**Reason and method for NN**

* One hidden layer was used for all of these because, one hidden layer is sufficient for a universal approximator. ( the universal approximation theorem)
* Solving it with a two-layer feed-forward network trained with Levenberg-Marquardt: consist of 1 hidden layer and an output lay.

**How to load Weights**

1. Open Weight\_check.m
2. Change load(‘….’) depending on the model you want to check
3. Run
4. Should see 10 regression plot models, 1 plot with all performances per nodes, Best\_weight will be selected

**Important variables included in files to be loaded**

%{

wb weight and bias values as single vector

b Cell array of bias vectors

IW Cell array of input weight matrices

LW Cell array of layer weight matrices

perf vector containing performance 10:100

x Input of model trained

y output

tr training structure contains 30 result from training

%}

|  |  |  |
| --- | --- | --- |
| Model trained on | Notes | Saved file title |
| * Dist from +X * Dist from +Y * Dist from -X * Dist from -Y * Init X * Init Y * Final X * Final Y * Distance traveled | -To load regression plot load mat file 🡪  Then run section: %% Plot regression models | Minus\_Y\_Target\_9\_weights\_regression.mat  Minus\_X\_Target\_9\_weights\_regression.mat  Plus\_Y\_Target\_9\_weights\_regression.mat  Plus\_Y\_Target\_9\_weights\_regression.mat |
| * Dist from +X * Init X * Init Y * Final X * Final Y * Distance traveled | -To load regression plot load mat file 🡪  Then run section: %% Plot regression models | Minus\_Y\_Target\_6\_weights\_regression.mat  Minus\_X\_Target\_6\_weights\_regression.mat  Plus\_Y\_Target\_6\_weights\_regression.mat  Plus\_Y\_Target\_6\_weights\_regression.mat |
| * Init X * Init Y * Final X * Final Y * Distance traveled |  | Minus\_Y\_Target\_5\_weights\_regression.mat  Minus\_X\_Target\_5\_weights\_regression.mat  Plus\_Y\_Target\_5\_weights\_regression.mat  Plus\_Y\_Target\_5\_weights\_regression.mat |
| * Init X * Init Y * Final X * Final Y * Dist from +X |  | Minus\_Y\_Target\_IFnDis\_weights\_regression.mat  Minus\_X\_Target\_IFnDis\_weights\_regression.mat  Plus\_Y\_Target\_IFnDis\_weights\_regression.mat  Plus\_Y\_Target\_IFnDis\_weights\_regression.mat |
| * Dist from +X * Distance traveled |  | Minus\_Y\_Target\_Dis\_weights\_regression.mat  Minus\_X\_Target\_Dis\_weights\_regression.mat  Plus\_Y\_Target\_Dis\_weights\_regression.mat  Plus\_Y\_Target\_Dis\_weights\_regression.mat |
| * Dist traveled * Dist from +X * Dist from +Y * Dist from -X * Dist from -Y |  | Minus\_Y\_Target\_AllDis\_weights\_regression.mat  Minus\_X\_Target\_AllDis\_weights\_regression.mat  Plus\_Y\_Target\_AllDis\_weights\_regression.mat  Plus\_Y\_Target\_AllDis\_weights\_regression.mat |
| * Dist from +X * Dist from +Y * Dist from -X * Dist from -Y * Init X * Init Y * Final X * Final Y |  | Minus\_Y\_Target\_8\_weights\_regression.mat  Minus\_X\_Target\_8\_weights\_regression.mat  Plus\_Y\_Target\_8\_weights\_regression.mat  Plus\_Y\_Target\_8\_weights\_regression.mat |