

## MSDA Capstone Release Form

It is the policy of Western Governors University (WGU) that student capstone projects should not be based on or include any proprietary or classified information or material belonging to your employer or any other organization. Such material belongs to the third party and is referred to as "restricted information," which requires you to obtain the party's permission to include the work.

Accordingly, in conducting your capstone project you are required to make one of the following declarations:

- ☒ My capstone project is not based upon and does not include restricted information.
- ☐ My capstone project is based upon and/or includes restricted information. *Before* submitting any capstone work, I will obtain authorization to use the restricted information in the manner proscribed by WGU.

< Signature Vincent Taylor Date 2/23/2024



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## Signer

Email: vdtexpenses@gmail.com  
IP Address: 2600:1700:e32:c800:25cc:73d7:a7a8:399e

## Signature



Event	User	Time	IP Address
Upload document	vdtexpenses@gmail.com	2/23/24 6:18:14 PM EST	
Send for signing	vdtexpenses@gmail.com	2/23/24 6:18:58 PM EST	2600:1700:e32:c800:25cc:73d7:a7a8:399e
Open document	vdtexpenses@gmail.com	2/23/24 6:19:26 PM EST	2600:1700:e32:c800:25cc:73d7:a7a8:399e
Sign document	vdtexpenses@gmail.com	2/23/24 6:20:06 PM EST	2600:1700:e32:c800:25cc:73d7:a7a8:399e
Close document	vdtexpenses@gmail.com	2/23/24 6:20:06 PM EST	2600:1700:e32:c800:25cc:73d7:a7a8:399e

## Data Analytics Capstone Topic Approval Form

*The guidelines for the Data Analytics Graduate Capstone course require a student to demonstrate the "application of academic and professional abilities developed as a graduate student. The capstone challenges students to integrate skills and knowledge from several program domains into one project." As a result, it is highly recommended that your topic **should resolve a current or perceived business problem**. As stated, you want to exemplify what you have learned in your MSDA program to showcase your skills. Remember, your research topic exemplifies scholarship and research at the highest level and is significant and helpful to potential employers in identifying your abilities. Your research will always be something you can look back on with pride. Finally, it is recommended for students to use publicly available data sets for transparency and external validity.*

*The purpose of this document is to help you clearly state the research question you will be exploring in your capstone project, your project's scope, and your timeline in order to ensure that these align with your degree emphasis. Without clearly defining each of these areas, you will not have a complete and realistic overview of your project, and it cannot be accurately assessed whether your project will be acceptable for the purposes of these courses. Of course, if this a project that you have already completed at work or elsewhere, this should be easy to fill in! Many students do use a project they have already completed in the past year or two. In that case, you will write the proposal as if the project had not been done yet, and when you report on your project, you will use your complete after-implementation report. If you have not yet done your project, this document can help make sure the scope is within the acceptable range for this capstone. A course instructor will approve this form before submitting this task for evaluation. The task will not be evaluated without a course instructor's signature. The course instructor may ask for additional information before approving the form.*

**Before submitting this form for approval, please remove all italicized directions in the form.**

**Please only submit a Topic Approval Form that has been signed by a course instructor for evaluation.**

**Student Name:** Vincent Taylor

**Student ID:** 011233145

**Capstone Project Name:** Time Series Forecasting (\$AAPL)

**Project Topic:** Time Series Forecasting

☒ **This project does not involve human subjects research and is exempt from WGU IRB review.**

**Research Question** To what extent can the closing price (Y) of Apple stock be predicted with 90% accuracy using MAPE/MSE? I believe that this question would be critical to understand as a Data Analyst in the finance space, as it would allow for the creation of better investment strategies, which could lead to higher returns, while reducing a company's risk.

**Hypothesis: Null hypothesis-** The closing price of Apple stock cannot be predicted with 90% accuracy using MAPE/MSE.

**Alternate Hypothesis-** The closing price of Apple stock can be predicted with 90% accuracy using MAPE/MSE.

**Context:** Using time series analysis on historical stock price data of Apple can provide insights into the stock's past behavior and can potentially help forecast future stock prices. This analysis can be valuable for investors and analysts looking to make informed decisions about buying or selling Apple shares.

**Data:** Date, high, low, close, adj close, and volume

I will be using the "Apple Stock Data" csv file from Kaggle. It contains the daily open, high, low, and close price as well as volume and the adjusted closing price. It contains 10,400 rows starting in December of 1980 through June of 2021.

The data is publicly available on Kaggle and can be used for academic and research purposes without restriction. Moreover, Apple is a publicly traded company and this information is readily available on their investor relations page.

**Data Gathering:** The data will be collected by downloading the "Apple Stock Data" dataset from Kaggle. The dataset will be preprocessed to extract the relevant stock price data.

**Data Analytics Tools and Techniques:** I will be using ARIMA model in python for the time series. This is a commonly used method in time series forecasting. I will be working in a Jupyter Notebook environment and using statsmodels and pmdarima to implement the model.

**Justification of Tools/Techniques:** Time series analysis is suitable for this analysis as it can help identify patterns and trends in the historical stock price data, which can then be used to forecast future stock prices. ARIMA is widely used and well-established techniques for time series forecasting.

**Project Outcomes:** Key outcomes and deliverables for this analysis will include, first being able to develop a time series model to forecast future stock prices of Apple. I will also need to evaluate the model's performance using mean absolute error (MAE) and mean squared error (MSE). Lastly, I would like to make a recommendation to other analysts to help them make better informed decisions.

**Projected Project End Date:** On or before 3/31/2024

**Sources:**

*APPLE Stock Data*. (n.d.). *Www.kaggle.com*. <https://www.kaggle.com/datasets/varpit94/apple-stock-data-updated-till-22jun2021>

**Course Instructor Signature/Date:**

☒ The research is exempt from an IRB Review.

☐ An IRB approval is in place (provide proof in appendix B).

Course Instructor's Approval Status: *Approved*

Date: *2/29/24*

Reviewed by: *Daniel J. Smith, PhD, MBA*

Comments: [Click here to enter text.](#)