

Approach towards Data analysis and Data visualization

In analysing India's Consumer Price Index (CPI - UNME), I followed a structured approach that included trend evaluation, inflation rate computation, seasonality detection, forecasting, and economic impact assessment.

My first step was data preprocessing and cleaning, where I identified and addressed any missing values or anomalies. To ensure the accuracy of my time series analysis, I properly formatted and sorted the Datetime Index.

When examining trends, I observed a consistent upward movement in CPI, confirming long-term inflation. To quantify this, I calculated the year-over-year percentage change, which provided a clear picture of how inflation rates fluctuated over time. To standardize comparisons, I indexed all CPI values to the year 2000 (set as 100), making it easier to visualize price changes across different time periods.

Understanding seasonality was also crucial, as inflation often follows recurring patterns. I used boxplots and rolling averages to detect monthly fluctuations, which I found were influenced by festivals, agricultural cycles, and policy interventions. These seasonal trends helped explain short-term price movements within a broader economic context.

To predict future inflation trends, I applied the ARIMA (1,1,1) model, which projected a continued rise in CPI over the next five years. This reinforced concerns about inflationary pressures and the need for effective economic policies. Additionally, I studied the impact of major economic events, particularly the 1991 economic crisis and the 2008 financial crisis. By analysing CPI data from these periods, I observed sharp fluctuations, confirming that significant economic disruptions have a direct impact on inflation.

To enhance my analysis, I used various visualization techniques. Line plots helped illustrate long-term trends and forecast projections, while boxplots highlighted seasonal inflation variations. I also used scatter plots to pinpoint CPI spikes during major economic events, offering a clearer view of inflationary shocks.

Through this process, I gained valuable insights into India's inflation trends, the key factors driving price changes, and the potential trajectory of future inflation. By combining statistical modelling with data visualization, I was able to build a clearer understanding of how inflation behaves and how it responds to macroeconomic shifts.