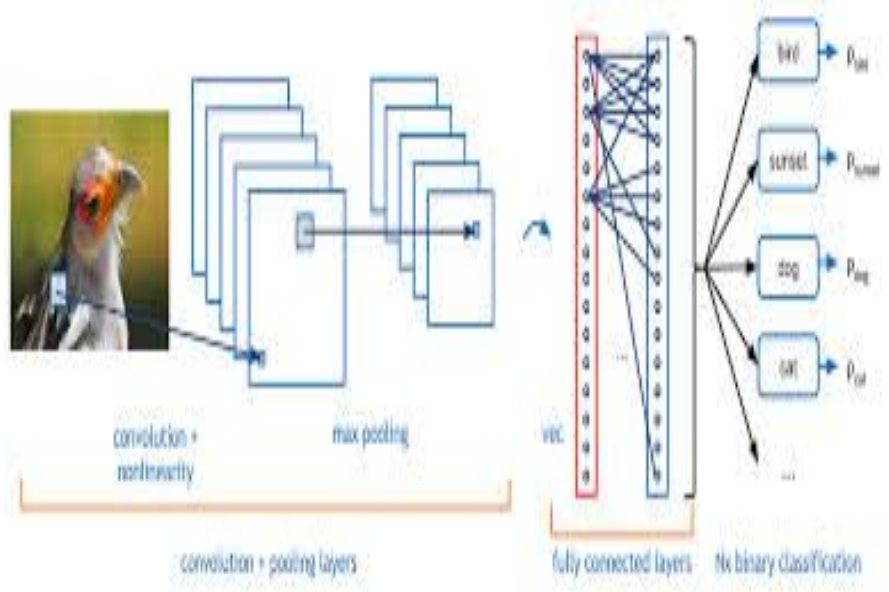
Attendance Monitoring using Facial Recognition

Problem Definition:

- This primary objective of this project is to monitor and maintain the attendance of students present for the lecture, using face recognition technology.

Convolutional Neural Networks:

- The name “convolutional neural network” indicates that the network employs a mathematical operation called convolution. Convolution is a specialized kind of linear operation. Convolutional networks are simply neural networks that use convolution in place of general matrix multiplication in at least one of their layers

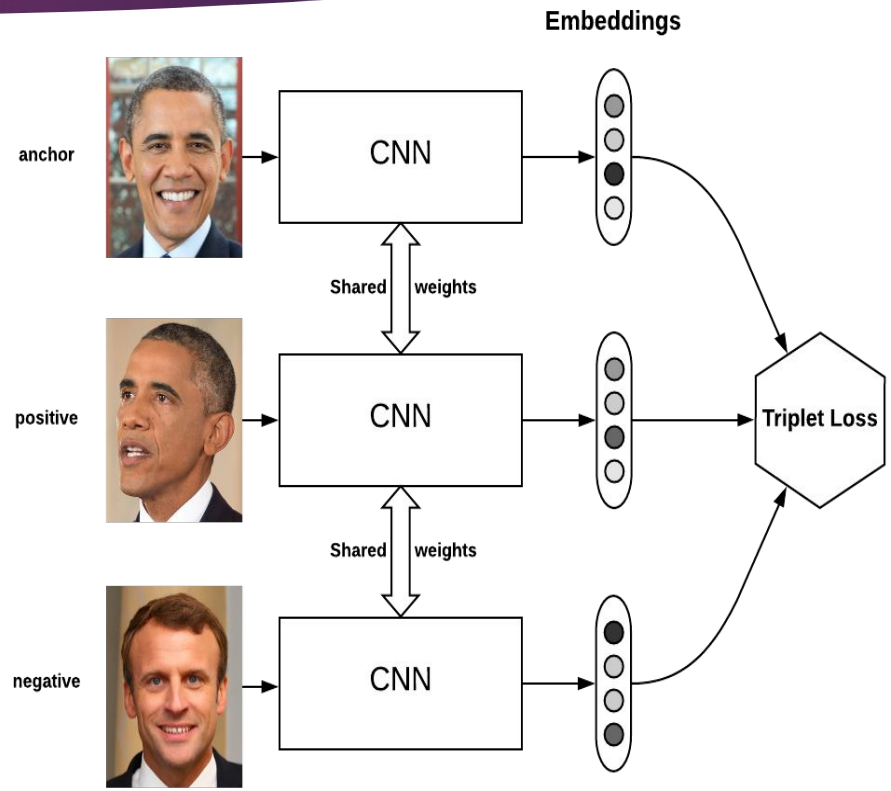


Face Detection:

