

## REAL TIME FACE AND GENDER DETECTOR

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### Abstract

This research paper provides an excellent way to do this detect and detect a person's face using OpenCV, as well python which is part of in-depth learning. This report contains ways in which in-depth learning is an important part of a computer science can be used to determine faces using several libraries in OpenCV and python. This report will contain a proposed program that will assist in finding a person face in real time. This application can be used in various locations device and smartphone platforms, as well as several software applications.

**Keywords:** Python, OpenCV, In-depth Reading, Face Discovery

### Introduction

Face recognition is a method by which a person's identity can be identified using a single face. That kind of program can be applied to photos, videos, or real time machines. The purpose of this article is to provide a a simple and easy way to machine technology. With the help of such technology one can easily see the face databases in the same appearance of a person. The way there with the help of python once OpenCV for in-depth reading is the most effective way to find human face. This method is useful in many fields such as the military, defence, schools, colleges and universities, airlines, banks, online web applications, play etc. this program uses a powerful python algorithm when facial recognition and recognition become more intense easy and effective. Artificial Intelligence (AI) is a computer program that mimics the actions of an individual. These actions can be done with AI algorithms with the help of Machine Learning (ML) and Deep Learning (DL) algorithms. To in order to be able to make personal decisions / predictions, the model needs to be trained and validated to determine the results. Assessment is done to confirm over what you have learned in training and to validate performance. Based on input data, neural network can use machine learning algorithms to improve accuracy. Machine learning algorithms such as regression, Sort of Supervised Reading and Combining unread reading etc. can be used to help improve the efficiency of the model as well accuracy as a supporting algorithm for predicting output to the main performance model. Output prediction depends on current input of those algorithms. In-depth learning enhances the efficiency and effectiveness of the model should detect human characteristics such as age and gender by building a neural network. The model being made can used for surveillance purposes. In-depth learning networks form the basis of every model and then the whole decision the process is performed by neurons of the neural network. The main purpose of the paper is to specify similar parameters age, gender of a person using a modelled model. It makes it easier because of video statistics, medical for surveillance purposes

and can be achieved through computer vision. In-depth learning models require input images to standard size (caveat: does not work in complete conversion network, except subject area). So, you need to change the size of the cut face. Changing the exact size is a common and straightforward method with obvious problems - facial degeneration. As shown in the picture below, the face becomes much wider after changing the exact size. This will adversely affect the performance of our models. Of the three objectives, age is the most difficult task. Sometimes even people make mistakes by guessing the age of others. We will therefore need an in-depth model for predicting age. Generally, these are normal convolutional neural networks. Please note that all of these model structures have not been repaired and repaired. The purpose of the article does not include the correct adaptation of in-depth reading models. Basically, an open CV captures video on your webcam. In each frame, it will convert it to RGB format. This RGB framework will be used to determine the performance of the face, which begins to see all the faces in the frame using MTCNN and the entire face, predicting the use of 3 trained models to produce results. These effects are restored along with the areas of the face mask. OpenCV then uses binding boxes to draw a rectangle on the frame and display the guessing results in the text. Face recognition function can be found in the source code. Note that as the emotional model is trained from the grey scale images, the RGB image needs to be taken as a grey scale before it can be predicted by the emotion model. The machine. Continuously the results of the proposed system and performance are tested using the operating character curves of the ROC receivers. This paper is structured as follows: Related work is defined as state or art in Section 1 and the proposed method is described in Section 3 which includes a series of steps such as previewing, analysing the linked section, removing facial feature and finally classification using SVM separator, test results are displayed, these results are analysed. Finally, a conclusion is given.

