Forecasting daily Opening Prices of NYSE symbols using ANNs

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Abstract

Properly pricing options is a challenging task. The traditional method of the Black-Scholes model makes a number of critical assumptions that do not hold up to reality and do not deliver results with as much desired accuracy. This paper proposes the use of Generative Adversarial Networks (GANs) in pricing European options. GANs can quickly learn to generate data distributions with realistic properties in a data-driven approach. In this paper we (i) explore methods of tuning the model's parameters, (ii) test the architecture on a curated dataset of European instruments and (iii) evaluate the performance of the networks, comparing the results to already established pricing methods, like the Black-Scholes model, as well as real derivative data.

Keywords: Deep Learning, Generative Adversarial Networks, Options pricing, Neural Networks

Table of Contents

1 Introduction

The ability to predict changes in stock prices is extremely important to the financial world as it influences trading strategies

Goodfellow et al. introduced the Generative Adversarial model in 2014 [3]. The original paper presented a two-network architecture comprising of a generator network and a discriminator network. The generator net G is trained to trick the discriminator net D by generating realistic images and D would try and tell which of the images by G were real or generated. The two networks are trained simultaneously

test

test2 test3

2 Related Work

This section will introduce work related to stock market prediction, namely traditional asset pricing models and work related to the development of generative adversarial networks.

2.1 Stock Market Prediction models

ARIMA(1,1,1) data mining can predict stock prices [1]

2.2 Generative Adversarial Networks

This is a gan[3]

2.3 Testing some math

Here are two equations:

$$a = b + 1 \tag{2.1}$$

$$\frac{\hbar^2}{2m}\nabla^2\Psi + V(\mathbf{r})\Psi = -i\hbar\frac{\partial\Psi}{\partial t} \tag{2.2}$$

And here is some text with some nice inline math, (x, y) wow γ so cool ρ.

2.4 Testing citations

This is Fama[2] and this is Goodfellow[3]. This is another GAN citation[4].

3 Predicting stock prices with GAN

The following section provides details in the construction of the model for predicting stock prices, as well as a breakdown of the data used in the training of the network.

3.1 Defining the problem statement

3.2 Prediction Model

Here is a sentence, and you can see a nice picture in Figure 3.1.

Figure 3.1: A picture of the Brayford from Google Images.

Also, a table can be found in Table 3.1. You should use a LaTeX table generator like `https://www.tablesgenerator.com/` if you want to make your life easier.

Table 3.1: Here is a table. The caption goes above like this.

First name	Last name	Age
Bob	Bobbington	24
Joe	Bloggs	37
Billy	Bob	10

4 Results

4.1 Data set

4.2 Evaluation Metrics

4.3 Results

5 Conclusions

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References

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List of Tables

List of Figures