# Student Recognition Through Their Photograph

Surya Prakash

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surya prakash
Galgotias University
school of computer science and engineering
Greater noida ,india

## Abstract

Face detection and recognition from a picture or a video could be a popular topic in biometrics research. Face recognition technology has widelyattracted attention thanks toits enormous application value and market potential, like real-time video closed-circuit,television. It's widely acknowledged that the face recognition has played a very important role in closed-circuit television because it doesn't need the object's co-operation. We design a real-time face recognition system supported IP camera and image set algorithm by way of OpenCV and Python programming development. The system includes three parts: Detection module, training module and recognition module. the right space is decided with the identification of the covariance matrix's own vectors, which are centered on a set of fingerprint images. I build a camera-based real-time face recognition system and set an algorithm by developing programming on OpenCV.

What we want is that the actual photograph of each student mapped with their address class and unique number within the database . we'd like a trainee set of information to coach our model so our software can work on its own . This software is typically build to ease the burden on student and administration during a university or school from always remembering their identificationcode

**Keywords:** Face detection, Face Recognition, OpenCv

## 1. INTRODUCTION

[1]Face detection and recognition is technology which is employed to spot someone from a video or photo source. within the 1960s face recognition was introduced by Chief Executive Bledsoe. Bledsoe developed a tool which will classify photos of faces by hand using what's called a RAND tablet, a tool which individuals could use to input horizontal and vertical coordinates on a grid employing a pen like stylus that emitted electromagnetic pulses. Ever since then the popularity system is being improved and optimized constantly, the technology becomes gradually mature and is more and more widely utilized in human standard of living. It's been used increasingly for forensics by enforcement and military professionals. In fact, identity verification system was wont to help confirm the identity of Osama bin Laden after he was killed during a U.S. raid. The face recognition system is additionally being increasingly utilized in the mobiles for device security.during this paper, we propose a face detection and recognition system using python together with Open CV package.this method contains three modules which are detection, training and recognition. Basically, the detection module detects the face which gets into the sphere of vision of the camera and saves the face within the style of a picture in JPG format. Then the training modules trains the system using Haar cascade algorithm which was proposed by Paul Viola and Michael Jones in their paper. This method consists of 4 steps -

1. Haar Feature Selection.
First step isto gather the Haar Features. A Haar feature considers adjacent rectangular regions at a selected location during a detection window, sums up the pixel intensities in each region and calculates the difference between these sums.

2. Creating Integral Images.
Integral Images are accustomed make this process fast. Most of the calculated features are irrelevant.

3. Adaboost Training
A concept which is termed Adaboost that selects the most effective features and trains the classifiers is employed. This algorithm constructs a stronger classifier employing a linear combination of weighted simple weak classifiers.

4. Cascading Classifiers
The cascade classifier consists of variety of stages, where each stage could be a group of weak learners. These weak learners are simple classifiers called decision stumps. Each stage is trained employing a method called boosting. Boosting provides the flexibility to coach a highly accurate classifier by taking the weighted average of selections made by the weak learners.

Finally, within the recognition module the principal components of the face from the new videos are extracted. [2]Then those features are compared with the list of elements stored during training and also the ones with the simplest match is found and name of the person recognized is displayed. [9]This monitoring system fulfills the fundamental needs of face detection and recognition system, also takes the priceinto consideration to confirm the pervasive mode as economical as possible. Furthermore, it can even be combined with real- time analysis algorithms.

**Literature**
these chain-based architectures,the most architectural considerations are to settle on the depth of the network and therefore the width of every layer. [3]As we are going to see,a network with even one hidden layer is sufficient to suit the training set. Deepernetworks often are ready to use far fewer units per layer and much fewer parametersand often generalize to the test set, but also are often harder to optimize.the perfect specification for a task must be found via experimentation guided by monitoring the validation set error.[4] A linear model, mapping from features to outputs via matrix operation, can by definition represent only linear functions.It's the advantage of being easy totrain because many loss functionslead to convex optimization problems whenapplied to linear models.
Unfortunately,we regularly want to find out nonlinear functions.
[5]At first glance, we would presume that learning anonlinear function requires designing a specialized model family for the type of nonlinearitywe wish to find out. Fortunately, feed forward networks with hidden layers provide a universal approxi-mation framework.
[10]Specifically, the universal approximation theorem ( Hornik et al. ,1989 ; Cybenko , 1989 ) states that a feed forward network with a linear output layerand a minimum of one hidden layer with any "squashing" activation function (such asthe logistic sigmoid activation function) can approximate any Borel measurable function fromone finite-dimensional space to a different with any desired
non-zero amount of error, as long as the network is given enough hidden units. Thederivatives of the feedforward network may also approximate

