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MISSING PERSON IDENTIFICATION SYSTEM

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Abstract - Every day in our society, there are children, youth, young women, the mentally handicapped, the elderly with dementia, etc. Countless people go missing. Although the police department filed a lawsuit against them. Often times they are very difficult to find. According to the current system, if a person is found missing, we must report his whereabouts to the nearest police station. After the complaint, the police will start an investigation by obtaining the necessary information.
This is a time-consuming process that requires a lot of effort. For this reason, we have prepared a project called "Using Face Recognition to Identify Missing Persons" to make our work easier. We will create a web application that can send missing persons information and store it in the database. If the disappearance of a missing person is caught on CCTV, the system can use facial recognition algorithms to capture it. When the system recognizes a match, it creates custom alerts and locations and sends them directly to family members and interested researchers.
Also, if someone or the police see a suspect on the street, they can send that person's picture to the database.

***Index term*- Haar Cascade, Open CV**

I. INTRODUCTION

With the increase of missing complaints in today's society, the task of police to find these complaints becomes very difficult. This is despite the fact that missing cases have arrived at the station. Tracking acall is difficult and takes a lot of effort and time. While cc footage can be used in some cases,attempts are required from each video recording included in the file. This is time consuming and difficult work.

This led us to prepare a project called "Teaching the Blind to Use Faces", which facilitates our work number. The main purpose of "Identifying Missing Persons" is to find missing persons using CCTV real-time video via face recognition and send report to police station with parking spots in newspaper. also allows ordinary people to upload pictures of strangers. If the complaint number has already been written about the same person on the portal, it will notify the police.

II.PROBLEM STATEMENT

The process of identifying a missing person often involves comparing available information about a person (such as physical characteristics, clothing, and last known location) with records from various sources (such as social media, surveillance footage, and missing persons files). This process requires extensive and complex data analysis, which is difficult and time consuming

The main purpose of our work is to create an application that helps to improve the process of finding missing persons. We focus on helping users and persons suffering from missing persons, those who may or may not be close to them. The main purpose of this study is to use Haar Cascade, an uncomplicated real-time algorithm. The purpose of this algorithm is to identify objects, but in our case we encounter.

III. LITERATURE SURVEY

IDENTIFICATION OF MISSING PERSON IN THE CROWD USING PRETRAINED NEURAL NETWORK (Issued on : 02 | Feb 2020) : The aim of this project is to identify the person who is missing in the crowded area using the drone which is having the camera and by this the person who is missed in the crowd will be easily identified within a minute. They have used Convolutional Neural Network (CNN) for the identification of missing person.

CRIMINALS AND MISSING CHILDREN IDENTIFICATION USING FACE RECOGNITION AND WEB SCRAPPING (Issued on 2020) : In this proposed system criminals and missing children can be identified by the face recognition from an image or video frame which is captured by the cameras which are installed in various locations and compare them with images available in existing dataset. If the match is found for the input face, then the details associated with the related image will be displayed.Here they have used Haar cascade classifiers for the identification of missing children and criminals.

ANDROID BASED APPLICATION-MISSING PERSON FINDER (Issued on 2018):
The proposed system start with two options 1)User registration tab and 2) User login tab.
As the user is logged in the app will show two option 1)missing persons and 2) found persons. Then system will compare with uploaded missing person photo with the previously existing image. If match is found, then system gives alert message.
Here SWF-SIFT algorithm is used for comparing two images.

MISSING CHILD IDENTIFICATION USING FACE RECOGNITION (Issued on 2017):
In this proposed system one can able to upload the missing person details and photo in database . If a person or a police finds a suspicious person on the road, they can upload a picture of that person into database.Then system will encode the photo and compare it with the previously existing images in database whenever the system confirms the matching, then it will send alert message.
Here PRINCIPLE COMPONENT ANALYSIS (PCA) is employed for the identification of person

EFFICIENT FACE RECOGNITION SYSTEM FOR IDENTIFYING LOST PEOPLE (Issued on : May 2019): When a person goes missing, police can upload the picture of the person which will get stored in the database. When the public encounter a suspicious person, they can capture and upload the picture of that person into our portal. The face recognition model in our system will try to find a match in the database with the help of face encodings.If a match is found, it will be notified to the police and the people related to that person along with the location of where the person is found. Here SVM is employed for identification of person.

