Midterm Report

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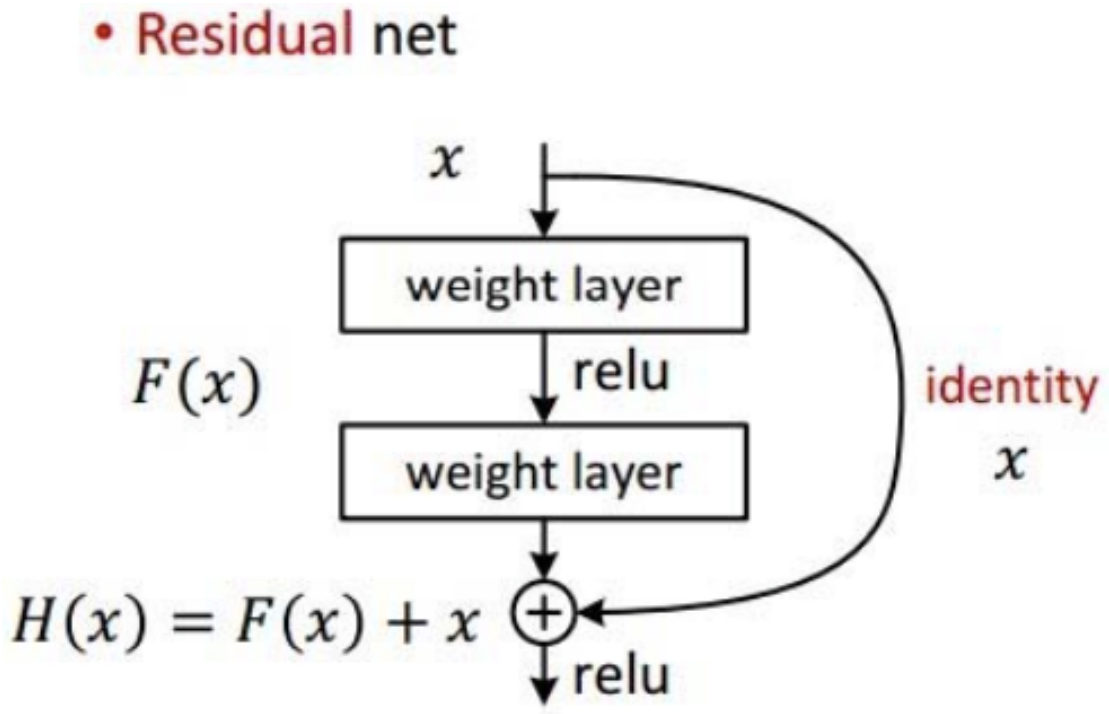
I. Introduction

This project requires us to train a deep model and then test on a test set including 5 kinds of flowers. We can use the training dataset, which contains 2569 pictures, to train the deep model, and using the validation dataset, which contains 550 pictures, to validate the performance of the model. Finally, we need to use this model to test our test dataset, which contains 551 pictures, to predict their labels and save them in a text file.

II. Model

CNN become increasingly powerful in large scale image recognition after Krizhevsky et al. won the first prize in ILSVRC 2012 with the introduction of AlexNet. In this experiment, I use ResNet, which was the winner in ILSVRC 2015. It introduced the concept of residual in convolutional neural network to avoid gradients descent. The structure is shown below:



III. Experiment

In this experiment, we use Pytorch, which is a very popular deep-learing framework to construct the project. I first do some data augmentation in training dataset, which are random size crop and random horizontal flip, in order to increase the diversity of training dataset. Also, we need to do the normalization for both training data and validation data. Then, I wrote a function for training. In this part, we need to scheduling the learning rate and saving the best model. Finally, I load a pre-trained model and reset final fully connected layer. More specifically, set output to 5, which stands for target classes instead of 1000. The best validation accuracy

reaches 94.36%.

After training, because I already save the best model during training, so I just load it and use it to perform in the test dataset. The prediction result already saved in a text file.

IV. Conclusion

There are already lots of models be pretrained in Imagenet and have very good performance. We can use the pretrained features to transfer to new problems with fine-tuning. That will be a efficient way for image recognition.