

# Process of Image Editor and Image Detection using OpenCV with Machine Learning

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*Abstract - As we know how artificial intelligence is beneficial for us, we also know nowadays in all systems AI is used, in software development, robotics, Image processing, and in many other IT sectors also in other areas. We have already known that AI is covering all the segments. Google and many other research centers already developed robotics with the help of AI and now that robots are doing many tasks and helping us. So now we are analyzing some more use of AI, here introducing the concept of OPEN CV (Open-Source Computer Vision). Basically, it is a Python library that is used for machine learning, artificial intelligence, and for computer vision. Basically, this library helps us to understand the concept of images (digital images, photography, and digital videos). Computer vision helps us to complete tasks that a human can do, even computer vision does tasks more efficiently with more accuracy because computer vision takes help from machine learning and artificial intelligence. We will discuss how it works and how it helps humans and how it provides good efficiency to us.*

**Keywords—** open CV, Artificial intelligence, Python, Image processing.

## INTRODUCTION

- 1) As we know now time is changed, everywhere Artificial intelligence and machine learning, everywhere machine learning is using now, in data usage, data science, and software development, mostly everywhere machine learning and Artificial intelligence is working, and they are making our work easy they are very helpful, meanwhile as we can see there are multiple images, digital image, and many other helpful pics all are created by machine learning and artificial intelligence. Now machine learning and artificial introduce us computer vision library that helps us to provide the accuracy and efficiency to judge what is this also helps us to create and click the better image, as we can see in our mobile camera there is the option of AI, and when we activate that our images are more clear and sharper because AI works there.
- 2) AI is used to set color according to the view and also helps us to provide more clarity.
- 3) Computer vision helps us to provide object classification and object identification it means that computer vision first classifies the object and then identifies the object and after that, they predict the object and give us suitable output.

Main Purpose of computer vision: -

They help us to understand the content of the image. Computer vision basically extracts the description of digital images. Images can be any object, 3D model, or description of the text. They help us identify objects like: - any object around like a boat near the sea, or any person near the sea. Computer vision converts images into numbers (into pixels) and they store the image in their database after that machine learning does their work and with the help of previous data, they help us to predict the image. Computer vision working is different, first, it saves data in its database and then helps us to predict the data

This is the function that is used to read the image: -  
`cv2.imread(filename[, flag])`

`CV_LOAD_IMAGE_ANYDEPTH,`  
`CV_LOAD_IMAGE_COLOR,`  
`CV_LOAD_IMAGE_GRAYSCALE`

The basic operation that we can perform on an image using OpenCV: -

1. We can modify the images and also, and we have access to modify the value of pixels
2. We have access to all the properties of images.
3. We have setting region access to images.
4. With the help of OpenCV we can be splitting and be merging images
5. With the help of OpenCV we can change the color of the image.

We have to import numpy as np library/import cv2 with the help of these libraries we have access and we can do any changes in images.

Let's take an example that how we can rotate or set images using OpenCV. Basically, it will tell you how the image editor works.

In this example, we will know how image editors work and how we can edit the image according to our requirements. We will check how image rotation works internally, and how we can change the color of the image internally. We will also learn how we can add filters to images. This method is used to set images angles  
`cv2.getRotationMatrix2D(center, angle, scale rotated = cv2.warpAffine(img,M,(w,h))`

`import cv2`

# it is used to read image

```
img = cv2.imread(r'C:\Users\rohit\Desktop\rohit documents\Rohit's Documents\profilepic') // we have to import image to read image
```

# This is used to get the height and width of images

```
(h, w) = img.shape[:2]
```

```
# calculate the center of the image center = (w / 2, h / 2) angle90 = 90 ; angle180 = 180
```

# We have to set angles of images in which we want to set the image

# 90 degrees

```
M = cv2.getRotationMatrix2D(center, angle90, scale)
```

```
rotated90 = cv2.warpAffine(img, M, (h, w))
```

# 180 degrees

```
M = cv2.getRotationMatrix2D(center, angle180, scale)
```

```
rotated180 = cv2.warpAffine(img, M, (w, h))
```

```
cv2.imshow('Original Image', img)
```

```
cv2.waitKey(0) # We have to press a key to show the output
```

```
cv2.destroyAllWindows() # It will destroy all the open windows to open a new window. cv2.imshow('picture rotate by 90*', rotated90) cv2.waitKey(0) # We have to press a key to show the output cv2.destroyAllWindows() # It will destroy all the open windows to open a new window. cv2.imshow('picture rotate by 180*', rotated180) cv2.waitKey(0) # We have to press a key to show the output cv2.destroyAllWindows() # It will destroy all the open windows to open a new window. If we have to draw a circle, triangle, square, or rectangle on any image cv2.circle(img, center, radius, color[,thickness [, lineType[,shift]])
```

```
cv2.circle(img,(90,90), 77, (0,245,0), -1)
```

```
cv2.imshow('image',img)
```

this is the method we used to create any shape.

