Face-Recognition Based Attentiveness Survey Model with Automated Attendance System Using Deep Learning

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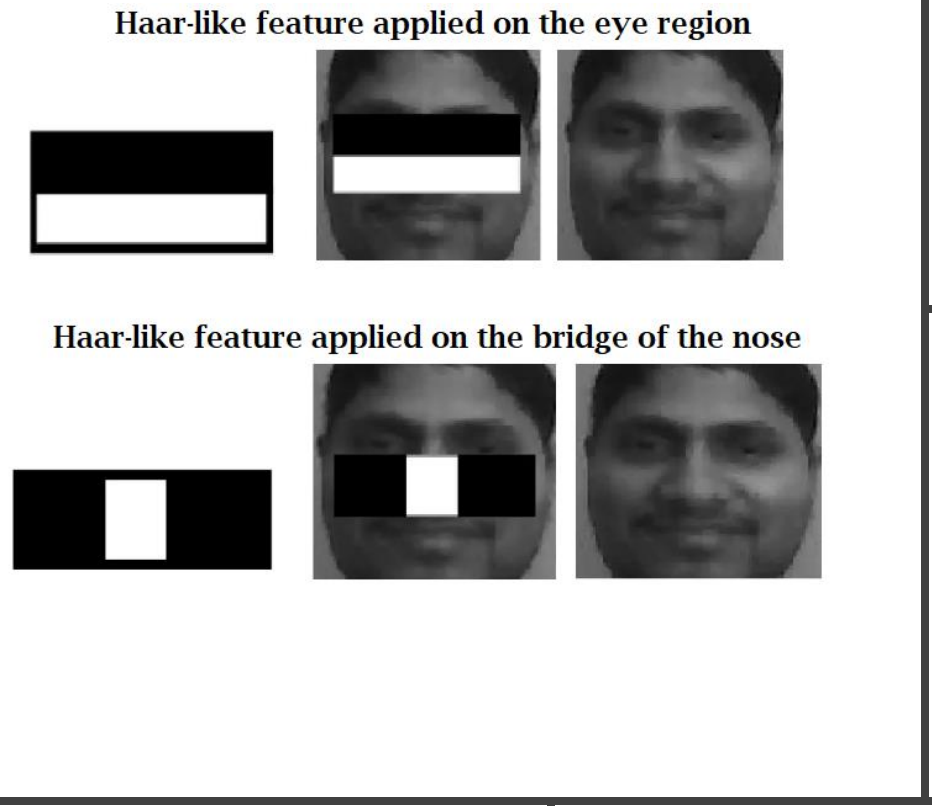
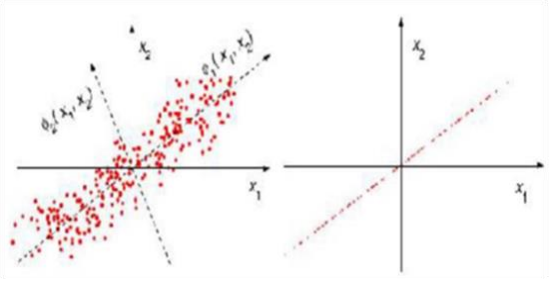
Literature Survey

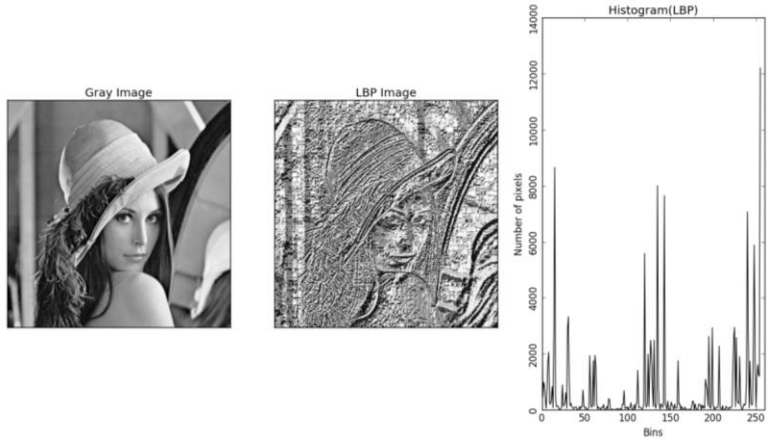
Number of students are increasing day by day in schools and universities, it's difficult for the teachers to cope up with many students in class.

