



# Forecasting Apple Inc's Quarterly Net Sales

A Time Series Analysis by Nicole Burns

College of Information Technology | Western Governor's University |  
Graduate Capstone

# Table of Contents



**Introduction**



**Problem Statement  
& Hypothesis**



**The Data Analysis  
Process**



**The Results**



**Limitations**



**Proposed Actions**



**Expected Benefits**



**Sources**

# Introduction

- MSDA Student
- B.S. in Accounting—Purdue University
- Former Derivatives Trader
- Interested in Data Science in Finance



# Problem Statement

The first company with a 3 trillion dollar market value.

Their financial performance and growth trajectory are of interest to stakeholders.

The ability to forecast future sales with a high level of accuracy is essential.

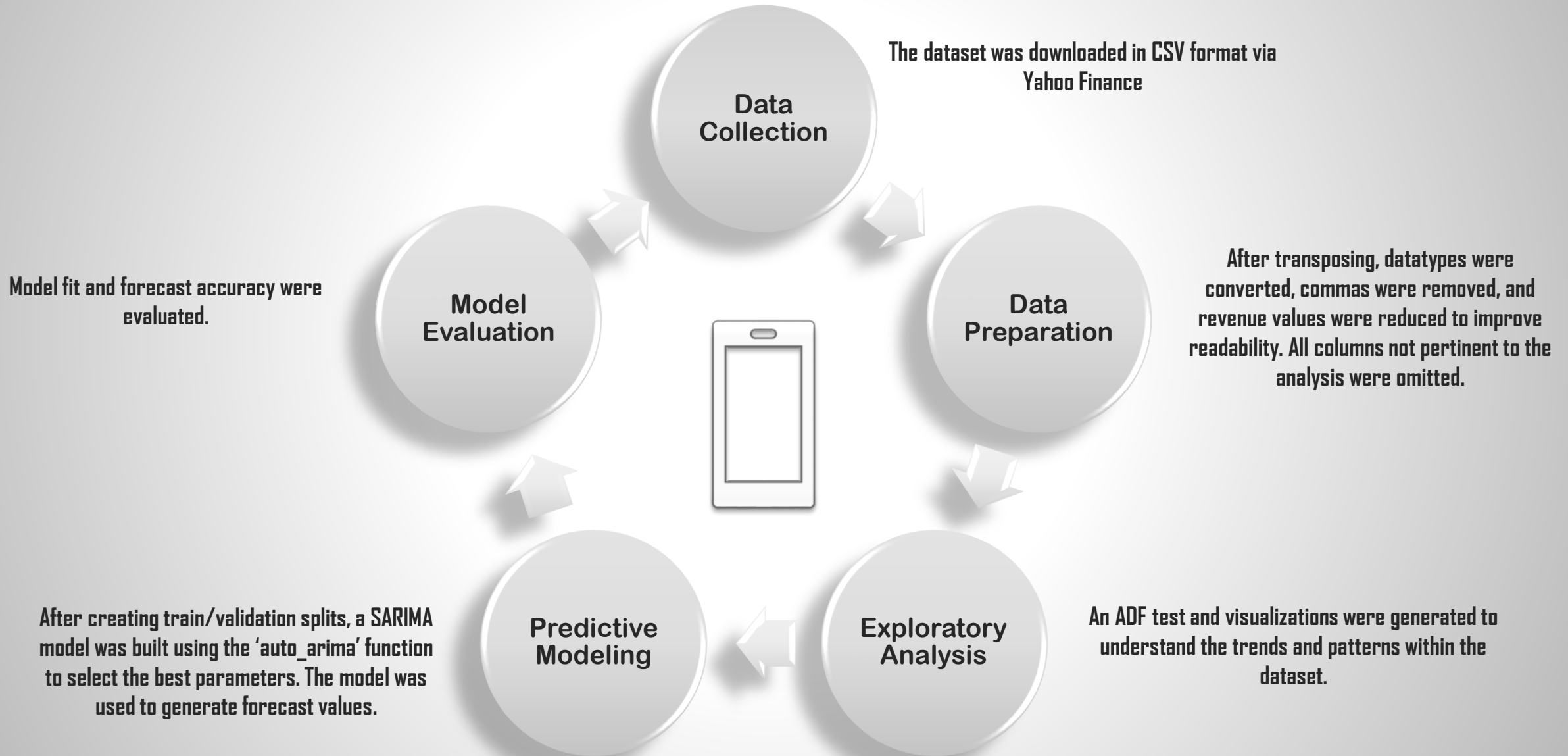
## Hypothesis

Can a SARIMA model effectively forecast Apple's quarterly revenue with  $> 80\%$  accuracy?

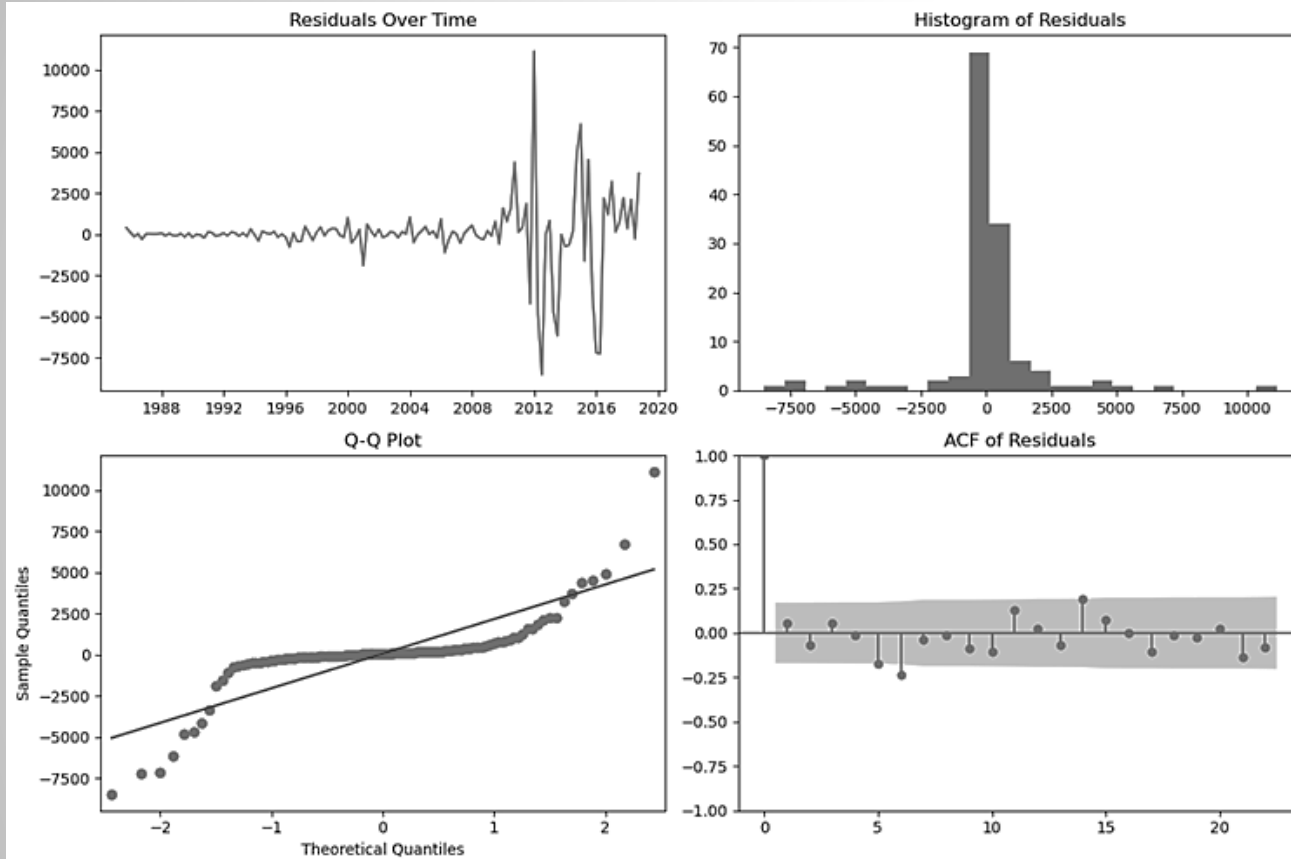
$H_0$ : A SARIMA model can't effectively forecast Apple's quarterly revenue at a model accuracy of  $> 80\%$ .