Let's check the output



Original image



90-degree rotated image



180-degree rotated



Image after adding a circle in the image.

How we are using filters in our images.

```
cv2.bilateralFilter(src, dst, d, sigmaSpace, borderType)
```

With the help of this method we are able to change filters on our images.

```
from matplotlib import pyplot as plt #this is a machine learning library
```

```
img = cv2.imread(r'C:\Users\rohit\Desktop\rohit documents\Rohit's Documents\profilepic')
```

```
abc = np.ones((5,5),np.float32)/25
```

```
nil = cv2.bilateralFilter(img,9,75,75)
```

Let's check the output.



Original image



after filter image

Analyze an image using Histogram

Histogram basically represents the graph in the Gray Scale image, which means that they are helping us to convert images from colored images to black and white images. For that, we have to first import matplotlib library.

```
import matplotlib.pyplot as plt
```

image should be in PNG format as matplotlib library pick and read images whose have PNG format.

```
img = plt.imread(r'C:\Users\rohit\Desktop\rohit documents\Rohit's Documents\profilepic')
```

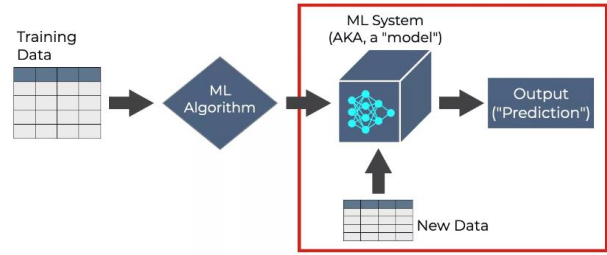
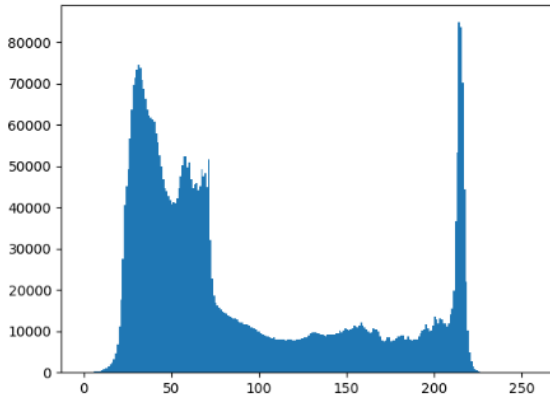
original image



After converting it into the black and white image.



To create a histogram of the image, we use the hist() function. plt.hist(n\_img.ravel(), bins=256, range=(0.0, 1.0), fc='k', ec='k')



As you can see in the diagram first, we have to train our data using different algorithms and different libraries. First, we have to import the libraries and we have to put formulas on the data, and train the data that we can use to predict the output.

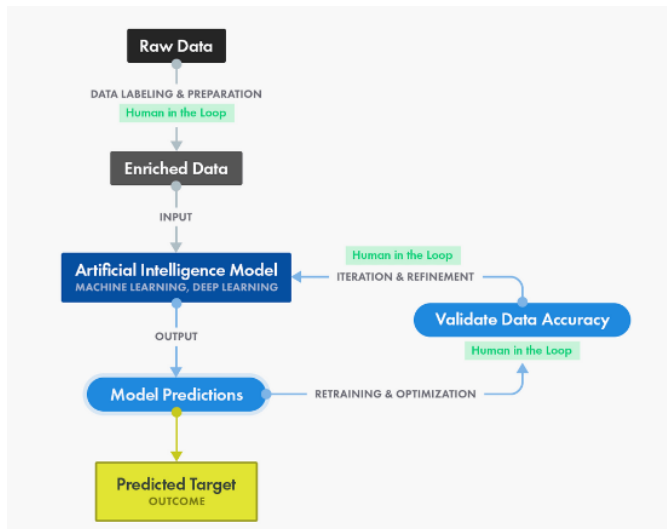
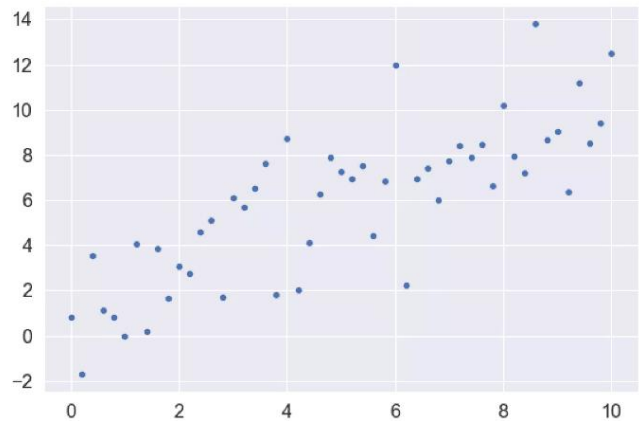
Face recognition and Face detection using OpenCV: -

Detecting the face in a digital image is a technique that is called Face recognition. As we know humans can detect the face without any effort. But this is not an easy task for computers to detect faces. While detecting faces computers have to face many issues like low resolution, illumination, etc. These are some highly affected issues when computers recognize faces in digital images.