The conventional method of taking attendance is done manually by the teacher which requires considerable amount of time and efforts. Sometimes it may also involve errors and proxy attendance.

Initially, the system employed, Radio Frequency Identification (RFID), iris biometrics, requiring students to register with their unique iris templates.





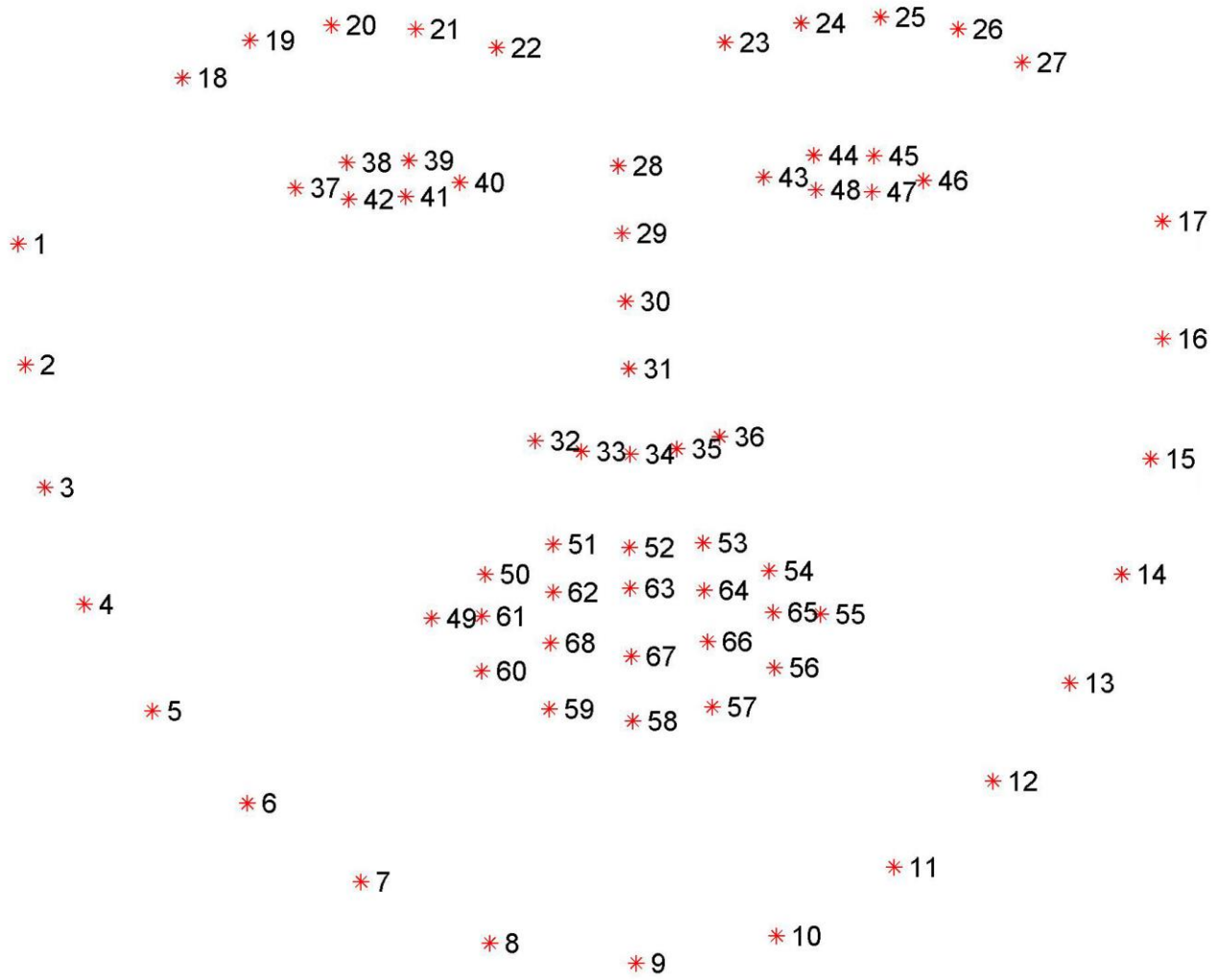


Methodology

- Histogram of Oriented Gradients (HoG)
- Local Binary Pattern (LBP)
- Principal Component Analysis (PCA)
- HAAR Integral Image Structure (HAARIS)
- K-Nearest Neighbors (KNN)

