International Journal of Scientific Research & Engineering Trends
Volume 6, Issue 4, July-Aug-2020, ISSN (Online): 2395-566X

Real Time Attendance Marking System Using Face Recognition Approach

Aparna K S, Ashwini Shirali, Bhoomika S, Gagana T S, Asst. Prof. M. Pavan
Dept. IS & E, JNNCE, Shivamogga, India
aparnaks30031999@gmail.com, shiraliashwini@gmail.com, bhoomi3239@gmail.com, gaganatelkar2015@gmail.com, pmadhvesh@jnnce.ac.in

***Abstract*-In real time taking the attendance in the classroom is a time-consuming task. Faculties face many problems in taking attendance manually. Manual attendance system is time consuming; it takes about 10 minutes to just mark attendance.In the present paper a real time automatic Attendance marking system using face recognition approach has been discussed. Face recognition has wider application and it is a good approach as compared to Biometric methods. Here Face recognition system is developed based on different machine learning concepts. We used HOG feature extraction technique in order to extract features of the face. We have planned to recognize multiple faces in the video which is taken in the classrooms.**

***Keywords*-Face Recognition, Biometric Methods, Machine learning, HOG**

I.INTRODUCTION

A face recognition system is a technology which identifies and verifies image associated with image of a person face from a digital image or video input. There are various methods in face recognition and face detection, but they work by comparing the selected face from image input with the encoded face which is already in the database. It is also described as a Biometric Artificial Intelligence as they are for unique identification of a person by analyzing patterns based on the person's facial textures, shape.

Face recognition has wider application in attendance marking, criminal detection, automated access control, person authentication, surveillance system etc. Face Recognition can be used in both public and private sectors. Deep learning [1] has widely used in computer vision community therefore face recognition become very popular and face recognition has been one of the most studied topics. The aim of face recognition method is to develop faster and robust algorithm. Face recognition algorithms affected by the external and internal variations although it reached the accuracy level. The main challenge of face recognition is to develop effective feature representation with highest accuracy in all conditions.

Histogram of Gradients [2] are image descriptive used in computer vision for day to day affairs involving object detection like pedestrian detection and face recognition. HOG works similar to sliding door using blocks. A block is a grid used to find gradient magnitude and gradient direction. HOG is for feature extraction from input image. Input image must be preprocessed to required form to find the gradient direction and gradient magnitude followed by normalization of block and extraction of the feature from input image.

II. RELATED WORK

Face recognition is implemented using many approaches involving LBP, SVM, PCA in the real time application of smart doors, missing child search, mobile unlock procedure and many more. Among many approaches, Face recognition work on deep learning is using deep learning concepts.

In the paper “Implementation of Face Recognition Algorithm for Biometrics Based Time Attendance System” by Adrian RhesaSeptianSiswant [3], they implemented Face recognition using OpenCV algorithms Eigenface and Fisherface and they achieved better results using Eigenface than Fisherface algorithm.

In paper "Facial expression recognition and histograms of oriented gradients: a comprehensive survey" by PierluigiCarcagni, Marco Del Coco [4], Face expression detection is observed using histogram of gradients. There are many approaches in face detection and face recognition which has its implementation in large number of real time application.

III. METHODOLOGY

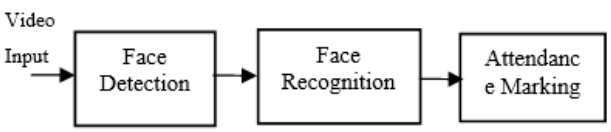


Fig.1 Flow diagram for Real time attendance marking system.

© 2020 IJSRET

The Fig.1 shows the methodology of Real time attendance marking system with 3 steps. They are Face detection, Face Recognition and Attendance marking.

The approach is divided into modules which includes
- Collection and preparation of dataset.
- Encoding the human face.
- Implementation of face recognition system.
- Implementation of real time attendance marking System.

1. Collection and preparation of dataset

LFW is a database with face images used for face verification and used for unconstrained face recognition. This LFW is also called pair matching.We tested on LFW standard dataset with 50 images shown in Fig.2. Out of 50 images 42 are correctly recognized and 8 are images are not correctly recognized.

Fig 2. LFW Dataset

We created a dataset which includes student images as shown in Fig 3. We have considered images of four student for preparing dataset. Then trained the model using the local dataset. There are about 10 to 12 images of each students used for training the model. We tested the model using this local dataset of students after testing with LFW dataset.