IV. PROPOSED SYSYTEM

The client will upload input in an image or video format. this input undergoes image processing. during the process of image processing the input is fetched from camera and is further converted into a format which is most suitable for our choice of used algorithm that is Haar Cascade. After this the process of face detection takes place. Here the image focuses om the face only excluding all the other unwanted and unnecessary objects which are in the input image or video frame. Once this step is completed in a successful manner the face is detected. This detected face goes through the next step further in line. This next step is Face Prediction. Face prediction uses data which is present in the database and starts finding a match using haar cascade algorithm which is non complex simple yet effective algorithm. Once a match is found the result is shown and no response is given when match is not found or detected.

Haar Cascade and Convolutional Neural Networks (CNNs) are both used for object detection, but they use different approaches.Haar Cascade is a machine learning-based approach that uses a set of Haar-like features to detect objects. It works by training a classifier using positive and negative samples of the object. The classifier uses the Haar features to identify regions of the image that may contain the object and evaluate the likelihood that the region contains the object. Haar Cascade is computationally efficient and can achieve real-time object detection.

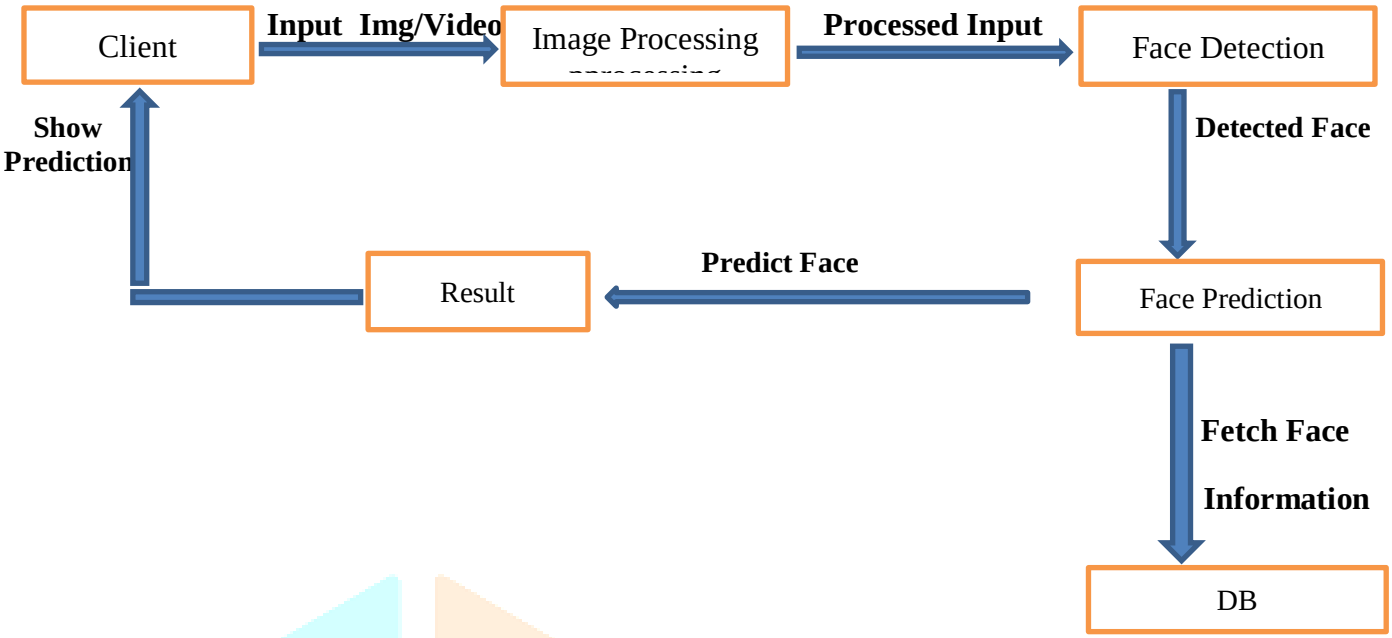
On the other hand, CNNs are deep learning-based approaches that learn features directly from the data. CNNs consist of multiple layers of convolutional and pooling operations that extract features from the input image. The features are then fed into a fully connected layer that performs classification. CNNs require large amounts of training data and are computationally intensive, but they can achieve high accuracy in object detection.

The main advantage of CNNs over Haar Cascade is their ability to learn more complex features directly from the data. This allows them to achieve higher accuracy in object detection, especially in cases where the objects have a lot of variation in appearance or shape.

However, CNNs are computationally expensive, and real-time object detection with CNNs can be challenging. Haar Cascade, on the other hand, is computationally efficient and can achieve real-time object detection, making it a better option in cases where real-time processing is critical.

In summary, Haar Cascade is a simple and efficient method for object detection, while CNNs offer higher accuracy but require more computational resources. The choice between the two depends on the specific requirements of the application.