Methodology

- Some of the main libraries used:
  - Dlib
  - OpenCV
  - face_recognition
  - tensorflow
  - keras
  - os
  - datetime

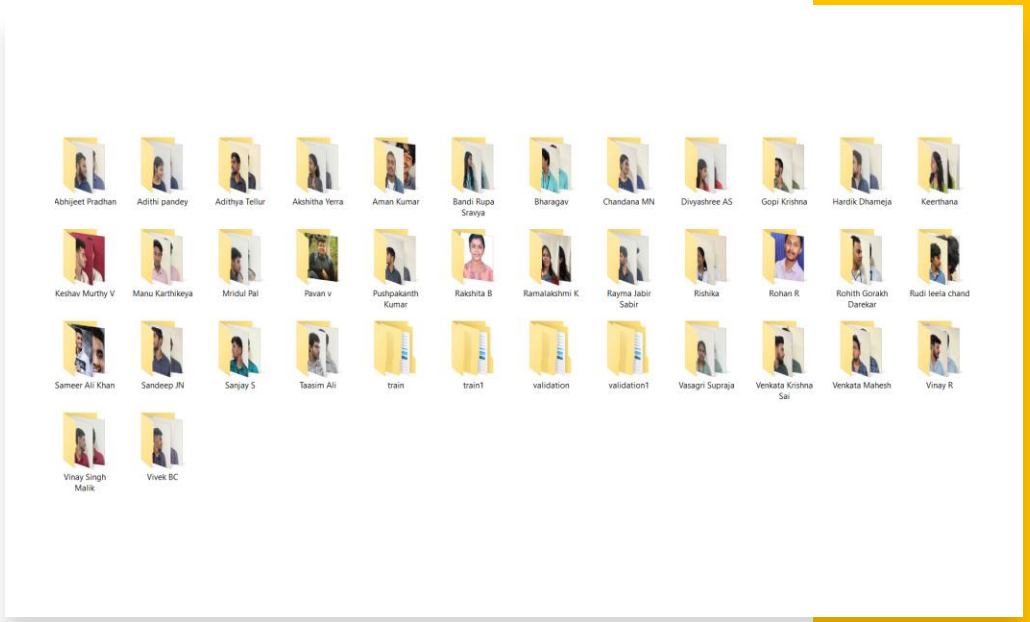


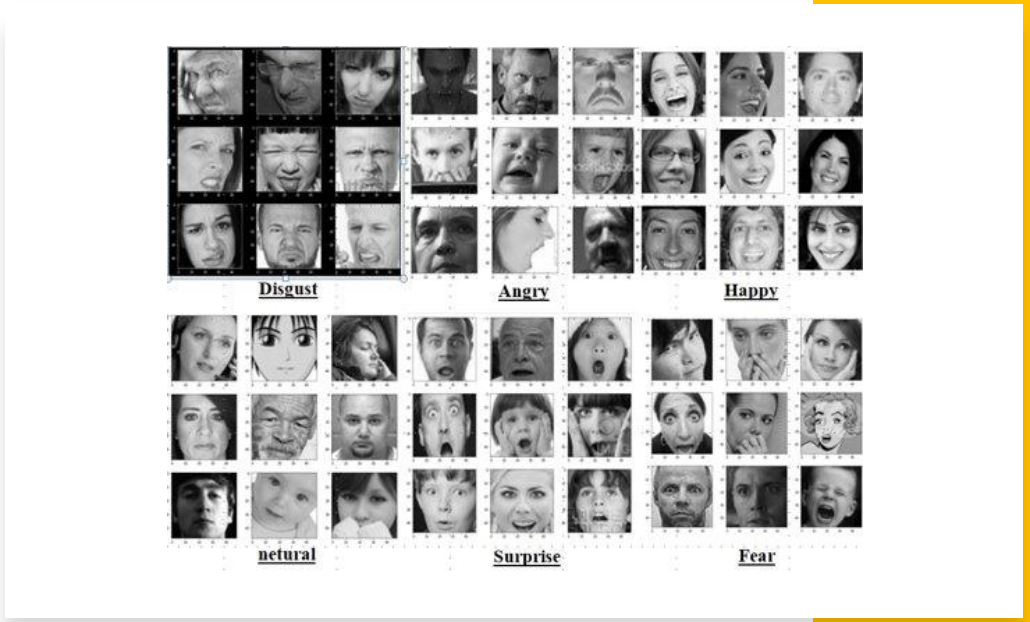
Data Set

- For attendance:
  - 3666 images belonging to 33 classes.