### **Literature survey**

This section is a basic overview of the main techniques used in the most effective face recognition system in the past human face. The mechanisms involve neural networks, Markov model hidden, face matching done geometric alignment and template. Eigenface is one of the most widely used facial expressions recognition and acquisition widely known parts of the system mathematically. I eigenvectors are instructed to represent different values of facial expressions. Neural networks are widely used for facial recognition once visual systems. ANN (artificial neural network) Used for face recognition that contains a single layer Demonstrating flexibility in facial recognition is important programs. Face verification is done using a double layer of WISARD on neural networks. Graph matching is another face recognition option. I object and facial recognition can be done used to match the graph made by the correct operation of a same function. Hidden Markov Models are a stochastic technique modelling of a nonpermanent vector time series based on HMM the model is used to pay attention to the person's face their face is divided into parts such as eyes, nose, ears, etc. Face recognition and accurate matching are 87% accurate. always offers the best and most accurate facial selection with a database. Whether the appropriate model is displayed facial recognition. Matching a geometrical element is the right approach based on the geometric shapes of the face. Geometrical face configuration has sufficient data detection database by system. GUIs used for mobile phones, media players, games and much more. We can design a visual design and temporary GUI behaviour on any software application and programs in the areas of human computer interaction. The GUI for this project will be more based on training and the existing assessment phase rotation will allow for photography and photo trains. Minimal software requirements can be python and OpenCV and required data. I minimum hardware requirements can be intel i3 any processor above it and 4 basic CPUs. Operating systems of windows 10 will also suffice for random access memory 8GB required. From the end of the user the computer or laptop is active voluntary internet connection and scanner.

### **Background and related work**

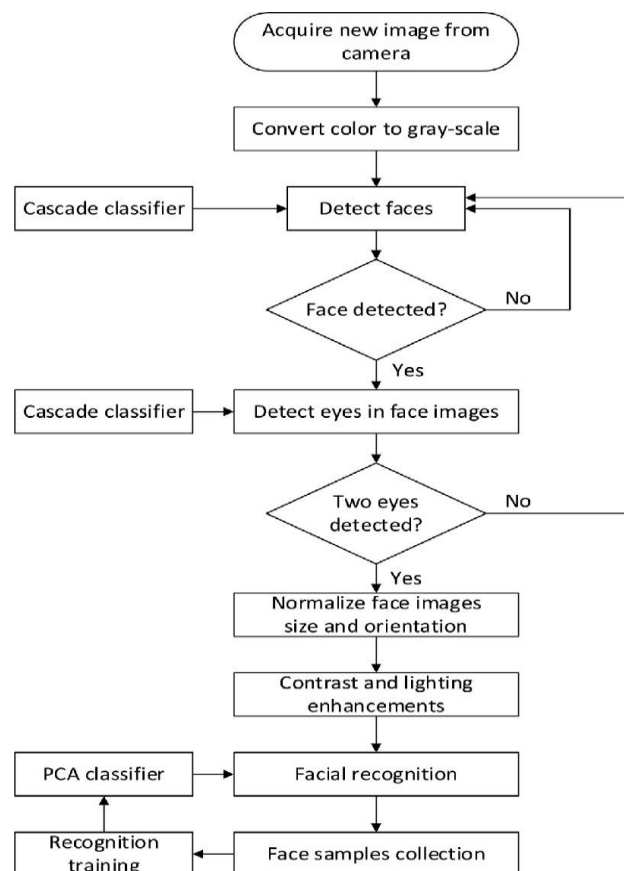
In this section we provide books on face and gender segregation and briefly describe the first few methods which are very numerous related to our proposed approach, which focuses on facial recognition and gender. Many early methods

