



CP301 Development Project

Challenges In Campus

- Wastage of Time at the Gate/Class
- Less efficient Data Management
- Less security
- Wastage of documents

What are we doing

- Website containing face recognition system for entry exit at main gate and attendance in classrooms.
- Website also have barcode scanner to scan ID card.
- It stores the information in CSV file.

1

Open the website

Login and select the Entry-Exit
choice in the website



2

Fill the Form

The form will ask details such as reason for going out, the place you are going, etc.

Name

Please provide a valid name.

Email

Please enter your email

Phone

Please provide a phone number

Subject

Please enter subject

Message

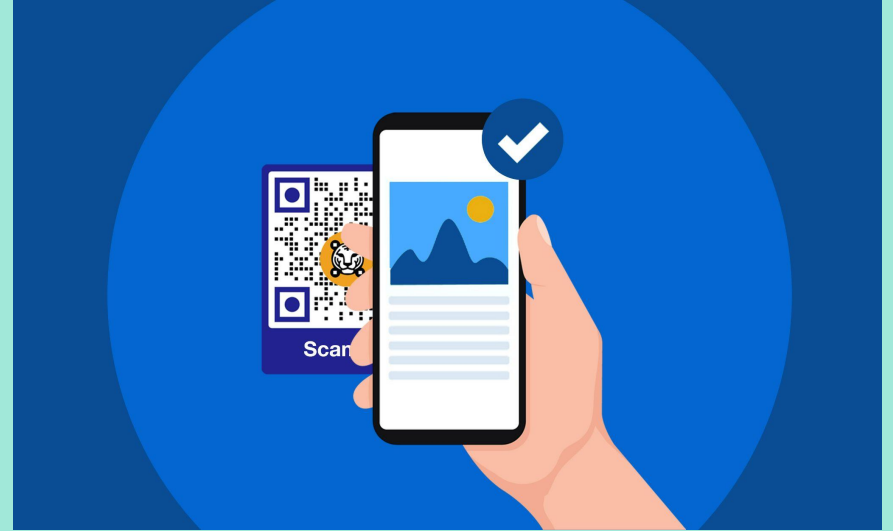
Please enter your message

Send

3

Scan the QR

After filling the form a QR will be generated scan that to go to verification stage.



4

Face Verification

Smile! Look into the camera for
the identification to complete.





Logs are Successfully updated.

TEST DRIVE

Working of Face Recognition

1. Look at a picture and find all the faces in it. We're going to use Histogram of Oriented Gradients (HOG)
2. Focus on each face and be able to understand that even if a face is turned in a weird direction or in bad lighting, it is still the same person.
3. Be able to pick out unique features of the face that you can use to tell it apart from other people— like how big the eyes are, how long the face is, etc.
4. Finally, compare the unique features of that face to all the people you already know to determine the person's name.

Preprocessing of the image

- Image loading
- Face and eyes detection
- Face straightening
- Face cropping
- Image resizing

The purpose of using preprocessing steps in face detection system is to speed up the detection process and reducing false positives.

Benefits

- Time saving
- Increased efficiency and capabilities
- Cost cutting
- Increase security
- Automated time tracking
- Integration with other systems
- Easy to manage records

Attendance system

Why FR

- Qr scan (Security issue)
- Biometric scan :
 - Involves physical touch
 - Can't be installed everywhere
 - Does not help in mass identification
 - Maintenance is expensive
 - Outdated technology



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End-sem Evaluation

Face Recognition

— and security system —

Pre mid-sem

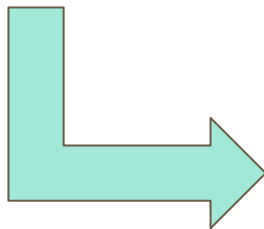
1. We had created a portal to increase the security and invigilation in our campus using facial recognition.
2. Till now we were able to identify a single individual from a domain set of images.
3. We also made a web portal to facilitate the above implementation.

What we are doing

1. We have implemented the algorithm which can recognise and label multiple faces.
2. We have also successfully implemented the many to one algorithm to one to one algorithm.
3. We can change into different directories for different courses. So that, we only have to check into dataset of students in that particular course.
4. Now, image can also be captured from website and sent to a directory from where the algorithm fetches it and searches the faces in the image from a domain set.

Multiple face recognition algorithm

1. This algorithm can now identify more than one individual in the given image which are also present in the dataset.
2. It compares the encoding of all the faces in the photo to the faces in the database.
3. Labels all the faces in the picture with their entry numbers.



One to One face recognition algorithm

1. It is much faster than many to one algorithm (Multiple face recognition)
2. When we enter the entry number then it will compare the face with only one photo.
3. Adding an option to select the course will make the algorithm efficient, as we have to compare faces in that particular course database.

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How is it working?

1. **Face detection:** uses computer vision algorithm that looks for patterns in the image that resembles a human face
2. **Feature extraction:** analyzing the face and identifying unique characteristics.
3. **Encoding:** features are converted into a numerical representation for comparison with other faces.
4. **Matching:** encoding are compared with a database of known faces.
5. **Continuous learning:** updating the database of known faces with new examples, which increases the system accuracy

Time Complexity

Let say, we have n person to recognise from m images in the dataset.

1. Multiple face recognition algorithm:

$$=O(1*\text{encode}+m*\text{encode}+m*\text{compare}(1,n))$$

$$=O(m+1+m*n) = \mathbf{O(m*n)}$$

2. One to one face recognition algorithm:

$$=O(n*(1*\text{encode}+1*\text{encode}+\text{compare}(1,1)))$$

$$=O(2n+n) = \mathbf{O(n)}$$

Time complexity of one to one algorithm does not depend on the size of the dataset.

Future Innovations

1. To remove photo misuse using depth sensing
2. Using Reinforcement Learning, mass attendance system and mess system.
3. We can improve by using the test images to train the algorithm.

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Thank You