Assignment5 - Deep Learning on Point Cloud

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Contents

1 Architecture of PointNet

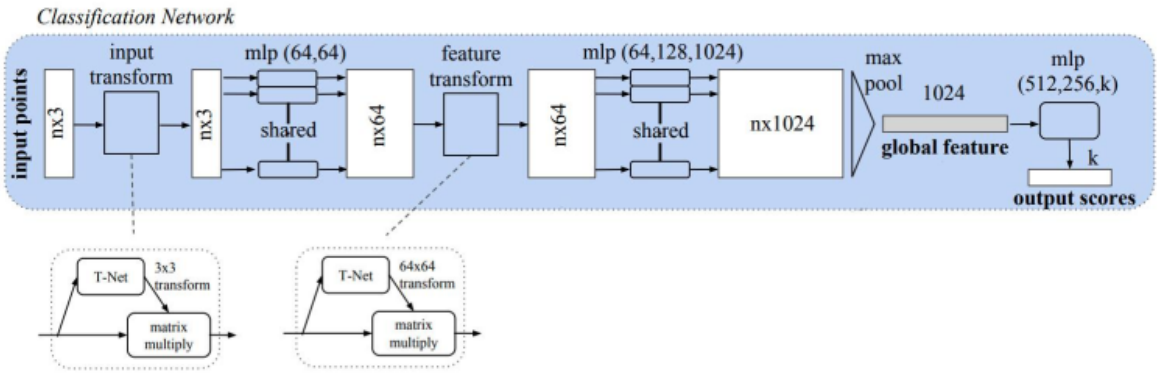


Figure 1: PointNet classification architecture of the original version.

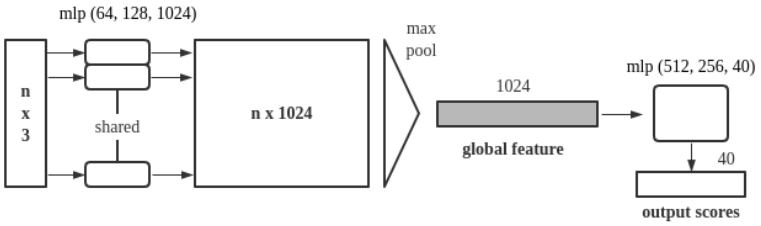
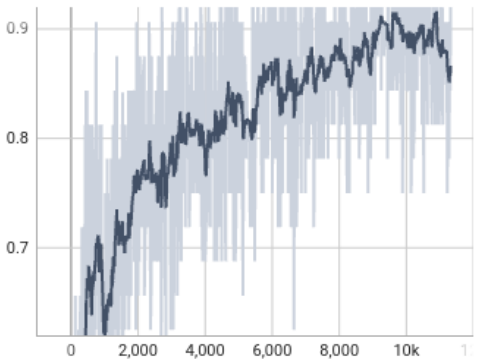


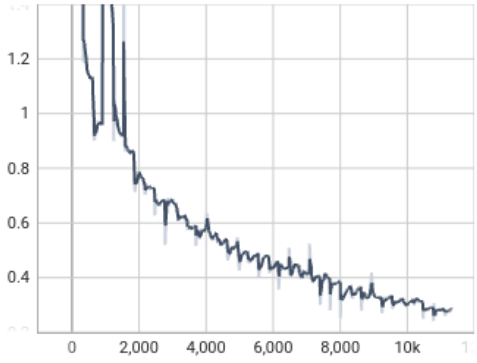
Figure 2: PointNet classification architecture implemented in the assignment.

In this assignment, we aim to implement a PointNet to complete the classification task on the dataset ModelNet40. Therefore, we only need to be focused on the PointNet network with the classification head. Figure 1 shows the PointNet classification architecture of the original version, and Figure 2 shows the one I implemented in the assignment. By comparison, the major difference is that the architecture in Figure 2 has removed the blocks of input transform and feature transform. And k is 40, corresponding to the 40 classes in ModelNet40.

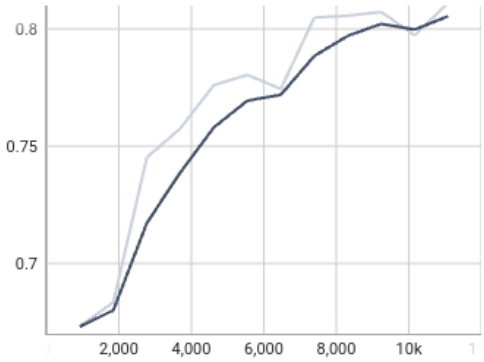
2 Training and Evaluation



(a) training accuracy.



(b) training loss.



(c) validation accuracy.

Figure 3: The three curves of the training process.

Figure 3 shows the three curves of training accuracy, training loss, and validation accuracy during the 100 epochs of training, respectively. With the training loss decreasing and the training accuracy increasing, the validation accuracy increases, representing the effectiveness of the PointNet model. Notably, the best model achieving the highest validation accuracy was obtained in the $77th$ epoch within the 100 epochs. More specifically, it achieved 0.839 in terms of the validation accuracy.