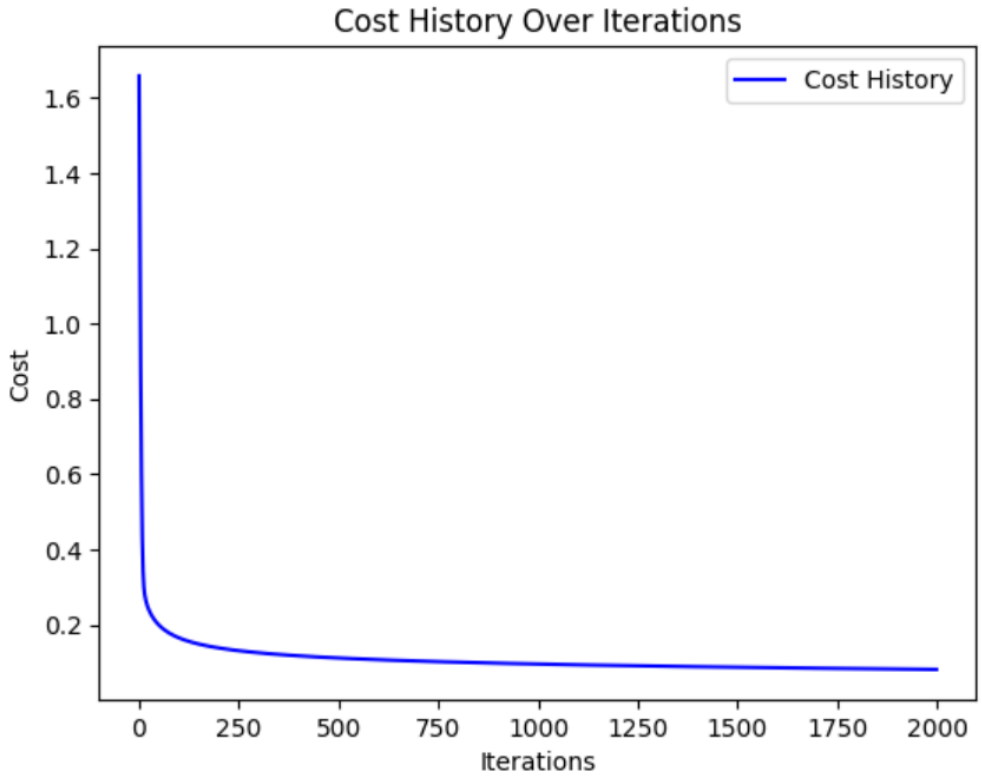
COMPSCI 589 Machine Learning
Assignment 4 Report

Task 1

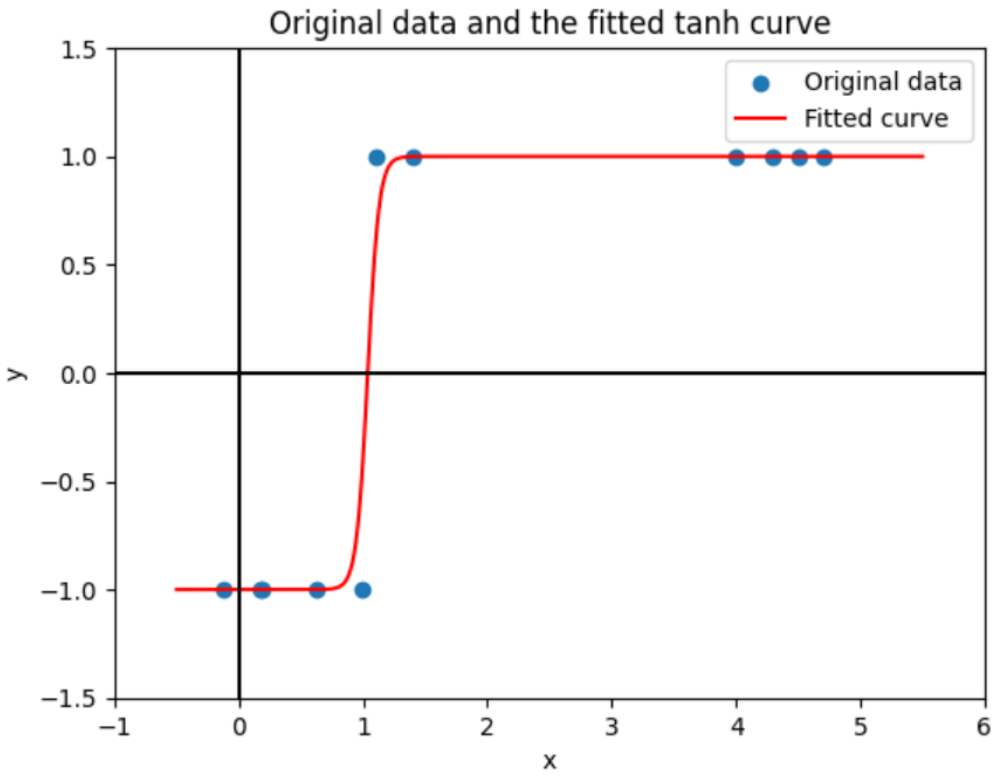
- Report both the accuracy and the misclassification of your model.

```
Misclassifications: 0
Accuracy: 100.00%
```

