Compare The Relationship Between Validation ‘Mean Square Error’ And Model Structure.

An experiment by Chia Hao Tang

How the model structure impact the accuracy?

In deep learning,we don’t know the precise rule between improving the accuracy and buliding the model structure.

In the reason,I want to test the relationship between the accuracy of each other under different neural network structures.

1. Setup

➔ **Experiment environment**

The data include 4 million+ PUBG player's data,each data include 27 features and final ranking.

➔ **Test mode**

In model structure. We set the 4 different depth of hidden layer(1~4). each depth of hidden layer set 5 different number of neural network elements(50,100,150,200,250).

So we will test the 20(4*5)mode to compare the 'mean square error' of each mode.

→ Experiment environment

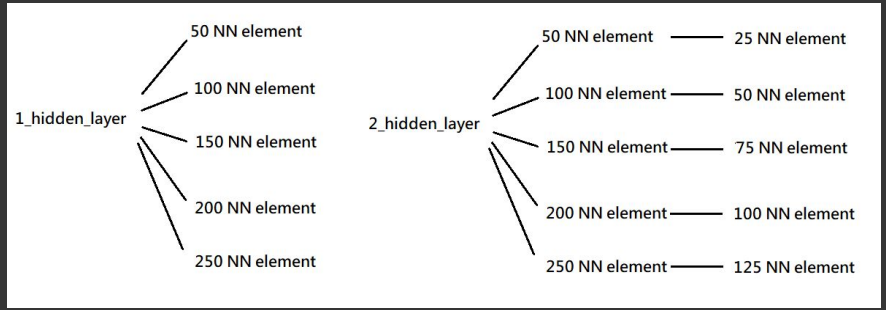
- Our data include 4 million+ PUBG round's data,each data include 27 features and final ranking which corresponding to each data. We will translate the ranking to score. (last ranking->0 and first ranking->1)
- We split the 4 million+ data to 3 million+ data as training data and 1 million+ data as validation data.
- Our goal is using training 3 million+ data to train the model and validate the validation data and take the difference between exact score(in data) and predict score(model predict). This difference also call **validation mean square error.**
- In the experiment, **we focus on the relation between each the model structure and its validation mean square error.**

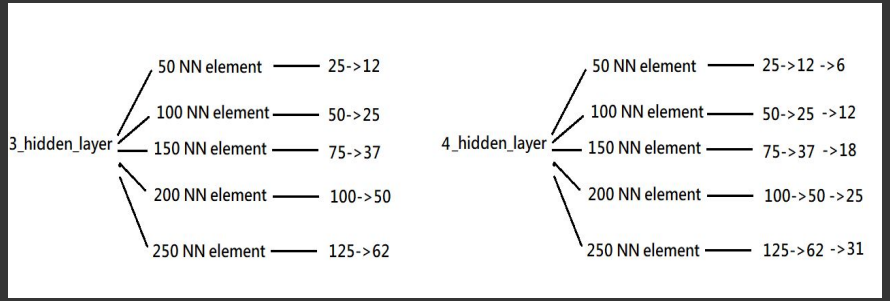
Tip

The data source is from Kaggle: https://www.kaggle.com/c/pubg-finish-placement-prediction

→ Test mode

- In model structure. We set the 4 different depth of hidden layer(1~4). each depth of hidden layer set 5 different number of neural network elements(50,100,150,200,250).
- So we will test the 20(4*5)mode to compare the 'mean square error' of each mode.
- The samples of mode are :





2. Experiment Result

➔ **The bar graph**

We use the bar graph to show the difference of validation mean square error of each mode.

➔ **The barh graph**

We use the barh graph to show the difference of validation mean square error of each mode.

➔ **The line graph**

We use the line graph to show the difference of validation mean square error of each mode.

