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SMART ADVERTISING BASED ON FACE RECOGNITION

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Abstract-Indian country grows rapidly both in population and industrial production. It enables the platform to various companies to establish their production in different fields. Initially, those companies rely on the advertisements to register their products in the society. Nowadays, in marketing the advertisement media plays an important role. Sometimes the consumers do not know what the customers need. So, the consumers mange to get advertisement. Also, few advertisements cannot view with the children because of some reasons. Here comes the idea of smart advertisingin public places which performs and displays ads only depending on their age and gender to avoid the irrelevant ads to the particular individual. To detect the person's age and gender the developers used CNN (Convolution neural network) because it performs well in accuracy and it works better in low light, high light and in medium light conditions. In this concept, CNN algorithm is used to detect person's gender and age of the particular person and to display advertisements according to detected gender and age. This Gender and Age Prediction System is one of the most common applications in Face Recognition and with the help of the predicted age and gender relevant ads gets displayed. This will help the people to get relevant advertisements and to avoid unnecessary advertisements and it helps the children to get only the child related advertisements and also it helps in various aspects.

Key Words: Smart Advertising, CNN, Face Recognition,WideResnet.

1. INTRODUCTION

Advertising is used for attract the customers in the present and it is also used for gather the business related information for the expected customers. The information gained by this ads includes the quality of the product and the place of availability of the product. For both the customers and sellers the advertising is the most necessary thing. However, it the most necessary thing for the sellers. Without advertising the product producers cannot think of profit in this present situation. Advertising plays a major role in marketing and make the human to buy the product. Because of the fastest emerging technology and tough competition in the market, advertising has a major part and the researchers find the taste of the customers and make the ads as fashion.

The most essential part of this research is face recognition. The necessary for face recognition comes in this age and gender base advertising is identify the person's own age and gender by the highest accuracy CNN algorithm and the interest in human vision system and the design of human system and the need of automatic identification of human's face. Various researchers involves on face recognition and the knowledge gained by the research and the researchers made research on various aspects of this face recognition such as image processing and machine learning etc. The work of face recognition systems based on the conditions under which the input images are taken. Face recognition playa a major role in marketing and business and it has many advantages. However, the most important thing is understanding the culture and norms of face recognition in target advertising. A seller has the major responsibility that to categorize the people based on advertising and make the customers to adapt to their marketing strategy.

The most beneficiary part of this part is face recognition. The work of sellers is to make customers to target the products in their advertising and make them to really shop by their advertisement. The most important part of the sellers is to give the product which was exactly looking by the customers and make them feel comfort. The main part in this target advertising is calculating the age and gender which was done by facial recognition. As a successful advertiser one should develop and execute marketing strategies that the customer is expecting. The main motive of this research is the smart advertising by detecting age and gender.

2. RELATED WORKS

Multi-Task Convolutional Neural Network for Pose-Invariant Face Recognition: Xi Yin and Xiaoming Liu. It explore multitask learning (MTL). It consists of two task. For face recognition it propose a multitask convolutional neural network, where main task consists of classification and sidetask consists of post illumination and expression (PIE). These process comes under first part of the paper. The crucial problem of the first part is balancing between different tasks in MTL. To solve this issue we develop a dynamic waiting scheme which assign the loss weights to every side task. To explore the working of CNN based MTL we propose an energy based method. It achieves better performance in face recognition.

Extended Local Binary Patterns for Efficient and Robust Spontaneous Facial Micro-Expression Recognition: Chengyu Guo, Jingyun Liang, Geng Zhan,

Zhong liu, MattiPietikanen and Li Liu: It uses local binary patterns histogram. It proposed an easy, logical and robust descriptor ELBPTOP for ME recognition. It invloves three complementary binary descriptors. LBPTOP and two novel one's radial difference and angular difference. In psychology the review of facial micro expressions is a conventional field. In automatic ME analysis three main challenges are noticed i.e., ME have a minimum duration, limited and minute facial moments.

