

USING THE OPENCV LIBRARY TO ENSURE THE COMPANY'S INFORMATION SECURITY

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ELSEVIER



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Abstract: As computer vision has become a part of our daily life. Using smartphones features like face recognition is all a part of computer vision. In this paper, we will talk about CV or Computer Vision which is preferably used to read and display a video stream in real time through which one can access the web camera and using machine learning one can let their system learn through data sent by user or through datasets which is easily available on the internet and then system trains itself. After training part it is ready to solve the real life problems. But using both computer vision and machine learning at the same time is always a challenging task as one has to capture and another has to train the system at the same time so that the system could be able to recognize the things to which they are trained is the most innovative work in this paper as we have to keep in mind that both the things should be done at the same time.

Keywords:.... Computer Vision, machine learning, smartphone.

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Introduction. In this era, where camera has become an important part of our life. This project mainly describes the use of computer vision for providing surveillance, security in very convenient way. Most of the people cannot afford the high cost of model which will give security to their important documents or anything which is important. This project aims to create a model through computer vision which will provide more security than the old ones. In simple words, computer vision is to provide vision i.e., eye to a computer. Using computer vision we are able to detect faces, eyes, nose and different body parts through haarcascade classifiers and hog. But I prefer to use haarcascade. But do you think about using more about machine learning and computer vision. Machine learning where a computer or a machine learns from the past data and used to predict or forecast future data. However machine learning is generally used to predict the future result which is known as dependent variable.

Materials. The name dependent and independent is used because independent means which is not dependent. As we get past dataset which is easily available on the internet or one can make its own dataset and the predicted result depend on the past dataset that's why it is known as dependent variable. The machine learning is subdivided into three categories i.e., supervised, unsupervised and reinforcement learning. Using different algorithms of machine learning which will get best accuracy can be used as per the dataset or as per the

model and users. The dataset which is generally used to train the model is easily available in UCI, Kaggle and many more. Actually, I prefer to use only two sites which I mentioned earlier. Machine learning is generally used to train 80% of data which is present in dataset. And test by using remaining 20% of data present in dataset.

Methods. However generally machine learning is used to train the data to predict stock prediction or disease prediction or something which can be predicted through past data. But using machine learning algorithm to predict the faces of humans by training with their images is really a big deal. This project aims to do so and later we will try to use third party to deliver some messages or giving missed call if possible. Currently we are working on this.

Results. Here, we will discuss about all the things which we will use in our project in detail. Starting with the computer vision part first then we come into machine learning and later which algorithm best fits in this scenario, then it's applications and at last the conclusion part. Computer vision is used to read an image and display an image with open CV. Things one should install in python before using any sort of detection:

- Numpy
- Cv2

To install Numpy in python use this command in cmd (command prompt): `pip install Numpy` To install cv2 in python use this command in cmd (command prompt): `pip install cv2` Numpy is used to support the open CV functionality. Generally Numpy is used for numerical calculations. And open cv-python i.e., cv2 is a library of python used to give vision to computer. Mainly there are two types of classifiers first one is hog (Histogram of oriented gradients) and haarcascade classifier. But we generally prefer to use haarcascade classifier. Haarcascade is generally used to detect a particular object or body parts for which it is trained. There are different classifiers of haarcascade like frontal face which is trained to detect front face of a human body, left eye which is trained to detect left eye of a human's body, right eye which is trained to detect right eye of a human's eye and there are many classifiers like this which is trained to detect some specific things. First we have to import Numpy as it helps to represent images in a multidimensional array then we will import cv2 which is a library of python. We use `while (True)` because we want to run the program infinitely so that it could capture video stream in real time without any disturbance and start taking images until waitkey is used. Actually this is used to capture real time video without stopping. Then to use face detection we preferred to convert BGR to gray to reduce noise and to convert 3dimensional array to 2 dimensional arrays. Then to read an image, we use `imread` which means image read which is generally stored in n dimensional array. For example:

```
Image = cv2.imread (‘_File path’)
```

As we does not use semicolon in python like c. Then to display an image we read before, we use imshow function:

```
cv2.imshow (‘_Image name’, image)
```

Generally, we use waitkey function to wait for a few milliseconds this is used so that user’s input can be taken from keyboard. Then we have to release the camera so that camera is able to read and display a real time video stream. At last we have to destroy all windows and the only active thing in laptop is the running real time video. If one has to do eye detection then he/ she must have to use ROI also known as region of interest. So that system will detect only those things which are a region of interest like eyes. This is the basic of computer vision. But do you think how good it will be if we use both computer vision and machine learning. One helps to display a realtime image while other is busy in training and testing of an image. If both used one at a time then we will be on another level and might give the best security model. The first basic thing we should do is to create an empty list of labels to gives labels to each and every image of different objects so that we could easily store them. But how does it start from the beginning. If one selects to add a different set of input then how anyone can do it? Actually, here we are giving the inputs of data which is in the form of images. For taking images from the web camera of the laptop, the very basic thing one should do is to import cv2 which helps to read and display a video stream. And after reading the image from the web camera, we have to give labels to the image with which we are going to train our machine or our computer so that they recognize it more easily. After that, web camera captures the image in different angles so that in any angle it can recognize the image and tells the name as given in the label. Here, we have trained our computer to take up to 50 pictures of image in different angles. The user can add as many images he/she wants. Adding many images will increase the accuracy of this project. While capturing images, we have to destroy All Windows. After adding many images or a single image, user can now train the system. Adding images to train our computer or machine is an easy task. We just have to use cv2 library which helps one to access the web camera so that one could read the image. Adding labels to an image is like adding name to an image. Like we do in supervised learning, we give labels to the input where first computer observes all the input by taking some time and then learns from the input and then able to predict the real time things. Just like we do it to train with only 50 pictures per image. Anyone can use more than 50 pictures or less than 50 pictures to train a model. It all depends on the user choice who wants to train a model. After taking pictures the next thing is to train the model by one of the classification algorithm in machine learning. This is the biggest deal any user will face as the best part is to select which algorithm one should choose while

using in a model, which will give best result or perfect result which accuracy will be the best, which result will match the result in the future if one is solving real time problem like stock prediction. All things should keep in one's mind before using the algorithm.

Conclusion. The biggest use of this project is to use this model in high confidential areas, where a few are allowed to access. Instead of using humans, we can use this model we can also save electricity or its power by using a sensor which can detect the human presence. Then camera will turn on when the sensor is able to detect the human and recognize whether the system know this person or not. If yes, then he/she is allowed to enter to that confidential area or if not then the system will give a call or give message to a security member whose number is saved on the system as the user want to use the system, the rest depends on user.

One can also use to train the system through a weapon dataset through system can easily recognize the weapons and give a call to the third party. We are currently working on the training part with weapons dataset. This project is highly used for security reasons. Recognizing the image through one of the best algorithms i.e., classification under supervised learning. However this is a prototype for this system, but if we able to build the real model using night vision camera, human presence sensor to reduce power consumption, this will be the best thing for the security of our county's confidential things.

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