Recognition and Detection of Emotions using facial expression

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Abstract

The current study is based on the recognition and detection of emotions using facial expressions. The main objects such as face detection using facial expression, pre-processing office detection, feature extraction and face recognition and the classification of face recognition are described in the study. The mentioned process helps to the fact of the face and also verifies the input data. The secondary data collection method is used in this research. The qualitative data are helps to maintain the research. The process of completing the pre-processing to get a clear image is depicted in this research. The steps of extracting the features and recognition of the face are discussed in the research.

Keywords : Face recognition, face detection, facial expression, feature extraction, classification of face recognition.

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Introduction

In this current study, the recognition and detection of emotions using facial expressions will be discussed. The main object of this context will be discussed. The objects will be described in the literature review part briefly. Facial recognition and detection can be produced in several ways. In this study, the ways will be discussed briefly. The stages of recognition of the face will be detected in this mentioned study. The implementation of the process of recognition and detection of facial expressions will be discussed in the mentioned study. This study will provide brief information about the overall process of recognising and detecting facial expressions. The methodology and data analysis of the study will provide the process of methods and analysis of the data. Brief information will be provided by this entire study.

Aim and objective

Aim: The current study is aimed at recognising and detecting emotions using facial expressions.

Objective:

- To analyse face detection using facial expression
- To analyse the pre-possing of face detection
- To analyse the feature extraction and face recognition
- To analyse the classification of face recognition

Literature review

One of the strongest tools for communication is a human emotion and facial expression. To read human emotion facial images are used here as a medium. Seven basic emotions are there that are universal to human beings (Hassouneh et al. 2020). Those are neutral, angry, fearful, disgusted, happy, sad, and surprised. These basic emotions are recognised through the facial expression of human beings. To recognise the facial expression of people is not an easy job because every person has their own facial expression which is different. A lot of factors are there to recognise facial expressions which influence physical characteristics as well as sex, genes and age. Many factors are taken to develop the emotion recognition system. The main stage helps to detect and classify face recognition in any face processing system. The facial expression system needs to work in all diverse atmospheres

such as changes in different illumination problems and light in surrounding light (González-Rodríguez et al. 2020). There are four general biometric process stages of the possess flows such as face detection, pre-processing, feature extraction, and face recognition.

Hace detection is the first step of processing of face. The main focus of this face is to detect the face from the dataset images. In this stage, the dataset provides the images of individuals. The images are scanned and then verified to examine that the images contain a face on only a background. This determination system of face determines whether the input data as the image is a face or not. This system examines the images to get the correct result. After the implementation of this step, the result of this process is forwarded for pre-processing (González-Rodríguez et al. 2019). With this process, facial features can be extracted from the face image.

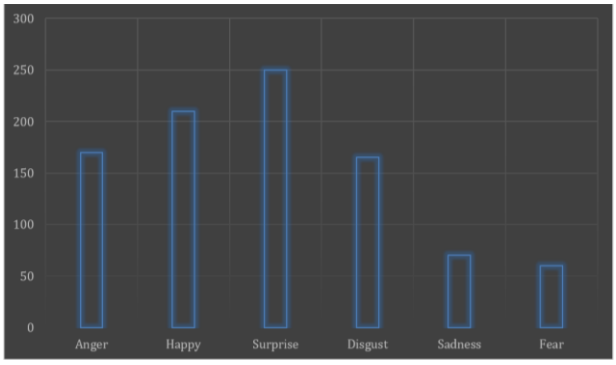
0 degree (frontal face)	98.7%	95%
18 degree	80.0%	78%
54 degree	59.2%	58%
72 degree	0.00%	0.00%
90 degree (profile face)	0.00%	0.00%

Table 1: Rate of face detection and recognition

(Source: Created by Author)

Any type of noise or hardware issues can contaminate any unprocessed or raw image data. With this process, the smooth face can be founded without any noise, blur images or shadowing effects. Many techniques are there for pre-processing images available. Most of them are based on the transformation of pixels such as pixel brightness transformation, transformation geometric, the restoration of images etc (Munasinghe et al. 2018). without pre-processing system a high-quality picture cannot be obtained. Without this process, the high accuracy of the detection system cannot be achieved.