$H_1$ : A SARIMA model can effectively forecast Apple's quarterly revenue at a model accuracy of  $> 80\%$ .

# The Data Analysis Process



# The Results



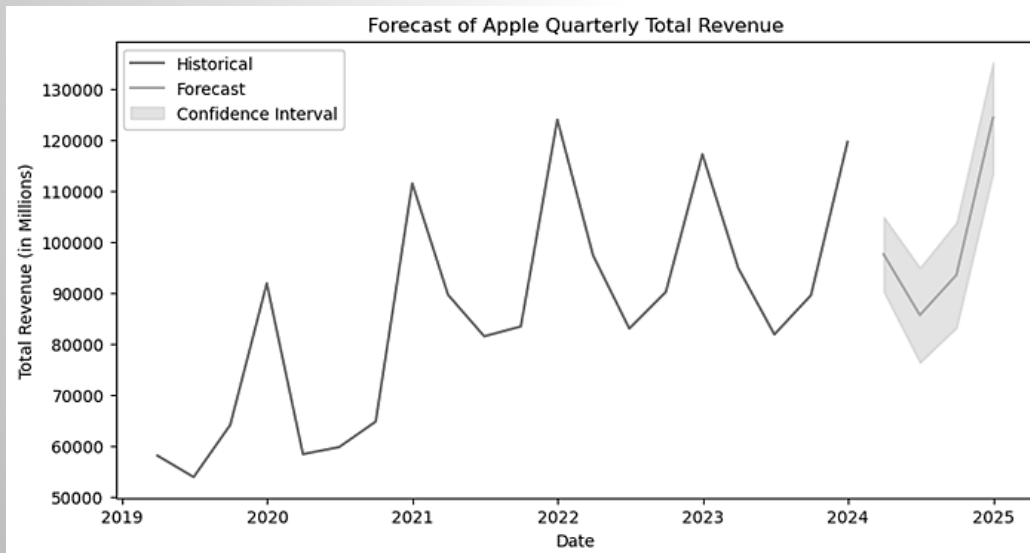
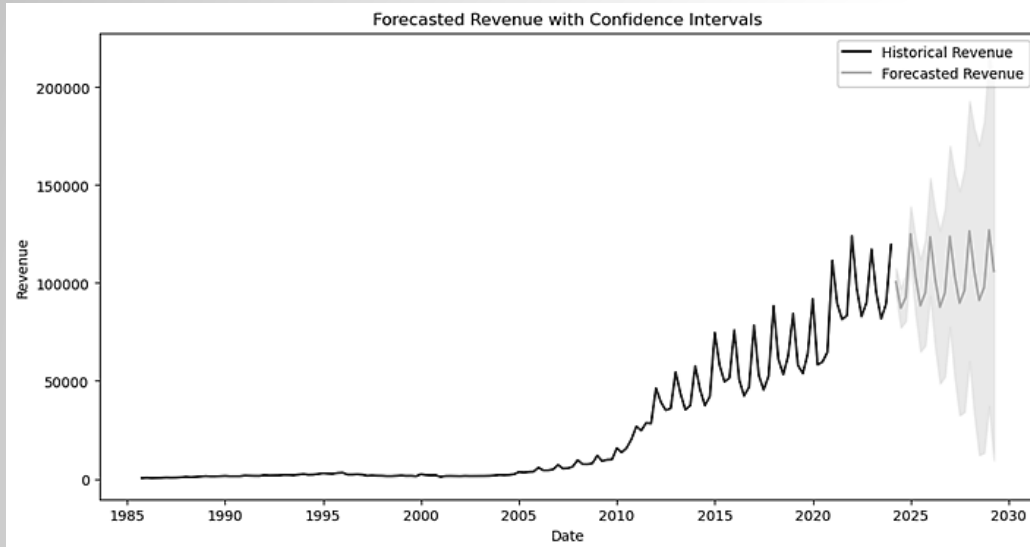
## Model Fit