- A figure that shows cost history over iterations. In the figure, the X-axis is the number of iterations, and the Y-axis is the cost



- A figure that shows the original data and the fitted tanh curve. This figure should look like the one in this requirement. In this figure, you should clearly indicate which is the original data and which is the fitted tanh curve.



Task 2

- Describe the initial values you choose for weight, alpha, and max iterations, and provide the rationale behind your selection.

  I chose the following values for the parameters since I observed better results in terms of Misclassification and Accuracy.

```
# Hyperparameters
  max_iters = 2000
  alpha = 0.1

# Initialize weights for Softmax and Perceptron
  w_softmax = jnp.zeros((9,1))  # Shape matches the number of features
  w_perceptron = jnp.zeros((9,1))  # Shape matches the number of features
```

  Eg. When I changed the learning rate to 0.001, my results were as below

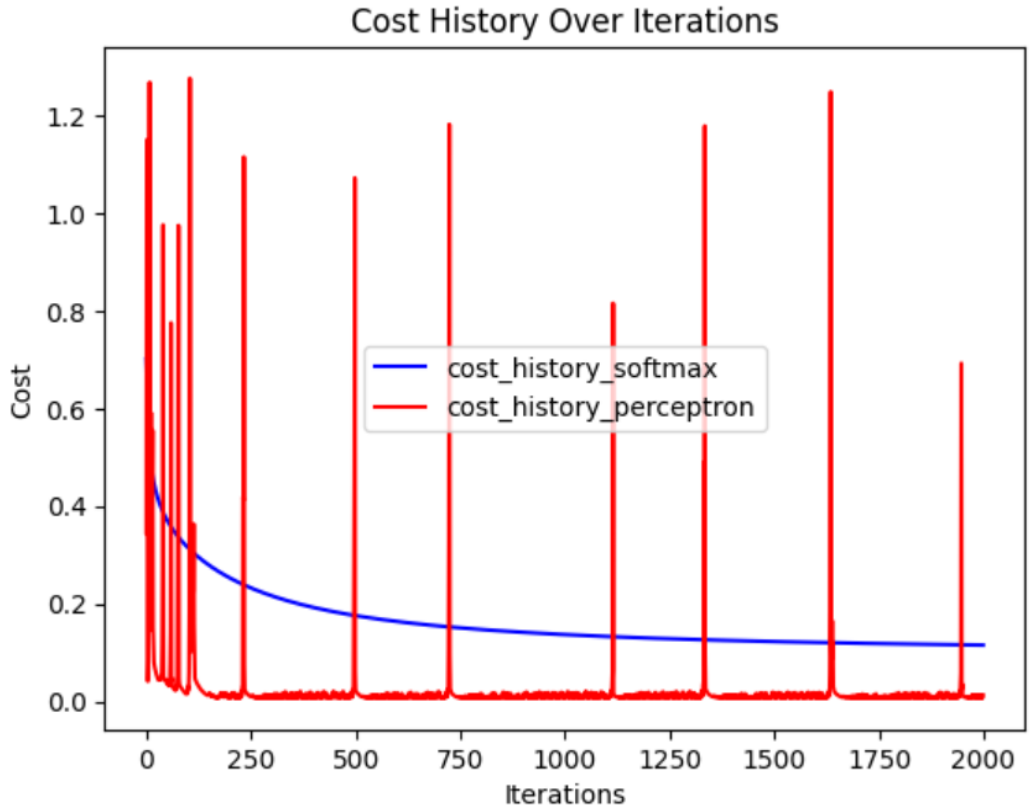
```
Softmax Misclassifications: 83
Softmax Accuracy: 88.13%
Perceptron Misclassifications: 41
Perceptron Accuracy: 94.13%
```

- Report both the accuracies and the misclassifications obtained from the two cost functions separately.

```
Softmax Misclassifications: 26
Softmax Accuracy: 96.28%
```

```
Perceptron Misclassifications: 29
Perceptron Accuracy: 95.85%
```

- A figure that compares the cost over iterations between two cost functions. In the figure, you should clearly indicate which line represents each cost function.



- A figure that compares the accuracy over iterations between two cost functions. In the figure, you should clearly indicate which line represents each cost function.