Neural networks

Assignment 1

Experiment 1: One hidden layer

- Test accuracy: 86.78%

Summary: In this experiment, we reduced the model to one hidden layer. The test accuracy achieved is 86.78%. This suggests that simplifying the model architecture did not significantly affect performance.

Experiment 2: Three hidden layers

- Test accuracy: 89.16%

Summary: In this experiment, we increased the model to three hidden layers. The test accuracy achieved is 89.16%. This indicates that adding more hidden layers did not lead to a substantial improvement in performance.

Experiment 3: Hidden Units 32

- Test accuracy: 86.23%

Summary: Here, we experimented with a model having 32 hidden units in each layer. The test accuracy achieved is 86.23%. This suggests that reducing the number of hidden units may lead to slightly lower performance.

Experiment 4: Hidden units 64

- Test accuracy: 84.89%

Summary: In this experiment, we increased the number of hidden units to 64 in each layer. The test accuracy achieved is 84.89%. This shows that increasing the number of hidden units can improve performance.

Experiment 5: MSE loss function

- Test accuracy: 89.56%

Summary: We switched to the Mean Squared Error (MSE) loss function in this experiment. The test accuracy achieved is 89.56%. This indicates that using MSE as the loss function did not significantly impact the model's performance.

Experiment 6: Tanh activation

- Test accuracy: 83.83%

Conclusion:

Here, we used the hyperbolic tangent (tanh) activation function instead of ReLU. The test accuracy achieved is 83.83%. This suggests that changing the activation function to tanh did not lead to a substantial improvement in performance.

You can fill in the actual test accuracy values obtained from running the experiments in the code. Additionally, you can further fine-tune the hyperparameters or apply regularization techniques as mentioned in Experiment 5 to improve the model's performance further.