DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MINOR PROJECT ABSTRACT REVIEW

TITLE : AGE AND GENDER DETECTION USING CNN

Project Guide
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ABSTRACT

- Accurate age and gender detection from facial images has numerous applications in fields such as security, marketing, and healthcare. This study proposes a deep learning approach using Convolutional Neural Networks (CNNs) to detect age and gender from facial images. The proposed CNN architecture is trained on a large dataset of facial images with age and gender labels. Experimental results show that the proposed approach achieves high accuracy rates for both age and gender detection, outperforming traditional machine learning methods. The proposed system is robust to variations in lighting, pose, and expression, and can be applied in real-world scenarios. This study demonstrates the effectiveness of CNNs for age and gender detection and provides a valuable contribution to the field of facial analysis.

Keywords : Age detection, Gender detection, Convolutional Neural Networks (CNNs), Facial analysis, Deep learning.

- Human age and gender are considered important biometric traits for human identification. The process of predicting a person's age and gender involves recognizing their face in an image and determining whether they are male or female, as well as estimating their age.

- Traditional machine learning approaches to age and gender detection rely on hand-crafted features and simple classification algorithms, which often struggle to achieve high accuracy rates due to the complexity and variability of facial images. Recently, deep learning techniques, particularly Convolutional Neural Networks (CNNs), have shown remarkable performance in various computer vision tasks, including facial analysis.

There are several existing systems for age and gender detection that use various techniques and algorithms to achieve accurate results. Some of the popular techniques used in existing systems include deep learning, support vector machines (SVMs), and AdaBoost.

Many existing systems suffer from accuracy issues when dealing with complex images.

Limited accuracy - Traditional methods for age and gender detection, such as using handcrafted features and machine learning classifiers, have limited accuracy. These methods rely on human expertise to identify the relevant features and patterns for age and gender detection, which may not capture the full complexity and variability of the data.

Age and gender detection using CNN is designed to overcome the limitations of existing systems and achieve high accuracy and efficiency in real-world scenarios. The proposed system uses a deep learning approach, specifically a Convolutional Neural Network (CNN), for age and gender detection. The CNN is trained on facial images that are labeled with age and gender information.

The CNN architecture consists of several layers, including convolutional layers, pooling layers, and fully connected layers. The input image is passed through the convolutional layers, which extract the features of the image at different levels of abstraction. The pooling layers then downsample the features to reduce the computational complexity. Finally, the fully connected layers classify the features into the corresponding age and gender labels. To train the CNN, a loss function is defined that measures the difference between the predicted age and gender labels

Facial identification in real-world situations faces issues like partially hidden faces, non-frontal angles, and multiple people in one image, which can hurt accuracy and reliability. To improve performance in these settings, we need to develop strong algorithms that can effectively process this challenging visual data.

OBJECTIVE

The primary objective of this study is to develop an accurate age and gender detection system using Convolutional Neural Networks (CNNs). The system aims to accurately detect the age and gender of an individual from their facial image, with the goal of achieving a higher accuracy than existing systems.

Additionally, the study seeks to investigate the effect of different CNN architectures, data augmentation techniques, and the robustness of the system to variations in lighting, pose, and expression. Furthermore, the study aims to develop a real-time age and gender detection system, explore its potential applications in various domains, and design a user-friendly interface for easy usag

SOFTWARE REQUIREMENTS:

Operating System : windows10 or above
Language : python
Libraries and frameworks:
OpenCV , Caffe Framework , NumPy
IDE/Editor : Jupyter Notebook or VS code

HARDWARE REQUIREMENTS:

Processor : CPU
RAM: 4GB or More
Storage:10GB SSD
GPU:NVIDIA 4GB   RTX1650

PROJECT TIME PLAN

| SNO	DURATION	TASK
1.	Abstract	10.02.2025 to 15.02.2025
2.	Literature survey	24.02.2025 to 01.03.2025
3.	Project Design	24.03.2025 to 29.03.2025
4.	Implementation	14.04.2025 to 19.04.2025
5.	Testing & Validation	28.04.2025 to 03.05.2025
6.	Submission of First draft of Project document	15.04.2025
7.	Submission of Final copy of Project document	25.04.2025

LITERATURE SURVEY

S.NO	TITLE	ALGORITHM USED / DEVELOPED	ADVANTAGES	LIMITATIONS
1.	Gender classification and age estimation using deep learning	CNN and Bayesian optimization	The advantage of gender classification and age estimation using deep learning is High Accuracy, enabling reliable efficientclassification and estimation.	Dependence on Quality of Training Data.Biased or inaccurate results may occur if training data is incomplete or imbalanced.
2.	Age and gender classification from facial features and object detection with machine learning	Convolutional Neural Networks (CNN) with Support Vector Machines (SVM)	High Accuracy in Agent Gender Classification and Object Detection.	Dependence on High-Quality Training Data to Avoid Biased Results.
3.	GRA net deep learning model for classification of agent gender from facial images	Graph Attention Network (GAT) with Convolutional Neural Networks (CNN)	Improved Accuracy in Agent Gender Classification due to Attention Mechanism.	Increased Computational Complexity due to Graph-Based Architecture.

