

## Assignment 7

### Experiment 1:

For the first experiment, I trained the model with 2 hidden layers. The first hidden layer had 40 neurons whereas the second hidden layer had 50 neurons. With this run, the training accuracy was 83%, and the test accuracy was 84%. The model detected 212 false negatives, as shown in the confusion matrix.

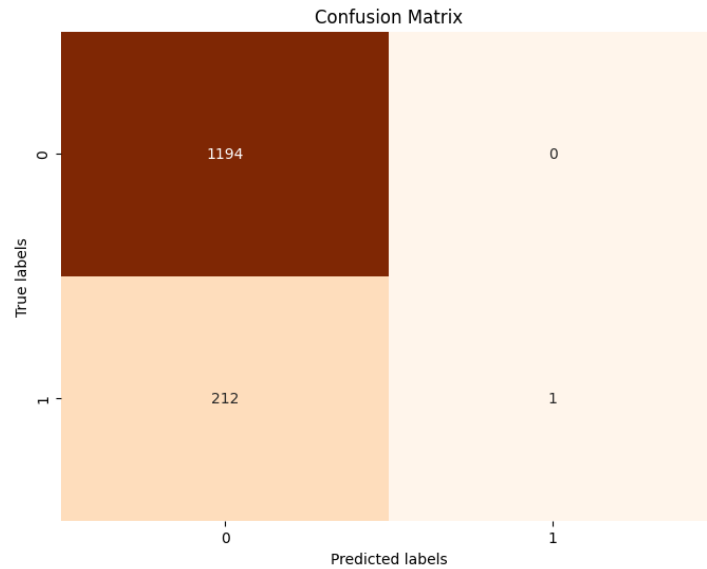


Figure 1A: Confusion matrix for the experiment with 2 hidden layers of 40 and 50 neurons each respectively.

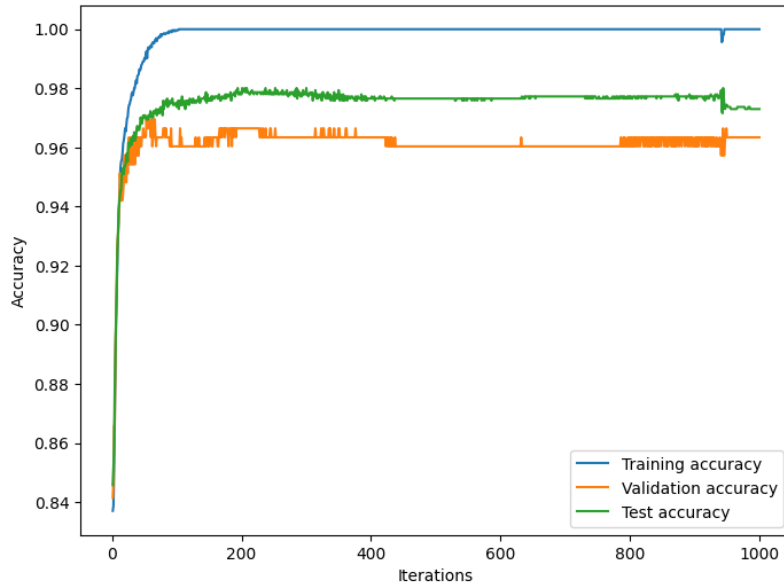


Figure 1B: The training, validation, and test accuracies plotted for the run with 2 hidden layers of 40 and 50 neurons each.

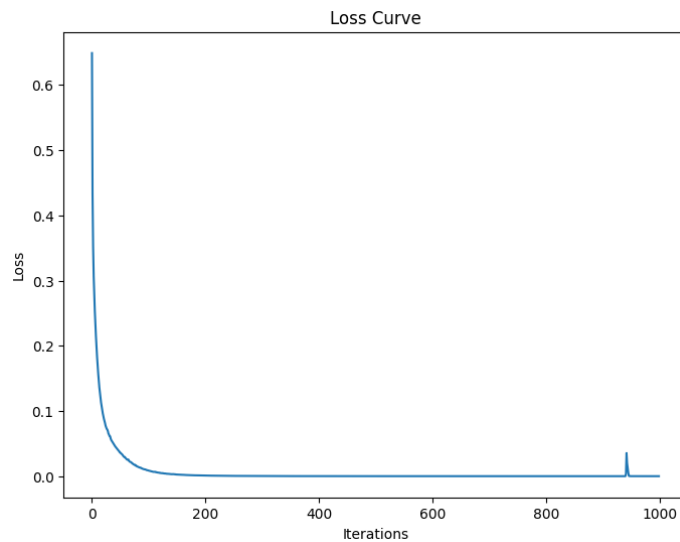


Figure 1C: The loss curve produced when the model was trained on a network of 2 hidden layers with 40 and 50 neurons each.