of facial recognition and sex were available handmade, focusing on hand-crafted engineering facial features from the face. To name a few, 1999, Kwon and Lobo developed the first method of age measurement focusing on facial geometric features that determine the proportions between different sizes of facial features. These geometric elements effectively separate children but they cannot distinguish between a young adult and an adult. Thus, in 2004, Lantis et al. proposed Active Appearance Model (AAM) is a based approach that incorporates both geometric and textual features, of measurement function. This method is not valid Optional photography scenarios specified in real-world face images with varying degrees of brightness, saying, standing, and so on. Since 2007, many methods have re-used hand-drawn measurement features function: Gabor, Spatially Flexible Patches (SFP), Local Binary Patterns (LBP), and Biologically Inspired Features (BIF). In recent years, classification and retrospective methods have been used to differentiate between the ages and genders of facial expressions. those features. Separation methods in used methods based on Support Vector Machine (SVM) for age and gender. separation. Line regression, Support Vector Regression (SVR), Canonical Correlation Analysis (CCA), and Small Square Squares (PLS) The most common regression methods for predicting age and gender. Deleep and Danti also proposed a method that used neural feed-forward propagation networks and a 3-sigma control method to differentiate human species. years to children, middle-aged adults, and older adults. However, they all did not know when they were given large data sets, therefore, it is unreliable in order to achieve a decent performance in practical use. Moghaddam and Yang [1] have developed the first automatic system for both faces adoption and gender segregation. Use the most likely scales with facial detection and facial feature detection. In classifying sex, they use several different categories. The experiment was performed with a set of FERET images. The most interesting finding in the context of this paper was that the Vector Support Machine (SVM) performed better than other separators and the facial adjustment did not affect the level of separation by SVM. The study included comparisons of four very different sex-oriented methods of four-way automatic alignment with indirect face and hand-directed face. They also analysed how the accuracy of the sections was affected when a change in facial size occurred before or after alignment. Finally, they performed the sensitivity analysis of class dividers by variability, scale, and translation of facial images. Saharovich et al. combined with Viola and Jones' broken face detector and Adab Oostbased gender segregation and racism. The beauty of the system is that much processing and calculation can be shared with a face detector and a gender separator. Hui-Ching Lain and BuoLiang Lu [4] have proposed a multi-faceted gender-based approach to focusing on facial data and texture to represent facial images. In this case, the surface area is subdivided into smaller regions where binary local histograms (LBP) are used. Roy Tatsu Iga et al., Has proposed an algorithm to differentiate between gender and age using the SVM category by considering factors such as geometric editing and light imagery. The drawing pairing method is used with the GWT method to determine the shape of the face. In gender classification the following features of GWT are considered to be geometric colour scheme, hair and mustacho and age classification of texture spots, wrinkles and flabs skin is considered. Baback Moghaddam and Ming-Hsua [6] proposed a gender-based approach to facial recognition using the indirect SVM separator and compared their results with traditional class dividers and modern methods such as Radial Basis Function (RBF) networks and major dividers. -RBF, the division of working categories with low adjustment and the corresponding images of its clarity is very small. Zee hangs Sun et al.

## Research Methodology

The basic requirements for this project include: Python 3.9.2.2, Open CV2, PyCharm Community Edition, Webcam (at least 2.0MP). A fully equipped window machine is needed to run the project. The project uses Python Deep Learning to identify the gender and age data of a given face accurately. In-depth reading belongs to the family of machine learning. Deep learning mimics human performance psychological thinking and acts as an Artificial Intelligence program. It can detect objects, faces, expressions, characters from random data sets. The algorithm is designed to be divided into four main sections: Input, Face Detection, Face Processing (Age and gender segregation)

and output. Deep learning has recently emerged in the recognition system programs. So in-depth reading and facial recognition. Collectively operate as deep matrix learning systems. In shorten-depth learning on facial recognition and recognition will be extensive work in two areas the first being to embrace unity photo frame and any other appropriate and second image to give the best output or image effects of Picture. We will be using dib face recognition. A frame that will be an easy way to organize a face to check. Two important libraries used in the program is dib and face recognition. Python is a very powerful programming language too one of the most widely used editing languages all over the world has been proven to give the best results on the face recognition and identification systems. Together facial attention and finding it is much easier and more productive with the help of python editing language and OpenCV. To evaluate the effectiveness of our proposed approach, first use the Wild Face Extruded (LFW) database [10]. This The site contains 13,230 photographs of 5,749 different people. Among them are 4,263 1,486 men and women. Pictures of this the site also has gender inequalities consisting of 10,256 men once 2,976 female samples. All images are collected on the web caught in uncontrollable situations. Some examples of pictures from the LFW database are given in Figure 3. We also used the recently closed audience database [6] to assess the effect of our proposed approach. Original database contains 26,580 portraits of 2,284 different people. Sine used an earlier version of this database that covers a total of 13,649 photos where 5772 photos are of a male face and 7788 are female face. We have considered the gender of all ages. Table 2 summarize the database description of the Adience used. Figure 4 shows some examples of images from the audience database. Finally, the FERET colour database [19] is used to test our system. FERET database colour has 1199 different themes. Total 2712 facial expressions applied. All photos were taken under control nature but different nationality, facial expression, makeup, light condition etc. We cut off part of the face using the Viola and Jones method. Figure 5 shows an example image from the FERET colour database.



