Exploring the applicability of Seq2Seq architecture to Intraday Technical trading
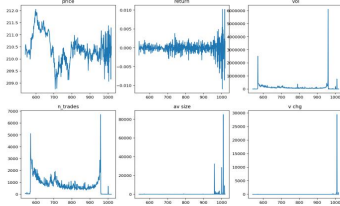
1 The problem: Knowing the behavior of a stock price or portfolio in a window of 60 – 100 minutes, can we predict returns in 5 – 60 minute window?

Having observed this (and other features of a portfolio)

Can I predict posterior return sequences or cumulative return?

2 We start with price data and develop minutely features: price, volume, volume change, returns, number of trades, maximum price

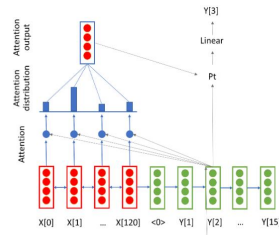**3** And create a dataset with 34 features using 7 stocks and an index

4 We use a seq2seq architecture with attention, like what is used for language modelling

5 Hyperparameters tested:
- All Linear layers with Bias, no bias
- Encode window: 60 – 120 minutes
- Decode window: 5 – 60 minutes
- Loss: Mean Squared Error
- Hidden size: 128, 256, 512, and 1024 (256 was best)
- Layers: 1 – 4 (2 -3 layer did best on loss)
- Adam Optimizer
- Dropout 0 – 0.3 (did not seem to affect results)

7 Future work:
- more data, bigger dev set -> get loss curves to look better
- Vary batch sizes to smooth performance
- Error analysis: does system perform equally in all days of week? hours of day
- Add 1d convolutions to develop additional features
- Develop portfolio selection criteria
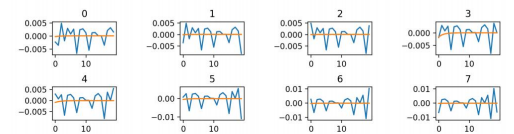
6 Experiments

Predict a sequence

Experiment 1: Predict a sequence

Encode data: sequence of 120, 100, or 60 minutes of feature set

Decode data (predict): sequence of 5, 10, 15, 60 minutes of TTD returns

System did not learn! Predicted flat line…

batch_size 8 x_len 120 y_len 20 h_size 10 n_layers 1 lr 1.00e-03 train_iterations 100

Predict cumulative return

Experiment 2: Predict a value – the cumulative return

Encode data: sequence of 120, 100, or 60 minutes of feature set

Decode data (predict): cumulative return 5, 10, 15, 60 minutes of TTD returns

System did not do well – 48% chance of predicting return sign correctly

Loss did not fall smoothly

Seemed to predict return sign correctly only 48% of time