CS 422 Assignment 5 Report

Name(s) of the student(s) completing the assignment:

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The dataset you used, its source and characteristics:

https://www.kaggle.com/aungpyaeap/fish-market

Input Features of the dataset: Length 1, Length 2, Length 3, Height, Width

Output Feature of the dataset: Weight

A table showing how many iterations it took for training to converge with the three different combinations of model parameters you experimented with.

	Iterations
Model One	115
Model Two	327
Model Three	263

A table showing relevant evaluation metrics (MSE, MAE, R2) for the training dataset with the three different combinations of model parameters you experimented with.

Here are three models with different parameters to compare the performance between the three. Throughout the report, I will refer to them as what is shown in this section

Model One Parameters

- (hidden_layer_sizes = (10, 10, 10, 10, 10, 10, 10), solver = 'adam', max_iter = 100000)

Model Two Parameters

- (hidden_layer_sizes = (1000, 500, 250, 125, 60), solver = 'adam', max_iter = 100000)

Model Three Parameters

- (hidden_layer_sizes = (1000, 1000, 1000), solver = 'adam', max_iter = 100000)

Relevant evaluation metrics (MSE, MAE, R2) for the training dataset for both algorithms in Assignment 3.

Linear Regression:

- Mean Squared Error: 15437.23547451023
- Mean Absolute Error: 93.91140535396316
- R^2: 0.8797518697479778

Relevant evaluation metrics (MSE, MAE, R2) for the test dataset with for both algorithms in Assignment 3.

Linear Regression:

- Mean Squared Error: 12109.803906070745
- Mean Absolute Error: 88.3250802746941
- R^2: 0.8928702867801026

A table showing relevant evaluation metrics (MSE, MAE, R2) for the **training dataset** with the three different combinations of model parameters you experimented with.

	Model One	Model Two	Model Three
MSE	53490.17436868248	5111.051483917159	6169.93299275203
MAE	209.4645356975833	43.29832791444836	49.01583691230585
R^2	0.6068105894532015	0.9624302716535484	0.9546467674640118

A table showing relevant evaluation metrics (MSE, MAE, R2) for the **test dataset** with the three different combinations of model parameters you experimented with.

	Model One	Model Two	Model Three
MSE	50228.30336095811	5035.104459249387	6666.488657917153
MAE	206.4524919654745	41.75653731201287	58.471371077536254
R^2	0.4532655552780569	0.9451929518530291	0.9274353555516565

Comparison of performance metrics for MLP regressor and Linear Regression from Assignment 3.

For this comparison, I will use Model Two as the representative for MLP Regressor because it produced a better result than the other two models in terms of MSE, MAE, and R^2 although the iteration count was lower in Model Three

- The table below shows the training data set used for MLP Regressor and Linear Regression

	Linear Regression	MLP Regressor (Model Two)
MSE	15437.23547451023	5111.051483917159
MAE	93.91140535396316	43.29832791444836
R^2	0.8797518697479778	0.9624302716535484

- The table below shows the test data set used for MLP Regressor and Linear Regression

	Linear Regression	MLP Regressor (Model Two)
MSE	12109.803906070745	5035.104459249387
MAE	88.3250802746941	41.75653731201287
R^2	0.8928702867801026	0.9451929518530291