Roy Kalu
Professor Wong
COSC 499

<center>User Documentation</center>

1. Minimum Hardware and Software Requirements
Hardware:
- A computer with at least 4 GB of RAM.
- Minimum 2 GHz processor.
- At least 500 MB of available disk space.

Software:
- Operating System: Windows 10 or later/ macOS / Linux
- Python 3.8 or higher
- Jupyter Notebook
- Required Libraries: Pandas, numpy, matplotlib, scikit-learn

2. Installation / Setup Guide
1. Install Python: Download from python.org
2. Install Jupyter Notebook: A good method is through [Anacoda,](Anacoda) which comes with Jupyter and all required packages.
3. Install required libraries: Open a terminal and run pip install pandas numpy matplotlib scikit-learn
4. Download the source code file.

3. Instructions on how to start the software
1. Open a terminal or Anaconda Navigator.
2. Launch Jupyter Notebook.
3. Navigate to the directory where the file is saved.
4. Click the file to open it.

4. Description of Main Features
- Historical GDP Visualization: View a graph of the United States' GDP from 2000 to 2023.
- GDP Prediction Model: Predicts the United States' GDP for the next five years (2024-2028) using linear regression with lagged GDP values.
- Performance Metrics: Displays R^2 score, MAE, MSE, and RMSE to evaluate the prediction accuracy.
- Future GDP Forecast Graph: Visualizes the predicted GDP with exact values for each future year.

5. Instructions on how to use the software
1. Launch the Jupyter Notebook and run each cell from top to bottom.
2. The notebook will automatically load and process GDP data, train the prediction model, evaluate the model, and generate and display GDP graphs for historical and future years.
3. Review the printed outputs and graphs for insights.

6. Cautions and Warnings
- Do not modify the structure of the GDP dataset (GDP.csv), it must have a column named observation_date and GDP.
- The model is trained on past GDP data only. It does not account for real-world economic shocks, global events, and policy changes.
- Predicated values are estimates only and should not be used for financial decisions.

Troubleshooting Steps

Issue	Solution
Error: FileNotFoundError: 'GDP.csv'	Make sure the dataset is in the same folder as the notebook.
nbconvert failed: xelatex not found	Install LaTeX or export as HTML and convert to PDF manually.
ImportError: module not found	Run 'pip install <module-name> for any missing libraries.
Graphs not showing	Ensure matplotlib inline is in the first code cell.

8. Contact information
Name: Roy Kalu
Email: royikalu@gmail.com
GitHub: royikalu
LinkedIn: royikalu