- Face detection occurs via the viola-jones algorithm which looks for the haar-like features, for the recognition of various facial features.
- Haar- like features are used for edge and recognition of facial features such as eve-brows, lip-line , that differ significantly among individuals.
- Haar-cascading classifiers are used for extracting features from the training data

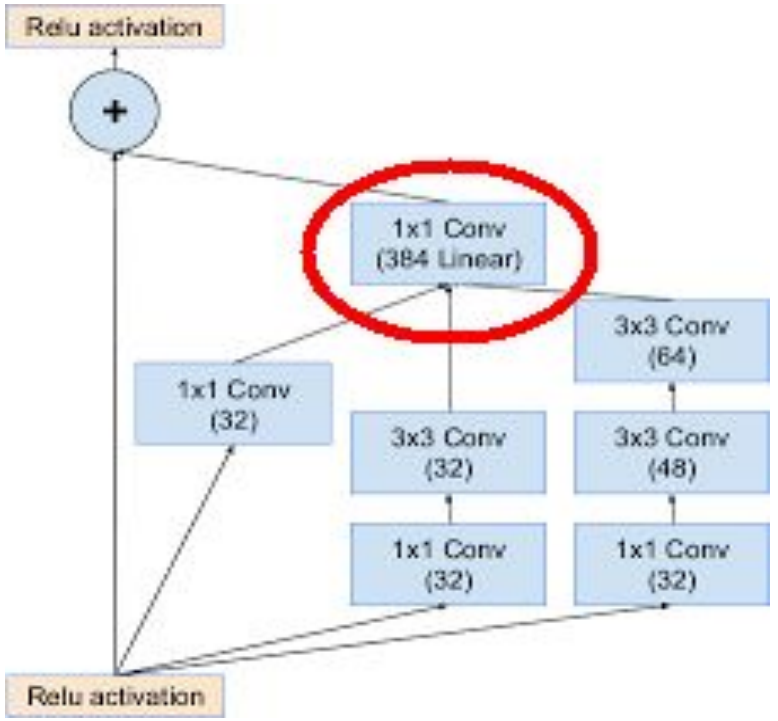
Face Recognition:

- After face detection, the detected faces need to be compared with the existing databases.
- This is achieved by first extracting the features using a pretrained inception resnet called FaceNet
- After extraction, the features are compared with the trained model using 3-loss function
- Triple loss functions consists of an anchor , a positive and a negative image.



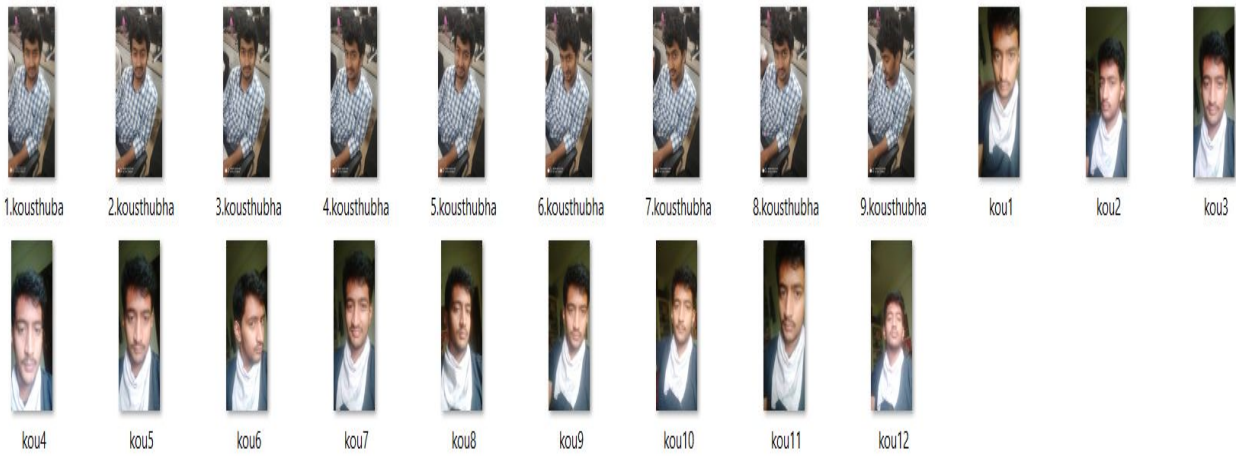
FaceNet:

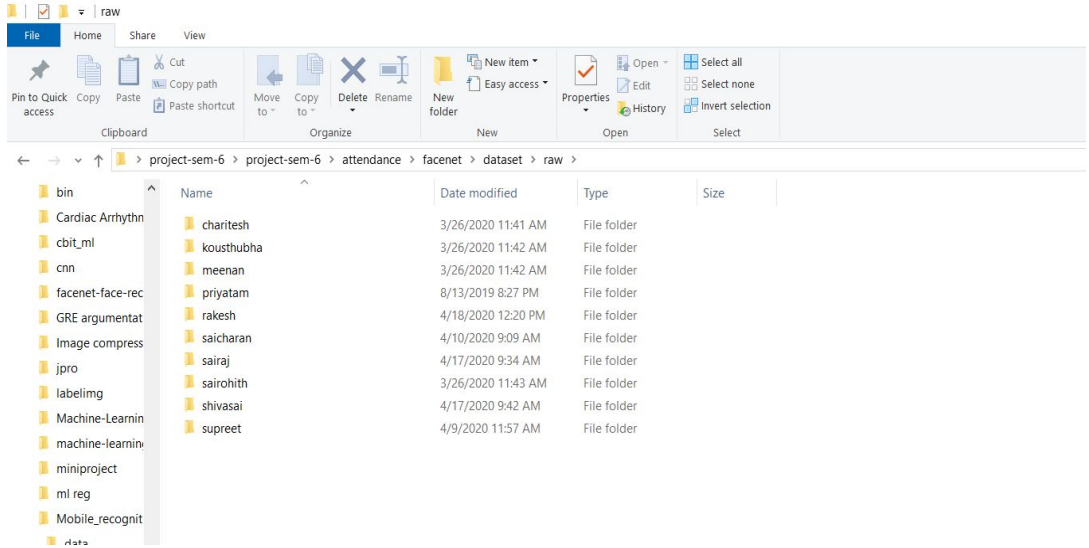
- Facenet is model developed by google, which uses state of the art methodology for face verification and detection purpose
- Unlike conventional CNN, facenet aims to improve the feature extraction by optimizing the embeddings fed to network
- Facenet runs on Inception-Resnet architecture, improving efficiency to 89%



Dataset

- We have built custom dataset, the dataset is essentially a folder, consisting of individual folders of the people that the system has to recognize





Flask

- **Flask** is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries.[3] It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. However, Flask supports extensions that can add application features as if they were implemented in Flask itself. Extensions exist for object-relational mappers, form validation, upload handling, various open authentication technologies and several common framework related tools. Extensions are updated far more frequently than the core Flask program

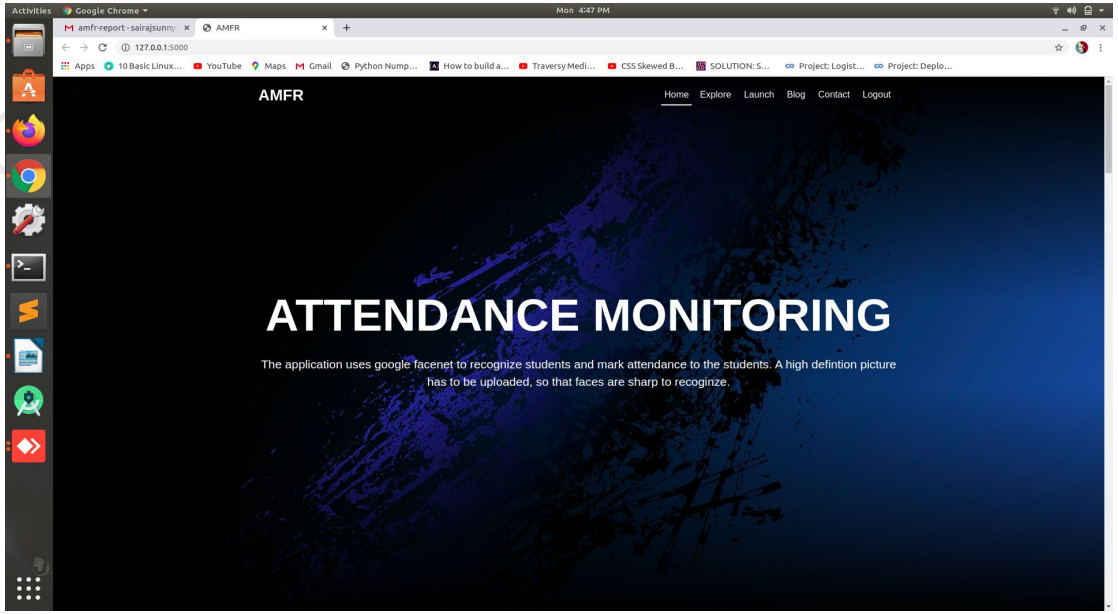
```
from flask_sqlalchemy import SQLAlchemy
from flask import Flask
from flask_bcrypt import Bcrypt
from flask_login import LoginManager

app = Flask(__name__)
app.config['SECRET_KEY'] = '59d4e34a8c7c47b529b7e73b461982c4'
app.config['SQLALCHEMY_DATABASE_URI'] = 'sqlite:///site.db'
db = SQLAlchemy(app)
bcrypt = Bcrypt(app)
login_manager = LoginManager(app)
login_manager.login_view = 'login'
login_manager.login_message_category = 'info'

from attendance import main
```