Flowchart of the algorithm

## Pre-Processing the Image

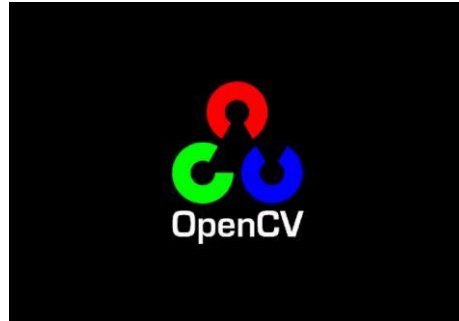
Pre-processing of the face image will undergo a few procedures in order find a changed face image that also enhances face quality image by capturing outstanding visual quality features. Reduce noise, colour modification and acquisition of some of the previous processing strategies. Edge Detection is mainly intended to detect and extract features in any digital picture. Detection is done in areas where the image brightness changes sharply and legally it has discontinuities. The main purpose of getting it is sharp the edge of the images is to capture and view important events that can change the whole nature of that incident. In good image quality, the effect of using an edge detector can lead to the formation of a set of interconnected curves corresponding to the spatial variation. Therefore, using the algorithm to get the edge of any image can be greatly reduced the amount of data to be processed and deleted unwanted data. The edges drawn from a 2-dimensional 3-dimensional scene can be classified as dependent on theory or independent of opinion. The vertical edge changes with the view and reflects the geometry of place or image, such as enclosed objects. The independent view shows the natural properties of objects of size 3, which includes more space composition and topography. Many ways of seeing the edge came about. A survey was conducted by Ziu and Tabone in 1998 to determine the number Edge acquisition techniques are available. Edge development the discovery algorithm is based on the following factors: Acquisition detection - the algorithm should identify or mark as many images as possible. Small Answer - Edge should be marked only once and as often as possible image the sound of the image should not create a false edge. Good local practice - the marked edges should always be close to the real one in any image. The Sobel edge detector is used in image processing; its operator effect depends in any corresponding or normal gradient vector of this vector. This is especially so depending on the summary of the image with a small, fragmented value and a total value filter in a horizontal and vertical image. Provides a better estimate of the output of existing ones. Kernels can be used separately in inputs to produce different gradient component values each position.

## OpenCV

OpenCV (Open-Source Computer Vision Library) is a library of editing functions used to process images. Available free of the Berkeley Software Distribution License. This library has 2500 algorithms that can be used to identify objects, see a person's face, etc. OpenCV was launched at Intel in 1999 by Gary Brodsky. Contains Python connection, Java and C ++. OpenCV-Python is an OpenCV python API. OpenCV-Python is not only fast but also easy to write and send. This makes it a good choice to do computer programming. Standard desktop packages (Windows, macOS, almost any GNU / Linux distribution). In-depth learning models require input images to have a standard size (caveat: does not work in a complete conversion network, outside of the subject area). So, you need to change the size of the cut face. Changing the exact size is the most common and straightforward method with obvious disadvantages - facial degeneration. As shown in the picture below, the face becomes much wider after changing the exact size. This will adversely affect the performance of our models. Of the three targets, age is the most difficult task. Sometimes even people make mistakes by guessing the age of others. We will therefore need an in-depth model for predicting age. Generally, these are the most common convolutional neural networks. Please note that all of these model structures have not been tuned and repaired. The purpose of the article does not include the correct adaptation of in-depth reading models. Basically, an open CV captures video on your webcam. In each frame, it will convert it to RGB format. This RGB framework will be deployed to determine the performance of the face, which first detects all faces in the frame using MTCNN and the entire face, predicting the use of 3 trained models to produce results. These effects are returned together with the areas of the face-covering box. OpenCV then uses the binding boxes to draw a rectangle on the frame and show the guessing results in the text. Face recognition functionality can be found in the source code. Note that as the emotional model is trained from the grey scale images, the RGB image needs to be taken as a gray scale before it can be predicted for the emotional model.



