

Deep Learning Lab Report - Exercise 3

Sara Al-Rawi

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1 Introduction

In the first part of this lab work four different configurations have been implemented. The number of skip connections have been increased gradually. In the implementation, it can be seen that the forth configuration have the highest number of skip connections while the first configuration has no skip connection.

As a second step the network has been trained using the default `learning_rate` which is: 0.0002 and 500 step per epoch. The model has been saved for each configuration and invoked during the testing phase.

2 The Implementation

One of the main goals of this lab is observing the effect of using skip connection on the intersection over union value.

Intersection over Union Value or it is also called Jaccard index, is a metric used to evaluate images segmentation models. The metric quantifies the percent overlap between the target mask and model's prediction.

$$IoU = \frac{target \cap prediction}{target \cup prediction} \quad (1)$$

3 Results and Conclusion

The following figures illustrates how the value of the IoU ¹ changed by increasing the skip connections in different configurations. As mentioned above the forth configuration has the highest number of skip connections while the first one has no skip connection.

please notice the number of the steps in epoch divided by 10 for a better visibility. This comment is applicable for all figures

¹Intersection over Union Value

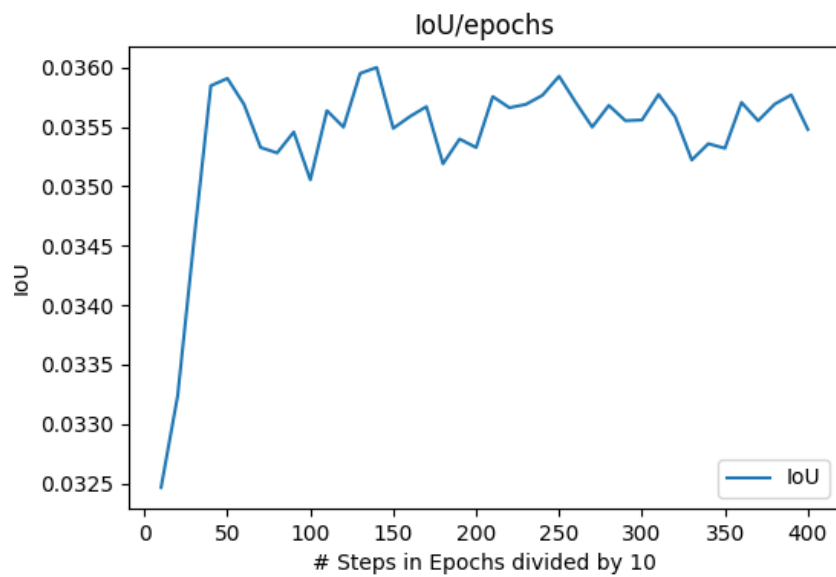


Figure 1: Configuration 1

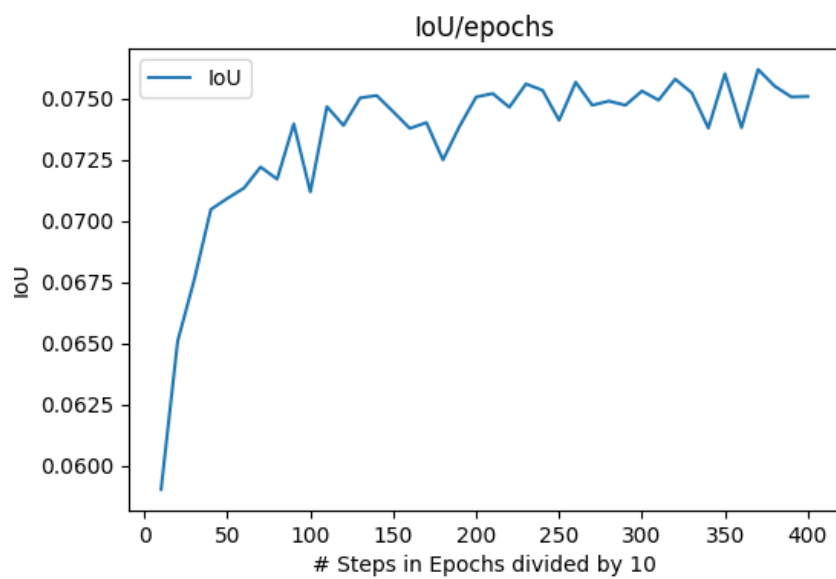


Figure 2: Configuration 2

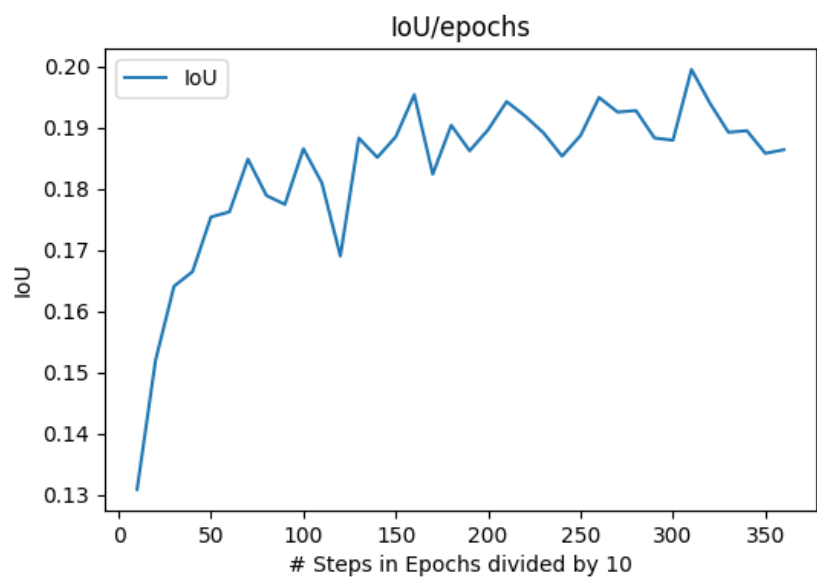


Figure 3: Configuration 3

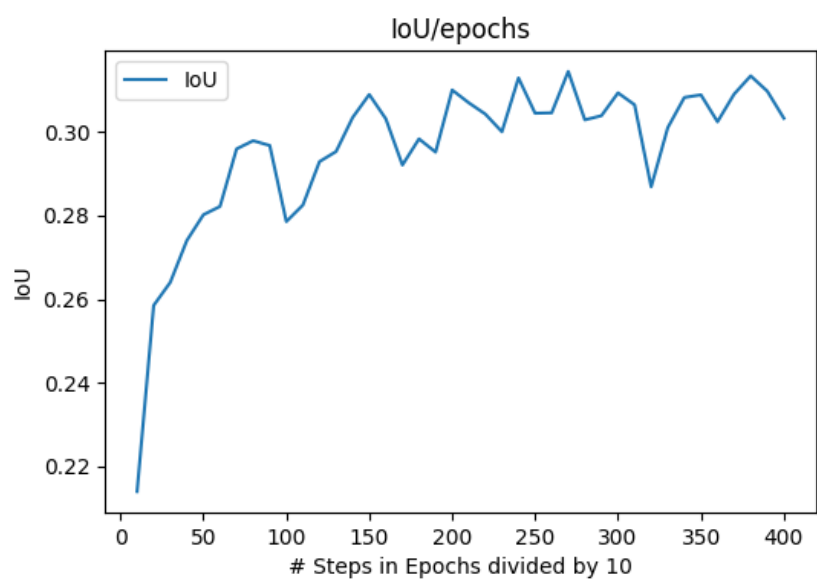


Figure 4: Configuration 4

The table below illustrates the highest IoU value achieved per configuration over the epochs. It can be observed that configuration number four which has the highest number of skip connections achieved the highest IoU ²value.

Configuration	Highest IoU value
Configuration 1	0.03600179706667393
Configuration 2	0.07619250730672947
Configuration 3	0.199523741111
Configuration 4	0.314494250978

²Intersection over Union Value