An Improved Micro expression Recognition Method Based on Necessary Morphological Patches: Yue Zhao and Jiancheng Xu. Micro expression is a simple emotional representation that is not managed by logic. A micro expression both of minimum duration and power. So, the detection of people seems to be difficult. The important part of this article is to classify and filterate necessary morphological features and takeout features to train and allow micro expressions to compare the onset frame and affects frame we use optical flow method. To recognize the NMP and to identify them we use SVM classifier in random forest future selection (RFSF) algorithm. CASME II and SMIC are the two popular publicly available database of our proposed method. The results shows that NMP statistically determined.

Consumer Responses to Advertising: Thomas J. Olney, Morris b. Holbrook and Rajeev Batra. The outcome of Emotions, Advertisement content and Attitude during the ad on viewing time. The development and testing of a step-by-step model of advertising outcome on viewing time is used in this method. This articleworks on sample of commercial ads during prime-time broadcast and the outcome are study across the advertisement. It explains the effects of the contents of the television advertisement through emotional response and attitude during the ads. To achieve the attainment of advertising objectives these are the important points to be noted. This study proposes a behavior measures of consumers responses to television ads and it shows the two dimensional of emotional responses and them aspects of advertising contents.

ImageNet classification with deep convolutional neural networks: Alex Krizhevsky, Ilya Sutskever and Geoffrey E. Hinton. It instructs a large and deep convolution neural network and it is used to classifythe large amount of datasets with high resolution images in the Image net. This neural network has fiveconvolution layers and to make implementation faster a very efficient CPU implementation computation is used. Current technology of face recognition uses very efficient machine learning methods. To improve the performance the researcher collects large amount of datasets and uses efficient algorithm to make implementation faster.

3. EXISTING SYSTEM

The existing system performs face recognition on the model using Haar cascade classifier algorithm which is inconsistent when compared to the proposed system. In the existing system it recognizes a person's face and it find only the age and gender. Deep learning and Machine learning classification algorithm are used to predict the age and gender of the input image. The prediction results are obtained using the common features from the database as input to the models. In the existing system the advertisement comes under the categories of television advertisement and the advertisement based on emotions SMS related advertising and the website ads etc… There are several algorithms for the age and gender predictions and it is less accurate when compared to the proposed system. In the past system it uses multiple object recognition to detect and recognize different kind of objects in real time. It captures a video and displays an age and gender which is of low clarity when compared to the proposed system. The current system only predicts the age and gender and it displaysthe output.

4. PROPOSED SYSTEM

The proposed system applies a technique known as convolution neural network (CNN). It is an efficient recognition algorithm and it used for image processing and pattern recognition. Less training parameter's simple structure and adaptability are the features in CNN. CNN is used for image classification and recognition because it has high accuracy. CNN is a form of deep learning neural network that is generated artificially. Since CNN has features such as parameter sharing anddimensionality reduction, it is superior to a feed-forward network. The number of parameters in CNN is reduced as a result of parameter sharing, and hence the computations are also reduced. The data collected from the pretrained models is used in CNN algorithm and the face is detected. At first, we detect age and gender using CNN algorithm. Since CNN based algorithm performs well in Accuracy, Good Light, Medium Light and also in Low light conditions compared to Haar Cascade Classifier and LBH algorithm. If no face is detected, it plays a generic advertisement. If a person's face is detected, it finds the age and gender of the respective person and plays the corresponding advertisement according to their age limit. When compared to other algorithms it works with better accuracy.

