

Real-Time Age and Gender Recognition using Python and OpenCv

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Abstract: This project is developed based on Python & Opencv Algorithms. For a very long time, human identification and gender classification have been utilized in various organizations for ID cards, verification, security systems, medical field etc. The most significant characteristics derived from faces are the eyes, nose, mouth, brows and so on. These will be utilized in a variety of human computer interaction sectors. The first stage of identifying the age and gender is done through face detection from the image that is provided. Other than this, many other ways for face detection are utilized. Although many other methods work efficiently for identification, many of them may require human proficiency for a simpler task. The technique which is in this paper is simple and easy for human classification, which can be achieved by a webcam and a computer.

Keywords: Face Detection, Age & Gender Recognition, Opencv, Webcam, Caffe Model

I. INTRODUCTION

New algorithms are developed frequently for improving the face analysis tasks, including face recognition, age and gender classification etc. Human faces are the primary source for a lot of vital information such as identity, expressions, emotion, age, race etc. Human image processing is an exciting area of study with new developments happening continuously. Many real-world applications work on face analysis, such as access control systems, video surveillance, crowd analysis, gaming platforms etc. Human faces are rich in information about our personal characteristics. Facial features concentrate mainly on the nose, lips, eyes and brows for giving valuable information. The age and gender identification process works in different stages, such as face detection, pre-processing, feature extraction & classification and finally, the age and gender estimation. In the classification, the genders are classified into two, such as male or female. The age group is classified into child, young age, middle age & old age. As deep learning models are becoming more successful in various computer vision areas, research is being turned into deep neural network models for predicting age and gender. Convolutional Neural Network (CNN) showed great success in face recognition, image classification and object recognition. It is composed of a sequence of convolutional layers, each of which processes the output of the previous layer to generate a reliable and compact output. CNNs are said to be deep networks if the number of layers inside the network is relatively large. Upcoming sections will discuss in detail the process involved in age and gender analysis, discussion about the methodology, result of the analysis and finally the conclusion about the gender and age recognition system.

II. LITERATURE SURVEY

- 1. Zang et al. (2017):** Proposed a Residual network of Residual network (ROR) for age and gender prediction from unconstrained facial images. They used pre-training on ImageNet and fine-tuning on multiple datasets. Achieved high accuracy for gender classification but faced challenges with age estimation accuracy and model speed. Dataset issues include alignment variations and specificity to certain facial features.
- 2. Philip Smith et al. (2018):** Employed transfer learning with VGG19 and VGGFace models to predict age and gender. Used techniques like input standardization and data augmentation. Achieved high gender prediction accuracy with VGGFace but faced challenges with age recognition, especially for females. Dataset issues include noise and mislabeled data in MORP II dataset.

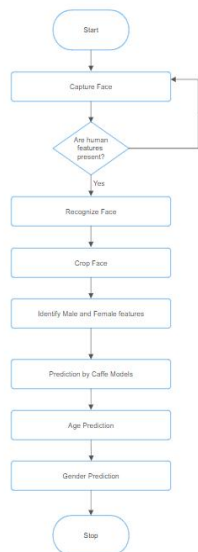
3. Ningning Yu et al. (2019): Proposed ensemble learning for age estimation using pre-trained deep CNNs on different image streams. Achieved improved performance with ensemble learning but faced challenges with dataset issues such as ambient illumination and complex backgrounds in IMDB-WIKI dataset.

4. Olatunbosun et al. (2020): Proposed a Lightweight Convolutional Neural Network (CNN) for real and apparent age estimation. Used image preprocessing and augmentation techniques to improve performance. Achieved lower training time with a lightweight CNN model and addressed challenges with noisy datasets like MORP II and APPA-REAL

