Deep Learning
Assignment 4 Report

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Contents

1 Introduction

This report explains the setup and methodology involved to deploy convolutional neural network with cross-entropy loss and dropout.

2 ConvNet

The proposed solution involves two convolutional layers followed by two fully connected layers with cross-entropy loss. The experiments performed and the hyperparameters involved are outlined in table 1. The dropout layer was added to the penultimate fully connected layer. Experiments were performed with and without dropout, with and without momentum and with different combinations for the feature maps outputted by the convolutional layers. The hyperparameters involved in the convolutional layers are outlined in table 2.

Feature Maps	**Epochs**	**LR**	**Dropout**	**Momentum**	**Decay**	**Test Acc (%)**
(32,64)	30	1e-3	0.0	0.9	5e-4	98.5
(32,32)	30	1e-3	0.0	0.9	5e-4	98.53
(64,64)	30	1e-3	0.0	0.9	5e-4	98.55
(32,64)	30	1e-3	0.2	0.9	5e-4	98.60
(32,64)	30	1e-3	0.0	None	5e-4	92.20

Table 1: Hyperparameters employed to train the model.

Type	**Filter**	**Padding**	**Stride**
Conv1	(5x5)	2	1
Conv2	(5x5)	2	1
MaxPool	(2x2)	0	2

Table 2: Hyperparameters for convolutional layers.

3 Results

Altering the number of output feature maps generated per convolutional layer tends to have a small impact on the performance of the model (0.05%), and all plateau at an almost identical rate. Using Momentum considerably speeds-up training and convergence. Using dropout enhances the

accuracy of the test set by a small amount (0.05%).