Fig. 3 Local Dataset of student images

2. Face Detection

Encoding is writing an image data to a stream. Face encoding is the information obtained out of the image that is used to identify the particular face. The flow diagram for face detection is shown in Fig.4.

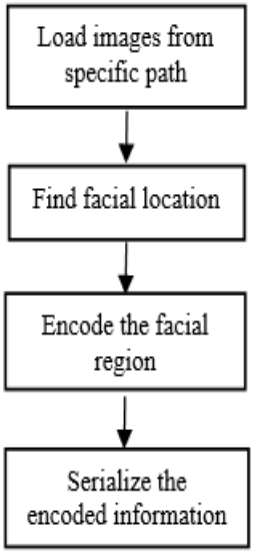


Fig.4 Flow diagram for Face Detection

Load the images and grab the paths to the input images in the dataset. Initialize the list of known encodings and known names. Loop over the image paths. Load the input image and convert it to grayscale from RGB. Detecting the location of the face using bound box technique [5] by finding the co-ordinates of the bounding boxes. Compute the facial embedding for the face. Loop over the encodings. Dump the facial encodings into another file. On running training file, it outputs a encode file in output directory named encoding.pickle.

3. Face Recognition

Load the encoding file from file system which contains facial features. Initialize the video stream and pointer to output video file. Then input the video stream using webcam. Loop over the frames in video stream and grab the frame from video stream. Convert the input frame from BGR to RGB then resize it. Find the facial location by finding the co-ordinates of bounding box and compute facial embedding for the face.

Then loop through the encoded file and compare the input with encoded file which already contains the feature of face. If match is true update the match counts each time when the face is recognized. Update the names in list. Then mark the attendance in attendance sheet. Loop through recognized faces and then draw predicted face name on the image. Display the output frame to screen.

© 2020 IJSRET

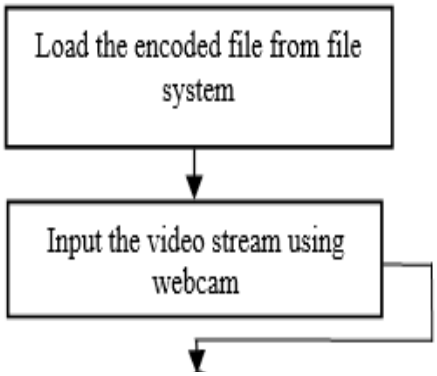
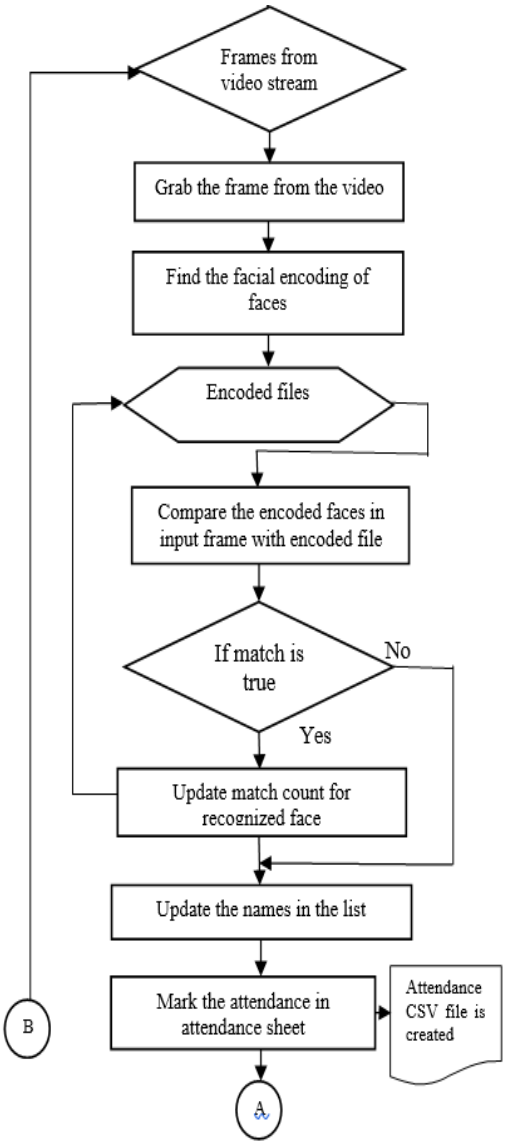


Fig. 5. The flow chart depicting the process.



