A Comparative Study on Facial Recognition Algorithms

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Abstract: Facial recognition methods were first explored in security systems to identify and compare human faces and is far superior compared to biometric and iris recognition, this technique has been implemented in iris recognition, image detection etc. Recently these methods have been explored in other fields of study and have become a commercial identification and marketing tool. This paper describes the different algorithms of facial recognition and compared their recognition accuracies. The face is detected through Haar Cascades algorithm which is saved into a database, after that, the study intended to compare facial recognition accuracy of the well-known algorithms Eigen faces with PCA, SVM, KNN, and CNN. The results showed out of the three algorithms we used CNN yielded the maximum accuracy.

Keywords: Eigen Values Haar Cascades Facial Recognition Principal Component Analysis, Convolutional Neural Network (CNN) K-Nearest Neighbour (KNN) Support Vector Machine.

Introduction

A Human face is a unique characteristic that differs from person to person , therefore face recognition becomes a credible source of identification apart from fingerprint scanners (Rodavia, Bernaldez, & Ballita, 2017)[14]. Face recognition is popular and widely used for personnel identification. The automatic facial recognition system involves the application of an intelligent artificial system to recognise the human faces under any circumstances. Today the study of facial recognition has involved a keen interest in pattern recognition, computer vision and other related fields. Camera is the only device for face recognition system. Face recognition provides an inexpensive and reliable personal identification which is applicable in many fields (Phankokkruad & Jaturawat, 2017)[13]. It is cheaper than biometric form of identification and can be used anywhere with low budget costs.

Recognition accuracy is an important factor in facial recognition system. However there are many factors that affect the recognition accuracy. Environmental factors, quality of image, shifting and scaling of images are the common factors that affect the recognition accuracy. Sometimes these factors makes an image non ideal for recognition with decreased accuracy (Phankokkruad & Jaturawat, 2017)[13]. Other factors that affect the accuracy are face shape, texture, specs, hair, illumination etc. There are several external uncontrollable factors that affect the accuracy of the image recognition system. However there is publication of face recognition algorithms which reveals that each algorithm has certain characteristics and provides good accuracy in different aspects.

This research studies about some well know face recognition algorithms and makes a comparison of their recognition accuracies both on train and test set. Eigen faces, SVM, KNN and CNN are chosen in this experimental study. A variation of face viewpoints is the factor that has been used in the experiment to study the effect of recognition accuracy. In this way the advantages and disadvantages of different algorithms can be studied. Consequently it will help the developers to choose the best facial recognition algorithm in their field of implementation.

Flow-Chart