Stock Price Prediction Project

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1 Introduction

1.1 Overview

A stock market, also called equity market or share market, is a network of economic transactions, where the stocks of public companies can be bought and sold. The equity market offers companies the ability to access capital in exchange of a portion in the ownership of the company for interested outside parties.

In the stock market, other financial securities like exchange traded funds (ETF), corporate bonds and derivatives based on stocks, commodities, currencies, bonds, etc. can be traded. However, for purpose of this project only the exchange of stocks will be considered.

It is common to use stock market and stock exchange interchangeably, but the stock market is a general superset of the stock exchange. If someone is trading in the stock market, it means that it buys and sells stock/shares/equity on one (or more) of the stock exchange(s) that are part of the overall stock market.

The stock market offers an opportunity to investors to increase their income without the high risk of entering into their own businesses with high overheads and startup costs. On the other hand, selling stocks helps companies themselves to expand exponentially, when a company's shares are purchased it is generally associated with the increased in the company's worth. Therefore, trading on the stock market can be a win-win for both investor and owner.

The stock exchange that are leading the U.S. include the New York Stock Exchange (NYSE), Nasdaq, BATS and Chicago Board Options Exchange (CBOE). The Dow Jones Industrial Average (DJIA) is a price-weighted average of 30 significant stocks traded on the NYSE and the Nasdaq, it is the most closely watched market indicator in the world and it is generally perceived to mirror the state of American economy.

Projecting how the stock market will perform is a very difficult thing to do, there are so many factors involved in the prediction some of them emotional or irrational, which combined with the prices volatility make difficult to predict with a high degree of accuracy. Abundant information is available in the form of historical stock prices, which make this problem suitable for the use of machine learning algorithms.

Investment firms, hedge funds and individuals have been using financial models to better understand the market behavior and attempt to make projections in order to make profitable investments and trades.

1.2 Objective

The purpose of this project is to build some stock prices predictors. More specifically, the problem is to predict the closing price of a given company's stock in the trading days existing in a queried date range. For the scope of this project only the companies included in the Dow Jones Industrial Average are considered.

To address the problem, different machine learning methods are used in this project, they take historical stock data for a particular company over a certain date range (in the past) as training input, and output projected estimates for a given queried date range (in the future).

1.3 X

the strategy to follow is to approach the problem as a particular case of forecasting in time series. As in supervised learning, a generalized function is tried to be inferred from the existing data which already contains the ground truth, the difference with this approach is that the existing data is in the past and the data to predict in the future, i.e. there is a clear separation of the predictor's values used for training and prediction, instead of being mixed and distributed along the possible set of values.