



# Pavan S

Final Project



Project Title

# Gender and Age Identification Using Deep Learning



# Agenda

- Introduction to Gender and Age Detection using Deep Learning
- Problem Statement and Objectives
- Overview of the Project
- Development Approach
- Algorithm Implementation and Deployment
- End Users and Target Audience
- Solution Benefits and Value Proposition
- Key Highlights of the Solution
- Modeling Techniques
- Wireframes Utilized in the Project
- Presentation of Results
- Citations and References

# Problem Statement

The project aims to develop a system for real-time gender and age detection using Deep Learning techniques. The goal is to accurately identify and classify faces in images or video streams, providing valuable insights for various applications such as targeted marketing, security, and demographic analysis.



# Project Overview

The project focuses on leveraging pre-trained models for face detection, age estimation, and gender classification. By combining these models, the system can detect faces, estimate the age group, and predict the gender of individuals in real-time. The integration of these components offers a comprehensive solution for facial analysis.

# System Development Approach

The development approach involves:


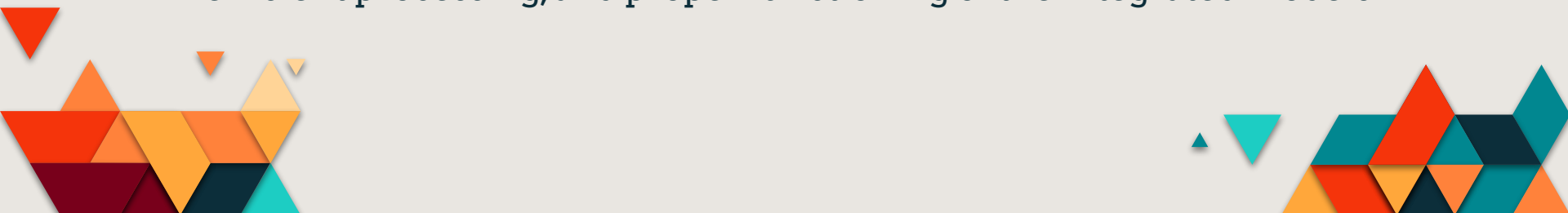
1. Utilizing OpenCV and Deep Learning models for face detection.
2. Implementing age and gender classification using pre-trained models.
3. Integrating the components to create a real-time gender and age detection system.
4. Testing and optimizing the system for accuracy and efficiency.



# Algorithm and Deployment

1. Create a face detection algorithm using OpenCV and Deep Learning models to identify faces in images or video frames.
2. Train the face detection model using pre-trained models for accurate detection of faces in varying conditions.
3. Extract face regions from detected faces and input them into age and gender classification models for predicting age groups and genders.
4. Convert the trained face detection, age estimation, and gender classification models into a format suitable for deployment using OpenCV's DNN module.



- 
- 
5. Integrate the models into a real-time system for processing images or video streams, ensuring efficient inference and accurate predictions.
  6. Adjust parameters such as confidence threshold and frame processing to optimize face detection, age estimation, and gender classification in real-time.
  7. Present the predicted gender and age group on detected faces, providing user-friendly visual feedback on the analysis results.
  8. Monitor the system during deployment to ensure accurate predictions, efficient processing, and proper functioning of the integrated models.



# End users

- Retailers for targeted advertising
- Security agencies for surveillance
- Entertainment industry for audience analysis
- Researchers for demographic studies

# Solution and Value Proposition

The solution offers

1. Real-time gender and age detection
2. Enhanced facial analysis capabilities
3. Improved insights for decision-making
4. Scalability and adaptability for various applications



# The Wow in Solution

The system's wow factor lies in its ability to accurately detect faces, estimate age groups, and predict gender in real-time. This enables quick and efficient analysis of individuals in diverse scenarios, providing valuable information for decision-makers.