- run (pip install OpenCV-python) if you only need basic modules.
- run (pip install OpenCV-contrib-python) this provides other modules that include the main modules.



### **Face detection**

For facial recognition a protocol buffer file can be used with all trained model weights. Protosun files with .pb extension holds data in binary format while files with .pbtxt capture data in text format. These can be used to run professional's model. These protosun files include age and gender detection in our model. These are the tensor flow files. Face detection has a long history of research. Yang et al compared some prominent face detection algorithms in 2002, however, they did not use any prominent algorithms such as Haar Classifiers in their studies. Haar Classifier is one of the most prominent and accurate methods of obtaining the objects described by P. Viola and M. Jones. For any Face Recognition System or Face Recognition System to work properly, Face Detection done in the right way. A complete survey can be found in. There are a few backgrounds (lighting, positioning angle, facial expressions) and digital variations (sounds, errors) that are placed when the face is detected in the frame. Difficulty of human face recognition is in the following two aspects of a person's face as a

pattern: the number of patterns, which that is, the face to be separated is too large, perhaps infinite; and almost all patterns are very similar. Sine using audience databases of all kinds of variables to address this issue and increase the efficiency of algorithm. The audience set will also serve as a benchmark for gender identification and age classification by out neural network. All images are collected under a Creative Common (CC) distribution license.

### **Face processing**

This process allows us to extract data from face detected in a previous step. When face detected data can be extracted. here we only check and measure the sex and age of the face but the face can provide sufficient information to study feelings, nationalities, values, treaties such as agreement / disagreement, attitude, abnormality. These materials are very useful in various industries. The face is the natural part of the body that is used biometrics application. If the face is found in the frame. We can start processing using the Convolutional Neural Network or CNN. It is a type of Deep Neural Network widely used for Image and NLP processing. CNN will do it do a test training phase and will give different predictions. With sex prediction can be anywhere two: Male and female. Age rating is a problem for many categories where age is divided into classes. People of different ages have different faces, so it is difficult to gather information accurately.

### **Gender detection**

CAFFE (Convolutional Architecture Embedding Feature) is an in-depth learning framework, initially developed at the University of California, Berkeley. It is an open source, under BSD license. Written in C ++, with Python interface. Caffe supports a variety of in-depth learning concepts related to the areas of image classification and image

classification. Supports CNN and fully integrated neural network designs. Caffe supports kernel libraries such as NVIDIA, CNN and Intel MKL. In this project the caffe model helps us to define the internal conditions of the layer parameters.

### **Need of an automated system**

Due to the growing need for programs that can help areas such as surveillance and security of this nature each authenticity can no longer be made easy to use handmade methods so there is a growing need for automated programs that can easily fix errors as well consider human facial recognition. When the work is finished with machines it can perform tasks efficiently for very little length of time and termination of major errors occurring people. Face recognition system based on real-time GUI built-in can simplify this face detection function and can be accessed at different methods.

