Identification of handwritten English alphabet using Convolution Neural Network

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ABSTRACT

Handwritten English alphabet recognition has become a challenging research topic. To reduce the time that human beings spend on using naked eye to catch the meanings form letters with various writing style. This project would focus on offering a system that could recognize handwriting English alphabet with Convolution Neural Network (CNN) model based on VGG 16. The proposed CNN model is trained and evaluated on the balanced subset of Extended Modified National Institute of Standards and Technology (EMNIST) dataset.

METHODOLOGY

The architecture of the VGG16 model is characterized by its deep structure, which includes multiple convolutional layers with small 3x3 filters followed by max pooling layers. This design allows the model to learn more complex features from the input images by gradually increasing the receptive field of the filters. The convolutional layers are followed by three fully connected layers that serve as the classifier for the model. One of the advantages of the VGG16 model is its simplicity and ease of implementation. The small 3x3 filters and max pooling layers allow for a more compact architecture than some earlier models that used larger filter sizes. Additionally, the use of only 3x3 filters allows for a more uniform representation of the input image, which can help to improve the accuracy of the model.

The parameters setting are as followed:

Parameters	Values
Input shape	28 × 28 × 1
Activation function	ReLu, softmax
Epochs	20
Training set size	112800 images
Test set size	18800 images
Learning rate	1e-4
Batch size	128

References

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INTRODUCTION

During the past few years, deep learning became one of the most popular technologies in society. An individual handwriting is unique and eccentric to specific person. People could use convolutional neural network to analyze and gain features from different input. As this technology has been applied in many aspects as well as handwritten alphabet recognition. People often use handwriting to convey the message for various reasons as well as receiving others handwriting message. This process always cost time as everyone got totally different handwriting style if they just recognize the letters using naked eye to get the meanings. So, this project would learn and use CNN model to build a handwriting English alphabet system to solve the related problem.
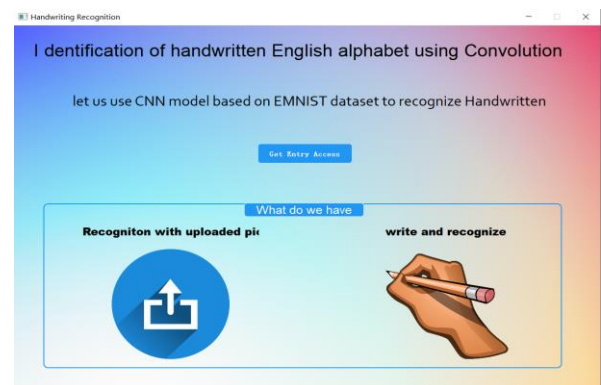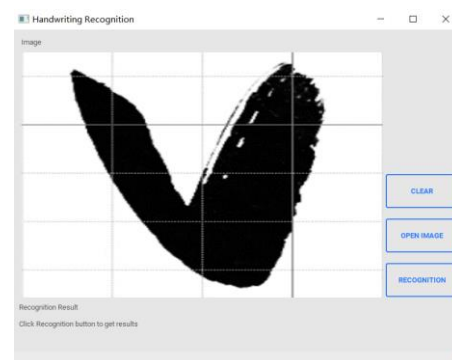
GUI

Figure 1: front page
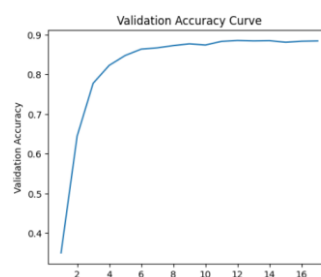

Figure2: application page
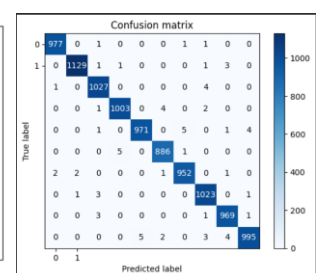
Results

Figure3: accuracy   Figure4: confusion matrix

The test accuracy is 88.9%, It is obvious that the performance of the model could satisfied the requirement of high accuracy, only a few results did the wrong prediction which is totally acceptable.