Details of parameter optimization

Randomly tried different parameter settings to have an educated guess for the grid search

LSTM

epochs	**2**	**5**	**10**	**100**	**1000**
1 layer, 3 neuron, basic n_lag	32.97%	38.04%	35.52%	39.71%	33.22%
1 layer, 3 neuron, [1, 10, 20, 10, 10]	X	X	37.97%	43.36%	X
1 layer, 3 neuron, [3, 3, 3, 3, 3]	X	X	44.64%	X	X
1 layer, 10 neuron, basic n_lag	X	X	27.90%	36.44%	X
2 layer, 3 neuron, basic n_lag	X	44.08%	49.86%	X	X
3 layer, 3 neuron, [1, 10, 10, 10, 10]	X	X	56.70%	48.61%	X
5 layer, 3 neuron, [1, 10, 10, 10, 10]	X	X	52.31%	52.23%	X
3 layer, 2-3-4 neuron, [1, 10, 10, 10, 10]	X	X	54.95%	X	X
3 layer, 4-3-2 neuron, [1, 10, 10, 10, 10]	X	X	56.01%	X	X

Conclusion:

- The increased number of layers, up to a point, results an increase in precision. The optimal number seems to be 2 or 3. 1 or 5 layers gives a worse estimator.
- Same for the neurons - the best result was achieved with 3 neurons. Setting different number of neurons to different layers does not change the result significantly.
- Setting the n_lag parameter from [1, 10, 20, 25, 30] to [1, 10, 10, 10, 10] results a significant increase in precision. One possible reason for this is the model is already trained properly therefore the longer the time window there is a higher risk for over fitting.
- The optimal epoch number seems to be around 10.

ANN

1 layer, 10 neuron, 10 batch, n_lag default,	X	X	X	39.61%	X
1 layer, 5 neuron, 10batch, n_lag default	X	X	X	43.16%	X
1 layer, 5 neuron, 5 batch, n_lag default	X	X	X	32.26%	X
3 layer, 12 neuron, 10 batch, n_lag=[1,10,10,10, 10]	X	X	X	46.45%	X
3 layer, 12 neuron, 10 batch, n_lag=[1,10,20,25, 30]	X	X	X	46.80%	X
4 layer, 10 neuron, 10 batch, n_lag default	X	X	X	48.96%	X
4 layer, 10 neuron, 10 batch, n_lag=[1, 10, 10, 10, 10]	X	X	X	51.25%	X
4 layer, 5 neuron, 10 batch, n_lag=[1, 10, 10, 10, 10]	X	X	X	52.38%	X
8 layer, 10 neuron, 10 batch, n_lag default	X	X	X	42.93%	X

Conclusion:

- The system is sensitive to the number of batches. 10 batch is better with 10% than 5 batch.
- When we chose the optimal number of layers based on this table we conclude there is no difference between 5 or 10 neurons. This could mean that 5 neurons are “important” and when we have then the other fives that are “less important” have weights close to zero.
- The ANN method is faster than the LSTM and it needs more epoch therefore I used 100 epochs throughout the test.