  - 122 images belonging to 33 classes.
- For emotion detection:

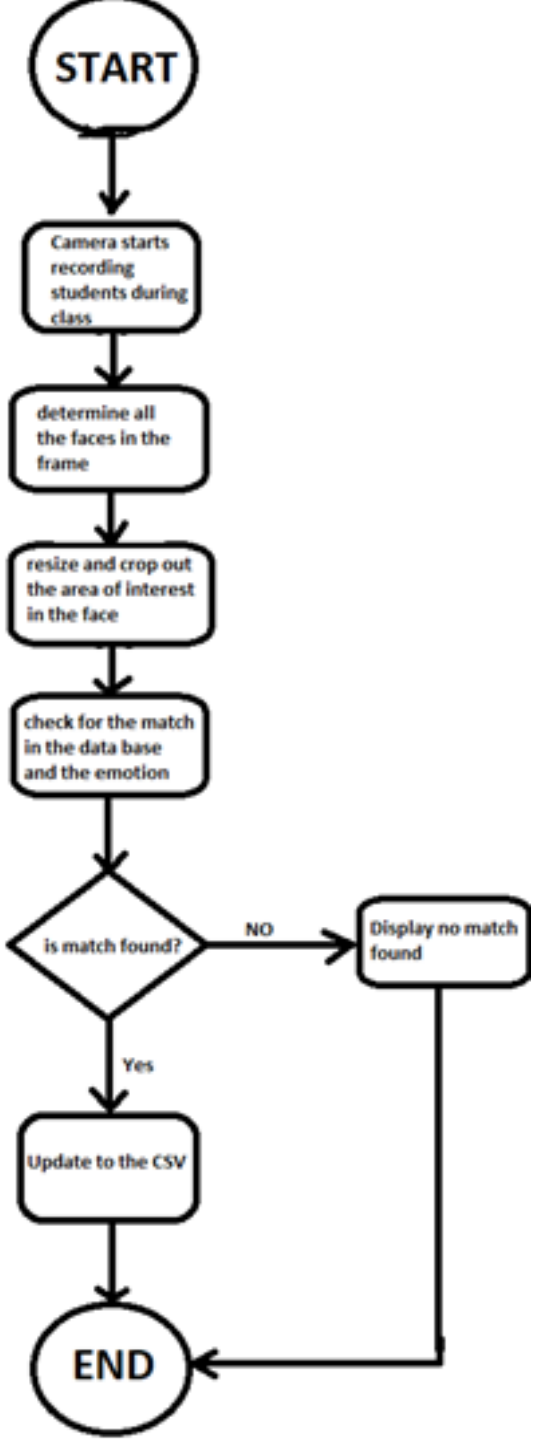
Folder Name	Count
Fear	4103
Disgust	436
Neutral	4982
Happy	7164
Angry	3993
Surprise	3205
Sad	4938

Folder Name	Count
Fear	1018
Disgust	111
Neutral	1216
Happy	1825
Angry	960
Surprise	797
Sad	1139