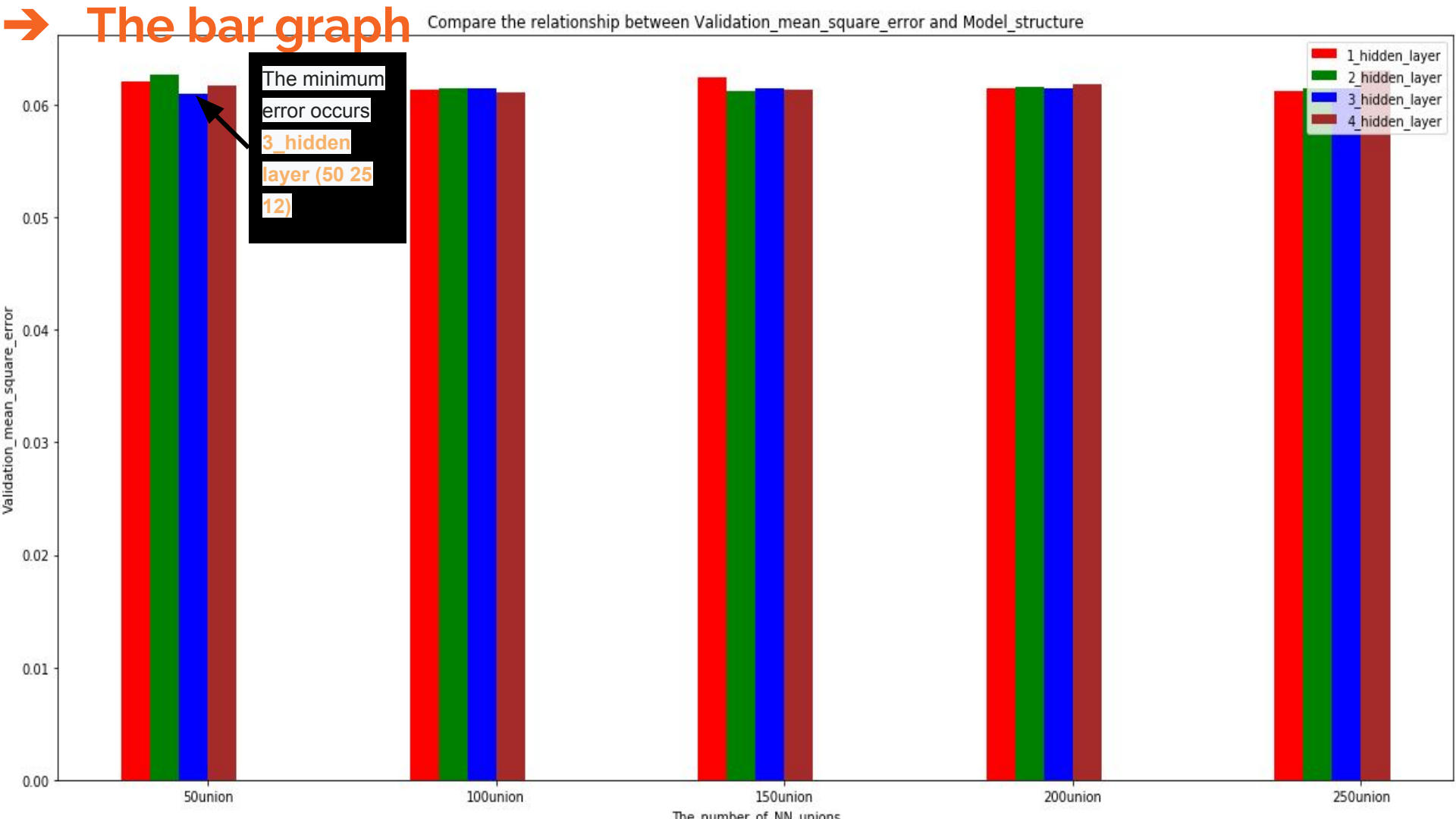
C	D
Mode	Validation_mean_square_error
1_hidden_50	0.06202605255
1_hidden_100	0.06134020556
1_hidden_150	0.06239121109
1_hidden_200	0.06140335519
1_hidden_250	0.06116325371
2_hidden_50_25	0.06265156604
2_hidden_100_50	0.06144620385
2_hidden_150_75	0.06116191167
2_hidden_200_100	0.06156295072
2_hidden_250_125	0.06153969225
3_hidden_50_25_12	0.06106214188
3_hidden_100_50_25	0.06139868349
3_hidden_150_75_37	0.06150997374
3_hidden_200_100_50	0.06147150416
3_hidden_250_125_74	0.06137745101
4_hidden_50_25_12_6	0.06170827169
4_hidden_100_50_25_12	0.06113834213
4_hidden_150_75_37_18	0.0613047557
4_hidden_200_100_50_25	0.06180651728
4_hidden_250_125_62_31	0.06299741585