5. METHODOLOGY

A. CONVOLUTION NEURAL NETWORK

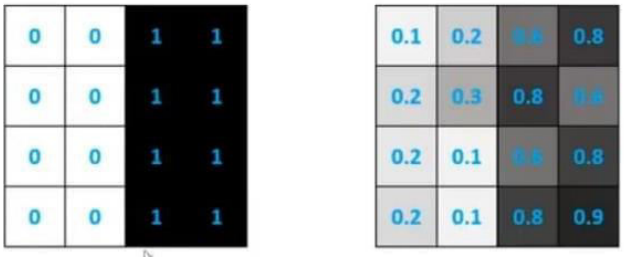
A Convolutional Neural Network is a Deep Learning algorithm that can take an image as input, assign importance to different objects in the image, and discriminate between them. Because of their high precision, CNNs are used to classify and recognize images. The CNN uses a hierarchical model that builds a network in the shape of a funnel and then outputs a fully-connected layer in which all neurons are connected to each other and the output is processed. Convolutional neural networks (CNN) are one of the most important forms of neural networks. They're made up of neurons that have weights and prejudices that can be taught. Each neuron receives a large number of inputs and then calculates a weighted sum, which it then passes through an activation function before responding with an output. In a convolutional neural network, there are three types of layers: convolutional, pooling, and fully linked. Each of these layers has its own set of parameters that can be tweaked, and each does something different with the input data. Since CNN has features such as parameter sharing and dimensionality reduction, it is superior to a feed-forward network.

B. PRETRAINED MODELS

A pre-trained model is one that has already been trained to solve a similar problem. Instead of starting from scratch to solve a similar problem, you start with a model that has already been trained on another problem. In this paper we are going to predict the human face and we are going to start with human faces, so let us take the models of human images which was taken from the internet. The models has more than 25000 images which was used for training the data. Using this pretrained models, we are going to predict the age and gender of a particular person using face recognition.

C. FACE DETECTION

Initially, the photo is taken from the webcam stream live by the cv2 module. Second, we turn the image to grayscale and use the cv2 module's Cascade Classifier class to detect faces in the image. After determining coordinates, we need to crop those faces before feeding to the neural network model. We add the 40% margin to the face area so that the full head is included. Edge and Line features are the important and powerful features of Haar Cascade Classifier. Both features are available in horizontal and vertical format. Major factors of human faces are eyes, eyebrows, nose, lips, and forehead and so on. It determines the intensities of each pixel in the edge and line feature.



The difference between the average of dark pixel intensities to the average of light pixel intensities is calculated. Delta equals 1 in case of ideal condition. The closer the value to 1,the more likely we have found a Haar feature.

D. FEATURE EXTRACTION

The feature extraction part of the neural network uses the WideResNet architecture, short for Wide Residual Networks. It leverages the power of Convolutional Neural Networks to learn the features of the face. What unique of the WideResNet architecture is that the author decreased the depth and increased the width of original residual networks so it trained several times faster.

6. EXPERIMENTAL RESULTS

6.1 AGE PREDICTION

For the age prediction, the output of the model is a list of 101 values associated with age probabilities ranging from 0 - 100, and all the 101 values add up to 1 (or what we call softmax). Thenwe multiply each value with its associated age and sum them up resulting final predicted age.

The softmax formula is as follows:

$$\sigma(\vec{z})_i = \frac{e^{z_i}}{\sum_{j=1}^{K} e^{z_j}}$$

6.2 GENDER PREDICTION

The gender prediction is a binary classification task. The model outputs value between 0 to 1, where the higher the value, the more confidence the model think the face is a male. The input is a greyscale image and it is converted into binary image using Convolution Neural Network and the output ranges between 0 to 1. If the value is between 0 to 0.5, the output is female and if the value is between 0.5 to 1, the output is male.

6.3 DISPLAY ADVERTISEMENT

Considering the age and gender obtained previously, the relevant ads gets displayed. Oncethe face gets detected, age and gender are displayed on the screen. By using the age and gender the ads are displayed on the new tab in the browser.

Fig -1: Results for kids

Fig -2: Results for adult

7. CONCLUSION

In today's advanced world, advertising plays a major role. It presents a smart advertising system that aims at providing a better advertisement experience for both advertiser and the customer. The smart advertising consists of several functionalities such as age and gender prediction, face detection and feature extraction etc. The most important part of advertising is to deciding the needs of the individual customer. To conclude, this project helped me to gain a knowledge on how the advertisement is created and how it is attracted towards human and available to the target audience. CNN classification accuracy was studied and compared with good results and fast implementation. Most of them watches the ads based on quality and some of them prefer the quality related things. As a result, the proposed model would be a good solution for smart advertising and it based on face recognition with respect to age and gender.

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