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Video based Attendance System

Anuj Kapoor[1], Ayush Bharadwaj[2], Utkarsh Patel[3], Dr. Rajesh Singh[4], Ms. Vaishali Malik[5]
[4] *Professor*, [5]*Assistant Professor, Department of Computer Science & Engineering, Meerut Institute of Engineering & Technology (MIET), Meerut, U.P., India*

Abstract: Attendance management done manually in college is difficult to work with. To automate the attendance system, there are many technologies available that are costly and you have to touch the pad every time you come to the class which makes it coronavirus prone.
Hence, to overcome this problem we have built a computer-based smart video attendance management system. Attendance is an important aspect of every organization or institution to confirm the presence. Some of the manual and automatic attendance systems are, entry by pen or paper, Fingerprint-based, IRIS-based, RFID-based, and face recognition. The possibility of false entry of students by fooling the system is not possible in our case.
Our system can take attendance remotely by live video. In this system, all frames are separated from the video. To recognize the face of any student human face detection and pre-conization steps are taken. Our model helps to manage the attendance of students in a live stream.
Keywords: Automate, Detecting, Learning, OpenCV, Recognizing, Video.

I. INTRODUCTION

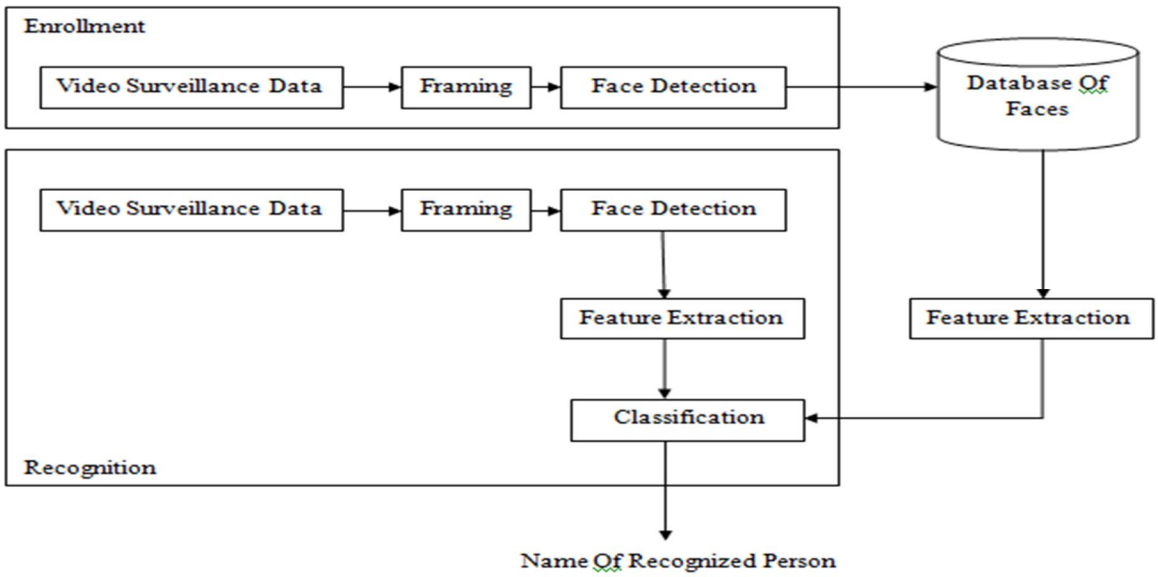
We human recognises other people by their faces. In all biometric reorganization system almost same technique is used like finger, finger-print, palm-print, iris, eye or face.
The technique is comprising of learning, detecting and recognising on the bases of data set available first the sample data is collected in data base in form of histogram or digitization then specific area are detected by HOG methodology or many other available techniques then after the area is detected the reorganisation part comes in steps.
Usages of face reorganisation is on airport, social networking sites, industries, railway stations arm forces etc.
In Policing and crime control organisation this system is very useful here large data is captured and stored for further processing as a suspect criminal required to detect the image is compared with centralised data set the system can detect him immediately. Face book is using this technique for tagging. in last 10 year of development this technology has improved a lot. like recognising pictures in any conditions like different light conditions, fade image or over exposed etc.
Our piece of work reduces the cost of high-end camera's used for attendance in camera based auto attendance of any organisation, it reduces cost by using simple low end web or existing CCTV camera for attendance purpose so to get attendance of people/ student in any institute we can use existing web or CCTV camera for attendance it only need our software inside this system.

II. RELATED WORKS

To point attendance there are plenty of methods like manual attendance by entering in register using paper pen, by finger printer which electronic method, by face reorganisation using high end cameras but all methods are ether manual time consuming or high end costly.
With this system we can mark attendance at lecture time which will proof genuinely this one of the advantages of this system
Attendance with RFID system need each student to mark attendance separately with an ID Card which is not fake proof.
IRIS and Finger print attendance have some disadvantages, whereas face recognition can be pointed automatically from camera of classroom. In video face detection system, we don't need separate student to mark attendance and high-end devices to capture images.