Experiment Result

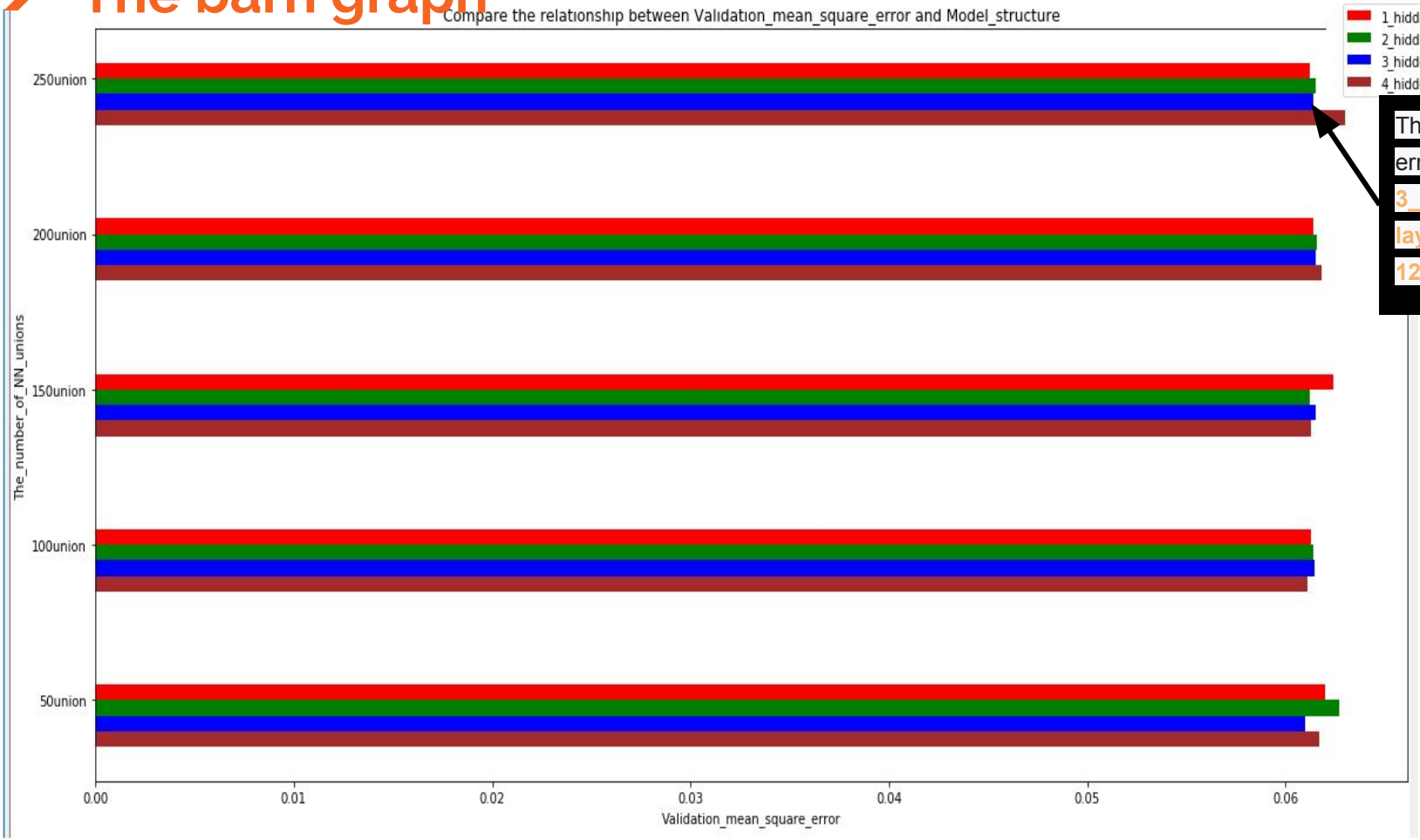
Lowest error

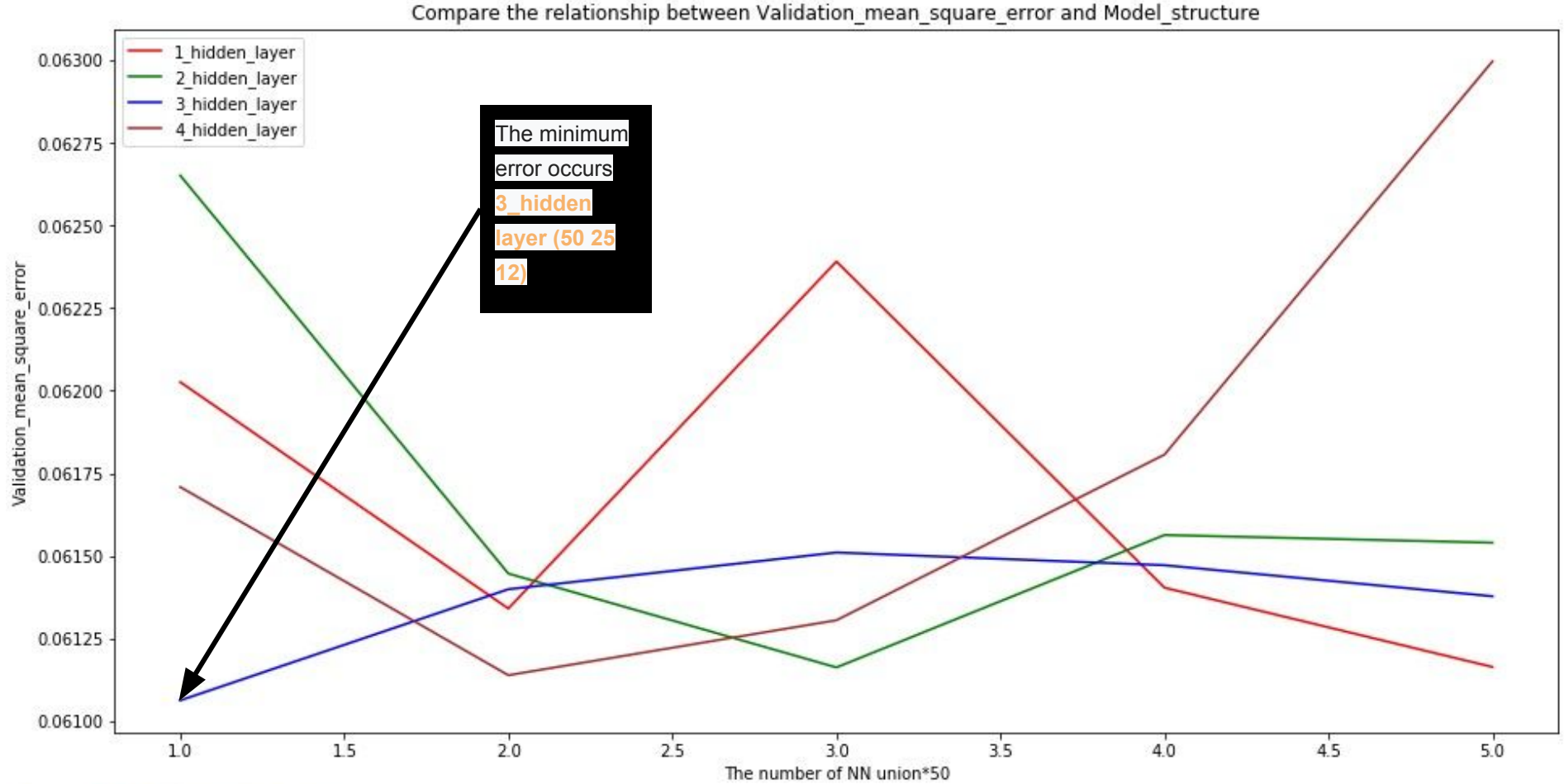
The experimental results show that the values are very close, and we will plot the 3 type graph(bar,barh,line).

The bar graph



The barh graph




Compare the relationship between Validation_mean_square_error and Model_structure
1_hidden_layer
2_hidden_layer
3_hidden_layer
4_hidden_layer
The minimum error occurs 3_hidden layer (50 25 12)
Validation_mean_square_error
0.06300
0.06275
0.06250
0.06225
0.06200
0.06175
0.06150
0.06125
0.06100
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
The number of NN union*50