with the identification of faces present in the photo or active video image against a pre-existing database that contains known faces. It starts with detecting along with distinguishing human being's faces from other objects present in the image or active video frame and then carries on with the identification of those detected faces. Face recognition is a deed that human begins perform routinely and without any effort in day to day life. The main objective is to give an easier and simple method in machine technology using which systems can effortlessly detect the faces with the aid of datasets containing the same kind of matching appearance of a person. Automated Real-time face recognition systems with the aid of computer vision will become skillful to behave like a human. It projects light on replicating the convoluted parts of the human visual system. This paper includes 8 sections, I Introduction, II Technology Used, III Methodology, IV Workflow of the system, V Implementation, VI Advantages, VII Applications and VIII Conclusion.

## II. TECHNOLOGY USED

### 2.1 Computer Vision

Computer vision is one among various scientific fields which provide an idea of how computers are capable of obtaining high-level understanding from the digital images or videos that are presented. The ideology behind this is to automate those tasks that the human visual system can do; a machine should be capable to detect the face of human beings, street lamp, or any other materials which are present in the provided digital image or video.



Figure 1. Computer identifying different objects

Computers cannot see the images as we see; computers see a matrix number between 0 to 255. For colored images, there will be firstly 3 channels are red, green, and blue, for all these channel matrices are associated. Each element of this matrix represents the intensity of brightness of the pixel.

Each matrix has individual matrices and these will be stacked onto each other to create a 3D matrix and thereby computer will interpret a color image as a 3D matrix. For greyscale or black and white images there will be only one channel, for the colored image there will be 3 channels (RGB). This is how computers read an image.

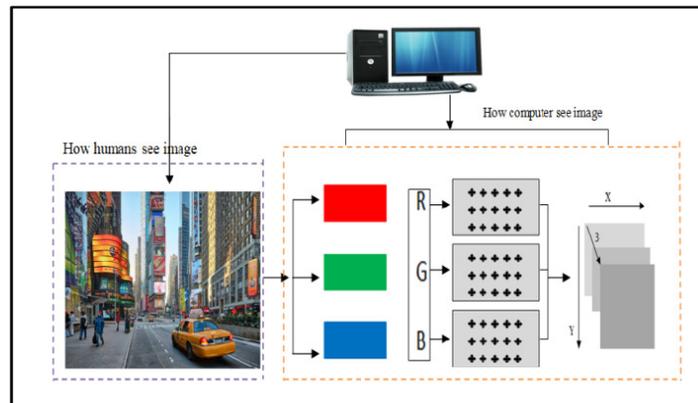


Figure 2: How Human v/s Computer see the image.

2.2 Open CV

Open CV is a library that is used for Computer Vision. It was first developed in the year 1999 at Intel by Gary Brad Sky and its first release came in 2000. Open CV python is a python wrapper for original Open CV C++ implementation. It is used to store computer vision problems. In Open CV all the images are converted from or to NumPy arrays which make it easy to integrate with other libraries that NumPy use (SciPy and matplotlib).

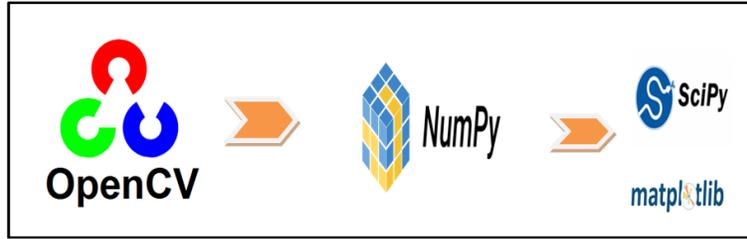


Figure 3: Pictorial representation of Open CV , NumPy ,SciPy and matplotlib.

### III .METHODOLOGY

#### 3.1 Face recognition system

Face recognition is the task of making an identification of a face in a photo or video image against a pre-existing database of faces. It begins with detection, distinguishing human faces from other objects in the image, and then works on the identification of those detected faces.

#### 3.2 Automated real-time face recognition system

An automated real-time face recognition system is capable of identifying or verifying a person from a video frame. To distinguish the face in a frame, one needs to spot whether the face is present in the frame. If it is present, mark it as a region of interest (ROI), take out the ROI, and process it for automated real-time face recognition.

### IV. WORKFLOW OF THE SYSTEM.

- Step 1: Load the faces into the database.
- Step 2: Face the web camera.
- Step 3: Detects the face in the frame defined.
- Step 4: Extracts a set of features using different Feature extraction methods.
- Step 5: Extracted data is compared to the match of stored datasets in the Database.
- Step 6: If a match is found, it returns matched face with the respective name or id provided.
- Step 7: If a match didn't find, it returns as unknown.

This is the working principle of the Real-time Face Recognition system. The data flow diagram of the above working principle is shown in the below figure.