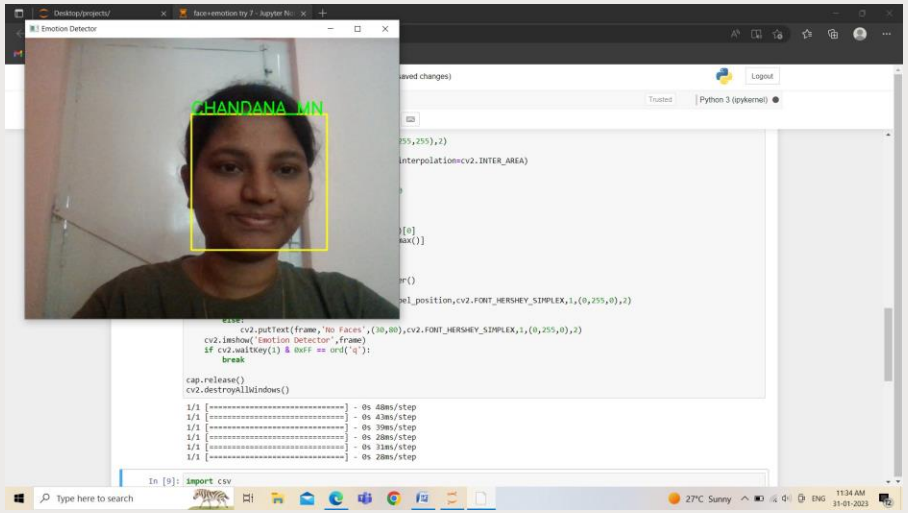




Flow Chart


START
Camera starts recording students during class
determine all the faces in the frame
resize and crop out the area of interest in the face
check for the match in the data base and the emotion
is match found?
NO
Display no match found
Yes
Update to the CSV
END

Result and Discussion



Clipboard | Font | Alignm

A1 | CHANDANA

	A	B	C	D	E
234471	CHANDANA MN	21:38:34	05 12 2022	Happy	
234472	CHANDANA MN	21:38:34	05 12 2022	Happy	
234473	CHANDANA MN	21:38:34	05 12 2022	Happy	
234474	CHANDANA MN	21:38:34	05 12 2022	Happy	
234475	CHANDANA MN	21:38:34	05 12 2022	Happy	
234476	CHANDANA MN	21:38:34	05 12 2022	Happy	
234477	CHANDANA MN	21:38:34	05 12 2022	Happy	
234478	CHANDANA MN	21:38:34	05 12 2022	Happy	
234479	CHANDANA MN	21:38:34	05 12 2022	Happy	
234480	CHANDANA MN	21:38:34	05 12 2022	Happy	
234481	CHANDANA MN	21:38:34	05 12 2022	Happy	
234482	CHANDANA MN	21:38:34	05 12 2022	Happy	
234483	CHANDANA MN	21:38:34	05 12 2022	Happy	
234484	CHANDANA MN	21:38:34	05 12 2022	Happy	
234485	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234486	CHANDANA MN	21:38:36	05 12 2022	Neutral	
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234488	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234489	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234490	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234491	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234492	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234493	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234494	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234495	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234496	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234497	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234498	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234499	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234500	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234501	CHANDANA MN	21:38:36	05 12 2022	Neutral	
234585	CHANDANA MN	21:38:40	05 12 2022	Neutral	
234586	CHANDANA MN	21:38:40	05 12 2022	Neutral	
234587	CHANDANA MN	21:38:40	05 12 2022	Neutral	
234588	CHANDANA MN	21:38:40	05 12 2022	Neutral	
234589	CHANDANA MN	21:38:40	05 12 2022	Neutral	
234590	CHANDANA MN	21:38:42	05 12 2022	Sad	
234591	CHANDANA MN	21:38:42	05 12 2022	Sad	
234592	CHANDANA MN	21:38:42	05 12 2022	Sad	
234593	CHANDANA MN	21:38:42	05 12 2022	Sad	
234594	CHANDANA MN	21:38:42	05 12 2022	Sad	
234595	CHANDANA MN	21:38:42	05 12 2022	Sad	
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234602	CHANDANA MN	21:38:42	05 12 2022	Sad	
234603	CHANDANA MN	21:38:42	05 12 2022	Sad	
234604	CHANDANA MN	21:38:42	05 12 2022	Sad	

Attendence

Ready

Conclusion

As the student population grows, we're using facial expression recognition to gauge their attentiveness in class, fostering a stronger connection between instructors and students.

Our method involves comparing input images from video frames to reference images, improving the balance between accuracy and speed in identifying individuals.

Further Work

We can even use CNN to achieve high accuracy instead of using predefined libraries for the face recognition.

A diction tree can we added to reduce the number of entries from per second to per hour. So, that for every person we will get only one entry per period.

A sorting algorithm can also be implemented on the processed csv file which will make it easy for the teacher to have track of the names.

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