LaTeX Author Guidelines for CVPR Proceedings

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Abstract

Generative Adversarial Networks (GAN) have become a precedent for unsupervised generative modeling. While remaining infamous for being difficult to train and requiring an abundance of focused research. There are pre-existing GAN models, which we can use as a basis for our model. We will combine the ideology of GAN with Game Theory modifications implemented into a basic GAN model. We begin with a basic GAN model and present new algorithms to establish Games of GANs. With more research being conducted on the topic, there is a stable foundation of information to build off. Finally, we discuss the results of our works and attempt to present future research possibilities.

1. Introduction

The price fluctuation of good and stocks are often difficult to predict due to the numerous amounts of variables that play an important role of the price function. While there exists research that reflects on those expected variables, such as that of Romero [5], who used a variety of Long Short-Term Memory (LSTM) models and compared results to that of a GAN. And the research conducted by Srivastava, Khare and Vidhya [6] which compares multiple results comprised from other researchers and their unique test leading to their results. However, there has been minimal research on the price fluctuation of goods and stocks due to external events, such as war, pandemics, or environmental catastrophes. While reports have been brought up that show certain effects of specific tragedies, such as the COVID-19 pandemic report by Mead, Ransom, Reed, and Sager [2]. The rate that prices fluctuate of goods and stocks during times of crisis and compared to other times of crisis could potentially help uncover areas which are most impacted. Including opportunities for potential preventive measures to attempt to thwart a severe effect. In order to conduct and produce effective results, we will compare our results from the data sets produced by Kesternich, Siflinger, Smith, and Winter [4], and that from Boysen [**?**], and also that from Mouchtaris, Sofianos, Gogas, and Thophilos [3]. We will attempt to measure the expected and actual price fluctuation, per each unique catastrophe and how it developed over time of the catastrophe.

The source code for our project can be found at https://www.github.org/Nragis/cs4263-project.

2. Proposed Approach

For this project we will approach it in our own unique way. We will utilize the Energy Information Agency's Natural Gas dataset spanning the past several years. We will also utilize a time-series regression algorithm to analyze and predict the price for natural gas. Using a time-series regression algorithm should help us with utilizing and processing the data set we have chosen to its fullest extent utilizing every bit of knowledge we have to give an accurate prediction not only of the past but also the future. Utilizing this method our prediction data should be superior to the traditional econometric models and have the ability to predict future data points.

3. Experiments

4. Results

5. Related Work

From what we have observed there seems to be certain trends when trying to predict natural gas prices. The trend majority of the articles such as "Forecasting Natural Gas Spot Prices with Machine Learning" use is by taking the

price of the gas as far as you have a data set for and then using adaptive and regression models to predict the gas prices future. The next theme that some articles use such as "Deep Neural Network Model for Improving Price Prediction of Natural Gas" is that they look at the current trend of natural gas and other similar items on something like google and if there is a trend of natural gas possibly becoming volatile with other forecasts also coming to this conclusion then it changes the prediction accordingly. The least common way that I have found is one explored in the paper "Natural Gas Price Prediction with Big Data" where the authors use sentiment analysis on a large body of literature, most commonly the news. This way while uncommon is surprisingly effective with it being able to tell the sentiment within the text and according to how drastic it is it changes the predictions.

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