Age and Gender Prediction Using Transfer Learning

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Abstract- **Automatic age and gender prediction from face images has lately attracted much attention due to its wide range of applications in numerous facial analyses. We show in this study that utilizing the Caffe Model Architecture of Deep Learning Frame Work; we were able to greatly enhance age and gender recognition by learning representations using deep convolutional neural networks (CNN). We propose a much simpler convolutional net architecture that can be employed even if no learning data is available. In a recent study presenting a potential benchmark for age and gender estimation, we show that our strategy greatly outperforms existing state-of-the-art methods. Gender is still a central aspect of personality, and in social life it is still an important factor. Gender and age projections for artificial intelligence can be used in many areas, such as the development of smart human-machine interfaces, fitness, cosmetics, e-commerce, etc. The prediction of age and gender is an ongoing and active research question for individuals from their facial images. A number of approaches to solving this issue have been suggested by the researchers, but the criteria and actual performance are still insufficient. This paper proposes a mathematical approach to recognition patterns in order to solve this problem. The Convolution Neural Network (ConvNet / CNN) deep learning algorithm is used as a feature extractor in the proposed solution. CNN takes input images and assigns value to and can distinguish between various aspects / objects (learnable weights and biases) of the image. ConvNet needs much less pre-processing than other classification algorithms. While the filters are hand-made in primitive methods, ConvNet can learn these filters / features with adequate training. In this research, face images of individuals have been trained with convolution neural networks, and age and sex with a high rate of success have been predicted. More than 20,000 images are containing age, gender and ethnicity annotations. The images cover a wide range of poses, facial expresiii Transfer learning for gender and age prediction sion, lighting, occlusion, and resolution**

Key Word-: **Gender recognition, Age classification, Haar cascade, Caffe deep learning framework.**

INTRODUCTION

Human face may be a storehouse of various information about personal characteristics, including identity, emotional expression, gender, age, etc. the looks of face is affected considerably by aging. This plays a significant role in nonverbal communication between humans. Age and gender, two key facial attributes, play a really foundational role in social interactions, making age and gender estimation from one face image a very important task in machine learning applications, like access control, human-computer interaction, law enforcement, marketing intelligence and visual surveillance. Automatic gender classification and age detection may be a fundamental task in computer vision, which has recently attracted immense attention. It plays a very important role in an exceedingly wide selection of the real-world applications like targeted advertisement, forensic science, visual surveillance, content-based searching, human computer interaction systems, etc. for instance we are able to use this method to display advertisement supported different gender and different age bracket. This method may be employed in different mobile applications where there's some age restricted content in order that only appropriate user can see this content. However, gender classification and age approximation is still a difficult task. In addition, the machine learning strategies utilized by these

frameworks did not completely abuse the huge quantities of image cases and information accessible through the Internet keeping in mind the end goal to enhance characterization capacities. In this system, the endeavor is to close the gap between automatic face recognition abilities and those of age and gender classification techniques.

LITURATURE SURVEY

• G. Guo and G. Mu, "Human age estimation: what is the influence across race and gender?" in 2010 IEEE Computer Society Conference on Computer Vision and Pattern Recognition-Workshops, pp. 71–78, San Francisco, CA, USA, 2010.,this paper, In recent times, nutrition recommendation system has gained increasing attention due to their need for healthy living. Current studies on the food domain deal with a recommendation system that focuses on independent users and their health problems but lack nutritional advice to individual users. The proposed system is developed to suggest nutritional food to people based on age and gender predicted from their face image. The designed methodology preprocesses the input image before performing feature extraction using the deep convolution neural net4 Transfer learning for gender and age prediction work (DCNN) strategy. This network extracts D-dimensional characteristics from the source face image, followed by the feature selection strategy. The face's distinctive and identifiable traits are chosen utilizing a hybrid particle swarm optimization (HPSO) technique. Support vector machine (SVM) is used to classify a person's age and gender. The nutrition recommendation system relies on the age and gender classes. The proposed system is evaluated using classification rate, precision, and recall using Adience dataset and UTKface dataset, and real-world images exhibit excellent performance by achieving good prediction results and computation time.

• Koichi Ito, Hiroya Kawai, Takehisa Okano and Takafumi Aoki, "Age and Gender Prediction from Face Images Using Convolutional Neural Network" in Proceedings of APSIPA Annual Summit and Conference 2018.This paper state that Attribute information such as age and gender improves the performance of face recognition. This paper proposes an age and gender prediction method from face images using convolutional neural network. Through a set of experiments using public face databases, we demonstrate that the proposed method exhibits the efficient performance on age and gender prediction compared with conventional methods.

