BVRIT HYDERABAD College of Engineering for Women

Department of Information Technology

# FACE RECOGNITION BASED ATTENDANCE SYSTEM USING MACHINE LEARNING


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# Abstract

- Passwords were the only method available to identify individuals. Passwords became obsolete due to obtaining password information and hacking into accounts.
- The face recognition system is a high-speed and reliable technology. It is an advanced, automated, and sensible identification system that can identify a person by facial features.
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# Introduction

- The management of the attendance can be a great burden, if it is done manually, so the smart and auto attendance management system is being utilized.
- Face recognition has set an important biometric feature, which can be easily acquirable and is non-intrusive, Face recognition based systems are relatively oblivious to various facial expression.
- It is a part of biometric identification that extracts the facial features of a face, and then stores it as a unique face print to uniquely recognize a person.
- Face recognition based attendance system consists of two categories: face identification and verification.

# Problem Definition

- A facial recognition attendance system uses facial recognition technology to identify and verify a person using the person's facial features and automatically mark attendance.
- The software can be used for different groups of people such as employees, students, etc.
- The system records and stores the data in real-time and attendance will be marked if the detected face is found in the database.

# Literature Survey

| S.No | Title of the Paper | Autor(s) Journal Details | Description |
|---|---|---|---|
| 1. | Study and Analysis of Implementing a Smart Attendance Management System Based on Face Recognition Technique using OpenCV and Machine Learning | K. Mridha and N. T. Yousef | They used the Face Detection with OpenCV technique where the model compares the recording image with the existing images of the registered person and identify the person. |
| 2. | Real Time Face Recognition using Effective Supervised Machine Learning Algorithms | P. Nagaraj, Rajesh Banala and A.V. Krishna Prasad | They used a machine learning algorithm called Haarcascade classifier. |
| 3. | Deep Learning Convolutional Neural Network for Face Recognition | Rondik J.Hassan Adnan Mohsin Abdulazeez, | They did a research on different Face Recognition approaches and the datasets and algorithms that can be used |

# Proposed System

- Recognition of multiple faces in one screen.
- Marking attendance of multiple people at a time.

# Project Modules

- Face Detection
- Face Encoding
- Face Recognition
- Marking Attendance

# Implementation and Results

- Libraries used

```
import cv2
import numpy as np
import face_recognition
import os
from datetime import datetime
from datetime import date
import pandas as pd
```

# Implementation and Results

- Creating attendance directories

```
if not os.path.isdir('Attendance'):
    os.makedirs('Attendance')
if f'Attendance-{datetoday}.csv' not in os.listdir('Attendance'):
    with open(f'Attendance/Attendance-{datetoday}.csv','w') as f:
        f.write('Name, Roll, Time')
```

# Implementation and Results

- Features Extraction (Numerical Encodings)

```
def findEncodings(images):
    encodeList =[]
    for img in images:
        img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
        encode = face_recognition.face_encodings(img)[0]
        encodeList.append(encode)
    return encodeList
```

# Implementation and Results

- Face Recognition

```
while True:
    success, img = cap.read()
    imgS = cv2.resize(img, (0, 0), None, 0.25, 0.25)
    imgS = cv2.cvtColor(imgS, cv2.COLOR_BGR2RGB)

    facesCurFrame = face_recognition.face_locations(imgS)
    encodesCurFrame = face_recognition.face_encodings(imgS, facesCurFrame)

    for encodeFace, faceLoc in zip(encodesCurFrame, facesCurFrame):
        matches = face_recognition.compare_faces(encodeListKnown, encodeFace)
        faceDis = face_recognition.face_distance(encodeListKnown, encodeFace)
        print(faceDis)
        matchIndex = np.argmin(faceDis)
        if matches[matchIndex]:
            name = classNames[matchIndex].upper()
            print(name)
            y1, x2, y2, x1 = faceLoc
            y1, x2, y2, x1 = y1*4, x2*4, y2*4, x1*4
            cv2.rectangle(img, (x1, y1), (x2, y2), (0, 255, 0), 2)
            cv2.rectangle(img, (x1, y2-35), (x2, y2), (0, 250, 0), cv2.FILLED)
            cv2.putText(img, name, (x1+6, y2-6), cv2.FONT_HERSHEY_COMPLEX, 1, (255, 255, 255), 2)
            markAttendance(name)
```