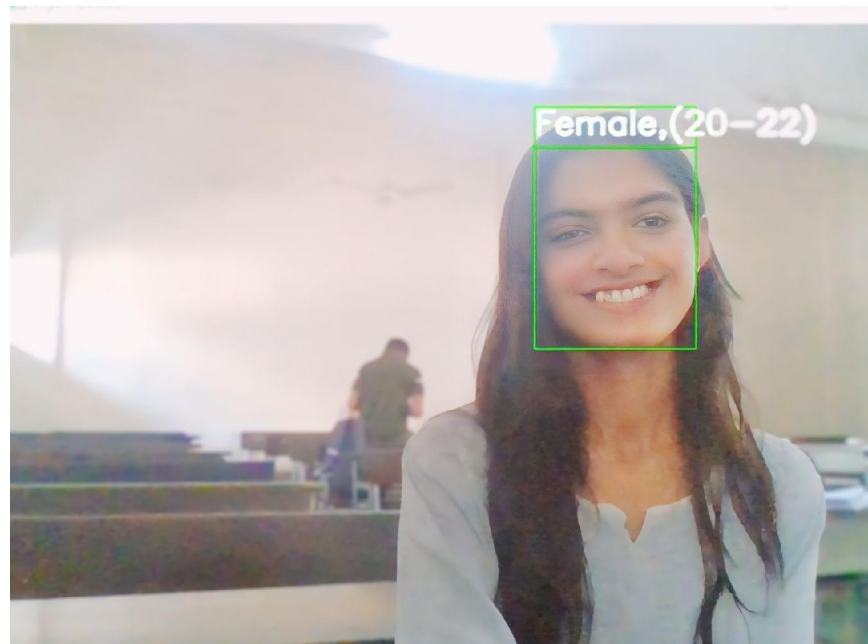
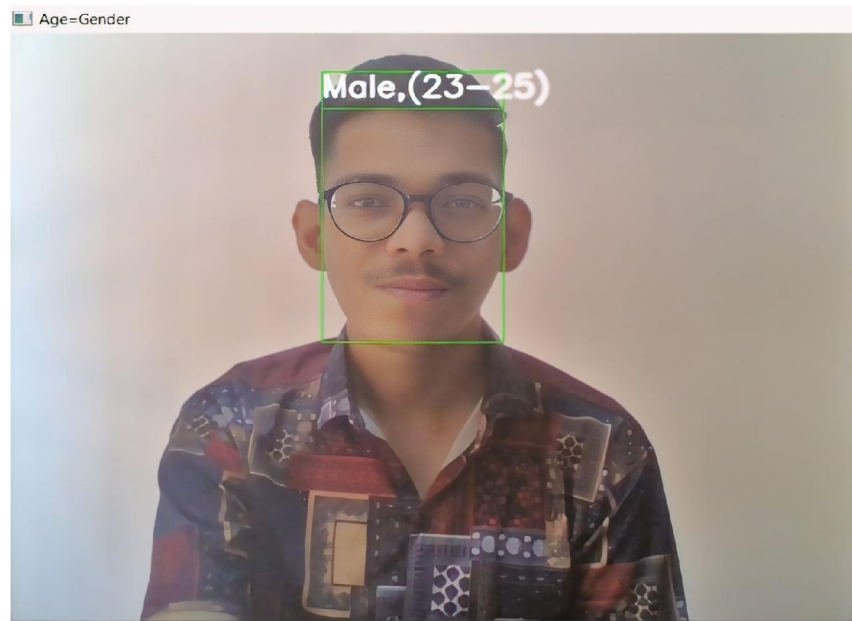
III. PROPOSED SYSTEM

- **Data Collection:** Gather a diverse dataset containing images with labels for both age and gender. Ensure the dataset is balanced across different age groups and genders to avoid bias.
- **Preprocessing:** Preprocess the images to standardize them for input into the model. This may include tasks like resizing, cropping, and normalization.
- **Age and Gender Classification:** Train separate models for age and gender classification. For age classification, the output layer can consist of neurons corresponding to different age groups (e.g., child, teenager, adult, senior). For gender classification, the output layer can have two neurons, one for male and one for female.
- **Model Training:** Split the dataset into training, validation, and testing sets. Train the models using the training set and validate them using the validation set to tune hyperparameters and prevent overfitting. Evaluate the models' performance using the testing set.
- **Model Evaluation:** Measure the performance of the models using metrics such as accuracy, precision, recall, and F1-score for both age and gender classification.
- **Deployment:** Once the models are trained and evaluated satisfactorily, deploy them in a real-world application. This may involve integrating the models into a software application or a web service that accepts images as input and provides age and gender predictions as output.
- **Continuous Improvement:** Continuously monitor the performance of the system in real-world scenarios and collect feedback. Use this feedback to iteratively improve the models, data collection process, and preprocessing techniques.
- **Ethical Considerations:** Ensure that the system is designed and implemented in a way that respects privacy and mitigates potential biases. Take steps to address issues related to fairness, transparency, and accountability

Flowchart



IV. RESULT



V. CONCLUSION

Age and Gender Analysis using Opencv gives us two sources of a lot of information which is gathered from sources. Human faces give us a lot of information for various purposes. In order to reach the correct audience, human age and gender classification is very important. Here we tried to do the same process with general equipment. The efficiency of the algorithm depends on many factors, but the main objective of this project is achieving the most accurate result in an easy and faster method.

VI. ACKNOWLEDGMENT

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