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Project 2
DSCI 372
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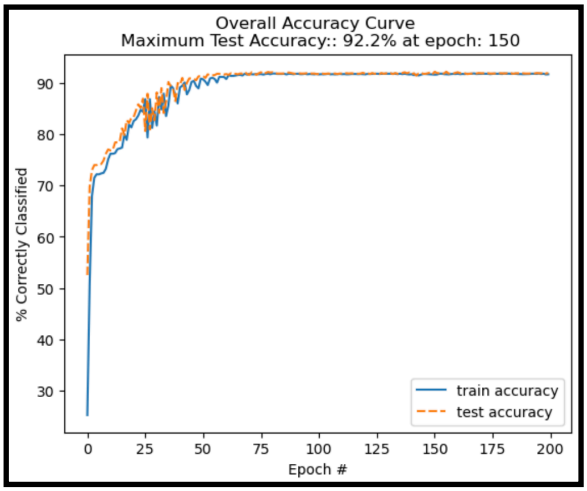
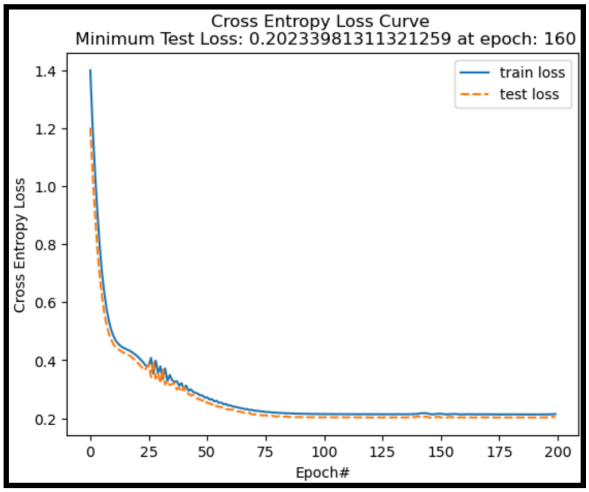
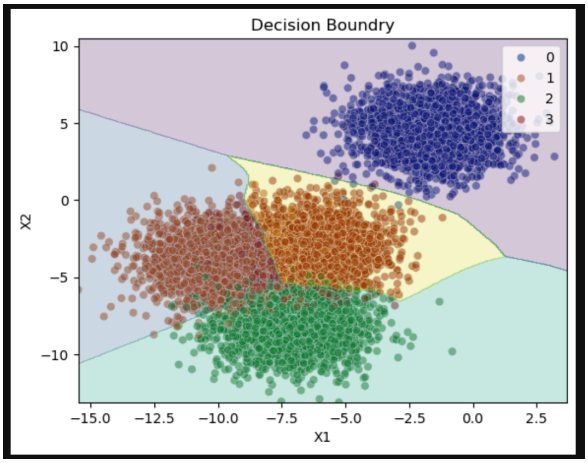
Part 1 - Multi-class Classification

For this part of the project I chose to use the Adam Optimizer with a learning rate of .002 and 200 Epochs. In my graphs I show which numbers of epochs had the optimal testing loss and maximum accuracy. We see that our test accuracy is highest at 150 epochs and the loss is minimized at 160 epochs. This decision boundary is showing us the decision boundary based on the training data at 200 epoch. When we have this many we could potentially run the risk of overfitting but we see with this model. That isn't happening. Below I will show the overfitting of a model based on the MINST fashion data, however here we get convergence of the test accuracy and training accuracy at around 92% and the cross entropy loss around 0.2. One





reason I can image the testing set having a better outcome here is that the testing set might have less noise in the data since it is a smaller set, this would give us a set of data that fits really well into a trained model.



Part 2 - ConvNet: MINST Fashion Data

Here we have our convolutional neural network using the MINST Fashion Dataset. I trained the set on the training set and used the validation set to tune the hyper-parameters. I again use the Adam optimizer and cross entropy loss for the L2 regularization loss. I had a learning rate of .001 and a regularization parameter of .005, I ran 40 epochs, and began to see overfitting. My model, if ran for long enough will eventually get a 99% accuracy on the training data, but the validation and testing data will have a worse accuracy and a higher average error as the number of epochs increases. It is interesting to me that the accuracy and loss curves look like horizontal mirror images of each other. If there was more time I think I would like to combine the validation and training data to train the model with the optimized parameters and see if there was better accuracy.