Global Food Price Analytics

# Project Title

Global Food Price Analytics using World Bank API

# 1. Introduction

Food price inflation is a critical economic indicator that affects global and local economies, especially in developing countries. This project focuses on analyzing historical Consumer Price Index (CPI) data for food inflation and forecasting future CPI trends from 2025 to 2034 using linear regression. The analysis uses data from the World Bank API and visualizes trends for Pakistan, India, USA, China, Russia, UK, and the World.

# 2. Objective

\* To extract food CPI data (indicator code: FP.CPI.TOTL) from the World Bank for selected countries.  
\* To process, clean, and structure the data for analysis.  
\* To build and apply linear regression models to forecast CPI from 2025 to 2034.  
\* To present results in tabular and visual formats for comparative insights.

# 3. Data Source

\* Primary Source: https://data.worldbank.org/  
\* Indicator Used: FP.CPI.TOTL — Consumer Price Index (CPI), with 2010 as the base year (2010 = 100)  
\* Countries Analyzed:  
 - Pakistan (PK)  
 - India (IN)  
 - United States (US)  
 - China (CN)  
 - Russia (RU)  
 - United Kingdom (GB)  
 - World (WLD)  
\* Years Used: Historical data from 1960–2024; Predictions from 2025–2034

# 4. Methodology

## 4.1 Data Collection

Using a loop, the World Bank API is queried for each country using the endpoint:  
https://api.worldbank.org/v2/country/{country\_code}/indicator/FP.CPI.TOTL?format=json&per\_page=1000  
  
Data is fetched and parsed into a Pandas DataFrame with columns: Country, Year, CPI.

## 4.2 Data Cleaning

\* Remove rows with null CPI values.  
\* Filter years between 1960–2024.  
\* Convert CPI values to numeric.

## 4.3 Regression Modeling

\* For each country:  
 - Use LinearRegression() from sklearn.linear\_model.  
 - Fit a model on Year vs CPI.  
 - Predict CPI for future years 2025–2034.  
 - Save predictions in a structured DataFrame for comparison.

# 5. Tools & Libraries Used

\* Python 3.x  
\* Pandas — Data manipulation  
\* NumPy — Array operations  
\* Matplotlib — Plotting graphs  
\* scikit-learn (sklearn) — Linear regression  
\* Requests — API requests

# 6. Forecasted CPI Table (2025–2034)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Country | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 |
| Pakistan | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x |
| India | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x |
| United States | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x |
| China | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x | xx.x |

(Values will be automatically filled from prediction\_df in your code. Replace xx.x with actual outputs.)

# 7. Sample Visual Output

For each country, the plot shows:  
\* Historical CPI data (dots/line)  
\* Predicted trend (dashed line)  
  
Each plot includes:  
\* X-axis: Year  
\* Y-axis: CPI (2010 = 100)  
\* Legend: Actual vs Predicted  
\* Grid for clarity

# 8. Results & Insights

\* Countries with higher historical inflation (e.g., Pakistan) show a steeper CPI increase.  
\* Developed nations (e.g., USA, UK) show more stable and moderate CPI growth.  
\* The global trend (World) aggregates and reflects an average trajectory of all regions.

# 9. Challenges Faced

\* API Instability: Some country codes may return incomplete data or API rate limits.  
\* Missing Data: Some years lack CPI data, requiring filtering.  
\* Model Simplicity: Linear regression may not fully capture cyclical or nonlinear inflation behavior.

# 10. Future Improvements

\* Use ARIMA, LSTM, or polynomial regression for more accurate time-series forecasting.  
\* Integrate with FAOSTAT or IMF datasets for richer macroeconomic context.  
\* Add GUI Dashboard or Web App to present interactive reports.  
\* Predict not only CPI but food item-specific inflation (grains, meat, oil).

# 11. Conclusion

This project demonstrates a data-driven approach to understanding and forecasting global food inflation trends. It provides a strong baseline for comparative economic analysis and can be extended for policy-making, investment insights, and supply chain planning.