V. BLOCK DIAGRAM



VI. HAAR CASCADE CLASSIFIER

Haar Cascade is a machine learning algorithm used for object detection in images and videos. It was developed by Viola and Jones in 2001. The algorithm uses a cascade of classifiers to detect the presence of an object by analyzing a set of features extracted from the image. The features used by Haar Cascade are known as Haar-like features, which are rectangular areas of an image with different brightness levels.

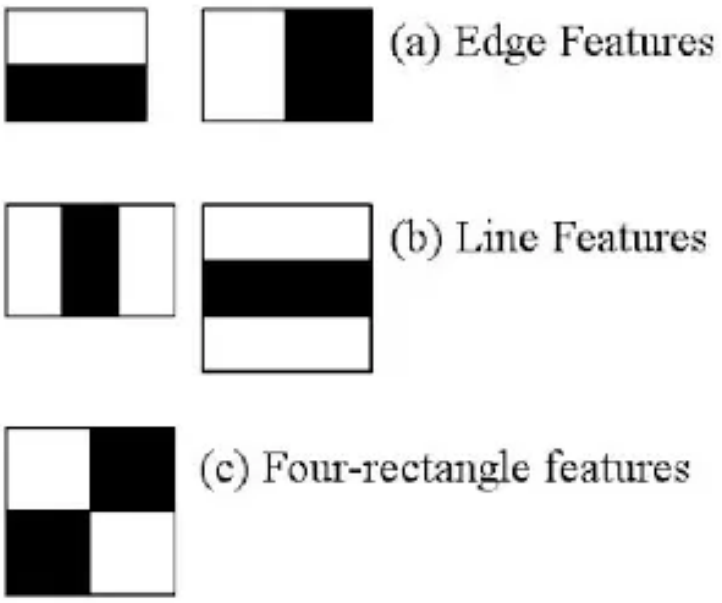
The algorithm can be explained in four stages:

- Calculating Haar Features
- Creating Integral Images
- Using Adaboost
- Implementing Cascading Classifiers

It's important to remember that this algorithm requires a lot of **positive images** of faces and **negative images** of non-faces to train the classifier, similar to other machine learning models.

6.1 Calculating Haar Features :

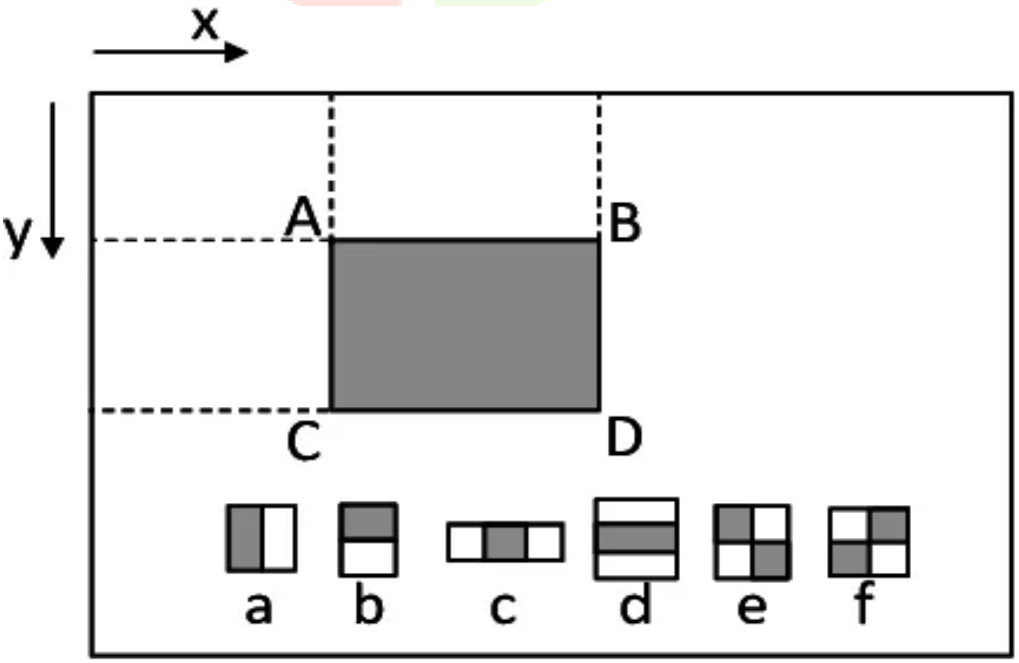
The first step is to collect the Haar features. A **Haar feature** is essentially calculations that are performed on adjacent rectangular regions at a specific location in a detection window. The calculation involves summing the pixel intensities in each region and calculating the differences between the sums. Here are some examples of Haar features below.