the derivatives of thefunction arbitrarily well ( Hornik et al. , 1990 ). The concept of Borel measurability is beyond the scope of this book; for our purposes it suffices to mention that anycontinuous function on a closed and bounded subset of R n is Borel measurable and thus could also be approximated by a neural network. A neural network may additionally approximate any function mapping from any finite dimensional discrete spaceto another. While the initial theorems were first stated in terms of units with activation functions that saturate both for very negative and for very positivearguments, universal approximation theorems have also been proven for a wider class of activation functions, which has the now commonly used rectified linearunit ( Leshno et al. , 1993 ).
The universal approximation theorem means irrespective of what functionwe are attempting to find out, we all know that an outsized MLP are going to be able tothis function. However, we don't seem to be guaranteed that the training algorithm are going to be able to that function. whether or not the MLP is in a position to represent the function, learning can fail for 2 different reasons. First, the optimization algorithm used for training might not be ready to find the worth of the parameters that corresponds to the required function. Second, the training algorithm might choose the incorrect function thanks to overfitting. Recall from Sec. 5.2.1 that the "no free lunch" theorem shows that there's no universally superior machine learning algorithm. Feedforward networks provide a universal system for representing functions, within the sense that, given a function, there exists a feedforward network that approximates the function. there's no universal procedure for examining a training set of specific examples and selecting a function which will generalize to points not within the training set. The universal approximation theorem says that there exists a network large enough to attain any degree of accuracy we desire, but the concept doesn't say how large this network are. Barron ( 1993 ) provides some bounds on the dimensions of a single-layer network needed to approximate a broad class of functions. Unfortunately, within the worse case, an exponential number of hidden

units (possibly with one hidden unit like each input configuration that must be distinguished) is also required. this is often easiest to determine within the binary case: the number of possible binary functions on vectors $v \in n$ is $2 2$ and selecting one such function requires $2 n$ bits, which is able to generally require $O(2 n)$ degrees of freedom. In summary, [6]a feed forward network with one layer is sufficient to represent any function, but that layer is also inf easibly large and should fail to find out and generalize correctly. In many circumstances, using deeper models can reduce the quantity of units required to represent the specified function and might reduce the number of generalization error. [7]There exist families of functions which may be approximated efficiently by an architecture with depth greater than some value d, but which require a far larger model if depth is restricted to be but or capable d. [8]In many cases, the number of hidden units required by the shallow model is exponential in n. Such results were first proven for models that don't resemble the continual, differentiable neural networks used for machine learning, but have since been extended to those models. .

## 2. EXISTING SYSTEMS

A linear Discriminate Analysis

LDA may be a method to seek out a linear combination of features which characterize or separate two or more classes of objects or events. Linear classifier are often obtained from the resultant. sizable amount of pixels are wont to represent face in computerized face recognition. Before classification Linear discriminant analysis is employed to cut back features and makes it more manageable. New dimensions are a linear combination of pixel values which forms a template.

B. Principal Component Analysis

PCA involves a mathematical procedure that transforms variety of possibly correlated variables into a smaller number of uncorrelated variables

## III. METHODOLOGY

Face recognition takes a photograph from a video or a photographic camera as input and outputs the diagnosed photo material. Facial featpures may additionally include regions inside the face, variations within the face structure, face cuts and angles which are formatted and styled. Face extraction includes grabbing of the capabilities from camera. Face detection includes the elimination of the background and specializing in the foreground eliminating another elements other than the face vicinity, but the device nevertheless pertains some drawbacks because it cannot encounter the pinnacle be counted which might be a present due to overlapping of faces or mistaken recognition of faces having similar facial functions.

•Find faces - irrespective of whether the errand of perceiving individuals in photos, or video acknowledgment, or whatever else.

•Face positioning - pics aren't regularly located on which a private stand straightforwardly before the main focus, often the face grows to become, we face the challenge of situating it like the image become taken legitimately.

•Defining outstanding facial capabilities - this development is noted as a full face acknowledgment step, it examinations the photograph and gets certainly one amongst a kind automated estimations of the face.