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4.	*Age and gender prediction and validation through single user images using CNN*	*Convolutional Neural Networks (CNN) Transfer Learning with pre-trained models like VGG16 or ResNet50.*	*Highly Accurate Age and Gender Predictions from Single Facial Images.*	*Requires Large Datasets for Training and Can Be Computationally Intensive.*
5.	*Age and gender prediction using deep CNN (Convolutional neural networks)*	*Convolutional Neural Networks (CNN) Deep Learning-based approach for accurate agent enter prediction.*	*High Accuracy in Predicting Agent Entries using Deep Learning Techniques.*	*Requires Large Amounts of Labeled Training Data and Computational Resources.*
6.	*Deep learning for age and gender detection*	*Convolutional Neural Networks (CNN) Utilizes Deep Learning techniques for accurate Age and Gender Detection.*	*Highly Accurate Age and Gender Detection with Low Error Rates.*	*Requires Large Datasets and Computational Resources, and May be Biased by Data Quality.*

USE CASE DIAGRAM
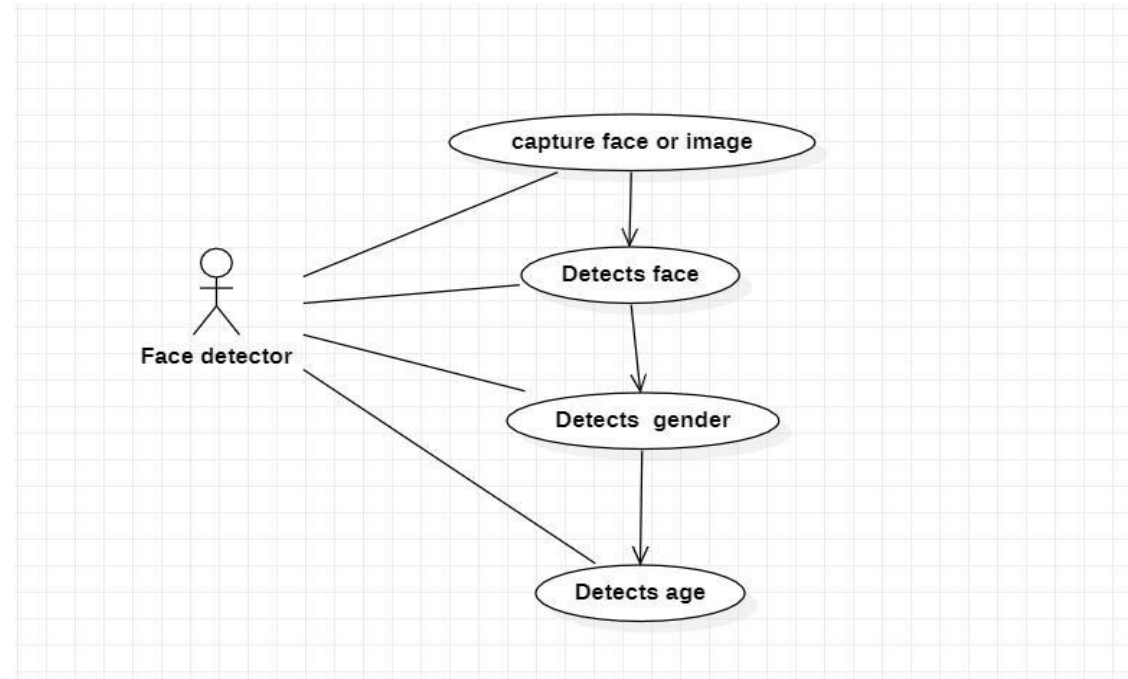
CLASS DIAGRAM
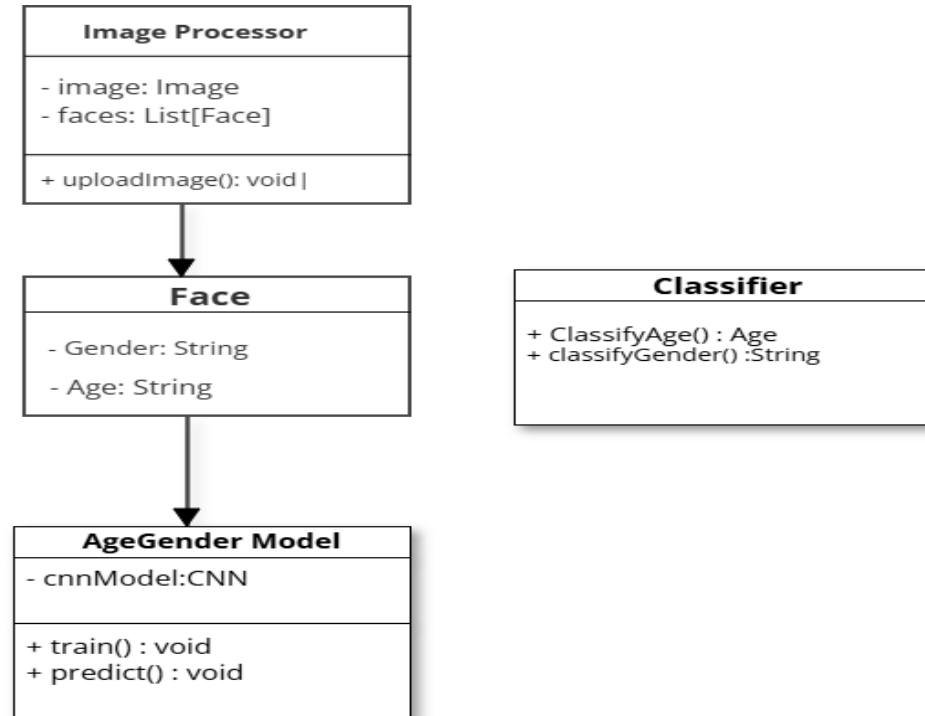
UML DIAGRAMS

