# CS – CPI ARIMA Analysis

**DS 4002 Fall 2023 – Shreenidhi Chundi**
**Due: May 2024**
**Submission format: Upload link to GitHub repo to canvas.**
**Individual Assignment**

**General Description:** Submit to canvas a link to your case study repository.

**Preparatory Assignments** – Class time about time series data and analysis.

**Why am I doing this?** The goal of this assignment is to get comfortable with working with time series data. Case studies are a great way to gain hands-on experience in dealing with real-world datasets, particularly those that evolve over time, like the CPI data from FRED. By engaging in this case study, you'll develop a deeper understanding of how to analyze and interpret trends in time series data. This experience will also enhance your ability to draw meaningful insights from complex data sets. You'll not only learn the technical aspects of data handling and analysis but also how to apply these skills to make sense of factors that impact everyday life.

- Course Learning Objective: Bridge knowledge with practical application, preparing you for future challenges in the dynamic world of data analysis.
- Course Learning Objective: Develop critical thinking and decision-making skills.

**What am I going to do?** You will use the provided data and code to create a 10-year forecast of CPI. Using ARIMA (AutoRegressive Integrated Moving Average) modeling to do trend forecasting, you will gain practical experience in applying advanced statistical techniques to real-world economic data. This will involve analyzing historical CPI trends to understand underlying patterns and then using these insights to project future changes. You'll learn how to interpret the results of the ARIMA model, understanding its strengths and limitations in the context of economic forecasting. Additionally, you will explore the implications of your findings, considering how changes in the CPI can affect economic policy and individual decision-making.

**Tips for success:**

- Make sure you understand the source code template. This case study provides you with a base of code that will help you create the models you need to. If you don't understand, try finding sources that explain time series and ARIMA modeling.
- Do your own research! If you are not well versed in economics, don't be afraid Google terms you are not familiar with.

**How will I know I have Succeeded?** You will meet specification on this case study assignment if you follow the rubric below.

| Spec Category | Spec Details |
|---|---|
| Formatting | • GitHub repository (submit link on Canvas)<br>• The top-level page should contain:<br>  ○ A README.md file (which auto displays) |

| | |
|---|---|
| | ○ A LICENSE.md file (use MIT as default)<br>○ A SRC folder<br>○ A FIGURES folder<br>○ References |
| README.md | • Goal: This file should be context for anyone who sees your repository. Provide an overview of your work and what you included in your SRC and FIGURES folders.<br>• SRC – H2 Section<br>○ Make an H3 section detailing what exactly you added to the template and how you used the code.<br>• FIGURES – H2 Section<br>○ Upload the two graphs you made.<br>○ Additionally, create a table of contents describing the figure and its main takeaway.<br>• Reflection – H2 section<br>○ In this section, write one to two paragraphs about how and the trend of the 10-year CPI forecast may or may not be as accurate as it can be.<br>○ Include thoughts about any variables that were not taken into consideration as well as potential real-world fluctuations.<br>○ Include your conclusions and how you predict the ARIMA forecast will line up with real world events in the next decade.<br>○ Feel free to add any questions you still have and any avenues for further exploration as well.<br>• References<br>○ Include any additional sources you may have used while completing this case study. No need to site the provided articles. |
| LICENSE.md | • Goal: This file explains to a visitor the terms under which they may use and cite your repository.<br>• Choose a license from the GitHub options list on repository creation.<br>• Usually, the MIT license is appropriate. |
| SRC folder | • Goal: This folder should include the completed version of the code.<br>• Using the template provided, follow along and understand the given code. In the #TODO section, add relevant code for the completion of this case study. |
| FIGURES folder | • Goal: This folder should include all of the figures produced in your case study.<br>• Make sure to update the table of contents for figures in the README.md file with descriptions and takeaways for each figure created. |
| References | • Goal: Cite any additional sources you used.<br>• Use IEEE Documentation style |

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