The feature extraction and face recognition step is a critical step. The features can be extracted with this step using the applied extraction of features algorithm (Sajjad et al. 2019). With the help of this step, the irrelevant features can be reduced as well as the noise of the data is also removed. This step helps to perform the compaction of information. After this, a vector is converted by facial recognition with a given proportion. With this, the feature of face communicates to their locations. After the completion of the prior step, and the completion of the analysis of the features then the recognition of the face process is used to examine the face of each person and after that store this in the database (Huang et al. 2019). After the training of the model, the model has to be tested against a given data. All of the steps such as pre-processing, face detection and the other step are performed again. If all of the processes can work properly, it will help to determine the identity of the person without the consent of the individual himself. The correct assumption can be able to determine the evaluation of the model.



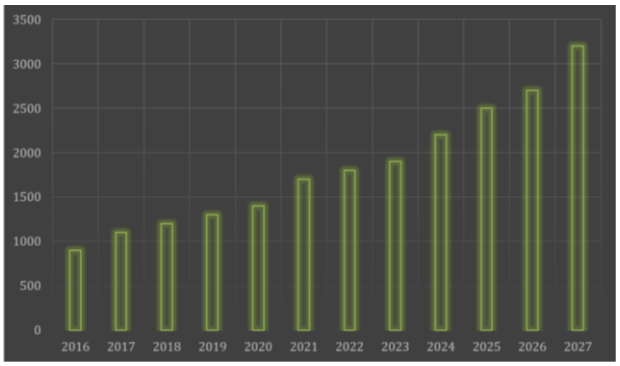
Graph 1: distribution of dataset for each emotion

(Source: created by author)

Classification is the last step in any image processing system. To classify images various numerous techniques and methods are used. In the classification process, the neural network is a very powerful method. This method is used for both linear and non-linear datasets. It also helps the images not in the dataset because it is a self-learning model that consists of several hidden layers. Different models of artificial neural networks are used in recent years (Liliana et al. 2019). Several approaches are there in neural networks such as deep convolutional neural networks, radial basis function neural networks, back propagation feed forward neural networks and bilinear neural networks etc. many other

classifications techniques are there such as decision tree, clustering, support vector machine etc.

These are the process which helps in the process of facial recognition and the detection of the face. The correct implementation of these processes can help to recognise the face and to detect the properly without any noise or blurred images or shadowing effects. The correct implementation of these processes is essential to get a satisfactory result and for the process to be effective for solving the challenges of this detection and recognition of a face.



Graph 2: Expected market of face recognition and detection

(Source: Created by Author)

Methodology

There are two types of methods for collecting the data such as primary data collection and secondary data collection (Canedo et al. 2019). The primary data are collected from the survey or the face-to-face interview. The secondary data are collected from journals, books, websites and social media etc. in this current study the secondary data collection method is used. This collected data can help the researcher to get accurate information about the study. They can be helped with this data to research properly about the study. Secondary data which are collected from several websites can help the researcher to reach the correct data. The implementation of correct data in the research properly helps to find the main topics and problems of the research and the researcher can be able to solve those problems without any complexities.

Data analysis

There are several types of data such as qualitative data and quantitative data. In this research qualitative data are used (Jeong et al. 2020). After collecting from any source those data needs to be analysed. Analysed data can make sure that the data is accurate for this research or not. The researcher can be able to find the proper things related to the mentioned research from the analysing data. The analysis of data can find every position of this data and the researcher will be able to find the correct data which they can use in their research to solve the research problem and find the scope of the research. Qualitative data as numerical data can help the researcher to maintain the overall research process. This statistical data help the data to be proper and accurate which will be helpful for the future researcher and the reader also (Dino et al. 2019). They can get accurate data throughout this process.

Conclusion and future scope

From the above study, it is concluded that face recognition can be produced in several processes. The current implementation can help to detect and recognise the face. This recognition process can be done in four steps such as face detection, pre-processing, feature extraction and face recognition, and classification. The face detection process helps to identify the fact that the face is real or not. This process can scan and verify the input data. After the scanning and verification, the data is forwarded for the pre-processing step. In the pre-processing step, the face images can be produced smoothly without any blur effect, shadow effect or unwanted noise. This process reduces unwanted noise and several types of hardware issues which can be helpful to produce a clear image of face. There are many processes to complete this pre-processing to produce a clear image of a face. Feature extraction and face recognition are critical steps. This process helps to extract the feature using the feature which is applied in the algorithm. This process helps to reduce the irrelevant features and also removes the noise created in the data. The last step classification helps to classify the images. In this classification process, the neural network is very powerful. Many types of models of the neural network are using in recent years. The future scope of these

processes can be huge if the implementation of these processes can producing in the correct way.

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