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ABSTRACT

Automatic gender, age and emotion recognition have relevant to an extension of its usage in various software and hardware, particularly because of the growth of online social networking websites and social media. The advertisements can be specialized based on the age and the gender of the person on the phone. It also can help identify suspects in criminal cases or at least it can minimize the number of suspects. A Convolution Neural Network is a deep neural network (DNN) widely used for the purposes of image recognition and processing and NLP. A convolution neural network architecture is built and the model is trained for gender, age and emotion recognition from images. An android application can be developed implementing the age, gender and emotion recognition. With the phone capturing photos and the frames are pre-processed and fed to the model to accomplish this task. The prediction is displayed accordingly.

CONTENT

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Facial analysis systems can ultimately change the way we live. Allied to Artificial Intelligence, it can provide personal assistance in every aspect of life. It can estimate our mood from the start of the day, connect itself to our habits and other factors. It can provide the perfect meal for the moment, the best music to accompany that meal, and the perfect outfit linked to the weather prediction. Machines will be capable of taking care of the uninteresting part of life. There are several real-world applications including security and video surveillance, electronic customer relationship management, biometrics, electronic vending machines, human-computer interaction, and entertainment. Deep Learning and Convolutional Neural Networks are a hot-topic in the field of Machine Learning. Many breakthroughs are being reached every other day. Being a part of that is what motivates us to develop this work. Mobile phones are already a huge part of our lives, and combining them with the power of deep learning can create user experiences that delight and impress users. There is no proper android application implementing facial recognition combining gender, age, and emotion of a human. Therefore, we have chosen to address this problem.

CHAPTER 2

LITERATURE SURVEY

1. Detection of Gender, Age and Emotion of a Human Image using Facial Features

In paper one, we get to study the recent research on FER, that allowed us to know the latest developments in this area. They have described different architectures of CNN and CNN-LSTM recently proposed by different researchers, and presented some different databases containing spontaneous images collected from the real world and others formed in laboratories, in order to have and achieve an accurate detection of human emotions. They also presented a discussion that shows the high accuracy rate obtained by researchers that is what highlights that machines today will be more capable of interpreting emotions, which implies that the interaction between human and machine becomes more and more natural. The main motive of this paper is to develop an automatic age and gender estimation method towards human faces which will continue to possess an important role in computer vision and pattern recognition. Apart from age estimation, facial emotion recognition also plays an important role in computer vision. Non-verbal communication methods such as facial expressions, eye movement and gestures are used in many applications of human computer interaction.

a) The IMDB-WIKI dataset which is the largest dataset with real age and gender annotations.
b) A novel regression formulation is used with deep classification followed by expected value refinement.
c) The DEX system, which is the winner of the LAP 2015 challenge on apparent age estimation.

2. Facial emotion recognition using deep learning: review and insights

In paper two, the automatic FER task goes through different steps like: data processing, proposed model architecture and finally emotion recognition. The preprocessing is an important step, that consist several techniques such as resized and cropped images, normalization spatial and intensity pixels, and the data. Three CNN with same architecture where each one detects a part of the face such as eyebrow, eye, and mouth. Before introducing the images into CNN, they go through

the crop stage and the detection of key-point facial. The iconic face obtained combined with the raw image was introduced into second type of CNN to detect facial expression. Researchers in this field are interested in developing techniques to interpret, code facial expressions and extract these features in order to have a better prediction by computer. With the remarkable success of deep learning, the different types of architectures of this technique are exploited to achieve a better performance.

3. Age, Gender Prediction and Emotion recognition using Convolutional Neural Network

In paper three, we get to study that the major role in every person's life is emotions. Emotions reflects how a person feels and the mood we are in at different situations what we encounter in our days. So, here we can see how the neutral networks take part in detection of our age, gender, and emotions. The success in CNN architecture and its capability to detect and compile is more efficient. There are many extraction techniques which helps in facial identification based on geometric, template, appearance etc. through the color using the methods like genetic algorithms technology. The convolutional layers are the most basic and important steps CNN's. Along with this the wide residual network which is the upgradation of original residual networks which helps in improving the network depth and accuracy. For each emotion and gender, A separate single layer had to be used, but here the multi-task learning comes into picture where the age and gender are estimated at once using the single CNN. IN this way, both age and gender share a set of layers which are projected as one single layer and produced as single output. The conventional method of neural networks is used for detecting the emotion. The accuracy of the emotion detection has reached its best using the CNN's. This paper produced unique way of compiling both age gender predictions with the emotion recognition which is of a great usage in future tech.