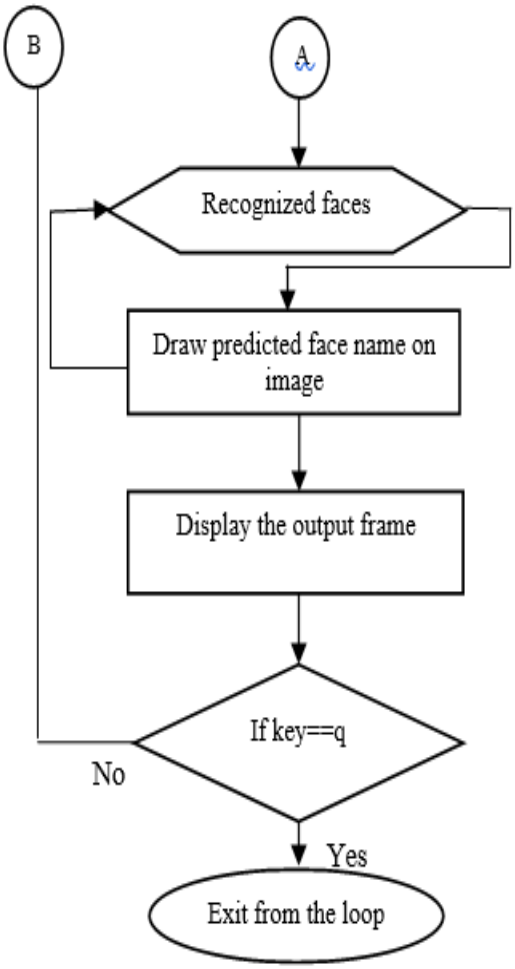


Fig.6 Flow diagram for Face Recognition

4. Implementation of Attendance Marking System

Maintaining the attendance is very important in all the in titutes for keeping track of the performance of students. A face recognition method in a real time background for a college or other institution help to mark the attendance of their students or faculties.Every institute has its own method f or attendance marking. Some are taking attendance manually using the old paper or file approach and some have implemented methods of biometric recognition. Biometric Recognition may involve finger print,face,iris,eyes recognition methods.

Steps involved:

- The webcam is fixed at a specific distance inside a classroom to capture videos of the images of the entire students of the class.
- Apply face detection and face recognition method on captured input video.
- The name list of the recognised image is displayed on screen in captured video.
- With this name list of recognised persons, attendance is marked at attendance sheet consisting of list of all students in the classroom.

© 2020 IJSRET

- The name list of recognised images from captured video is marked as present in attendance sheet.
- In case of absentees neither the name nor the image in captured video appear.

5. Implementation of GUI

Python has many GUI frameworks, but Tkinter is the framework present in the Python standard library.
Tkinter has many advantages. Both Tk and Tkinter are available on Unix platforms, Windows. Tk offers native look on all platforms. Large number of modules are present in Tkinter. The binary extension module named_tkinter provides Tk interface. We are using library which is statically linked with python interpreter named dll. Tkinter is the most important interface module which is available in python module.To use Tkinter, we have to import the Tkinter module:
import Tkinter or we can write
from Tkinter import *
Tkinter module contains many classes, functions and other things to work efficiently with the Tk toolkit. Creating a Tk root widget to initialize Tkinter. Tk root widget is an ordinary window, with a title bar and other decoration provided by your window manager.

To create a tkinter app first we have to import the tkinter module then create the main window or container. Next step is add number of widgets to the main window and then apply event Trigger. We use mainly three manager classes for organizing the widgets. They are pack (),grid() and place() method.

IV. EXPERIMENTAL RESULTS

Implementation of face recognition system is been done using python platform. The performance of the system is measured in terms of accuracy.

Accuracy is given by

$$\text{Accuracy} = \frac{\text{Correctly detected face images}}{\text{Total number of face images}}$$

Recognition Rate (RR):

$$RR = \frac{\text{Total no. of faces - Total no. of false recog}}{\text{Total number of faces}} \times 100$$

Snapshots of results are shown in the figures. Fig 6 represents Graphical User Interface.Input video is recorded from webcam and recognizing the face using face detection and face recognition. Here name of the recognized person displays on screen as seen in the Fig 7.

Fig 8 represents marking of attendance for students who are present in the class with time stamp.