### **Graphical User Interface**

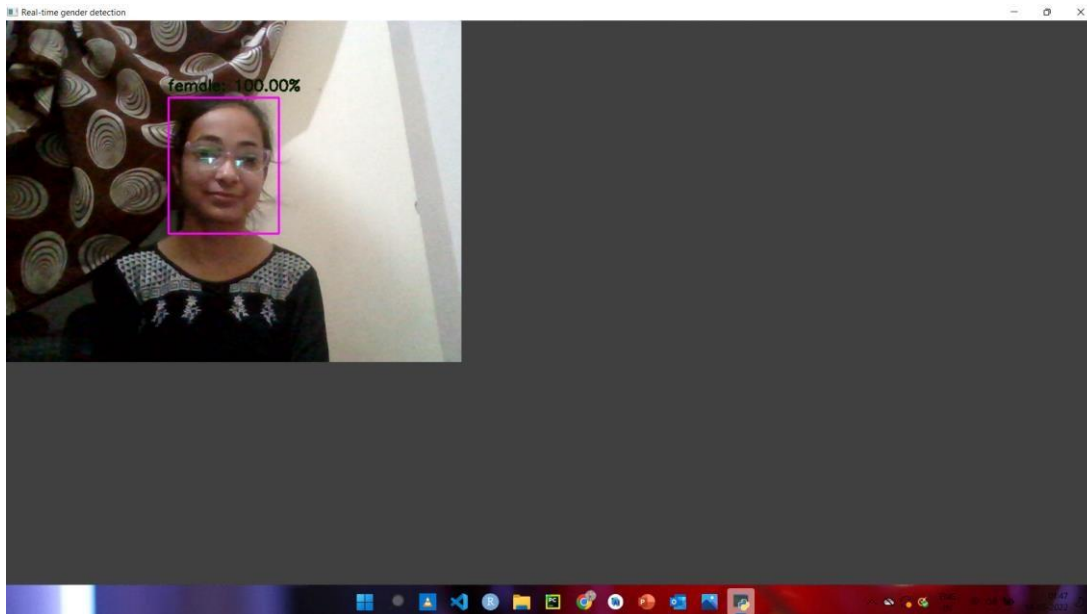
The graphical user interface (GUI) is a platform to do so let user input complete the system interaction type. GUIs used for mobile phones, media players, games and much more. We can design a visual design and temporary GUI behaviour on any software application and programs in the areas of human computer interaction. The GUI for this project will be more based on training and the existing assessment phase rotation will allow for photography and photo trains. Minimal software requirements can be python and OpenCV and required data. minimum hardware requirements can be intel i3 any processor above it and 4 basic CPUs. Operating systems of windows 10 will also suffice for random access memory 8GB required. From the end of the user the computer or laptop is active voluntary internet connection and scanner.

### **Proposed Arrangement for system design**

In order to create this program first we will need to create data sets. When the image quality becomes good different procedures will take place in facial expressions program functions are performed using python queries "Python encode\_faces.py". Input will be taken from Database to be obtained from "encodings.py". There it will be the correct formatting in the system where the face is the embedding of each face will occur. Second file "Recognize faces images.py" will contain everything you need methods and techniques of the identification process of a person's face from a given database image. The provided file will be created with a python command "Python records\_faces\_image.py-encodings". We can resize or open an image to be closer to the finding goal the output you want. Current category and OpenCV libraries will enhance the effect or effects on the face recognition system.

