Unveiling Market Trends

A Predictive Stock Market Analysis Using Python: McDonald's

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Summary

The company under study is McDonald's (MCD – Stock Symbol) with an analysis period of (1999 to 2023).

This report showcases the results of a study conducted through the lens of advanced programming, where historical data, machine learning algorithms, and statistical models converge to provide a forward-looking perspective on market movements.

The predictive stock market analysis involves the utilization of a powerful programming language, thus enabling to process vast datasets, execute algorithms, derive meaningful conclusions.

Introduction

McDonald's is a global fast-food giant with significant presence in the stock market. Understanding the historical trends of its stock performance can provide valuable insights into its financial health and market behaviour.

Historical stock data for McDonald's was obtained from an API (Application Programming Interface). The dataset includes weekly closing prices, trading volumes, and other relevant metrics over a specified time period.

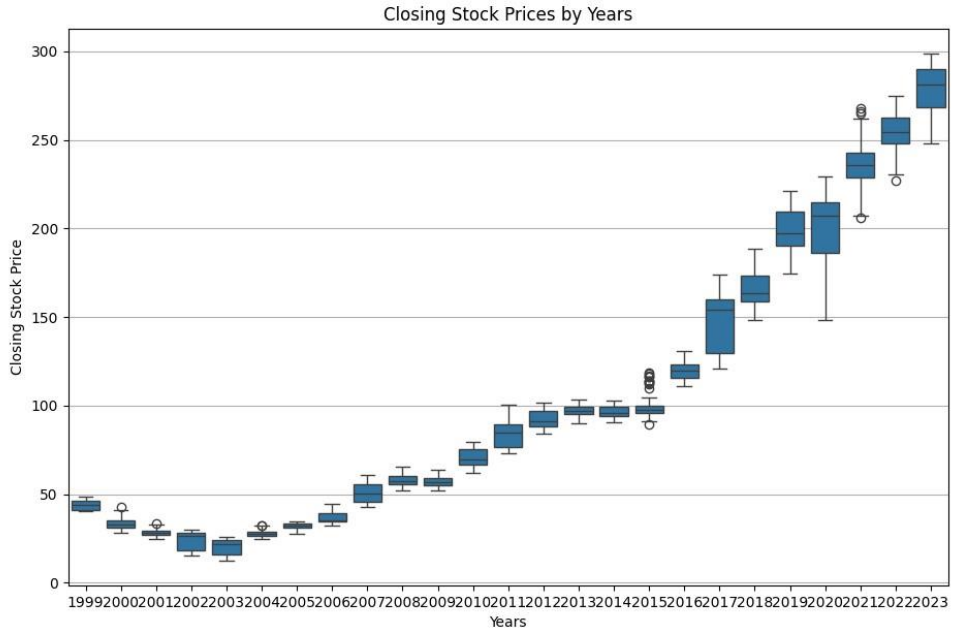
Exploratory Data Analysis (EDA)

Firstly, raw data was pre-processed to handle missing values, outliers and ensure data integrity. Additionally, the data was formatted to a time-series format to facilitate time-based analysis. Then, Descriptive Statistics, such as mean, standard deviation, and

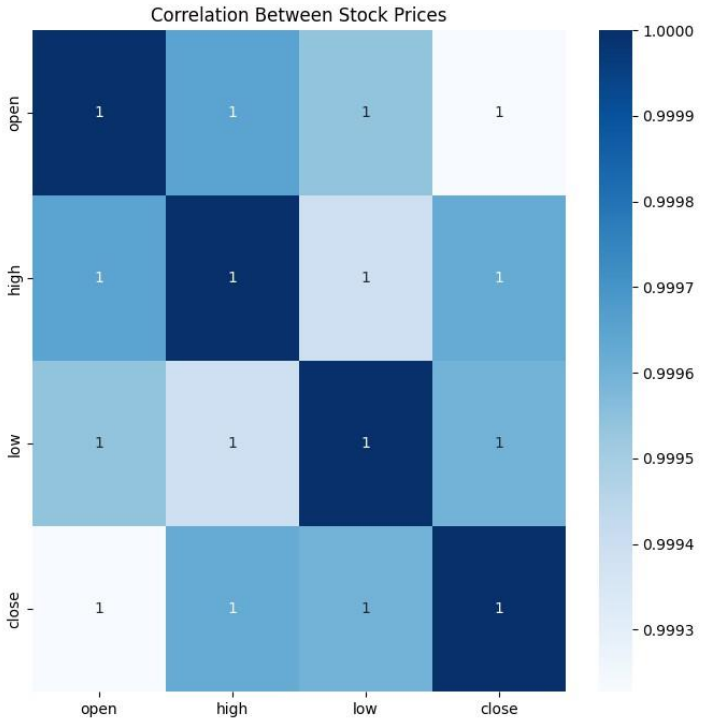
percentiles, were calculated to provide a summary of the central tendency and dispersion of McDonald's stock prices over the chosen time frame.

