CAP 6615 Neural Network

University of Florida

Cap 6615

**Programming Assignment 4 -- Recurrent Neural Network**

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**CAP 6615 - Neural Networks - Programming Assignment 3 – Recurrent NN**

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Extra Credit

For Extra Credit, we use a different method to get our sell and buy signal.

6.1 Add buy signal to the label （描述如何通过+1-1什么的判断出buy signal）

First create sliding windows array. There are 15649 windows (each window contains 28 days price). Within a window, use for loop to make current day price minus previous day price (e.g. day 2 price minus day 1 price). If current day price is lesser, our array will append 1, else append -1. This will convert price to price fluctuation pattern (fluctuation pattern will also reflect ABCD pattern). Then we use these patterns as features vectors and use Pearson Correlation as our labels to train our CNN. Then we use our CNN output to train our RNN.

After RNN is being trained, we make it produces 28 days price prediction. This prediction will then be put back into CNN to check if buy signal exist inside these 28 days window. If buy signal exists, we will set the buying day to be the predicted day which has the highest price. And we set the selling day to be the predicted day which has the lowest price.

Our CNN parameters and training performances are shown as follow.

6.2 CNN和RNN的参数配置和训练效果

CNN parameters:

Learning rate = 0.001

Number of epochs = 200

Optimizer = Adam

Loss function = MSE

CNN Training performance:

Shape, square

Description automatically generated

RNN parameters:

rnn\_seq\_len = 28

rnn\_input\_size = 2

rnn\_output\_size = window\_size # 28

rnn\_hidden\_size = 16

rnn\_num\_layers = 1

rnn\_learning\_rate = 0.001

rnn\_num\_epochs = 100

RNN Training performance:

Chart

Description automatically generated with low confidence

6.2.1 神经网络架构以及训练时的参数

Our CNN has 3 convolutional layers. The kernel size is 3. We use Relu as activation function for each layer. We use max pooling for filtering. The code is shown as follow.

Graphical user interface, text, application

Description automatically generated

6.3 画出money的变化曲线

Chart, line chart

Description automatically generated

Sell and Buy Signal Profit

The profit is 27905.528505 for just trading one stock.

A picture containing Word

Description automatically generated

If we have 1,000,000 at the very beginning, we can buy 9203 shares. Therefore, the total profit would be 256,814,578.831515 dollars.

6.4 和最初只有sell signal的对比讨论

Chart, line chart

Description automatically generated

The profit is 14955.968391 for just trading one stock.

A picture containing Word

Description automatically generated

If we have 1,000,000 at the very beginning, we can buy 9203 shares. Therefore, the total profit would be 137,639,777.102373 dollars.

Comparing to both sell and buy signal strategy, the previous profit is double the amount of only sell signal strategy profit.