CHAPTER 3

PROBLEM DEFINITION

The main motive is to develop an age and gender estimation method towards human faces which will continue to possess an important role in computer vision and pattern recognition. Apart from age estimation, facial emotion recognition also plays an important role in computer vision. This implementation proposes a new framework of Convolutional Neural Network for the simultaneous tasks of age estimation, gender recognition and emotion recognition on face images.

CHAPTER 4

SYSTEM REQUIREMENTS SPECIFICATION

Hardware Requirements:

1. CPU Intel Pentium 2 or higher.

2. Cores Minimum dual core.

3. Memory 8 GB or higher.

4. Hard Disk space 100 GB or higher.

Software Requirements:

1. Python

2. Pandas And Numpy

3. Keras

4. TensorFlow

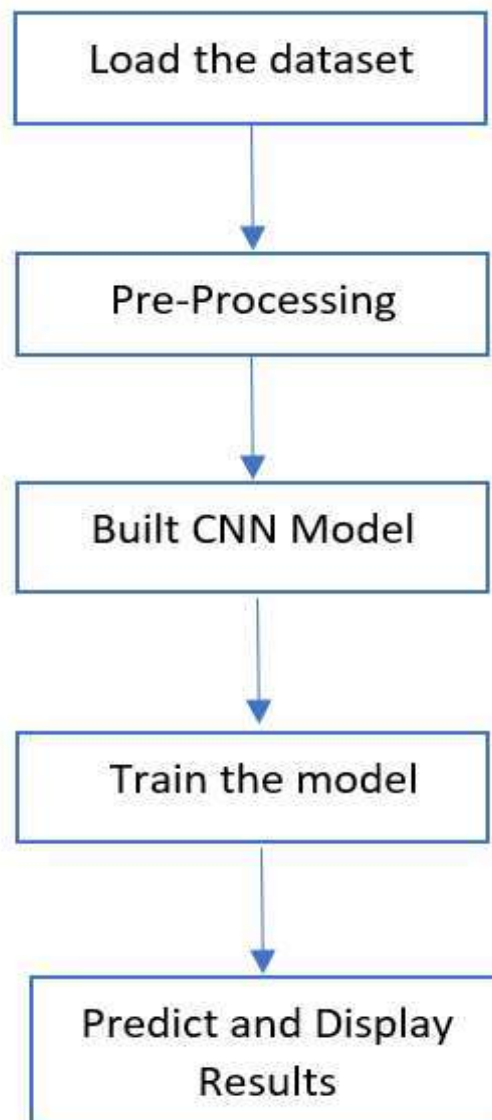5. SeaBorn

CHAPTER 5

SYSTEM DESIGN

6

Figure 1: System Design

Data Collection

- Web crawler.

- Data for the website Udemy is already available from Kaggle.

- Collection of Computer Science courses.

Preprocessing

- Converting the image to greyscale.

- Applying Anti-Aliasing on the images.

- Normalizing the images.

Building and Training the model

- Adding Convolution neural layers

- Add Relu Activation Function

- Train the model with the dataset

Display the Results

- Model predicts the age and gender

CHAPTER 6

CONCLUSIONS AND FUTURE WORKS

The proposed framework is capable of age estimation and gender recognition simultaneously in a fast and efficient way. Misclassifications might occur because people from different ethnic groups have different facial characters, which might slightly alter the actual age from the predicted age. The use of glasses might affect the age classification by interfering with the features learned. In our research, we have also learnt that a company like Apple Inc., is also working on a model to help curb emotional illness by using a camera to detect behaviour and facial expressions. Thinking about the future, it would be interesting to implement this model in a live business service. The project can also be applied in social media and content streaming services to customize advertisements and content to the various users. In the field of e-commerce, the applications framework can help in identifying the various products that one can order to help them feel better. Also, in the field of surveillance, this application can be linked up to a CCTV system and can monitor the various facial expressions and can potentially identify the cause for threats to the society.

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