## Experiment 2:

For the second experiment, I still used 2 hidden layers, but I used 100 neurons in each layer. There was not a large observed difference from the first experiment. Here, the

training accuracy was 83%, and the test accuracy was 85%. The test accuracy had increased slightly, but the training accuracy had remained the same. Additionally, the increase in neurons did not decrease the number of false negatives produced.

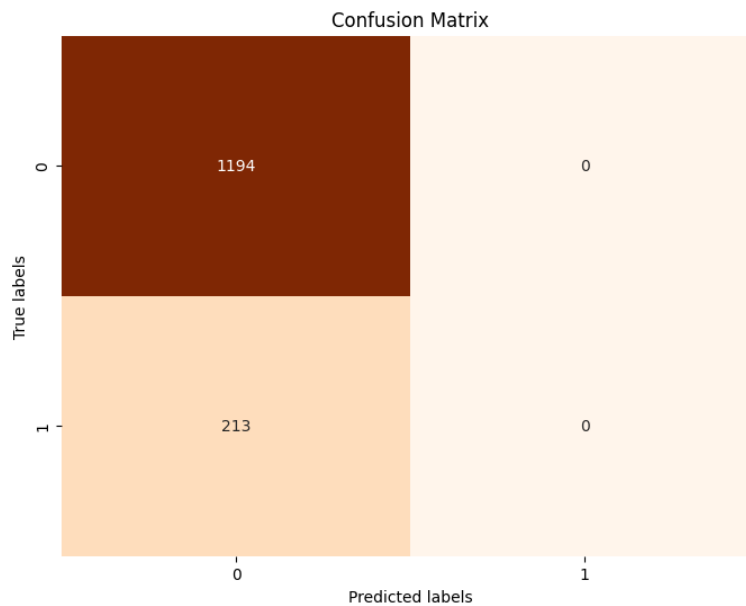


Figure 2A: Confusion matrix produced when training the model with 2 hidden layers of 100 neurons each.

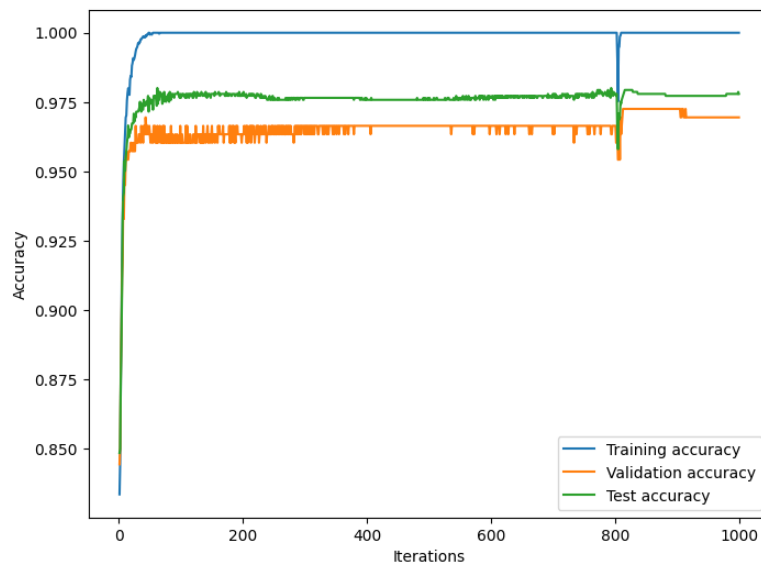


Figure 2B: Plot of the training, validation, and test accuracy when the model was trained with 2 hidden layers of 100 neurons each.

