Deep learning for portfolio management

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https://youtu.be/FKtgHa18Q44

Introduction:

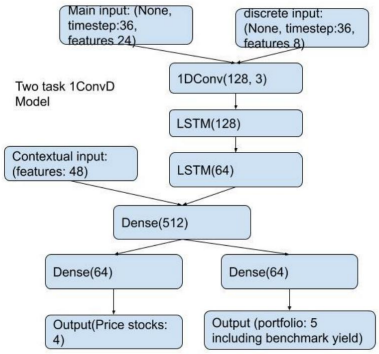
A multi inputs and outputs LSTM model
Predict portfolio directly other than predict stock price

Data:

S&P 500 stock

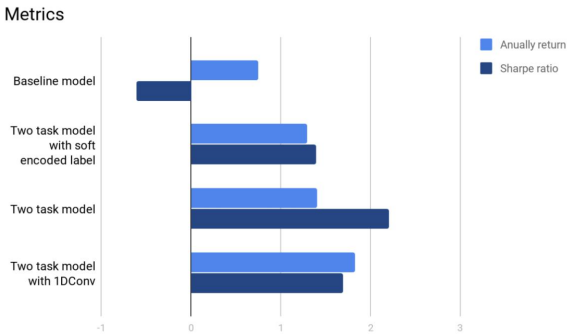
	date	volume	open	close	high	low	adjclose
0	1997-05-15	72156000	2.437500	1.958333	2.500000	1.927083	1.958333
1	1997-05-16	14700000	1.968750	1.729167	1.979167	1.708333	1.729167
2	1997-05-19	6106800	1.760417	1.708333	1.770833	1.625000	1.708333
3	1997-05-20	5467200	1.729167	1.635417	1.750000	1.635417	1.635417
4	1997-05-21	18853200	1.635417	1.427083	1.645833	1.375000	1.427083

Model Structure:



Dropout(0.2) Adam(0.001)
Batch: 64 Time step: 32
Filter size: 3 Epoches:500

Results:



Future work:

1. simulate slippage and add taxes
2.try longer time step and more stocks combination
3.capture relationship among stocks by using advanced algorithm

Key points:

-Two task

The two task share the same LSTM and some dense layers. We want the portfolio prediction task can learn some information form price prediction task. It's a simple transfer learning

-Set label and loss:

Method1: softmax the daily return(excluding negative return)
Method2: use daily return directly
Unlike using mean square loss for price prediction. We use categorical cross entropy loss when predicting the portfolio.

$$-\sum_{c=1}^{M} y_{o,c} \log(p_{o,c})$$

-1DConv:

When the input dimension is large, the 1DConv can reduce the dimension and let us train model fast.