Backend: SQLite Database

- **SQLite** is a relational database management system (RDBMS) contained in a C library. In contrast to many other database management systems, SQLite is not a client–server database engine. Rather, it is embedded into the end program.
- SQLite is a popular choice as embedded database software for local/client storage in application software such as web browsers. It is arguably the most widely deployed database engine,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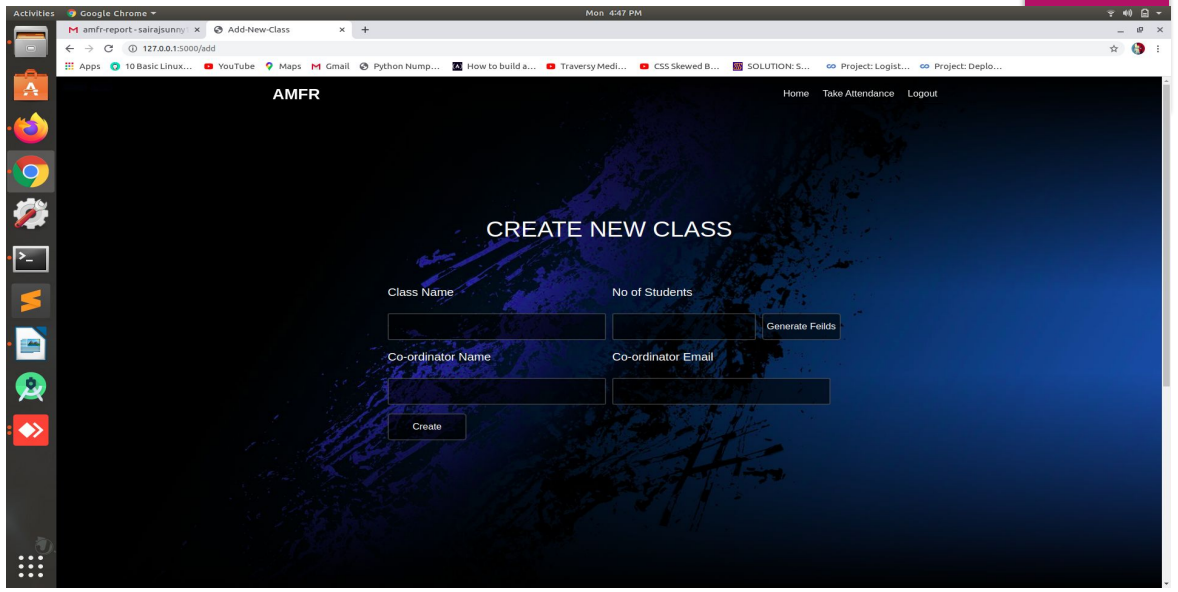
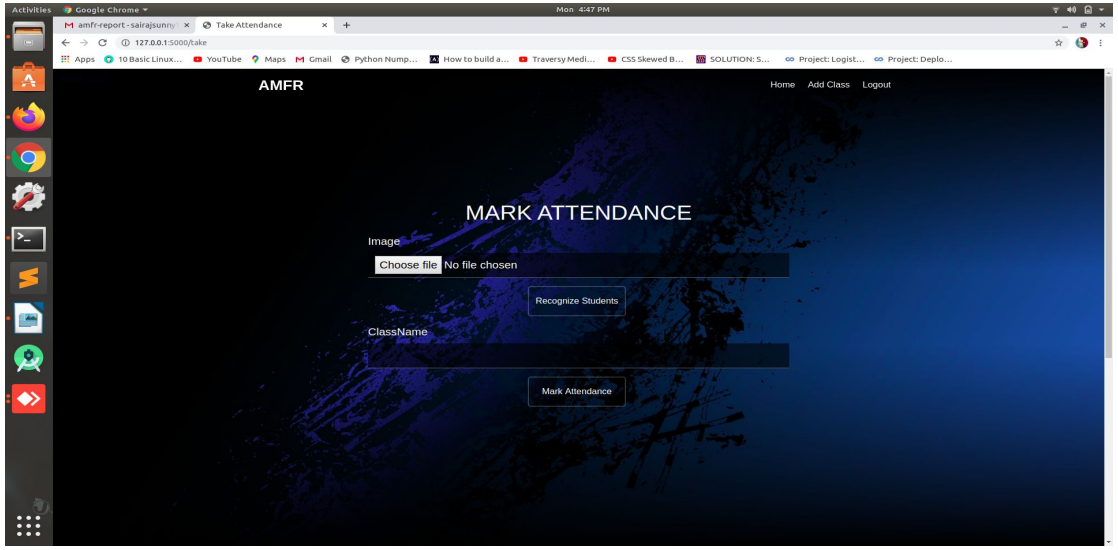
ATTENDANCE MONITORING
The application uses google facenet to recognize students and mark attendance to the students. A high defintion picture has to be uploaded, so that faces are sharp to recoginze.