# Modeling

The system employs pre-trained models for face detection, age estimation, and gender classification. These models are fine-tuned and integrated to create a robust solution for facial analysis



# Wireframes Used in Modeling

Wireframes were utilized to design the user interface for the system, showcasing the process of face detection, age estimation, and gender classification. These wireframes helped in visualizing the flow of information and interactions within the application.



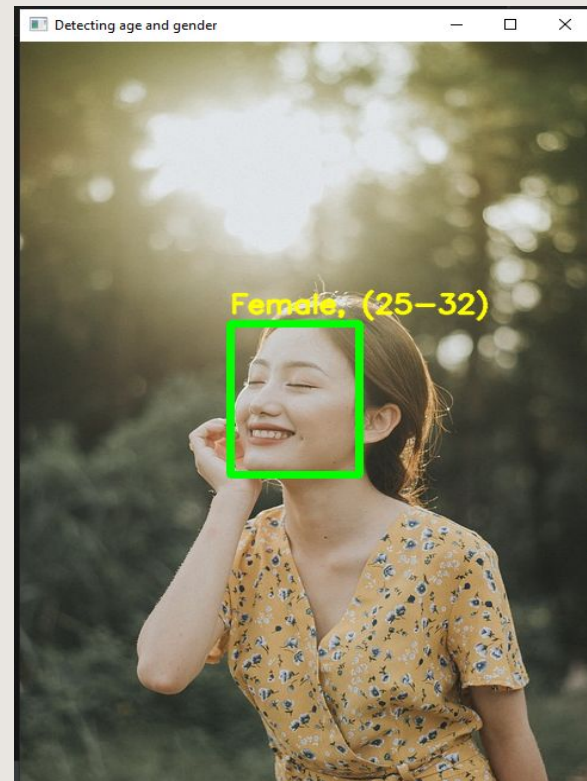
# Result

The system successfully detects faces, estimates age groups, and predicts gender with high accuracy. Real-time processing ensures swift analysis of individuals, making it a valuable tool for various industries and applications.



# Output

```
Gender_Age_detection.py 1 X
C:\Users\apsa> Gender_Age_detection.py highlightFace
1 import cv2
2 import argparse
3
4 def highlightFace(net, frame, conf_threshold=0.7):
5     frame_opencv_dnn = frame.copy()
6     frame_height = frame_opencv_dnn.shape[0]
7     frame_width = frame_opencv_dnn.shape[1]
8     blob = cv2.dnn.blobFromImage(frame_opencv_dnn, 1.0, (300, 300), [104, 117, 123], True, False)
9
10    net.setInput(blob)
11    detections = net.forward()
12    face_boxes = []
13    for i in range(detections.shape[2]):
14        confidence = detections[0, 0, i, 2]
15        if confidence > conf_threshold:
16            x1 = int(detections[0, 0, i, 3] * frame_width)
17            y1 = int(detections[0, 0, i, 4] * frame_height)
18            x2 = int(detections[0, 0, i, 5] * frame_width)
19            y2 = int(detections[0, 0, i, 6] * frame_height)
20
21    PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\apsa> python Gender_Age_detection.py --image C:\Users\apsa\girl1.jpg
```



# References

- OpenCV Documentation: <https://docs.opencv.org/>
- Deep Learning for Computer Vision by Adrian Rosebrock: <https://www.pyimagesearch.com/deep-learning-computer-vision-python-book/>
- Research papers on face detection and age/gender classification:
- "Joint Face Detection and Alignment Using Multitask Cascaded Convolutional Networks" by Kaipeng Zhang, Zhanpeng Zhang, Zhifeng Li, and Yu Qiao. [https://kpzhang93.github.io/MTCNN\\_face\\_detection\\_alignment/](https://kpzhang93.github.io/MTCNN_face_detection_alignment/)
- "Age and Gender Classification using Convolutional Neural Networks" by Gil Levi and Tal Hassner. [https://talhassner.github.io/home/publication/2015\\_CVP](https://talhassner.github.io/home/publication/2015_CVP)

