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FACE RECOGNITION USING DEEP LEARNING

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Abstract:

The relevance of security concerns has increased with the ongoing advancement of computer technology and the increasing reliance of humans on network technology. To prevent attacks and security flaws, user authentication is essential. There are several forms of authentication, including facial recognition, voice recognition, SMS one-time passcodes, and fingerprint scanning. One of the key uses for image processing in still photos is face recognition. Making an automated system that can recognize faces as well as a person is a real task. This paper's primary goals are to examine the value of CNN, describe the many datasets used in face recognition systems, and assess the various CNN models. The deep learning CNN may be applied to facial recognition to boost authentication security. Here we are collecting the dataset of different faces. Once after preprocessing it we train the data with the CNN algorithm. After training, we will test the results using the OpenCV and also can upload the image for recognition of faces.

Keywords: OpenCV, CNN Algorithm,Facial Recognition,Deep Learning.

1. INTRODUCTION

Now a days, face recognition is routinely employed to identify people. The features of a human face vary from person to person. The only item required for facial recognition is a camera. As a result, it offers low-cost, trust worthy personal identification that may be used in many different contexts. User identification and authentication are made possible via an effective facial recognition system, which is quick and precise. It plays a crucial part in several applications, including those related to government, business, security gates, attendance tracking, smart cards, access control, and biometrics. An authentication method based on face traits is known as facial recognition. Face descriptor-based algorithms, Eigen face-based algorithms, and Gabor wavelet-based solutions have all been used in the past to do facial recognition .In terms of algorithms I am using CNN, in this there are sharing parameters

between the convolution layer and the convolution layer of cnn. The advantage of this algorithm is that the memory requirements are reduced, and the number of parameters to be trained is correspondingly reduced. The performance of the algorithm is therefore improved. At the same time, in othermachine learning algorithms, the pictures need us to perform pre-processing or feature extraction. However, we rarely need to do these operations when using CNN for image processing. This is something other machine learning algorithms cannot do. There are also some shortcomings in depth learning. One of them is that it requires a lot of samples to construct a depth model, which limits the application of this algorithm. Today, very good results have been achieved in the field of face recognition and license plate character recognition, so this topic will do some simple research on CNN-based face recognition technology.

With the development of convolutional neural networks, the achievements made in various competitions are getting better and better, making it the focus of research. In order to improve the training performance of the forward BP algorithm, an effective method is to reduce the number of learning parameters. This can be done by convolution of the spatial relationship of the neural network. Convolutional neural network, the network structure is proposed, it minimizes the input data pre-treatment. In the structure of convolution neural network, the input data is input from the initial input layer, through each layer processing, and then into the other hierarchy, eachlayer has a convolution kernel to obtain the most significant data characteristics. The previously mentioned obvious features such as translation, rotation and the like can be obtained by this method.

2. LITERATURE SURVEY

[1] Yao L S, Xu G M, Zhap F. Facial Expression Recognition Based on CNN Local Feature Fusion[J]. Laser and Optoelectronics Progress, 2020, 57(03): 032501.

With the transition of facial expression recognition (FER) from laboratory-controlled to challenging in-the-wild conditions and the recent success of deep learning techniques in various fields, deep neural networks have increasingly been leveraged to learn discriminative representations for automatic FER. Recent deep FER systems generally focus on two important issues: over fitting caused by a lack of sufficient training data and expression-unrelated variations, such as illumination, head pose and identity bias. In this paper, we provide a comprehensive survey on deep FER, including datasets and algorithms that provide insights into these intrinsic problems. First, we introduce the available datasets that are widely used in the literature and provide accepted data selection and evaluation principles for these datasets. We then describe the standard pipeline of a deep FER system with the related background knowledge and suggestions of applicable implementations for each stage. For the state of the art in deep FER, we review existing novel deep neural networks and related training strategies that are designed for FER based on both static images and dynamic image sequences, and discuss their advantages and limitations. Competitive performances on widely used benchmarks are also summarized in this section. We then extend our survey to additional related issues and application scenarios. Finally, we review the remaining challenges and corresponding opportunities in this field as well as future directions for the design of robust deep FER systems.

[2] Zhang Chen. Research on some key technologies of facial micro-expression recognition [D]. 2019.