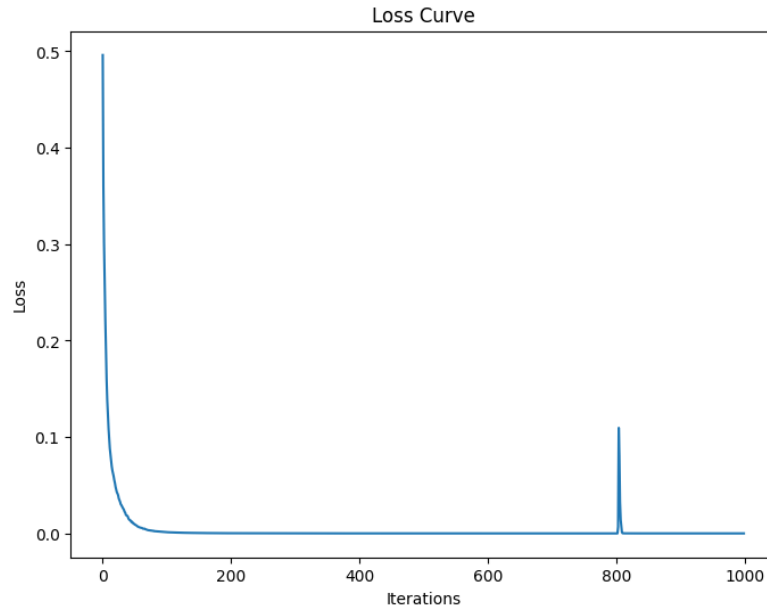


Figure 2C: The loss curve produced when the model was trained with a network of 2 hidden layers of 100 neurons each.

### Experiment 3:

For this experiment, I decided to increase the number of hidden layers. Because there was no drastic change between experiment 1 and experiment 2 with changing the number of neurons per layer, I decided to experiment with the number of layers. I completed with experiment with a network of 3 hidden layers each with 50 neurons. The training accuracy remained consistent at 83% whereas the test accuracy was 85%.

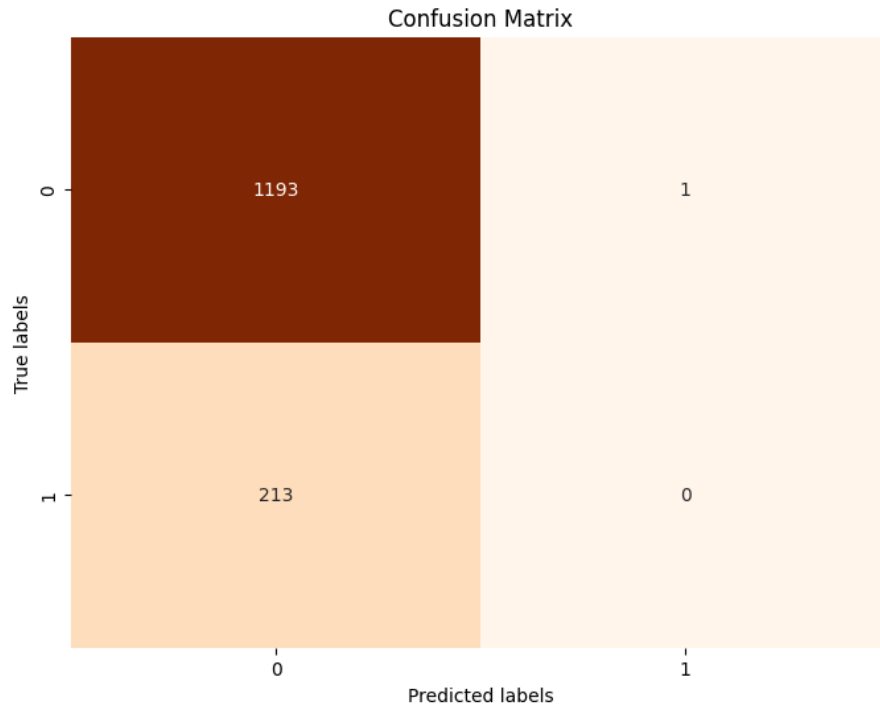


Figure 3A: The confusion matrix produced when the model was trained on a network with 3 hidden layers of 50 neurons each.