 • Kyoungson Jhang, Junsoo Cho, "CNN Training for Face Photo based Gender and Age Group Prediction with Camera" in proceedings of 2019 International Conference on Artificial Intelligence in Information and Communication. this paper explained that CNN for camera-based age and gender prediction is usually trained with RGB color images. However, it is difficult to say that CNN trained with RGB color images always produces good results in an environment where testing is performed with camera rather than with image files. With experiments, we observe that in camera-based testing CNN trained with grayscale images shows better gender and age group prediction accuracy than CNN trained with RGB color images.

AIM & OBJECTIVES

• To recognize Human's face contains features that can be helpful in determining the identity, ethnicity, gender, age and emotions of people. We propose a multi-task learning framework to jointly predict the age and gender of individuals from their face images.

• To develop an ensemble of attentional and residual networks, which outperforms both individual models. The attention layers of our model learn to focus on the most important and salient parts of the face.

• We further propose to feed the predicted gender label to the age prediction branch, and show that doing this will improve the accuracy of age prediction branch.

• With the help of the attention mechanism, we can explain the predictions of the classifiers after they are trained, by locating the salient facial regions they are focusing on each image.

MOTIVATION

The increasing demand of smart security systems has enhanced the demand for the proper identification and verification of a person. In this context, accurate estimation of age as well as proper identification of gender is highly significant. Therefore, in this work, we have implemented two separate methods with satisfactory runtime and efficiency to estimate both human age and gender using facial images. In recent years, age and gender predictions have been applied to various applications; they not only provide interesting features in mobile applications but also enable reliable mechanisms in security systems.
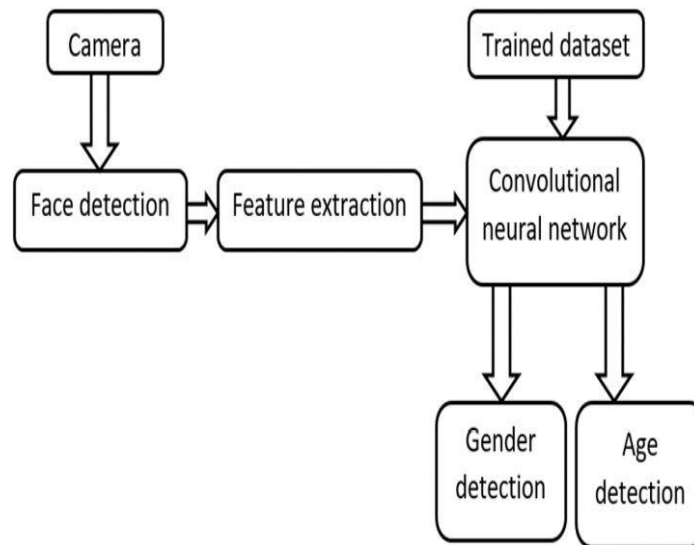

SYSTEM ARCHITECTURE

Fig -1: System Architecture Diagram

APPLICATION:
• In Hospitals.
• In Organizations.
 • Research

FUNCTIONAL & NON-FUNCTIONAL REQUIREMENTS
Functional requirements:
 • The System should be able to retrieve the results stored on database by using quick retrived process.
• The system application of modules must able to encrypt the data and decrypt it whenever needed..
Non-functional Requirements:
• There should be minimal lag between taking of the processing and result
• The processing should be as efficient with maximum accuracy.
 • The system should give valid result for positive as well as negative test cases.

Functional requirements
• Registration
• User Login
• Creation of database: Users Mandatory Information
Design Constraints:
• Database
• Operating System
• Web-Based Non-functional Requirements
Security:
• User Identification
• Login ID
• Modification
Performance Requirement:
• Response Time
• Capacity
• User Interface

- Maintainability
- Availability

SYSTEM REQUIREMENTS
Software Used:
- Python 3.9.0 or above, Kaggle and PyCharm

Hardware Used:
- I3 processor or above
- 150 GB Hard Disk or above
- 4 GB RAM or above

CONCLUSION
The model proposed was developed very carefully and error-free while being efficient. During this research, we proposed a model to estimate people's age by feeding the CNN image dataset, a deep learning algorithm and trained in broad database facerecognition. In all, we think that the accuracy of the model is decent and better than many already existing model, but can be further improved by using more data , data increase and better network architecture. The project model also predicts the age of the image provided with little slip and angle issue.The completely automated face recognition program was not sufficiently reliable to achieve high accuracy of recognition. It was mainly due to the fact that even a slight invariance to the size, rotation or shift errors of the segmented facial image did not occur in the face recognizing subsystem

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