Facial Expression Recognition (FER) can be widely applied to various research areas, such as mental diseases diagnosis and human social/physiological interaction detection. With the emerging advanced technologies in hardware and sensors, FER systems have been developed to support real-world application scenes, instead of laboratory environments. Although the laboratory-controlled FER systems achieve very high accuracy, around 97%,

the technical transferring from the laboratory to real-world applications faces a great barrier of very low accuracy, approximately 50%. In this survey, we comprehensively discuss three significant challenges in the unconstrained real-world environments, such as illumination variation, head pose, and subject-dependence, which may not be resolved by only analysing images/videos in the FER system. We focus on those sensors that may provide extra information and help the FER systems to detect emotion in both static images and video sequences. We introduce three categories of sensors that may help improve the accuracy and reliability of an expression recognition system by tackling the challenges mentioned above in pure image/video processing. The first group is detailed-face sensors, which detect a small dynamic change of a face component, such as eye-trackers, which may help differentiate the background noise and the feature of faces. The second is non-visual sensors, such as audio, depth, and EEG sensors, which provide extra information in addition to visual dimension and improve the recognition reliability for example in illumination variation and position shift situation. The last is target-focused sensors, such as infrared thermal sensors, which can facilitate the FER systems to filter useless visual contents and may help resist illumination variation. Also, we discuss the methods of fusing different inputs obtained from multimodal sensors in an emotion system. We comparatively review the most prominent multimodal emotional expression recognition approaches and point out their advantages and limitations. We briefly introduce the benchmark data sets related to FER systems for each category of sensors and extend our survey to the open challenges and issues. Meanwhile, we design a framework of an expression recognition system, which uses multimodal sensor data (provided by the three categories of sensors) to provide complete information about emotions to assist the pure face image/video analysis. We theoretically analyse the feasibility and achievability of our new expression recognition system, especially for the use in the wild environment, and point out the future directions to design an efficient, emotional expression recognition system.

[3] XuLinlin, Zhang Shumei, Zhao Junli. Expression recognition algorithm for constructing parallel convolutional neural networks [J]. Journal of Image and Graphics, 2019, 24 (02): 0227-0236.

Facial expression recognition is one of the very important research topics in computer vision. Studies on nonverbal communication have shown that 55% of intentional information is conveyed through facial expressions. Expression recognition has recently found a lot many applications in medical and advertising industries. In this paper we have proposed a parallel Convolutional Neural Network (CNN) structure for detection of expression from frontal faces. The CNNs are trained on two most important subfacial patches. The overall feature vector will be the features concatenated from the parallel models. We have experimentally found applying such a strategy provides better results than the models which take the entire facial image. We have also compared our performance with other benchmark CNN structures like AlexNet and VGG16.

3. EXISTING SYSTEM

In existing method the face recognitions could only performed by seeing the persons visually. One can see and then only they able to recognize, which could be done manually. It will very difficult to doing recognition manually.

Problems in the Existing System:

1. Data Missing.
2. Time consuming.
3. Performance is low.

4. PROPOSED SYSTEM

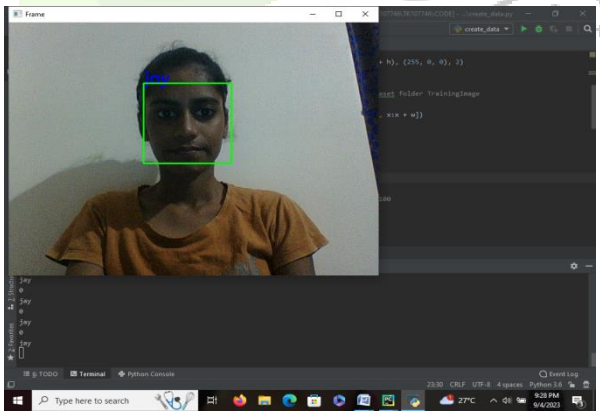
In our proposed work, we are implementing a method that which will able to recognize the faces by using deep learning based CNN model. Here we are collecting the dataset of different faces. Once after preprocessing it we train the data with the CNN algorithm. After training, we will test the results using the OpenCV and also can upload the image for recognition of faces.

5. EXPERIMENTAL RESULTS

From the below figures it can be seen that proposed model is more accurate in order to prove our proposed system.

User Interface for identifying Face Using Image

Face Recognition Using Web Camera



6. CONCLUSION

In this project we have successfully developed an application, that which can detect and recognize the faces. Here we developed thetwo types of methods like image and video based by using CNN algorithm. Once after trained the dataset results were tested by uploading image and also video streaming with face inputs

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