ECGR 5106 Homework 1

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I. Problem 1

Problem 1 focuses on looking at the overall and component mean of red, green, and blue themed images. For images that are consists mostly of a single color, you can tell which one it is by looking at the mean of the components of that image. This can be explained in the Neptune image where it is mostly a blue image and the blue mean component is the highest of the 3 components as seen in Out[43] to Out[47].

Image	Overall Mean	Red Mean	Green Mean	Blue Mean
Strawberries	0.3292	0.7124	0.1347	0.1404
Red Car	0.3402	0.4378	0.3347	0.2482
Red Flower	0.3506	0.4696	0.3152	0.2669
Trees	0.2514	0.1907	0.3756	0.1879
Forest Railroad	0.2518	0.1647	0.4056	0.1852
Grass	0.4056	0.4419	0.5070	0.2679
Blue Bird	0.6589	0.6444	0.6571	0.6751
Blue Flower	0.4779	0.3064	0.4601	0.6673
Neptune	0.1446	0.0750	0.1049	0.254

Table I: Images and their means

II. Problem 2

Problem 2 focuses on changing the temperature model from a linear system to a non-linear system and compare it with the linear model. The models were trained using 5000 epochs and between 0.1 to 0.0001 learning rates. The learning rate that performed the best for the non-linear system was 0.0001 learning rate with a loss of 3.861744. The other learning rates was not able to find coefficients for the non-linear system. In the graph, the non-linear system did not perform as well as the linear system.

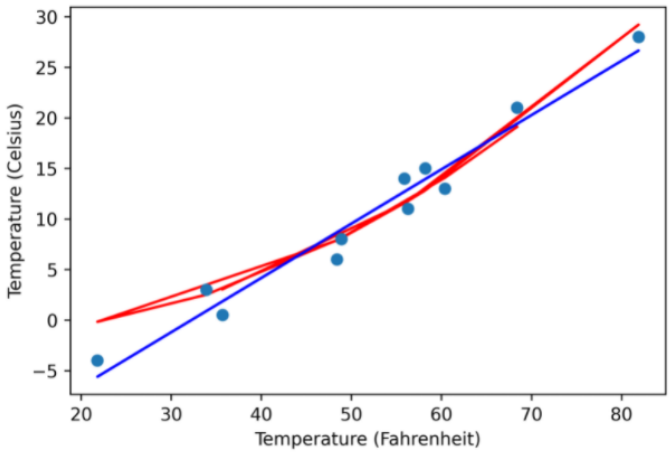

Figure 1: Graph of the Non-Linear and linear System and Ground Truth

III. Problem 3

Problem 3 involved using a house data set to predict the price of a house using the area, bedrooms, bathrooms, stories, and parking in a linear model. The models were trained using 5000 epochs and learning rates from 0.1 to 0.0001. The learning rate that was used was the 0.1 learning rate with a loss of 0.008655.

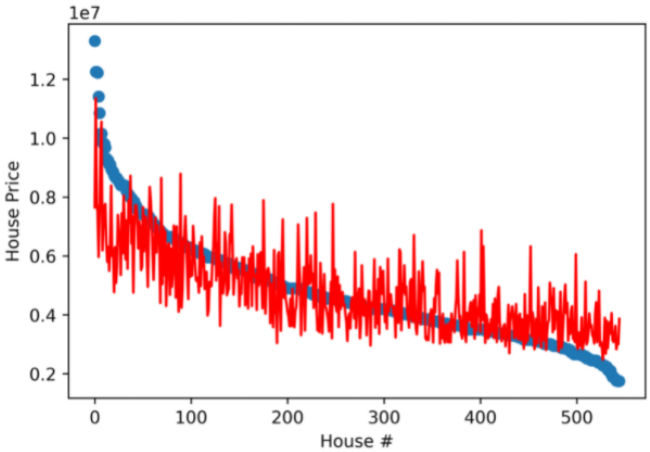

Figure 2: Graph of the Predicted and Actual House Prices