Preprocessing

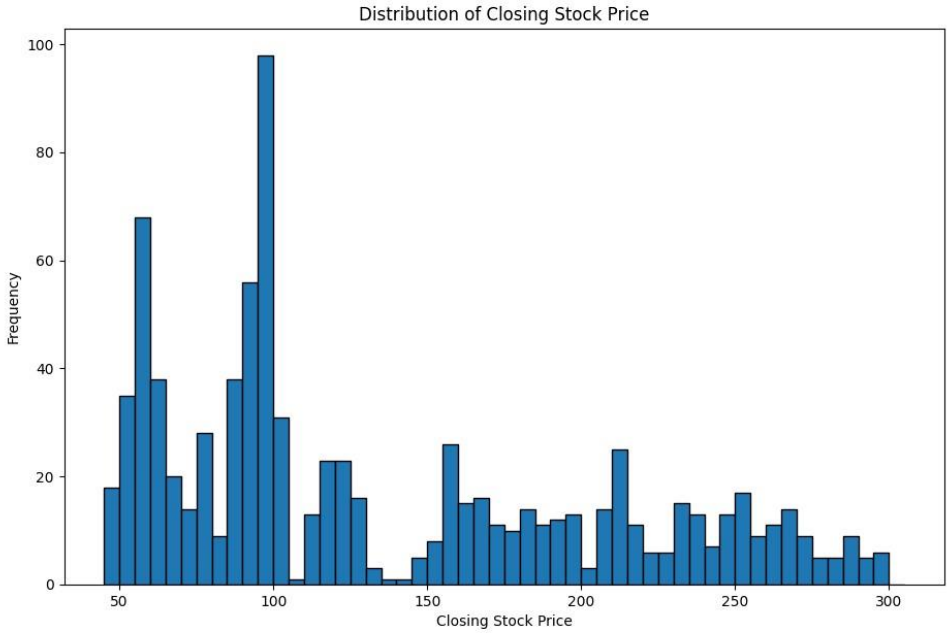
There are none Non-Null Values



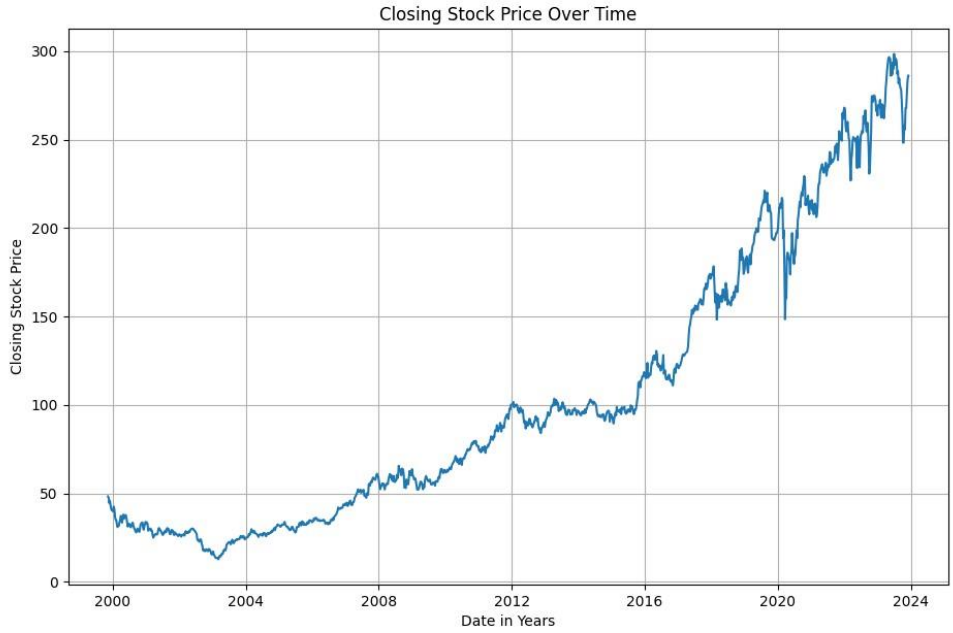
Boxplot – outliers



Heatmap – correlation



Histogram – descriptive statistics



Plot – visualization of the close stock price variable

Here, we can observe two different tendencies - before and after 2016. Also, we can point out several drop points (2001, 2008, 2020)

After identifying these, I present here possible explanations that affected the entire stock market and not only just the fast-food industry:

- 2001 – This year was marked by many significant events in the stock market. Here are two of them, first, dot-com bubble burst. This one is characterized by inflated prices of many internet-based companies. Most of these companies had seen their valuations rise to unsustainable level despite little or no profit. Second, the September 11 attacks. Stock markets were closed for several days following the attacks, and when they were reopened, there was a sharp sell-off as investors reacted to the uncertainty and geopolitical instability.

- 2008 – Global Financial Crisis (GFC) was the most severe worldwide economic crisis since the Great Depression of the 1930s. The financial crisis was caused due to deregulation in the financial world. Here are some of the causes:

Housing Bubble – A housing bubble is when an asset's price above its real value. In 2008, average housing prices had declined which made the borrowers default to avoid higher payments.
Predatory Lending – Predatory Lending means when lenders impose unfair, deceptive, and abusive loan terms on the borrowers.
Bad Economic Assumptions - Defore the crisis, it was assumed that the home prices would never decline. This led to various underwriters and investor in mortgage-backed securities on the assumption that these were risk free.