These features can be difficult to determine for a large image. This is where **integral images** come into play because the number of operations is reduced using the integral image.

6.2 Creating Integral Images :

Without going into too much of the mathematics behind it (check out the paper if you're interested in that), integral images essentially speed up the calculation of these Haar features. Instead of computing at every pixel, it instead creates sub-rectangles and creates array references for each of those sub-rectangles. These are then used to compute the Haar features.

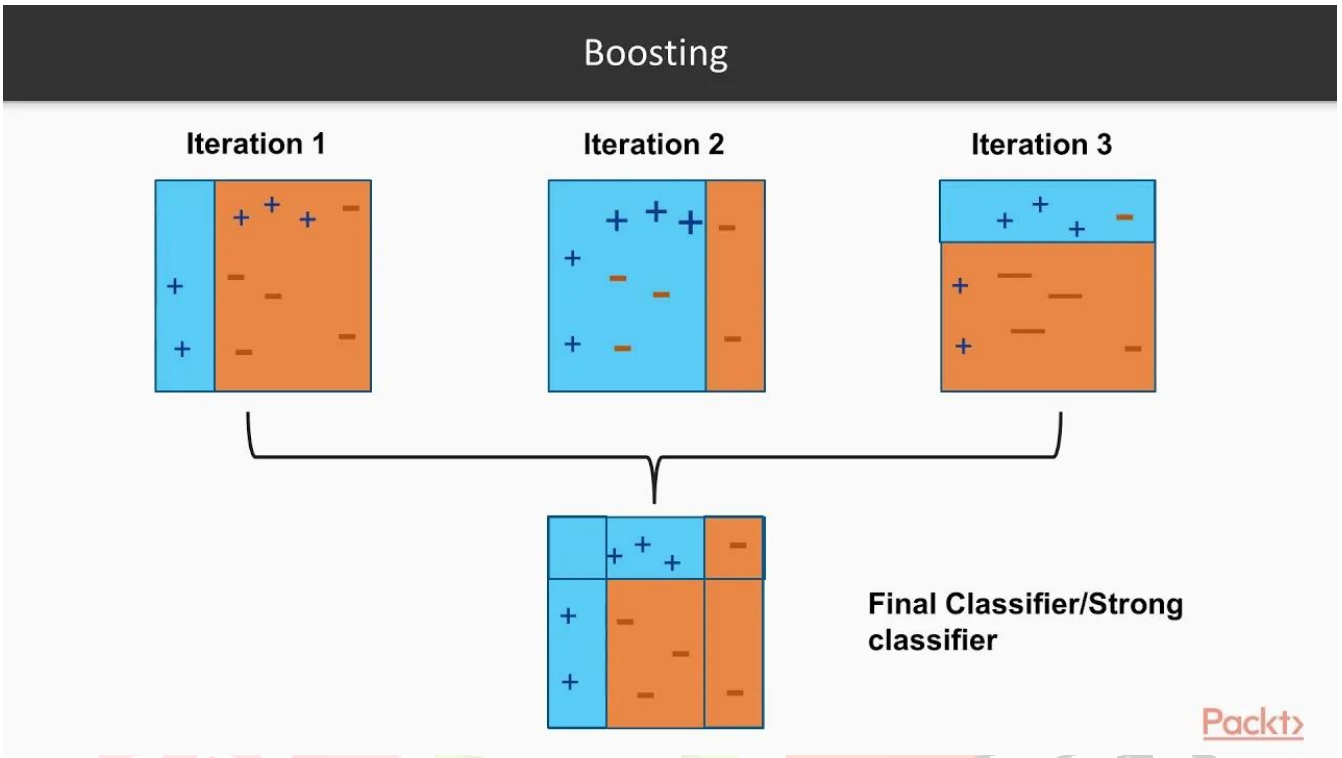


It's important to note that nearly all of the Haar features will be **irrelevant** when doing object detection, because the only features that are important are those of the object. However, how do we determine the best features that represent an object from the hundreds of thousands of Haar features? This is where **Adaboost** comes into play.

