



Face recognition system using convolution neural Network

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Abstract: Face recognition is of great importance to real world applications such as video surveillance, human machine interaction and security systems. As compared to traditional machine learning approaches, deep learning based methods have shown better performances in terms of accuracy and speed of processing in image recognition. This paper proposes a modified Convolutional Neural Network (CNN) architecture by adding two normalization operations to two of the layers. The normalization operation which is batch normalization provided accelerating the network. CNN architecture was employed to extract distinctive face features and SoftMax classifier was used to classify faces in the fully connected layer of CNN. Global Position Systems and other navigation systems that collect spatial data through an array of sensors carried on by people and distributed in space have changed the way we navigate complex environments, such as cities. However, indoor navigation without reliable GPS signals relies on wall-mounted antennas, WiFi, or quantum sensors. Despite the gains of such technologies, underlying these navigation systems is the dismissal of the human wayfinding ability based on visual recognition of spatial feature. Face recognition is a method to identify or verify the identity of an individual using their face.

Keywords: Face Recognition, Convolution Neural Network

INTRODUCTION

Face recognition from the real data, capture images, sensor images and database images is challenging problem due to the wide variation of face appearances, illumination effect and the complexity of the image background. Face recognition is the process of recognizing the face of a relevant person by a vision system. Face recognition from the real data, capture images, sensor images and database images is challenging problem due to the wide variation of face appearances, illumination effect and the complexity of the image background. Facial Recognition possess the importance to give biometric authentication that is used in different applications especially in security. Face recognition is achieved using Deep Learning's sub-field that is Convolutional Neural Network. A stored database of the subjects is manipulated using image processing techniques to accomplish this task. The original small dataset is augmented to be a large dataset via several transformations of the face images. The process of face recognition refers to identifying the person by comparing some features of a new person with the known persons in the database. Face recognition (FR) technology is identified as an active area of research in recent years because of the rise in security demands and the potential of the technology in law enforcement and commercial use.

I.METHODOLOGY

CNNs are a category of Neural Networks that have proven very effective in areas such as image recognition and image. The goal of employing the FCL is to employ these features for classifying the input image into various classes based on the training dataset. FCL is regarded as final pooling layer feeding the features to a classifier that uses Softmax activation function. The sum of output probabilities from the Fully Connected Layer is 1. This is ensured by using the Softmax as the activation function. The Softmax function takes a vector of arbitrary real-valued scores and squashes it to a vector of values between zero and one that sum to one.

The Proposed Algorithm:

The block schema of the proposed CNN recognition algorithm is given in Fig. 2. The algorithm is mainly carried out in three steps as below:

- 1) Resize the input images as 16x16x1, 16x16x3, 32x32x1, 32x32x3, 64x64x1, and 64x64x1.
- 2) Build a CNN structure with eight layers made up of convolutional, max pooling, convolutional, max pooling, convolutional, max pooling, convolutional, and convolutional layers respectively.
- 3) After extracting all features, use Softmax classifier for classification.

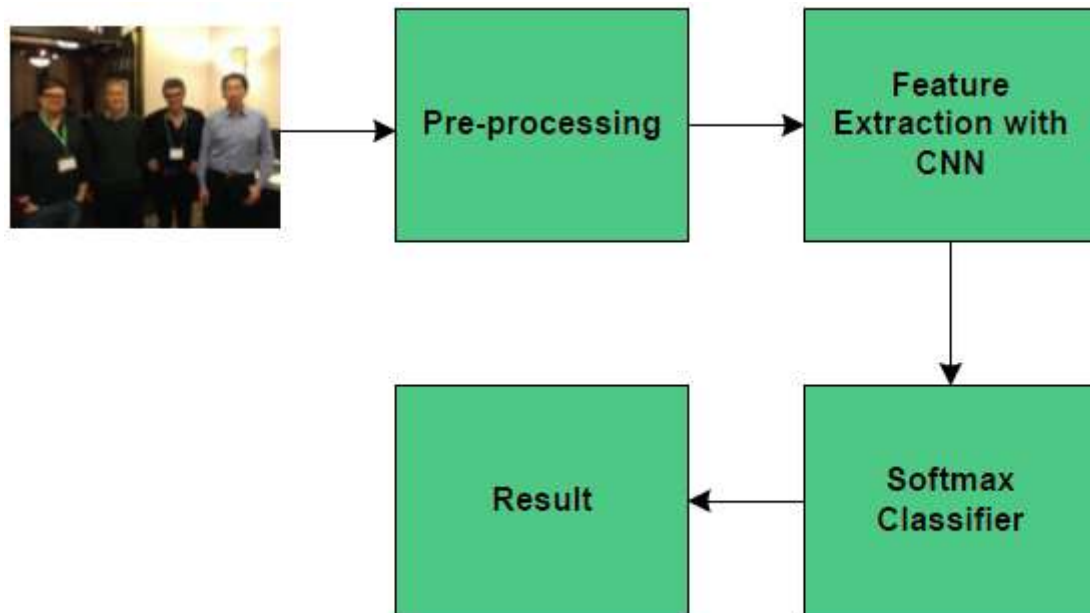


Fig 3.1 The block schema of the proposed algorithm

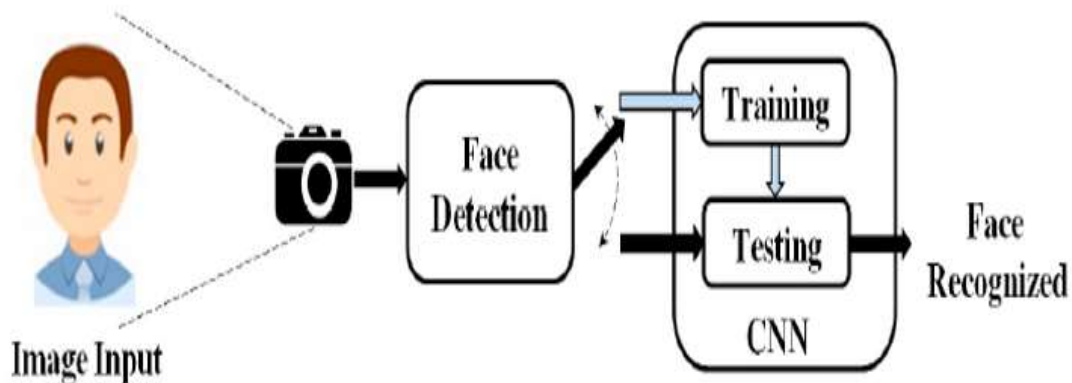


Fig 3.2 Block diagram of proposed real-time face recognition system

3.1 Face Detection

The main function of this step is to detect the face from capture image or the selected image from the database. This face detection process actually verifies that weather the given image has face image or not, after detecting the face. This output will be further given to the pre-processing step.

3.2 Pre-processing

This step is working as the pre-processing for face recognition. In this step the unwanted noise, blur, varying lightening condition, shadowing effects can be remove using pre-processing techniques Once we have fine smooth face image then it will be used for the feature extraction process.

3.3 Feature Extraction

Extractions are performed to do information packing dimension reduction, salience extraction, and noise cleaning. After this step, a face patch is usually transformed into a vector with fixed dimension or a set of fiducial points and their corresponding locations In this step features of face can be extracted using feature extraction algorithm.

IV CONCLUSION

Summary review of literature studies related to face recognition systems based on ANNs. In this project we are discussed different architecture, approach, algorithms, methods, database for training or testing images and performance measure of face recognition system were used in each study. Every researcher has their own approach for recognizing face from



database or from video many researches has try to solve the problems associated with earlier proposed method but still there are some advantages and limitations in these discussed methods.

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