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Gender and Age Detection Using Naive Bayes Algorithm

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ABSTRACT: In this Paper has worked on a technique for age and gender classification using python algorithm Human identification and classification are being utilized in various field for a very long time. Although these already built methods works efficiently, the hardware, software and human proficiency requirement are way too demanding for several simpler task which may or may not require a professional efficiency. Facial analysis from images has gained a lot of interest because it helps in several different problems like better ad targeting for customers, better content recommendation system, security surveillance, and other fields as well. Age and gender are a very important part of facial attributes and identifying them are the very basic of facial analysis and a required step for such tasks. Many companies are using these kinds of tools for different purposes making it easier for them to work with customers, cater to their needs better and create a great experience for them. It is easier to identify and predict needs of people based on their gender and age. Not everyone ages the same and it all depends on genetics and how well they care for their skin and body, we also often associate balding and white hairs with aging but it is very different for different people. Similarly, we associate long hairs and jewelry with women but it is different in many cases. So we can say that it is not such an easy task. This task especially age detection is a subjective matter and solely based on looks and appearances and can vary widely. Our Project Result is 98% which compare to Existing system 3% more.

KEYWORDS: Detection, Age identification, Gender Identification

I. INTRODUCTION

Human Classification is an age-old procedure and being done in various fields and technology such as biometrics, forensics sciences, Image processing, Identification system, etc. With the development of Artificial Intelligence and techniques such as Neural Network and Deep Learning, it has become increasingly easier to classify human. These new technologies help identification, classification of Individuals without the need of another professional or Individual records. Also Being immensely fast, these technologies can classify millions of individuals way faster than a professional. Human Facial Image Processing provides many clues and cues applicable to industries such as security, entertainment, etc . Human Face can provide immense amount of information like their emotional state, slightest agreement or disagreement, irony or anger, etc. This is the reason why faces have been long research topic in psychology . This data (or in our case digital data) is very valuable as they help recognition, selection or identification of individual according to the requirement. Age and Gender Detection can alone provide a lot of information to places such as recruitment team of organizations, Verification of ID cards, example: Voter ID cards which millions of individual uses to cast their vote at the time of election, etc. Human Facial Image processing eases the task of finding ineligible or counterfeit individuals.

II. LITERATURE SURVEY

A new architecture for face image classification named unsupervised CNN was introduced by S. U. Rehman et al. A CNN that handles multitask (i.e. Facial detection and emotional classification) is made by merging CNN with other modules and algorithms. A hybrid deep CNN and RNN (Recurrent Neural Network) model was introduced by N. Jain et al.

. This model aims to improve the overall result of face detection. MI Facial Expression and JAFFE dataset were used to evaluate the model. A convolutional network architecture was proposed by G. Levi et al. that classified the age with small amounts of data. The Audience Benchmark was used to train the model. A system in which a real time automatic facial expression system was designed was proposed by S. Turabzadeh et al. It was implemented and tested on an embedded device which could be the first step for a specific facial expression recognition chip for a social robot. MATLAB was first used to build and simulate the system and then it was built on an embedded system. The hardship of performing automatic prediction of age, gender and ethnicity on the East Asian Population using a Convolutional Neural Network (CNN) was explored by N. Srinivas et al. . A fine-grained ethnicity has predictions based on a refined categorization of the human population (Chinese, Japanese, Korean, etc.). Previous results suggest that the most critical job is to predict the fine-grained ethnicity of a person, followed by age and lastly gender. An automated recognition system for age, gender and emotion was presented by A. Dehghan et al. that was trained using deep neural network. At the ImageNet LSVRC-2010 contest, A. Krizhevskyyetal. presented a paper which suggested segregation of 1.2 million images into 1000 different categories with the help of a deep Convolutional neural network. The results which were obtained suggested that supervised learning can deliver exceptional accuracies. Some datasets have annotations on the face images which are not considered to be of any use for face recognition. Some papers have also used RNN but it is not applicable for our project as the RNN takes text or speech as an input whereas we required an image to be as the input. Hence, CNN is chosen over RNN for the sake of our project. Some papers also suggest the use of unsupervised CNN, but, for this project supervised learning is more appropriate. The UTKFace dataset is used as dataset for the project.