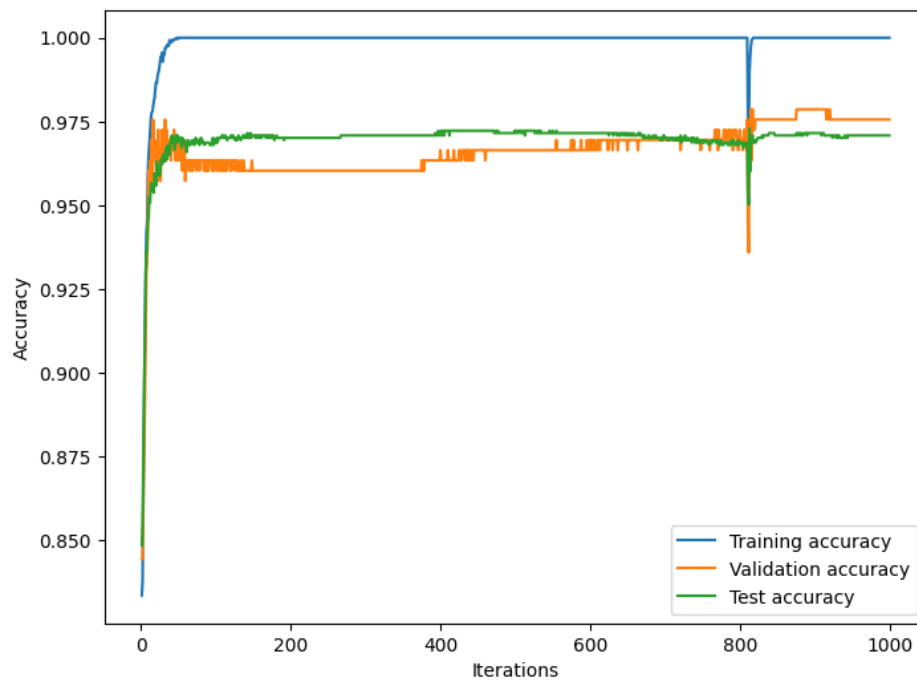


Figure 3B: The training, test, and validation accuracies plotted for a network with 3 hidden layers of 50 neurons each.

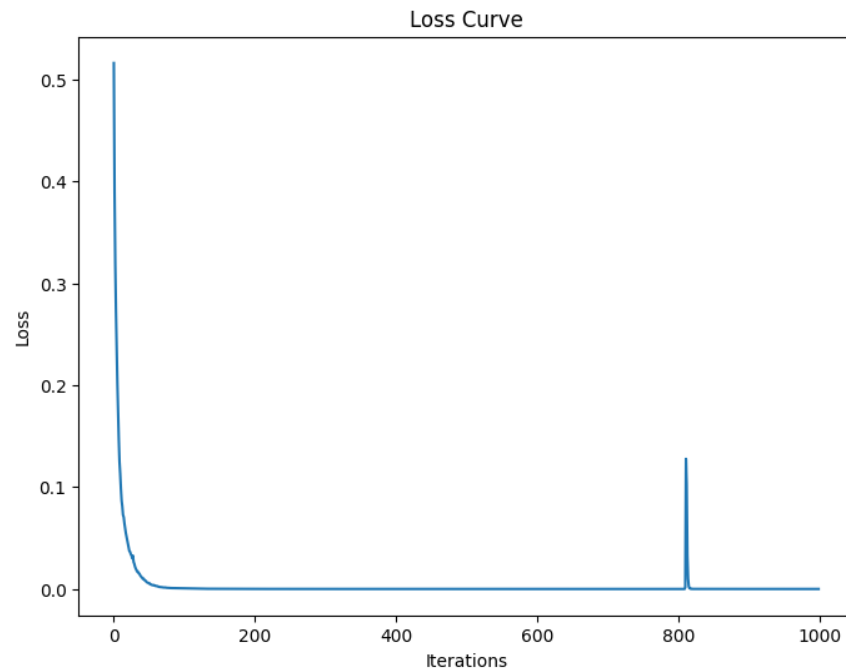


Figure 3C: The loss curve produced when the model was trained on a network of 3 hidden layers of 50 neurons each.