Libraries that we can use to save the data for machine learning to predict the output: -

1. Pickle Library (import pickle)
2. Jolib Library(import joblib)

Trained data help us to predict the data in a graphical format and also gives the value, with the help of value and graphical data we can predict the value and how much it is accurate or not. Let's check how machine learning shows data in a graphical format. With the help of these values and graphical data, we can split our data in a certain way and also, we can initialize the model.



Where we can use this trained data: -

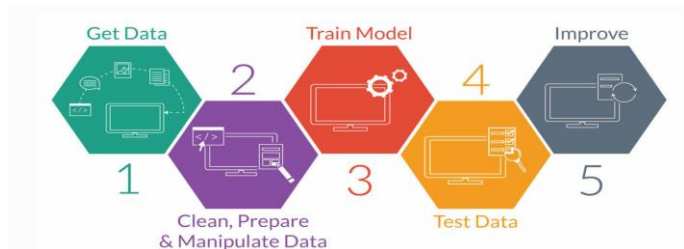
In image editor using OpenCV, we have to save our data in the image editor to edit our images, and with the help of machine learning and OpenCV algorithms we can predict the image that images have faces or not, also we can use this algorithm in images detector, in many security areas like we can use this in any device that can detect the faces if the army is in forest and have to find enemy than we can use our devices and we can find the count of the enemy and we can plan our strategy.

There are some steps that we can use to save data and predict data:

Step 1: Import Packages

Step 2: Load the IRIS Data

Step - 3: Split the IRIS Data into Training & Testing Data



With the help of trained data, we are able to save data and that trained data is secure so we can easily use our data anytime, with

the secure data we can transfer our data.

Basic Concept of HAAR Cascade Algorithm: -

HAAR cascade is a machine learning, this function is very trained from lots of images, images are negative and positive, positive images have faces and negative images haven't faces.

HAAR-Cascade Detection in OpenCV

As we discussed already OpenCV providing the trainer also helps us to provide the detector. We can train the classifier for any object like mobile phones, or building by using the OpenCV. There are two applications that are provided by OpenCV cascade classifier `opencv_haartraining` and `opencv_traincascade`

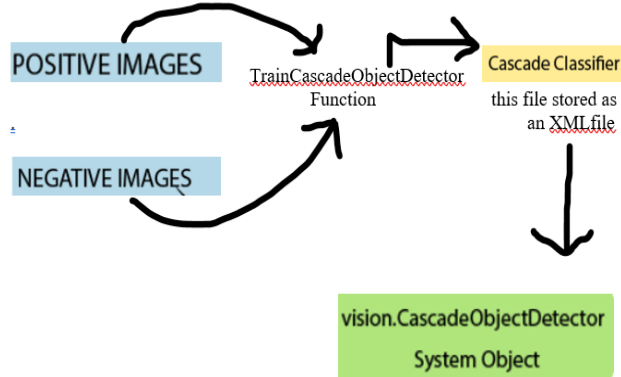
With the help of images and face detection, we are able to provide good images with better quality, we are able to modify our images and we can set images according to our requirements and these image editors are usable in both Android and IOS as they are platform independent and there is no restriction on this editor.

rotate the image in an image editor. We have learned the algorithm and internal process of the image detector and image editor.

### REFERENCES

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Let us understand the process



With the help of OpenCV, we are able to manage pixels of images, we can increase and decrease pixels of any image and make the image with good quality also we can decrease the quality. We are also able to predict the image that images have a face or not this is very helpful, we can add this feature to the cameras and this will help the police/army to detect the images, like if there is a car and we have to check how many faces are there so it can find and tell us the exact value if there is no annoying this in the car we are able to find.

### CONCLUSION

In this, we have learned how face detection is working in digital images, we have introduced many formulas and algorithms that help us to detect the image. With the help of the Cascade Algorithm, we have fixed the issue of the face detector, this algorithm helps us to train our data, and this algorithm helps us to save the data and internally they train data by using positive and negative images in positive their is face and in negative images there is no face, as we already know that how machine learning works, machine learning first save the data and then they help us to predict the data by using previous data. This algorithm is very useful for us, with the help of this algorithm we have made an image editor, as we have already seen in the above example how we are able to add a filter, we have already learned how we can