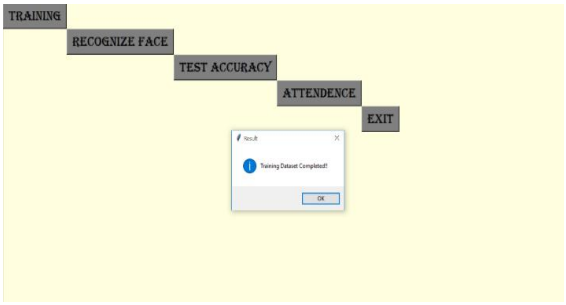


Fig 6.Graphical User Interface.

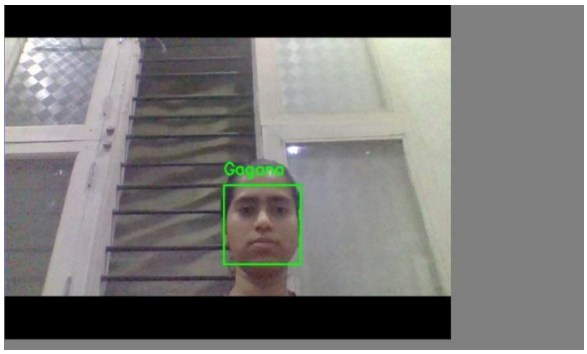
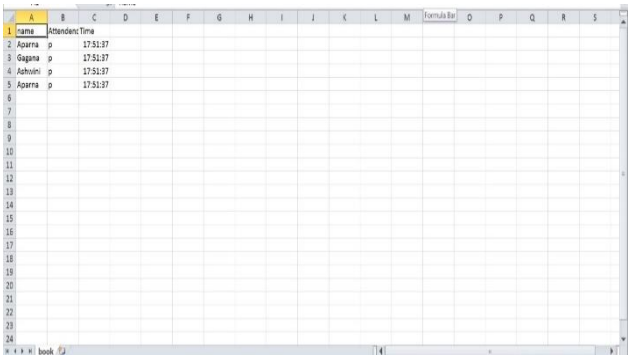


Fig 7. Taking input video to recognize the face and face is recognized



name	Attendenc Time
Aparna	p 17:51:37
Gagana	p 17:51:37
Ashvini	p 17:51:37
Aparna	p 17:51:37

Fig 8. Marking of attendance in Excel Sheet

V. CONCLUSION

The proposed method recognizes the student's image when we place the web camera in the classroom on the basis of face features and attendance is marked based on recognition. The system recognizes the students' image with accuracy of 84%. In future, we want to recognize the faces in outdoor environment and this face recognition system could be implemented in mobile devices.

© 2020 IJSRET

REFERENCES

[1] Xiao Han, "Research on Face Recognition based on Deep Learning," IEEE Conference,2018
[2] Alireza TavakoliTarghi "HOG andL BP: Towards a Robust Face Recognition System",Tenth International Conference on Digital Information Management(ICDIM 2015)
[3] Adrian RhesaSeptianSiswanto ,AntoSatriyo Nugroho, MaulahikmahGalinium "Face recognition Algorithm For Biometrics Based Time AttendenceSystem",InformationTechnology,Swiss German University EduTown BSD City, Tangerang 15339, Indonesia
[4] PierluigiCarcagni, Marco Del Coco, Marco Leo, CosimoDistante,"Facial expression recognition and histograms of oriented gradients: a comprehensive survey" inSpringer Open Journal, pp. 1-25, 2015
[5] K. Zhang, Z.Zhang, Z.Li, and Y.Qiao, "Joint face detecti on and alignment using multitask cascaded convolutionalnetworks,"IEEE Signal Processing Letters, vol.23,no.10, pp.1499 1503, 2016.

Author Profile

Aparna K S
Aparna K S pursuing B.E in Information Science and Engineering at JNNCE, Shivamogga.
Email Id: aparnaks30031999@gmail.com

Ashwini Shirali
Ashwini Shirali pursuing B.E in Information Science and Engineering at JNNCE, Shivamogaa.
Email Id: shiraliashwini@gmail.com

Bhoomika S
Bhoomika S pursuing B.E in Information Science and Engineering at JNNCE, Shivamogga.
Email Id: bhoomi3239@gmail.com

Gagana T S
Gagana T S pursuing B.E in Information Science and Engineering at JNNCE, Shivamogga.
Email Id: gaganatelkar2015@gmail.com

Mr. M Pavan
Mr. M Pavan, Assistant Professor, Dept. of Information Science and Engineering, JNNCE, Shivamogga.
Email Id: pmadhvesh@jnnce.ac.in

© 2020 IJSRET