Face Recognition System using Machine Learning, Data Science and Python

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Abstract - Face Recognition System is a way to recognize the human face. It takes images for recognition. We are facing a problem when we capture the picture for the model training, the picture of the object is not clear. If the picture of the object is not clear, the model will not train too good that's why it will predict the wrong output and it reduces the accuracy of the model So, we decided to work on this problem to improve the model accuracy by capturing the images. We made a project on the Face Recognition System. If we have clear images captured by the camera then it will give the accurate result. It will depend on the resolution of the picture. There are three main components on our face mouth, nose and eyes. One the basis of these three components face recognition system works.

*Key Words***: Machine Learning, Python, Data Science, Logistic Regression**

1. INTRODUCTION

The Human face is complicated multi - dimensional structure. That Contains a lot of information about the individual, including expression, feeling, facial feature. We have biggest task in front of user to take the information effectively and efficiently. There are so many applications on the face recognition system successfully implemented and worked in their fields as in Refs ([1],[2],[3],[4]). There are lots of algorithm made to improve the accuracy for better results.

The main challenges in front of us for more accuracy are more clear images of the user. For more accuracy we have to improve the camera quality. Which can take clear images with good resolution and density of images and background color. Using the appropriate algorithm which is fit for the system and gives the accuracy and it depend on the training data

If we train our model with large data, it will give more accuracy. The main challenges for successful face detection and recognition systems are; illumination conditions, scale, occlusion, pose, background, expression etc., as highlighted in Refs. ([5], [6]).

1.1 Machine Learning

Machine Learning is a technique that analyses the data and train the machine by using some algorithm and after analyzing it gives the output the data on the basis of input. It is the field in which it gives the ability of self-learning of computer without any explicit programming. There are three types of learning named as supervised, unsupervised and Reinforcement learning.

It has so many applications in every field like face detection, smart attendance System and in the medical field there is flow diagram of the Machine Learning below ref. ([7]).
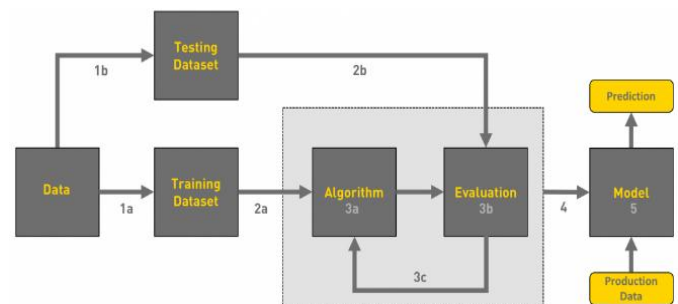

Fig-1 Workflow of Machine Learning

1.2   Python

Python is high level programming language. It is very easy to learn. Python libraries which is used in machine learning. These are below.

1. Numpy
2. Pandas
3. Sci-kitLearn
4. Matplotlib

1.3   Data Science

Data Science is collection of various tools, algorithm and machine learning principal. It finds the hidden pattern in the data. It works on the data and gives the pattern to the system. Data Science is used for the prediction and decision. There are some tools for Machine Learning, Weka, R etc.
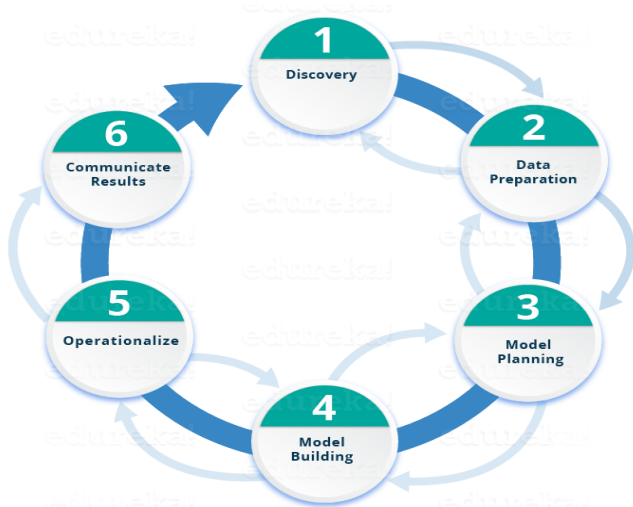
Fig-2   Data Science Life Cycle ref [8].