III. METHODOLOGY

When a student's face is detected through the automatic attendance management system, which is aided by video monitoring, aids in recording the students' attendance. Because the current attendance system has shortcomings, we propose a new attendance system that corrects those issues. The flow chart for the recommended system is shown in



IV. ALGORITHM

Pseudo code of proposed System

1) Take a Video Surveillance Data from classroom
2) Apply voila Jones Algorithm [Face Detection]
3) Extract the detected faces
4) Perform pre-processing such as scaling, histogram equalization
5) Convert into grey scale Faces with different Orientation having dimension
a) Put the photographs into a database.
b) Examine video surveillance data for patterns.
c) Use the LBPH classifier [Face Recognition] to classify your data.
d) Extract the features from the faces that have been discovered.
e) Compare and contrast features
f) Make a list of students' attendances based on faces they recognize.

Enrollment of students in the system and identification of students and attendance are the two key steps of the present system.

A. Enrollment of Students

1) The registration of students with the system is part of the student enrollment procedure. Students must complete the registration process.
2) You must stand in front of the laptop's webcam. Students' faces with various orientations are kept in the database after registration. We utilized the Viola-Jones Face detection method to recognize human faces. When compared to existing face detection methods, our technique is significantly quicker. The Viola-Jones face detection technique is faster to compute yet has higher accuracy.
3) Video Surveillance Information
4) As a dataset, we use classroom surveillance footage.
5) Framing The goal of framing is to get rid of frames from videos that don't have a human in them. Because frames containing only human objects are accessible, it helps to minimize the time necessary to recognize the human face after applying framing.

B. Algorithm for Detecting Faces

The voila jones algorithm will be used to recognize faces. Compared to other face detection algorithms, the Viola Jones approach has a number of benefits. The viola jones algorithm was chosen because it employs integral picture representation.

Deep Metric Learning is a set of algorithms that employ Deep Learning to learn a lower-dimensional effective metric space in which pictures are represented by points, with photos of the same class grouped together and images of other classes separated by

large distances.

Instead of directly reducing the-dimension of the pixel space, the convolution layers. first calculate the meaningful features. which are then implicitly used to create. the metric-space. Turns out we can use the. same CNN architecture we use for image classification for deep metric learning.

Instead·of·directly·reducing·the·dimension·of·the·pixel·space,·the·convolution·layers·first· calculate· the· meaningful· features·which· are· then· implicitly· used· to· create·the·metric·space.·Turns·out·we·can·use·the·same·CNN·architecture·we·use·for·image·classification·for·deep·metric·learning.¶

Figure·5:·CNN·for·clarification·task¶

In·Figure·5·see·a·CNN·that·is·trained·to·take· as· input· a· 150x150· colour· image·(which· is· the· same· as· a· vector· of· size·150x150x3· =· 67,500)· and· output· the·probability·that·it·belongs·to·one·of·the·128·different·animal·classes.· In· Deep· Metric·Learning,· the· architecture· remains· the·same,·but·the·loss·function·is·changed.¶

as· well· as· AdaBoost· due· to· this· it· will·

Figure 5: CNN for clarification task

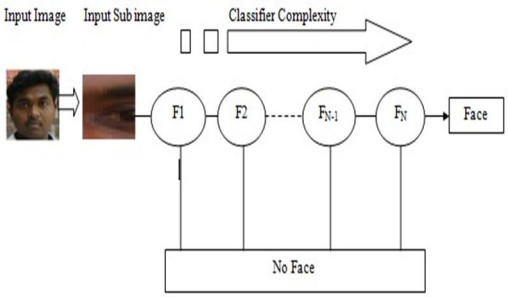
In Figure 5 see a CNN that is trained to take as input a 150x150 colour image. (which is the same as a vector of size 150x150x367.500) and output the probability that it belongs to one of the 128. different animal classes. In Deep Metric. Learning, the architecture remains. the same, but the loss function is changed as well as AdaBoost due to this it will give better performance different lighting conditions. The step of viola jones algorithm is as follows: Four steps are to be used for implementation of Viola-Jones face detection algorithm are as follows:

C. Selection of Haar features

Haar features are digital image features used in face detection process. These features are moved over an image to detect an object. These features have two regions one is white and second is black. The computation carried out during haar feature selection is as follows O eqn. 1.Val-E(pixels in black region) -Σ(pixels in white region) (1).

To detect human faces, video is captured and threshold value calculated of capture image from video by using above formula and Appling below features of human face. Various types of haar features are used on an image is shown in the Fig.2.These features are developed by considering O human face characteristics so that it will help us to detect the human face with great accuracy.

