CS492C – Introduction to Deep Learning – Extra Programming Assignment

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For Extra Dataset

I constructed the architecture for 3-channel image data. The basic idea of this architecture is similar as previous assignment. First, I used the data augmentation method for extending the dataset. Then, the extended dataset is convolved and pooled by convolutional layer and pooling layer. The data that is passed through the convolutional neural network layer is multiplied by dense layer and output layer. But I increase the number of filter in convolutional layer because the channel size of input data is bigger than the basic MNIST data. The accuracy of these best architecture shows performance of 0.6208.

Conv1 Filter	Pool1 Stride	Conv2 Filter	Pool2 Stride	Conv3 Filter	Pool3 Stride	Conv4 Filter	Pool4 Stride	Conv5 Filter	Pool5 Stride	Fully units	Output units	Acc.
32	2									1024	10	0.439
32	2	64	2	128	2					1024	10	0.535
64	1	96	2	128	1	196	2	256	1	1024	10	0.621

Table 1. Final performance with change of the depth

If the network consist of more deeper and deeper, the accuracy of the model is more accurate. This phenomenon is seemed to be caused as similar as the programming assignment #2. But the channel of input data is three, so I think we should extend the number of feature map in convolutional layers for more accurate of classification.

If I extend more of the depth in network, the codes would have some problem like memory allocation as OOM. But I found a fact by other experiment that the difference with change of the number of feature map in convolutional layers.

Conv1 Filter	Pool1 Stride	Conv2 Filter	Pool2 Stride	Conv3 Filter	Pool3 Stride	Conv4 Filter	Pool4 Stride	Conv5 Filter	Pool5 Stride	Fully units	Output units	Acc.
32	1	64	1	96	2	128	2	196	1	1024	10	0.613
64	1	96	2	128	1	196	2	256	1	1024	10	0.621

Table 2. Final performance with change of stride and number of feature maps

As you can see the table above, the performance of the experiment with more number of feature maps showed the better accuracy than the experiment with less number of them. Especially, the experiment with more of feature maps losses some features in early steps of convolutional neural networks. In this point, I think the number of feature maps is important to make more accurate architecture in more complex input data.