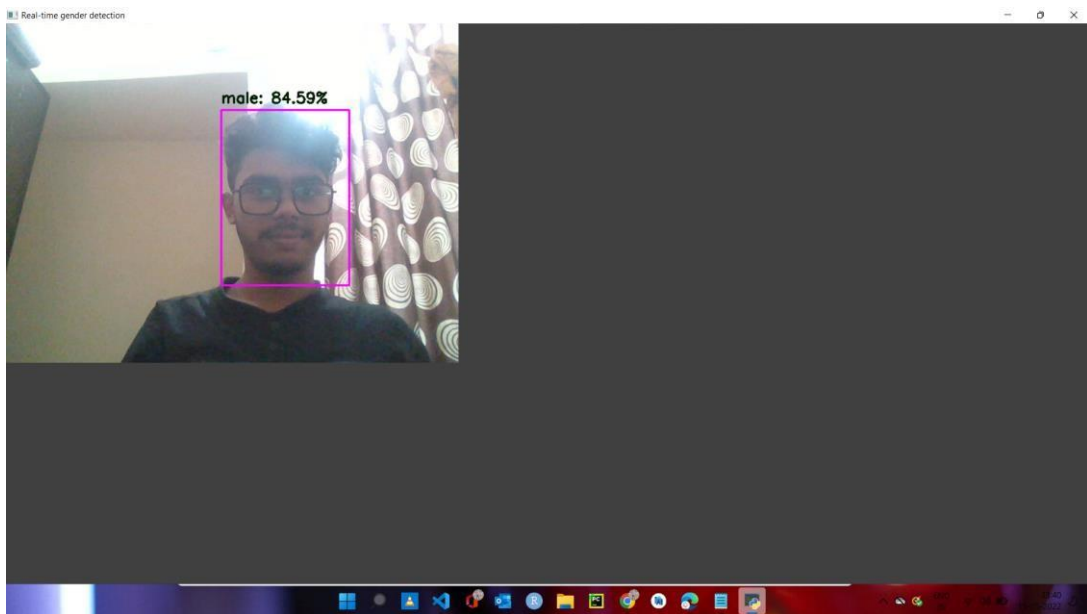
## Experimental Results

### Test Case 1: Picture of a female



From the above figures when given a picture, the female face is detected and the gender is shown. The output satisfies the gender. The output is shown with a pink square box that shows the face of the female and above the box is the gender.

### Test Case 2: Picture of a male



From the above figures when given a picture, the male face is detected and the gender is shown. The output satisfies the gender. The output is shown with a pink square box that shows the face of the male and above the box is the gender.



### Procedure

As the process progresses, we can begin to assess its accuracy. The most common procedure to follow is

- Enter data.
- Create an outline.
- Find a face.
- Separate gender.
- Paste the effect on the picture.
- Take a picture somewhere.

### Advantages and Disadvantages

The benefits of a face recognition system are immediate processing, identity theft, breach of privacy, greater data retention, better results, improved security, authenticity time is spent on student recognition in schools and colleges, employees in corporate offices, unlocking smartphones and much in everyday life.

There are a few negatives in this system including cost, or subsidy, the best high-definition cameras are needed, low image quality may limit the performance of this program, image size will matter because it becomes difficult to see faces in small images, face angles can be limited fidelity of face recognition, large storage is required this application successfully.

### KEY FEATURES

The main purpose of this program is to provide a faster and more affordable way of age and gender of male and female. The main features of this model are:

- No need for high hardware or software accuracy. It can process the image directly with the camera a device like a webcam. Although a better device will provide a more efficient result. • This procedure is easy to use, does not require expert level knowledge. Normal computer information is sufficient.
- Can process and maintain hundreds of facial effects with a consistent effect without slowing down or delaying.

### Conclusions

Face recognition systems are currently associated with many high-tech companies and industries that do the work easy face recognition. Use of python programming and OpenCV makes it a simple and useful tool or program which can be done by anyone on his own requirement. The proposed plan discussed in this project will be useful to many as it is easy to use and expensive\_ operating system. So, using python and OpenCV. The face recognition system can be built differently objectives. In this paper, we present a real-time sex discovery a field system, widely approved by Pascal VOC Database. Our experiments show that by using reading transfer and adding training samples from the "simple" database. (Celebes) is likely to find reasonable map values wild sexual discovery. In a controlled Celebes database, the accuracy of the proposed method is the same as for other genders alert methods that significantly examine facial

features. As an additional contribution, we are also providing sex commentary on other pedestrian images on the Pascal VOC database, and provide visual analysis of the implementation maps of selected CNN (YoloV2) base. Start-up maps show that facial expressions appear to be most commonly used when the face is clear in the picture, but body language is useful for most "wild" conditions. They also show that the context information (e.g., as the presence of other objects at the scene) may be biased in adoption results. As a future project, we aim to test temporary information to find sex in the wild where video sequences are available. We also aim to update our gender labels on Pascal VOC data set using human annotations, or by allowing feedback from the public about what is wrong or questionable labels. Finally, we plan to deal with the cases where both sexes are present in the same bounding box.

### **The future scope of work**

This project can be developed in a number of ways so that this project can be fully utilized:

- 1) Application - The project can be developed into a web application or mobile application in a way that is easily accessible.
- 2) In public places - using sensors this can be used in public places such as restaurants, ATM areas, shops like this where stealing happens the scope of finding someone can be much easier.
- 3) Develop this project for more people - this project can be developed to match age and gender a group of people in the picture. This model finds the faces of each person in the group but cannot give an exact age or gender ratio.

### **Acknowledgement**

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