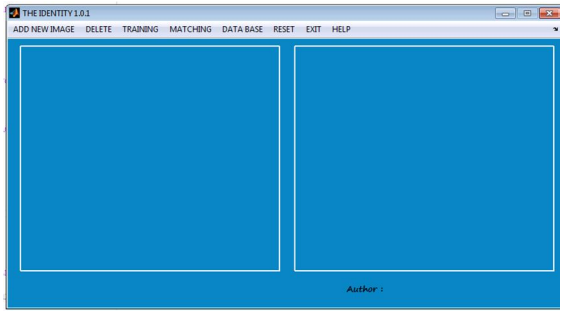
The traits were chosen based on some of the characteristics of human faces. The area around the eyes, for example, has traditionally been darker than the area around the nose and cheeks. Bridge of nose is lighter than eyes, which is the second characteristic. However, the application of the same windows to the cheeks or any other location is immaterial. As a result, 'AdaBoost' selects acceptable features from the 160000 features provided. Each feature in 'AdaBoost' implemented to images to be trained. Following that, it determines the threshold value for each characteristic, depending on which faces are classed as positive or negative. Misclassification or error may occur during classification, but it select the feature with lower errors.

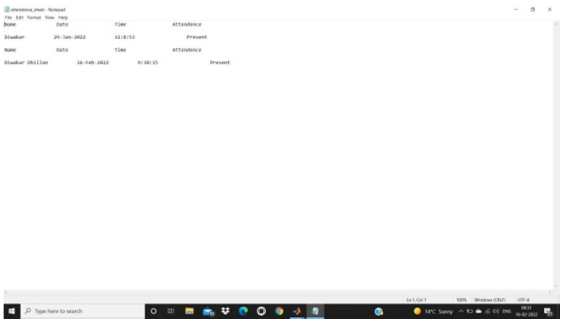


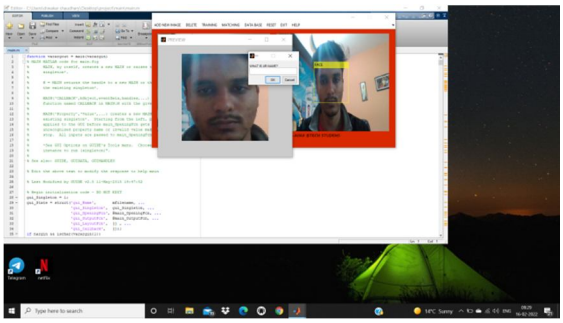
V. CONCLUSION

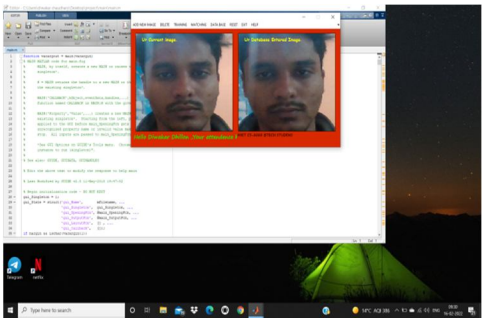
The procedure described above will produce the best results. This is accomplished through the use of OpenCV for frame extraction and dlib for face recognition. This approach will be more accurate in recognising many faces from a single frame and will have a faster reaction time.

```
if exist('features.mat','file') == 0
    msgbox('FIRST TRAIN YOUR DATABASE','INFO...!!!','MODAL')
    return
end
ff = dir('database');
if length(ff) == 2
    h = waitbar(0,'Plz wait Matlab is scanning ur database...','name','SCANNING IS IN PROGRESS');
    for k = 1:100
        waitbar(k/100)
        pause(0.03)
    end
    close(h)
    msgbox(('NO IMAGE FOUND IN DATABASE';'FIRST LOAD YOUR DATABASE';'USE ''ADD NEW IMAGE'' MENU'),'WARNING....!!!','WARN','MODAL')
    return
end
fd = vision.CascadeObjectDetector();
[f,p] = uigetfile('*.jpg','PLEASE SELECT AN FACIAL IMAGE');
if f == 0
    return
end
pi = fullfile(p,f);
im = imread(pi);
bbox = step(fd, im);
vo = insertObjectAnnotation(im,'rectangle',bbox,'FACE');
r = size(bbox,1);
if isempty(bbox)
    axes(handles.axes1)
    imshow(vo);
    msgbox(('NO FACE IN THIS PIC';'PLEASE SELECT SINGLE FACE IMAGE'),'WARNING...!!!','warn','modal')
    uiwait
    cla(handles.axes1); reset(handles.axes1); set(handles.axes1,'box','on','xtick',[],'ytick',[])
    return
elseif r > 1
    axes(handles.axes1)
    imshow(vo);
    msgbox(('TOO MANY FACES IN THIS PIC';'PLEASE SELECT SINGLE FACE IMAGE'),'WARNING...!!!','warn','modal')
    uiwait
    cla(handles.axes1); reset(handles.axes1); set(handles.axes1,'box','on','xtick',[],'ytick',[])
    return
end
axes(handles.axes1)
image(vo);
set(handles.axes1,'xtick',[],'ytick',[],'box','on')
bx = questdlg(('CORRECT IMAGE IS SELECTED';'SELECT OPTION FOR FACE EXTRACTION'),'SELECT AN OPTION','MANUALLY','AUTO','CC');
if strcmp(bx,'MANUALLY') == 1
    while 1
        fhx = figure(2);
        set(fhx,'menubar','none','numbertitle','off','name','PREVIEW')
        imc = imcrop(im);
```