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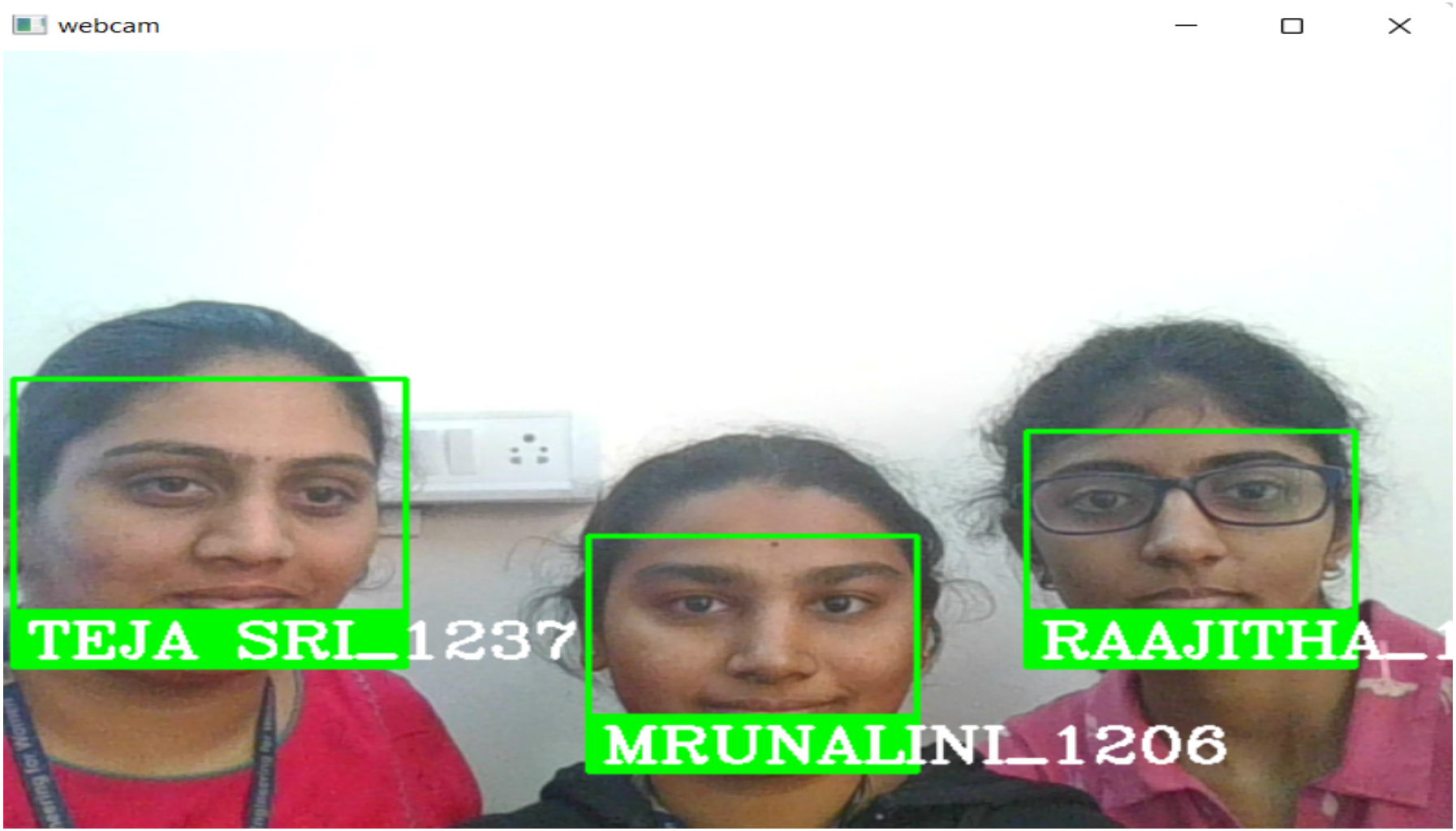
# Implementation and Results

- Marking attendance

```
def markAttendance(name):
    username = name.split('_')[0]
    userid = name.split('_')[1]
    current_time = datetime.now().strftime("%H:%M:%S")
    df = pd.read_csv(f'Attendance/Attendance-{datetoday}.csv')
    if username not in list(df['Name']):
        with open(f'Attendance/Attendance-{datetoday}.csv','a') as f:
            f.write(f'\n{username},{userid},{current_time}')
```

# Implementation and Results



# Implementation and Results

# Implementation and Results

Attendance > Attendance-17_12_22.csv

```
1    Name, Roll, Time
2    TEJA SRI,1237,14:29:10
3    MRUNALINI,1206,14:29:28
4    RAAJITHA,1210,14:29:33
```

# Performance Measure

- We used the library face_recognition which is built on deep learning techniques.
- This library gives the accuracy of 96% using a single training image

# Conclusion

- A multi facial recognition based attendance system uses facial recognition technology to identify and verify multiple faces using the person's facial features and automatically mark attendance.
- We have completed recording and storing the data in real-time and attendance will be marked if the detected face is found in the database.

# References


- K. Mridha and N. T. Yousef, "Study and Analysis of Implementing a Smart Attendance Management System Based on Face Recognition Technique using OpenCV and Machine Learning," IEEE, 2021.

- P. Nagaraj, Rajesh Banala and A.V. Krishna Prasad "Real Time Face Recognition using Effective Supervised Machine Learning Algorithms" CONSILIO, 2021.

- Rondik J.Hassan Adnan Mohsin Abdulazeez, "Deep Learning Convolutional Neural Network for Face Recognition: A Review," IJSAB, 2021.

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# THANK YOU