NEED OF THE PROJECT:

Humans are capable of determining an individual's gender relatively easily using facial attributes. Although it is challenging for machines to perform the same task, in the past decade incredible strides have been made in automatically making prediction from face. The project identifies or detects the gender from the given face. The tools used programming language like Python. The project has been motivated by problems like lack of security, frauds, child molestation, robbery, criminal identification.

PROBLEM STATEMENT :

The number of crimes has been increasing daily at a much faster rate. It has become a necessity to identify criminals as soon as possible. The traditional way of identification is a slow process while the proposed approach can be used to counter terrorism by identifying the features at a much faster rate. The project can also be used to overcome the frauds that can take place during voting i.e. can be used for voter identification. The old generation has the difficulty to operate computers with ease. This bridge can be lessened by improving Human-Computer Interaction (HCI). The child molestation cases can be tackled at a faster rate by comparing school surveillance camera images to know child molesters and the same can be used for verifying the court records thereby minimizing victim trauma. Similarly, it can also be used for surveillance at banks and residential areas. The technologies used in the project are Machine Learning - supervised, Image Processing - Digital images of the face region, Deep Learning - Convolution Neural Network and Deep Learning - Tensor Flow. Supervised learning is a machine learning algorithm wherein the input is mapped to the output with the help of training data consisting of input output pairs. TensorFlow, an open source library, is used for mathematical computation, dataflow programming and various machine learning applications. TensorFlow computations are expressed as stateful dataflow graphs. These arrays are referred to as tensors. Convolutional Neural Network (CNN) as one of the most prevalent algorithm has gained a high reputation in image features extraction.

III. PROPOSED SYSTEM

There are many methods we can use to solve this problem. They have proven to be most effective when dealing efficient, accurate architectures for these tasks and aim to extend their approaches in order to improve results. increasing the depth of the network, and modifying the level of dropout used. These modifications actually ended up causing system performance to decrease (or at best, stay the same). This verified suspicions I had that the tasks of age and gender classification are more prone to over-fitting than other types of classification. age and gender recognition to take advantage of the gender-specific age characteristics and age specific gender characteristics. This stemmed from the observation that gender classification is an inherently easier task than age classification, due to both the fewer number of potential classes

and the more prominent intra-gender facial variations. By training different age classifiers for each gender I found that I could improve the performance of age classification, although gender classification did not see any significant gains.

Advantages:

- The system should be able to classify a face into a set of age and gender classes.
- The system should be configurable in terms of age classes used.
- Evaluate currently available models for both face detection and age/gender classification.
- Create a system integrating the identified best available models.
- Evaluate the failing outputs of the integrated models in order to find an underlying reasons for such failures.
- Adapt the system to overcome the identified failing outputs to improve the classification accuracy.

IV. IMPLEMENTATION PROCEDURE

Face Processing

It can start its processing using Convolutional Neural Network or CNN. It is a type Deep Neural Network which is mostly used for Image processing and NLP. The CNN will carry out the testing training phase and will give different prediction.

Face Detection

Face recognition system or facial image processing system to work properly face detection needs to be implemented properly. A thorough survey can be found in there are several natural (lighting, pose angle, face marks) as well as digital (noise, glitches) variation imposed while detecting a face in a frame. Difficulties of human face recognition lie in the following two properties of human face as a pattern: number of patterns, that is, faces to be classified is tremendous, maybe infinite almost all patterns are very similar. We have used audience dataset of all the different type of variations to fix this issue and increase the efficiency of the algorithm. The audience set will also act as benchmark for Gender Detection and Age Classification in our neural network. All the photos have been collected from Creative Common (CC) distribution license.

Gender Prediction

They have framed Gender Prediction as a classification problem. The output layer in the gender prediction network is of type softmax with 2 nodes indicating the two classes “Male” and “Female”.

Age Prediction

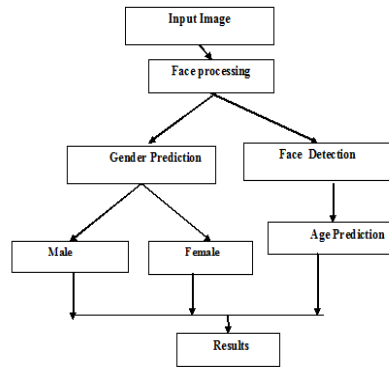
Age Prediction should be approached as a Regression problem since we are expecting a real number as the output. However, estimating age accurately using regression is challenging. Even humans cannot accurately predict the age based on looking at a person. However, we have an idea of whether they are in their 20s or in their 30s. Because of this reason, it is wise to frame this problem as a classification problem where we try to estimate the age group the person is in. For example, age in the range of 0-2 is a single class, 4-6 is another class and so on.