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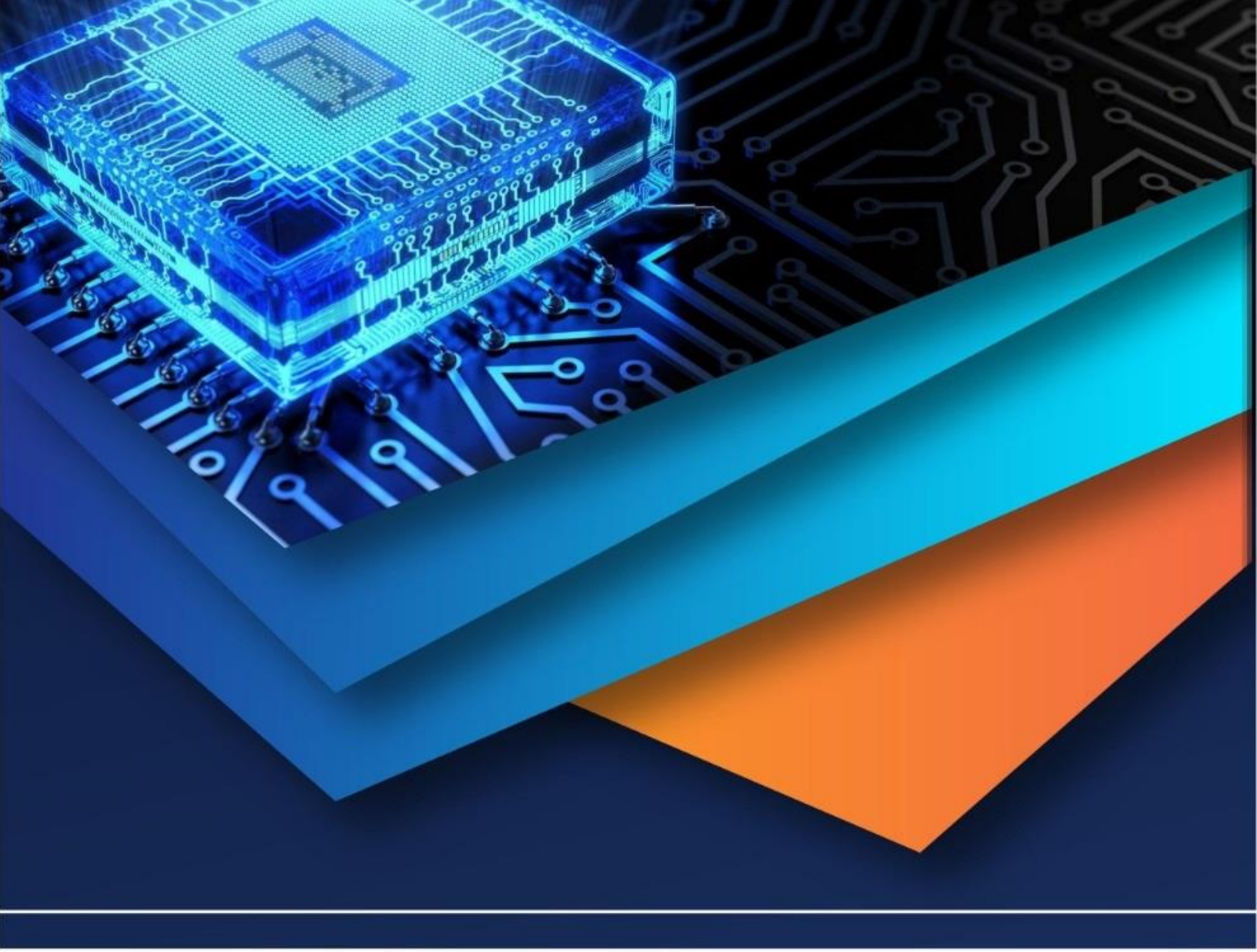

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