The model managed to account for a significant amount of the data's autocorrelation, which is a positive outcome.

The distribution and extreme values in the residuals suggest that the model could be improved.

The spikes in residuals over time, the skewed histogram, and the deviations from normality of the tails in the Q-Q plot indicate that the model may not be fully capturing all the data's underlying patterns.

# Results cont.



## Forecast

**Long Term**—Projections spanning 21 quarters into the future display wide confidence intervals suggesting that there is uncertainty in the forecast as time increases. MAPE yielded moderate results at 33%, inferring a 67% accuracy.

**Short Term**—Utilizing the last 5 years of historical quarterly revenue and projecting 1 year into the future, showed a significant improvement with a MAPE of ~3.97% and ~96% accuracy.

# Limitations



Revenue is only recorded annually and quarterly, limiting the amount of data the model is trained on. The more data for training, the more reliable the prediction accuracy is.



Much of the dataset is considered irrelevant due to time frames. Years like 1985 aren't comparable to recent times economically or regarding Apple's current consumer sentiment. This is also why forecasting too far into the future creates uncertainty.



# Proposed Actions



Employ the SARIMA model primarily for short-term revenue forecasting, revenue forecasting, treating it as an informative tool rather than a rather than a prediction.



Future research should include external factors to build a model that build a model that better accounts for external influences and trends. influences and trends.



Pair SARIMA with other forecasting methods or machine learning models machine learning models to enhance prediction accuracy. accuracy.

# Expected Benefits



The analysis revealed that a SARIMA model is capable of utilizing Apple's short-term historical quarterly revenue to effectively forecast future quarterly revenue with over 90% accuracy.



This insight enables stakeholders interested in Apple's future performance to use this information as a foundation for strategic decisions.



Counter in external factors and utilize a combination of forecasting methods to validate the results obtained in this study.

# Sources



Title Page [Photo](#) by Unknown Author is licensed under [CC BY-NC](#) and provided by Bing

Patra, T. D.-D. (2023, September 24). Sarima vs Arima for Timeseries Analysis Model. Medium. Retrieved April 3, 2024, from

<https://dhirajpatra.medium.com/sarima-vs-arima-for-timeseries-analysis-model-a600ab544b1f>

Vaswani, A., Prasad , Dr. P. C., & Padhi, Dr. P. K. (2023). Journal of University of Shanghai for Science and Technology. Time Series

Analysis: An Application of SARIMA Model in General Trade to Forecast Sales, 25(3), Retrieved April 3, 2024, from

<https://jusst.org/wp-content/uploads/2023/03/Time-Series-Analysis-An-Application-of-SARIMA.pdf>.

<https://doi.org/10.51201/6735>

Vlastelica, R., & Bloomberg. (2023, June 30). Apple just made history by becoming the first company with a \$3 trillion market value-'all

powered by a device people look at 4 hours a day'. Fortune. Retrieved April 3, 2024, from [https://fortune.com/2023/06/30/apple-](https://fortune.com/2023/06/30/apple-history-3-trillion-market-value/)

[history-3-trillion-market-value/](https://fortune.com/2023/06/30/apple-history-3-trillion-market-value/)

Yahoo! (2024, April 1). Apple Inc. (AAPL) income statement. Yahoo! Finance. Retrieved April 1, 2024, from

<https://finance.yahoo.com/quote/AAPL/financials>

Thank You