•Identification of someone - we assessment a got information and therefore the information efficiently accessible to us, if the statistics are similar, we are going to show the decision of the character, if now not, in like way we've not recognized at now to us character. this can analyses in element all of the means to manufacture a face acknowledgment framework and comparison their execution and also the help of varied libraries, simply because the velocity of crafted by way of each section in various libraries of Computer vision.

## EXPERIMENTAL INVESTIGATIONS

The goal of our face recognition frameworks may rely on the employment of the framework. we are able to recognize in any event two general classes of face acknowledgment frameworks.

•We must discover a personal inside an infinite database of countenances. These frameworks normally return a rundown of the altogether likelihood individuals within the database. Regularly only one picture is accessible per individual. it's generally a small

amount much for acknowledgment to be wiped out real time.

• we want to acknowledge specific individuals continuously (for example in an

exceedingly security checking framework, banking framework, and so on.), or we want to enable access to a gathering of people and denyaccess to all or any others. Numerous pictures per individual are regularly accessible for preparing and constant

acknowledgment is required. during this paper, we are basically intrigued by the following case. We are keen on acknowledgment with fluctuating facial detail, demeanor, present, and so on. we do not consider in variance to high degrees of turn or scaling - we accept that an insignificant per-handling stage is accessible whenever required.



## IV. IMPLEMENTATION

A general face recognition framework incorporates numerous means: Face Detection Feature extraction and Face recognition. Face detection and recognition incorporates numerous correlative parts where each part could be

a supplement to the subsequent. Contingent upon standard framework where each part can work separately. Face identification could be a PC innovation that depends on learning calculations to designate human faces in advanced pictures.

Face detection takes pictures/video successions as information and finds face zones inside these pictures. this can be finished by isolating face regions from nonface foundation districts. Facial extraction finds significant highlight (eyes, mouth, nose and eye-temples) positions inside a distinguished face.

OpenCV has the advantage of being a multi-platform framework; it supports both Windows and Linux, and more recently, Mac OS X. OpenCV has such a large amount of capabilities it can seem overwhelming initially. a

decent understanding of how these methods work is that the key to getting good results when using OpenCV. Fortunately, only a

get few must be known beforehand to getstarted.
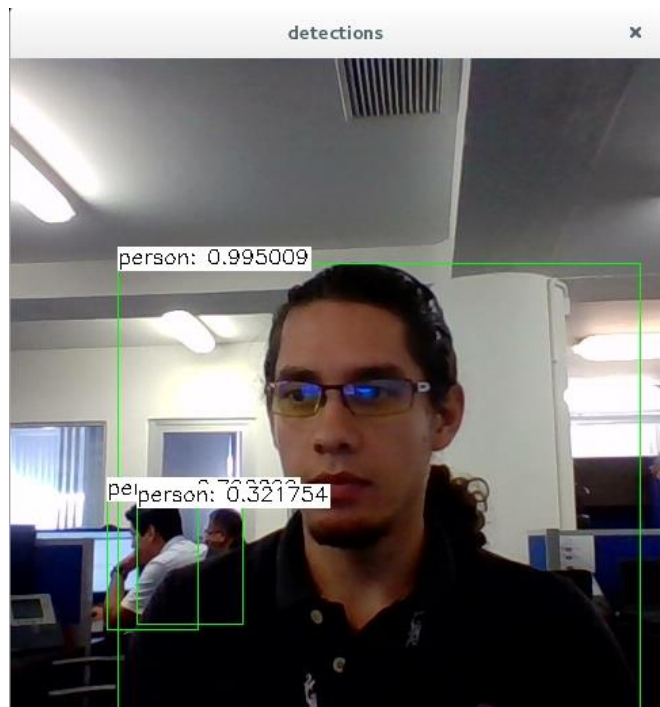
## 6. CONCLUSIONS

in this paper we've got developed a system for face detection and recognition using

opencv. it's accustomed detect faces . we

will detect k of faces in real time .in my case I used this technology to detect student faces from their real time photograph . What we require may be a database which store their data like admission number address mapped with their real-time photos .this software are useful for both administration and students. after using this software in university and faculty students

will not must carry their whole certificate for his or her required data .hence this may be one amongst the powerful tool to be employed

in organization

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surya prakash is currently persuing bachelor of technology in computer science and technology specilization artificial intellgence and machine learning from galgotias university . His main area of interst is artificial intellegence and machine learning