ENPM808A-INTRODUCTION TO MACHINE LEARNING

FINAL PROJECT

SUBMITTED BY

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PROBLEM STATEMENT

- Through an efficient machine learning algorithm, the action commands for the robot to move around should be predicted.

DATA PRE-PROCESSING

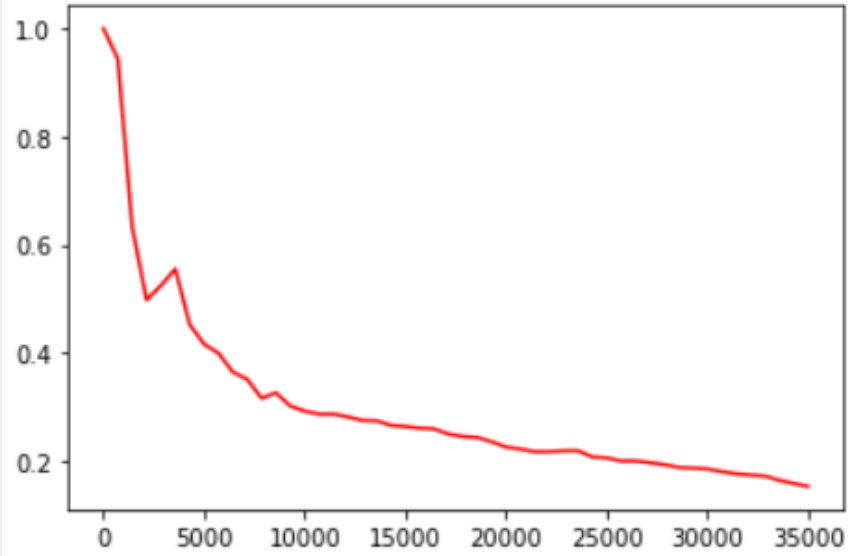
- A field of view of 30 degrees is taken as one value and hence the laser data is brought down to 9 columns.
- The current robot position, the local goal and the final goal positional data has x, y and q values contributing 3 columns each.
- A testing dataset, a training dataset and a validation dataset are segregated from the given data set for further learning.

MODEL SELECTION AND VALIDATION

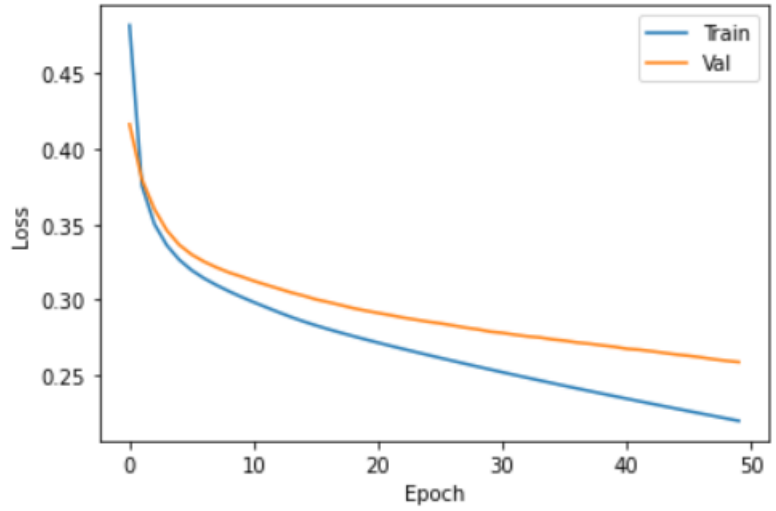
- For this project, LINEAR REGRESSION FROM SKLEARN and NEURAL NETWORKS FROM KERAS TENSORFLOW are taken and compared.
- .Then, the validation error E_val is calculated for both models.
- The model with better E_val is considered to be the best model to implement and test out with the testing data.

SELECTION OF THE PREDICTION MODEL

Eval for LINEAR REGRESSION [0.1139935 0.06222696]



Eval of translational velocity for Neural Network [0.10823153]
Eval of rotational velocity for Neural Network [0.0638172]



SELECTION OF THE PREDICTION MODEL

- From the learning curves and Eval values of both the models , the performance of the neural network model is better.
- The regularization of the neural network model is observed after purposefully overfitting the data.

TESTING THE DATA AND EVALUATING OUT OF SAMPLE ERROR

```
Etest for lin vel 0.0843801184253638
Etest for ang vel 0.04773384888149761
Eout for translational velocity 0.30887426586226197
Eout for rotational velocity 0.2722279963183958
```