The Audience dataset has 8 classes divided into the following age groups [(0 – 2), (4 – 6), (8 – 12), (15 – 20), (25 – 32), (38 – 43), (48 – 53), (60 – 100)]. Thus, the age prediction network has 8 nodes in the final softmax layer indicating the mentioned age ranges.

Results

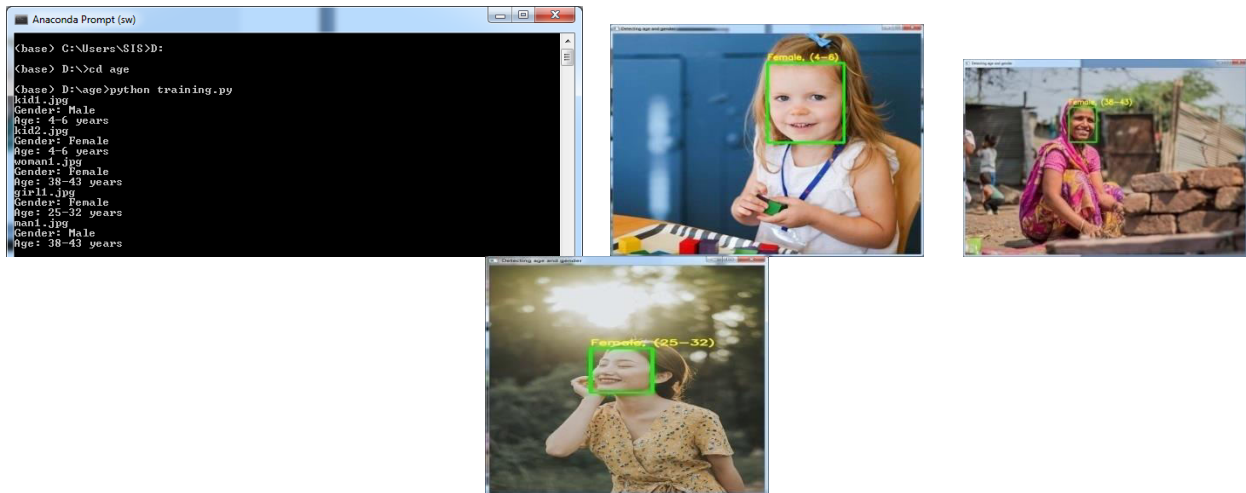
this project to predict both Gender and Age to high level of accuracy. Next, we wanted to do something interesting with this model. Many actors have portrayed the role of the opposite gender in movies.

Methodology

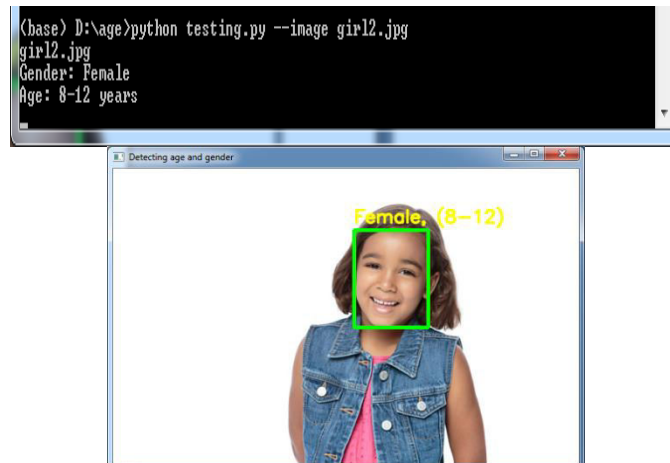


V. RESULT

Training Sample :



Testing :



VI. CONCLUSION

"Human Age and gender classification" are two of the many important information gathering resource from and individual. Human faces provide enough data which may be used for many purposes. In order to reach the correct audience human age and gender classification is very essential. Here we tried to do the same process but with general equipment. The efficiency of the algorithm depends on several factor but the main motif of this project is being easy and faster while also being as accurate as possible. Work is being done to the improve the efficiency of the algorithm. Some future improvements include discarding the face like non-human objects, more datasets for people belonging to different ethnic groups and more granular control over the workflow of the algorithm.

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