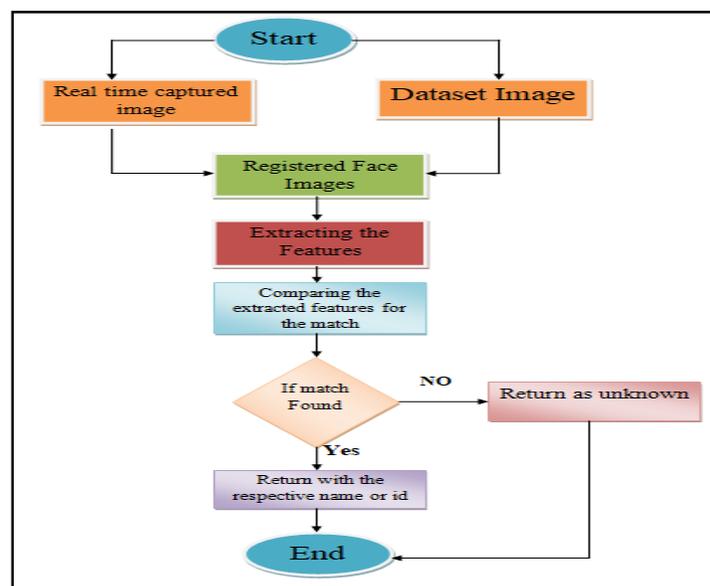


Figure 4 : Flow diagram for working principle of system.

## V.IMPLEMENTATION

For the real-time face detection system implementation, a dataset containing images of persons should be there to extract data for comparison, Open CV and face recognition modules should be installed. Open CV module is for computer vision and the face recognition module provides an easy to use set of face recognition utilities. These are the basic and prerequisites required to implement this system.

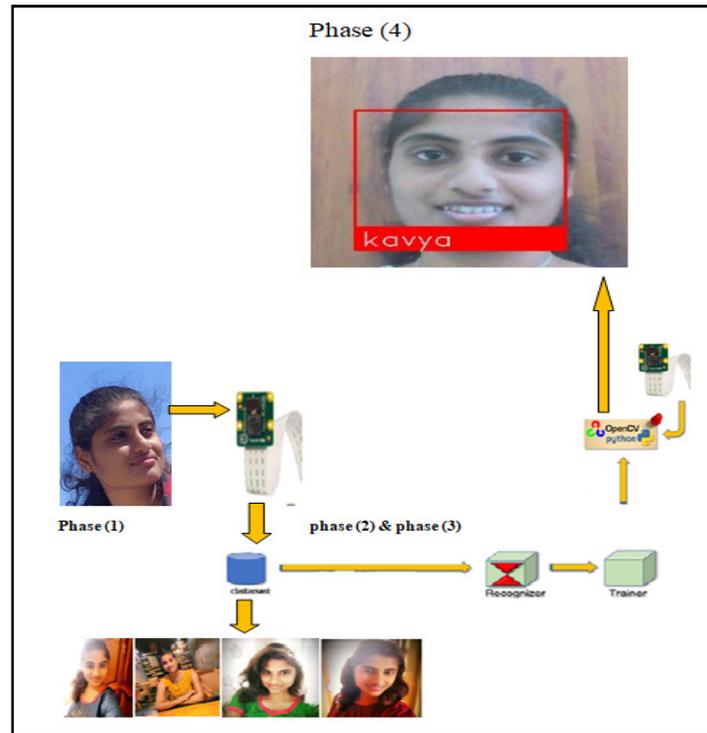


Figure 5: Implementation of an Automated Real-Time Face Recognition System

In phase (1), the camera detecting the face of a person. in phase(2) and phase(3), it is extracting the features from the face and comparing those data with the dataset which is already present in the database, in-phase(4) with the help of the algorithm used it recognizes the face of a person and returns with the name of them.

## VI. ADVANTAGES.

- It uses the Open CV module which is open source and has more functions for computer vision than any other modules like Matlab and Tensorflow.
- Open CV is comparatively faster.
- It detects the face of the human being even at a distance of 75cm.
- It includes automation of identity.
- It has enormous applications in different fields like security, biometric, etc.

## VII.APPLICATIONS.

- Unlocking phones.
- Biometric.
- Law enforcement.
- Airports and border control.
- Finding missing person.
- Improving retail experiences
- Banking.
- Marketing and advertising.
- Healthcare.

- Driver's ID or Any other National ID.
- Surveillance.  
Some famous industries which use this automated face recognition system effectively are:
- Snap chat is the pioneer of face recognition software; it allows the creation of filters that mould to the user's face.
- MAC make-up allows customers to virtually "try on" make-up using in-store augmented reality
- Mirrors.
- Facebook, without human intervention tags the individuals in images using its tag suggestions tool.
- Many Smartphone companies use face recognition to help users quickly unlock their phones, log in to apps and make purchases.

#### VIII.CONCLUSION.

Face recognition systems are presently associated with many companies which are at the crest of Technology and also with the industries assembling with the work of Automated Real-time Face Recognition System. The usage of python programming and Open CV makes it an easier and versatile tool or system; this can be accessed by any person as per their prerequisites.

It provides the importance of Automated Real-time face recognition and its functionalities along with its diverse applications in various fields. There by with the use of the Open CV module and python programming the real-time face recognition system can be intended for a wide range of purposes.

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