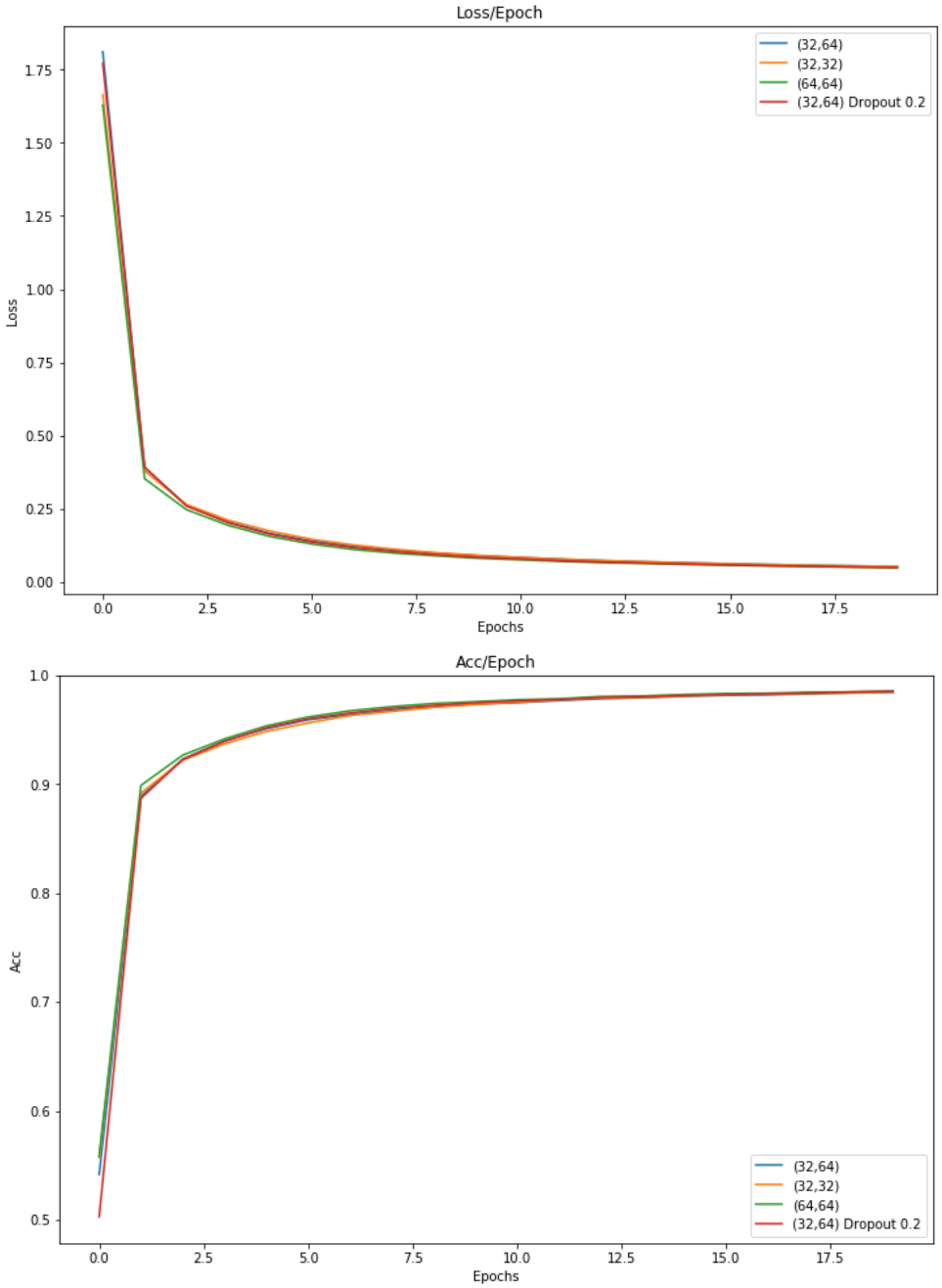

Figure 1: Train loss and accuracy across epochs.

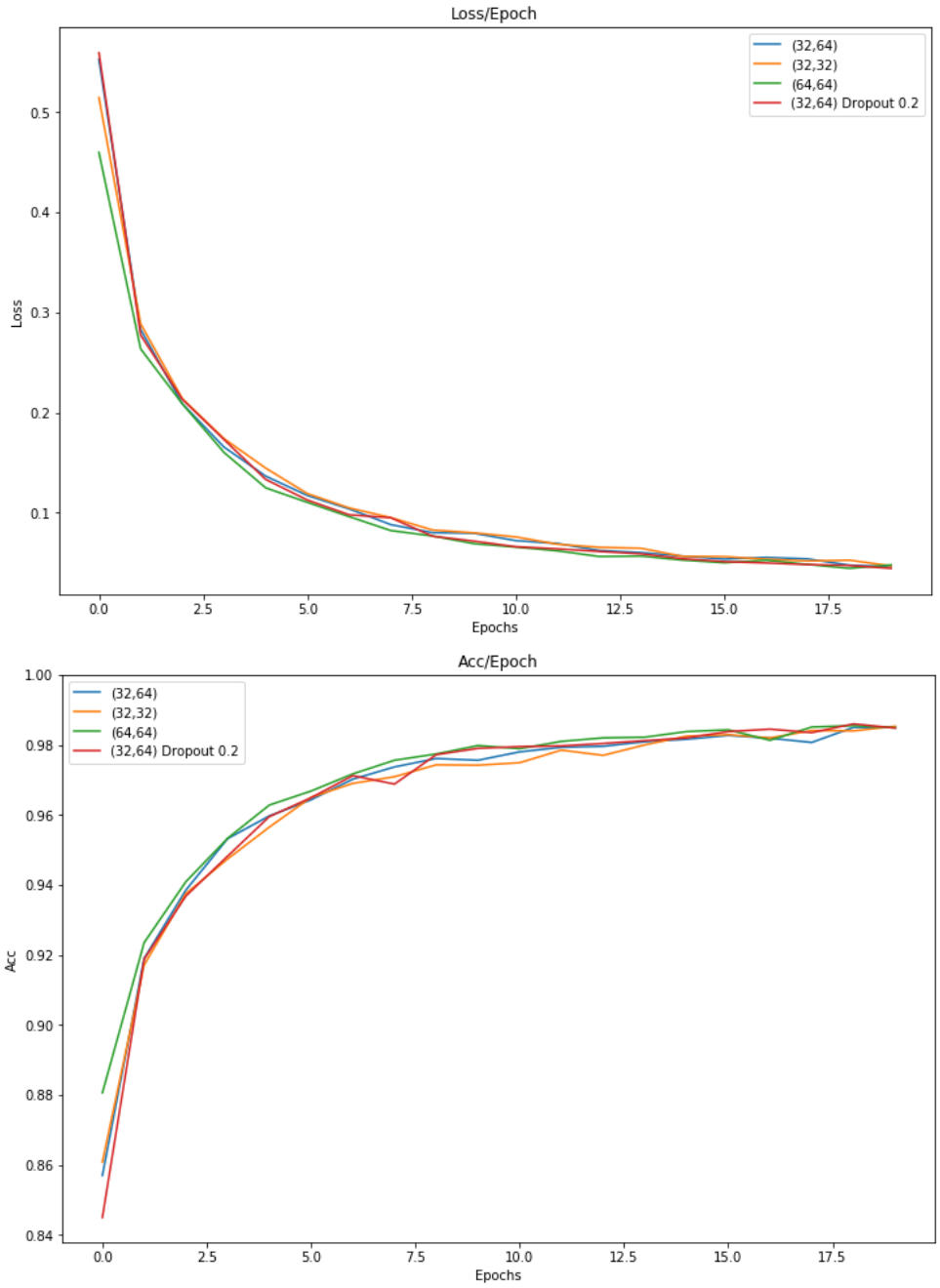

Figure 2: Test loss and accuracy across epochs.