

Face Recognition by Artificial Neural Network using MATLAB

Abozar Atya Mohamed
Sudan Technological University
Omdurman - Sudan
abazaratya@gmail.com

Khalid Hamid Bilal
University of Science & Technology
Omdurman - Sudan
khalidhamidk9@gmail.com

Imadeldin Elsayed Elmutasim
Universiti Malaysia Pahang UMP
Pahang- Malaysia
emadcts@yahoo.com

Abstract—Facial Recognition considering one of the most difficult operations due to the unruly amount of datasets. However, human could easy to recognize an emotion while inconceivably for a computers. Artificial Neural Networks (ANN) provides an exceedingly smart solution in terms of recognition performance when deal might as well with the data. In this paper human faces have been detected through artificial neural network using MATLAB simulation to find out the impression via recognizing the expression of the faces obtained from the database that containing 266 samples with various expressions within the wide ages. Consequently, many pre-classified datasets such as Japanese Female Facial Expression (JFFE), Face and Gesture Recognition (FG-NET), Face Expression Recognition Dataset 2013 (FER-2013), and Cohn Kanade Dataset (CK +) were studied to achieve a comprehensive model that could contribute the scientific research. The study investigated an obtained dataset to demonstrate the efficiency and solidarity of the proposed through to focus positively on the facial impression and its fluctuations. The result clearly shows that LEARN Gradient Descent with Momentum weight (LEARNGDM) is the best learning function to get an accomplishment with an average error equal to 0.01257, validation ratio 97.462, and 98.67232 precision.

Keywords—face recognition, matlab, artificial neural network, human face, face expression recognition.

I. INTRODUCTION

Artificial Intelligence AI is very often applied to the undertaking of developing systems that provided through the intellectual processes characteristic of humans, such as the ability to realize, find out the meaning, generalize, or pick up from the previous experience, despite that move up but unit now is limited in terms of emotional intelligence that could only discover the basic human emotional states such as anger, disgust, happiness, fear, sadness, surprise, and warring. Whereas the Artificial Neural Networks ANN considers the point of departure of artificial intelligence that being the way to the future in the upcoming computing era when the human capability demonstrates a limitation to solve problems [1]. On the other hand, the self-learning mechanisms that do not require the traditional skills of the programmer such as Language acquisition become available and easy to obtain. Recently the fields of image processing that includes compression, recognition, and coding, and pattern recognition witnessing immense growth due to indispensability in various critical sectors such as security surveillance and law enforcement [2]. Accordingly, the general face recognition system includes many factors such as the face detection; feature extraction; and the face recognition, thus to considering the earlier factors, initially needs to prepare the data has been collected in excellent shape. This work, investigated human faces via an artificial

neural network to recognize the most facial expressions, the data has been used in 266 samples to create a fashionable way that would contribute to the field. While in the next section, a group of classified data has been dealt with for a thorough comparative study.

II. DATA PROCESSING AND PATTERN GENERATOR

Artificial Neural Networks are known for requiring large amounts of training data that require high quality and large datasets. Generally, the main differences in the dataset when considering the quantity refer to numerical values whereas the quality is related to properties. In this work, the empirical analysis has been presented to a model that works with several common facial expression recognition datasets including Japanese Female Facial Expression (JFFE), FER2013, Cohn-Kanade Extended and the Facial Expression Research Group (FERG) database.

A. Japanese Female Face Expression (JFFE)

Japanese Female Facial Expression database was taken from publicly available data which consists of 213 facial expression images of 10 subjects of Japanese female. The image has the resolution in gray scale. All the expression in frontal view and the resolution of the original image are 256 x 256 pixels data, four sample images from (JFFE) dataset are shown in Fig. 1[3][4].

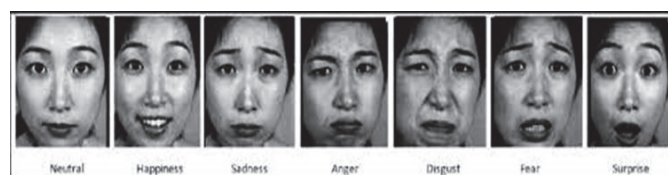


Fig. 1. Four sample images from JAFFE database

B. Face and Gesture Recognition FG-NET

Type of a dataset for age estimation and face recognition across ages. It is composed of a total of 1,002 images of 82 people with age range from 0 to 69 and an age gap up to 45 years, four sample images from (JFFE) dataset are shown in Fig. 2[5][6].



Fig. 2. Four sample images from FG Net database