2.   EXISTING PROBLEM

There are many applications which use face recognition system. The problem is input for the system. If images are not clear, it is challenge for system to give a better output. In this system first of all we take the input for system then it will train the model and by using the algorithm it predicts the output. So, we are focusing on the clear images for input of machine. If images are clear, the algorithm will give the better output.
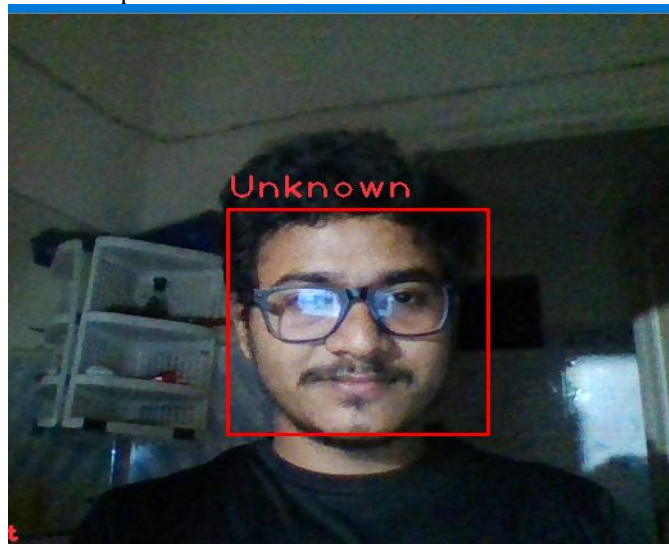

Fig -3 Image and Background Blurred.

Images and background are not good so it is showing unknown images while this system took images for training of the model.

3. Working

This project first takes the input from the user and the data will be taken by using the camera and the data will be stored

and after clicking the train the data it will use the data science algorithm and it will analyze the data and using the appropriate algorithm it will extract the pattern from the training data and this is used for the predicting the data which will be used to predict from the user. For taking good images we can use good equipment for the taking the input then it will give good accuracy and analyze the data.
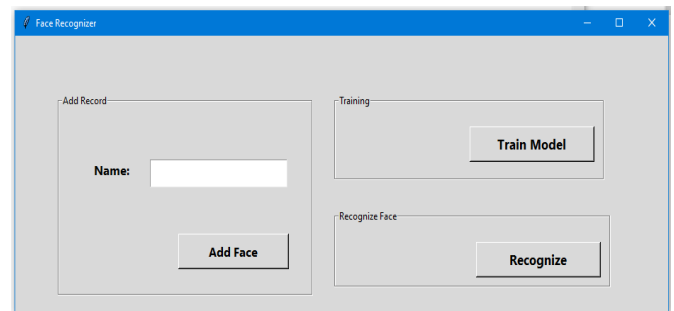

Fig-3 UI of Face Recognition System

Fig-5   Face Recognition of Object

It is UI in which there is name in which we give the name of the user and then we click on add face then it takes data from the user and it will take some picture after detecting the object in front the camera and then we will click train model it will train the model and take time which depend on the size of training data then after we click recognition then it opens camera and detect the object if the object is present then it gives the output. Otherwise it shows unknown. If images are not clear then it shows unknown or showing another name at any other picture.
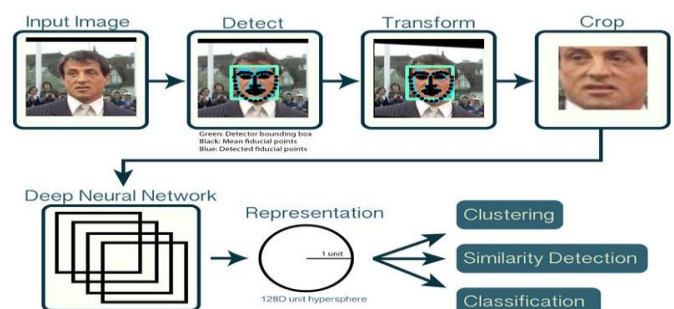

Fig-6 Workflow of Face Recognition System ref [9].

In this we have used logistic regression algorithm and gives accurate value as in fig-5. This is working flow diagram of the face recognition system which is given in the picture.

4. Conclusion and Future Scope

This project is face recognition System. This gives accurate output while we give the neat and clean images to the system and using the appropriate algorithm for this. In this project we focused on the image and background should be neat and clean for the system. These are key point by which we can increase the accuracy and we have to use good algorithm for this nowadays may algorithms are coming so we have to check and implement in the project. We can increase the accuracy. There are using other method and algorithm to build the face recognition system applications ([10], [11]) examples are face lock in mobile which is working on this. Nowadays everyone wants to secure his document and personal information and his system. It will work in security system because everyone has unique face point and his dimensions. It's working all other fields like as medical and defenses etc.

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