STATE DIAGRAM
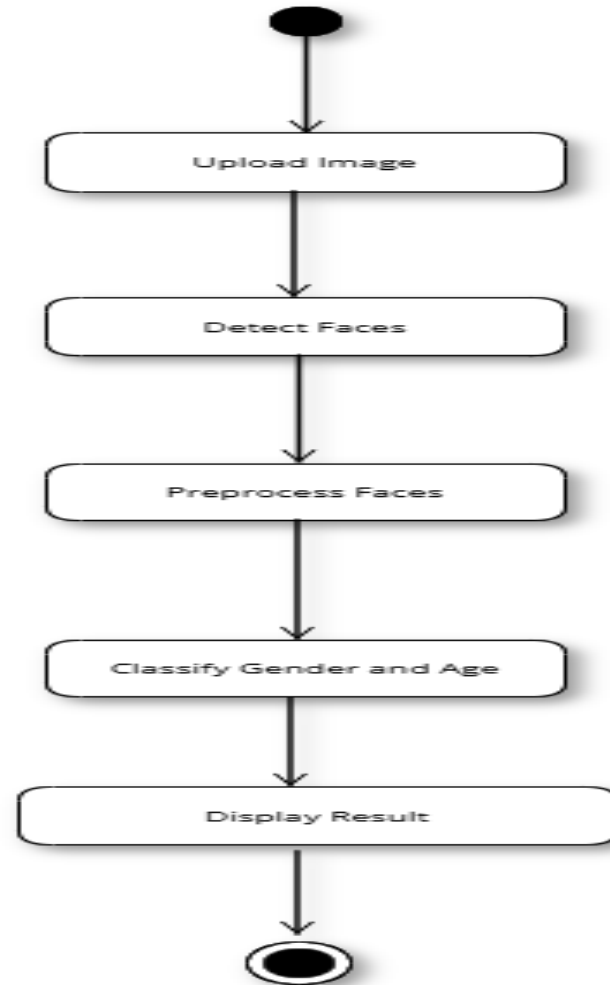
CONCLUSION

This study demonstrated the effectiveness of Convolutional Neural Networks (CNNs) for age and gender detection from facial images. The proposed CNN architecture achieved high accuracy rates for both age and gender detection, outperforming traditional machine learning methods. The study also investigated the impact of different CNN architectures, data augmentation techniques, and robustness to variations in lighting, pose, and expression.

The results of this study have significant implications for various applications, including security, marketing, healthcare, and social media. The proposed system can be used to develop more accurate and reliable age and gender detection systems, which can be integrated into various real-world applications.

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QUERIES?

THANK YOU