AMFR
Home Take Attendance Logout
CREATE NEW CLASS
Class Name
No of Students
Generate Feilds
Co-ordinator Name
Co-ordinator Email
Create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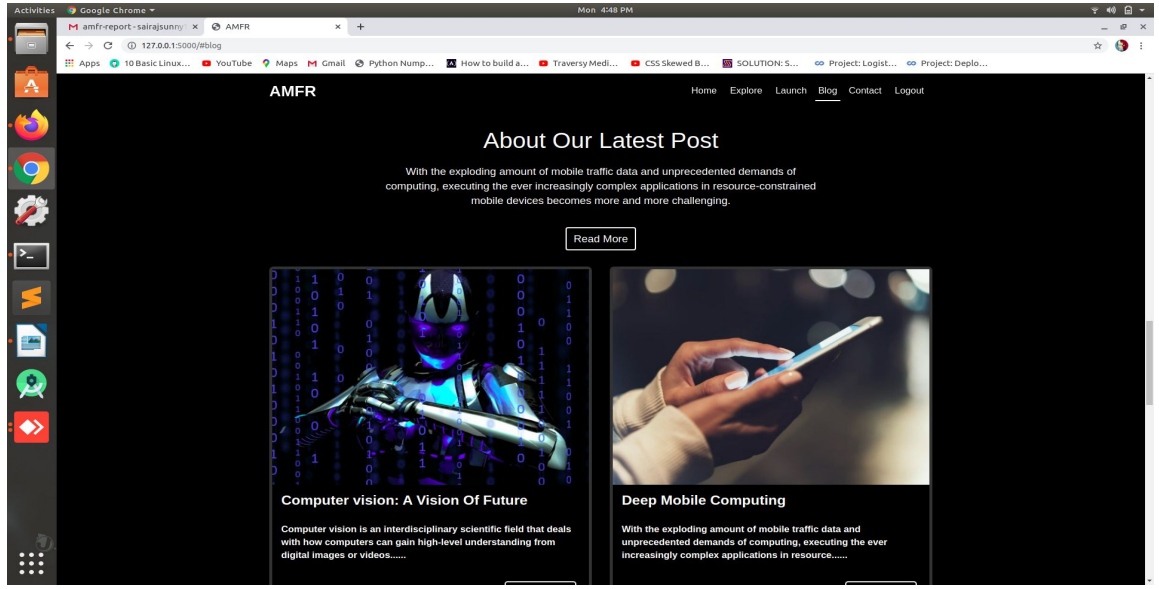
Home Add Class Logout
MARK ATTENDANCE
Image
Choose file No file chosen
Recognize Students
ClassName
Mark Attendance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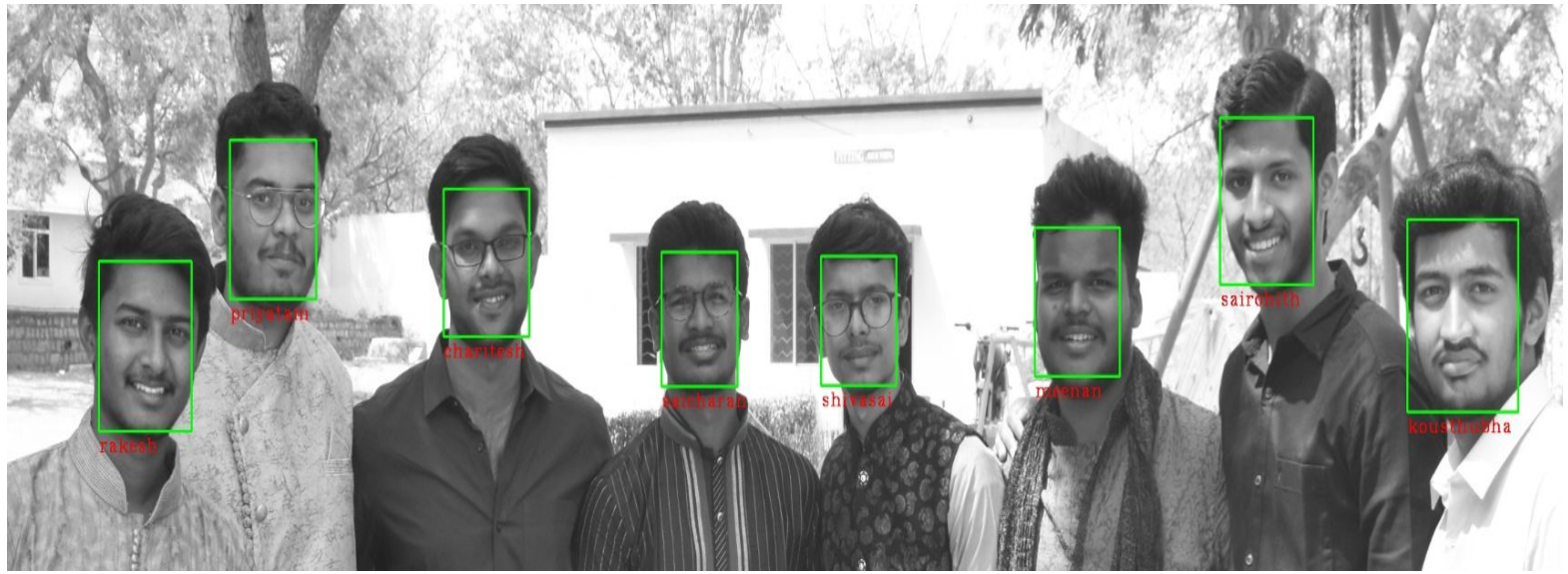
Result



	A	B	C	D	E
1	bhanu		Absent		
2	chanakya		Absent		
3	charitesh		Present		
4	dhanush		Absent		
5	varma		Absent		
6	deekshith		Absent		
7	gourav		Absent		
8	heamanth		Absent		
9	karthik		Absent		
10	kishore		Absent		
11	kousthubha		Present		
12	manideep		Absent		
13	nihash		Absent		
14	priyatam		Present		
15	rahulsai		Absent		
16	saikrishna		Absent		
17	meenan		Present		
18	sairaj		Absent		
19	sairohith		Present		
20	saicharan		Present		
21	sairaam		Absent		
22	santosh		Absent		
23	sathvik		Absent		
24	satyajit		Absent		
25	shivakumar		Absent		
26	siddharth		Absent		
27	sreedeep		Absent		
28	srinath		Absent		
29	nevas		Absent		
30	sujan		Absent		
31	supreet		Absent		
32	varun		Absent		
33	vishnu_g		Absent		

Conclusion:

- Through this project, we aim to deliver a facial recognition concept for monitoring attendance of students , making it easy and efficient to use.