

FACE RECOGNITION SYSTEM FOR AUTOMATIC DOOR LOCK SYSTEM

Abstract

This project is to research a face recognition system for an automatic door lock plan. This project has researched for AI (Artificial Intelligence) element, CNN algorithm and several architecture training in research. After the model trained, pretesting experiment by image for face recognition function has been done and getting 100% accuracy on testing.

Introduction

Recognition function is form by biometric identification element which is a high technique for automatically verify every different physical characteristic or personal detail. The biometric technique is mostly used in the high-level security system and law enforcement system. At the starting time for developing facial recognition (FR) function, the elements of biometric technology have been analysed and used to verify human being for improving the security system.

Proposed Method

CNN algorithm is an important big frame to implement face recognition system in the project research. In CNN algorithm has several useable architecture or it can called as network for training difference models used for face recognizing system. In my research have provided 5 architecture model which is using ResNet50, ResNet152, MobileNet, VGG16 and Xception. Difference models have shown with difference result in training time, training loss, validation loss, training accuracy and validation accuracy. The result data can use to do comparing and analyzing between difference architecture and lastly choosing most suitable architecture for using in designing an automatic door lock system.

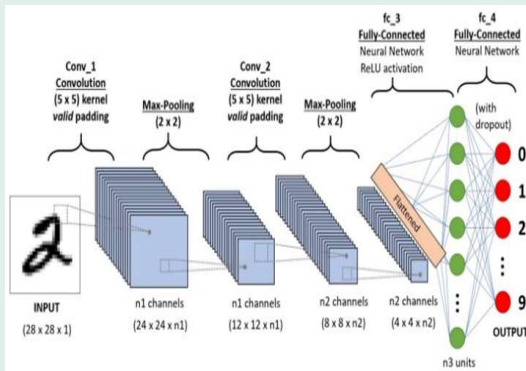
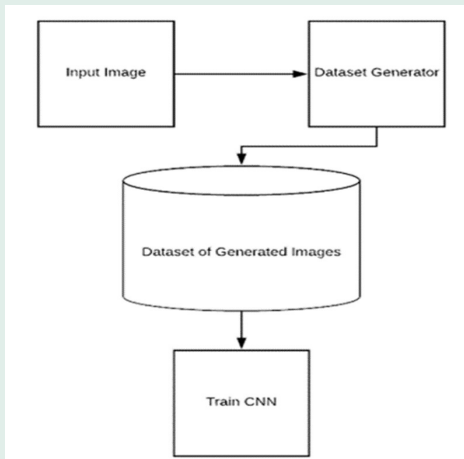


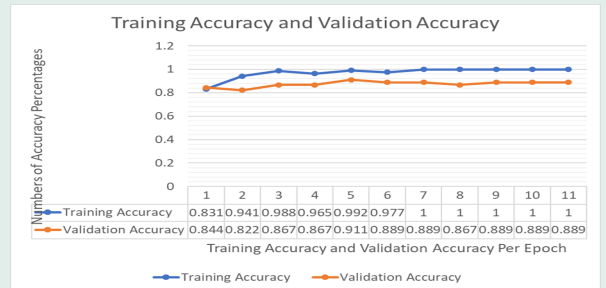
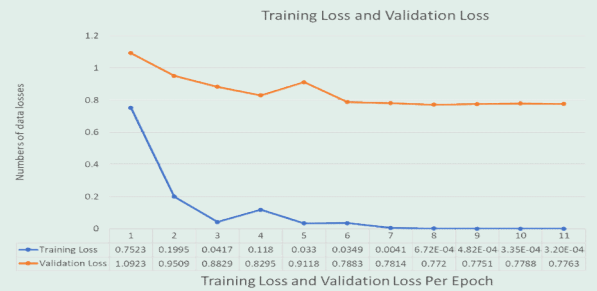
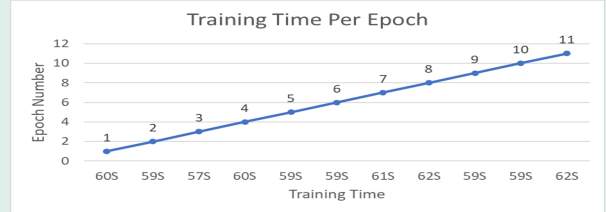
Image Augmentation and Dataset Preparing

The method used for image augmentation in training deep neural networks process is dataset generation and data expansion. In my research is focusing on using CNN (Convolution Neural Network) algorithm for the face recognition system designed, the image augmentation method been used is a recommended methods which dealing good with neural network process. In machine learning model step, this method is needed less amounts of images for training data requirement. For example, this dataset generation and data expansion method can use single image for applying data augmentation to create large amounts of images needed. In my research has not import the existing image dataset to achieve a high accurate recognition system. Training based on own image dataset to test the final result accuracy will be my research direction and proof as own design result. Therefore, using image augmentation method to generate more and difference element images used in training process is a better way to improve the training ability and provide high accuracy model.



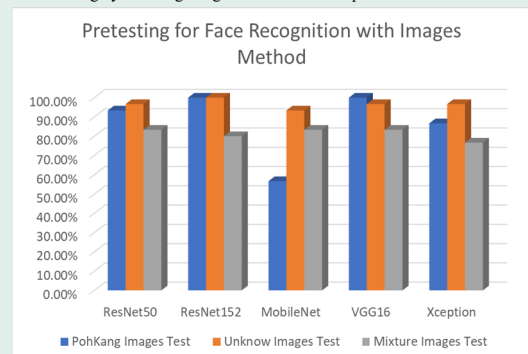
Result For Training Time, Training Loss, Validation Loss, Training Accuracy and Validation Accuracy

In difference architecture trained will provide difference data result. The example graph provided below is training result of ResNet50. For training time is around 1 minute in each of the epoch. The total epoch used for training ResNet50 is 11 epoch and stop training when reach the best training target. In ResNet50 model trained is provided less training loss than validation loss and high training accuracy than validation accuracy.



Pretesting Result

At the data graph below has shown with 5 architecture pretesting result, the testing are conducted with three types of images folder for testing which is tested based on Pohkang image folder, Unknow person image folder and Mixture image folder. The mixture image folder is combining with both Pohkang and unknow person images to test. ResNet152 and VGG16 architecture have hit the highest accuracy in Pohkang image folder test. The most higher accuracy architecture is ResNet152 which hit the 100% at 2 testing by Pohkang image test and Unknow person test.



Final Result

The final result for real time face recognizing has success in detect and recognizing my face and able to distinguish one from others. The result below is tested by ResNet50 model classifier. For result shown by detecting and recognizing my face is achieved 97.47%. For 2 target detecting and proceed recognizing at the same time, the system also able to define out the real facial and fake facial by phone image.