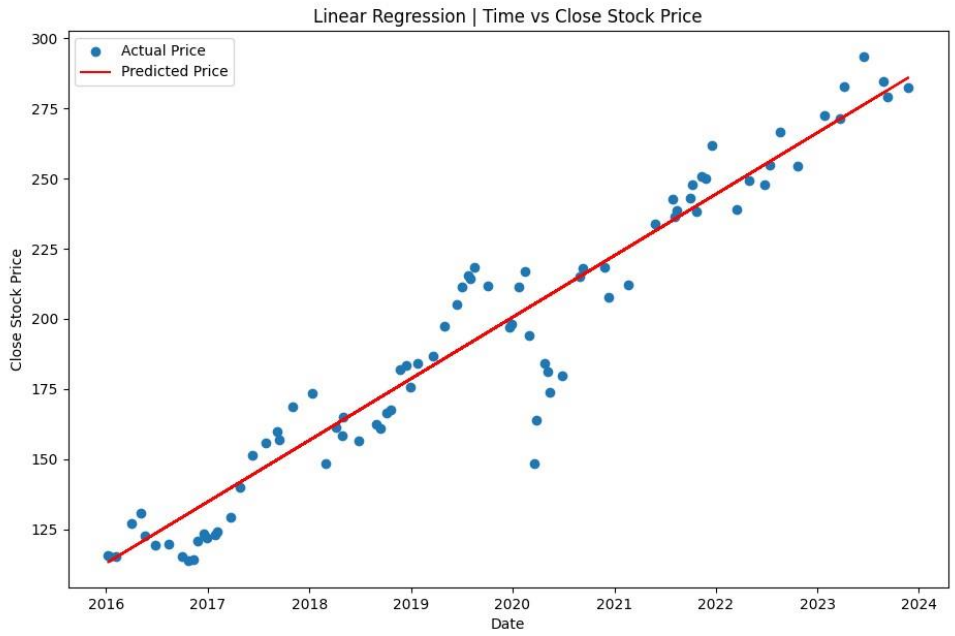
- 2020 – 2020 was heavily influenced by the unprecedented challenges posed by the COVID-19 pandemic. The rapid spread of the novel coronavirus resulted in lockdowns, disruptions to supply chains, and a significant contraction in economic activity. Financial markets responded with sharp declines as investors retracted with the uncertainty surrounding the duration and severity of the pandemic.

- 2016 – What changes McDonald's made that might explain this new positive trend it has on the stock market?
  The company hired a new CEO.
  A rebrand towards healthier food and lifestyle.
  A redesigned and simpler menu.
  It started to serving breakfast all day.
  A delivery service was launched in New York, which later, through a partnership with Uber Eats, expanded into a nationwide delivery network in the United States.

Predictions

1. Linear Regression

For the present study, only data from 2016 will be considered to ensure the most accurate results.



Plot – prediction through a Linear Regression model

Model best attempt:

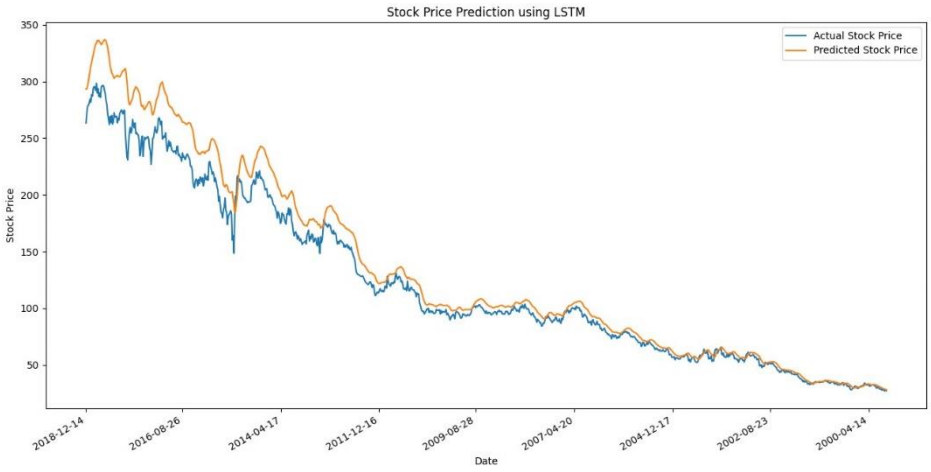
- Mean Squared Error (MSE): 100.99416200265537
- Coefficient of Determination (R2): 0.9587342419414906

By observing the graph above and the evaluation metrics, it is concluded that the Linear Regression model is a good model for predicting the stock market closing price of the company McDonald's

Prediction for the next month closing price (13-02-2024): 290.34560196

2. Long Short-Term Memory (LSTM)

For this model, all data from the ‘close’ column was used.



Plot – prediction through a Long Short-Term Memory model

Model best attempt:

- Mean Squared Error: 406.96336142884036

By observing the graph above and the evaluation metrics, it is concluded that the Long Short-Term Memory model is not a good model for predicting the stock market closing price of the company McDonald’s