6.3 Adaboost Training :

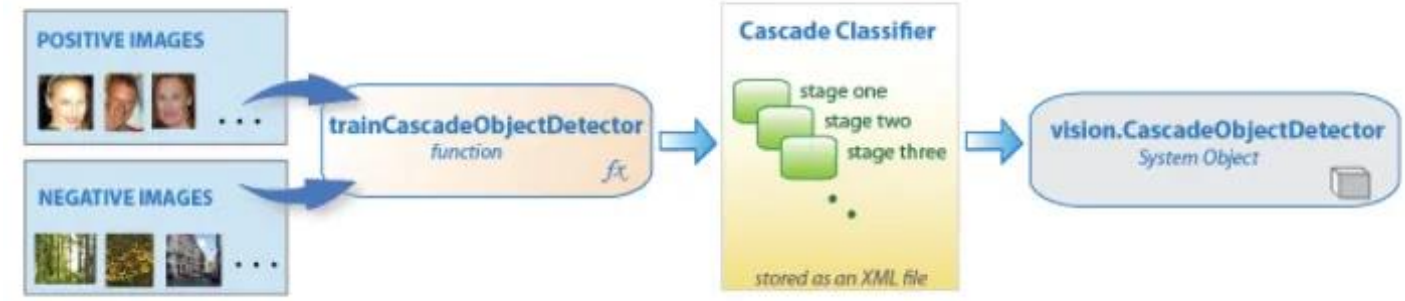
Adaboost essentially chooses the best features and trains the classifiers to use them. It uses a combination of **"weak classifiers"** to create a **"strong classifier"** that the algorithm can use to detect objects.

Weak learners are created by moving a window over the input image, and computing Haar features for each subsection of the image. This difference is compared to a learned threshold that separates non-objects from objects. Because these are "weak classifiers," a large number of Haar features is needed for accuracy to form a strong classifier.



The last step combines these weak learners into a strong learner using **cascading classifiers**.

6.4 Implementing Cascading Classifiers :



The cascade classifier is made up of a series of stages, where each stage is a collection of weak learners. Weak learners are trained using boosting, which allows for a highly accurate classifier from the mean prediction of all weak learners.
Based on this prediction, the classifier either decides to indicate an object was found (positive) or move on to the next region (negative). Stages are designed to reject negative samples as fast as possible, because a majority of the windows do not contain anything of interest.

It's important to maximize a **low false negative rate**, because classifying an object as a non-object will severely impair your object detection algorithm. A video below shows Haar cascades in action. The red boxes denote "positives" from the weak learners.

VII. SOFTWARE REQUIREMENTS

1. Python :

Python is a widely used general-purpose, high level programming language. It was created by Guido van Rossum in 1991 and further developed by the Python Software Foundation. It was designed with an emphasison code readability, and its syntax allows programmers to express their concepts in fewer lines of code. Pythonis a programming language that lets you work quickly and integrate systems more efficiently.
There are two major Python versions: Python 2 and Python 3. Both are quite different.

2. **OpenCV**:

OpenCV is a library which is used for image recognize. It will identify our hand tracking and Drawing. It is library basically design to work on image processing and image recognition. Object detection image processing methods are included in the OpenCV computer vision library. Real-time computer vision applications can be created by utilising the OpenCV library forthe Python programming language. The processing of images and videos as well as analytical techniques like face and object detection use the OpenCV library.

3. **NumPy**:

The N-dimensional array type known as ndarray is the most significant object defined in NumPy. The collection of identically categorized thing is described. A zero-based index can be used to access items in thecollection. A ndarray's items all take up the same amount of space as a memory block. Every item in ndarrayis a data-type object objects called dtype. A Python object of one of the array scalar types represents each item that is retrieved from a ndarray object (via slicing). The relationship between ndarray, data - type object (dtype), and array scalar type is depicted in the picture below.

4. Tkinter :

Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit. Creating a GUI application using Tkinter is an easy task.

7.2 HARDWARE REQUIREMENTS

1) Processor : I3/Intel Processor(Min)
2) RAM : 4GB (Min)
3) Hard Disk : 128 GB

VIII. FUTURE SCOPE

The scope of this project is:
In the future, this system can be expanded by connecting our system to public cameras and detecting human faces in real time. These frames will be continuously sent to our system by public cameras and our system will continue to monitor these frames. We shall also add another functionality to the system where one will be able to use their phone to detect the missing people. When a missing person is detected in the sample, it notifies the relevant authorities and takes action immediately.

IX. CONCLUSION

Thus our project has the potential to eliminate the traditional method or procedure of finding a missing person. Image recognition is a very powerful tool. This technology when developed to good use can be very beneficial.
Our program can be set in small scale industries like malls hospitals or hotels to help find missing people and even criminals. The process of identifying missing persons is accelerated. Our system has the potential to replace the manual scanning process with database for each image to check compliance in an efficient manner
using facial recognition method that gets the job done in no time.

X. ACKNOWLEDGMENTS

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XI. REFERENCE

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