Google Trends Forecasting Report

[USING TIME SERIES]

1.Introduction

The objective of this project is to forecast and visualize public interest trends for selected keyword pairs using Google Trends API, Exploratory Data Analysis (EDA), and time series forecasting techniques. It aims to analyse how interest in selected topics changes over time using time series analysis. Keyword pairs like *"Remote jobs vs Office jobs"* and *"LinkedIn vs Indeed"* reflect real-world behavioural shifts. The project uses PyTrends for data extraction and Prophet for forecasting future trends.
Ultimately, it provides insights into evolving public preferences based on historical search behavior.

2.Data Collection & Preprocessing

Google Trends data was collected from 2018 to 2025 using the PyTrends API for three selected keyword pairs. Each dataset included a time series of normalized search interest scores. The data was cleaned by dropping non-relevant columns (e.g., 'isPartial') and resetting the index for easier manipulation. Date formats were standardized, and individual keyword columns were extracted for separate trend and forecasting analysis.

3.Keywords Analysed

- Remote jobs vs Office jobs (Career trends)
- Stock market vs Cryptocurrency (Investment interest)
- LinkedIn vs Indeed(Job platform popularity)

4.Tools & Technologies Used

- **Python**
  The primary programming language used for data extraction, manipulation, visualization, and forecasting.
- **PyTrends (Google Trends API)**
  An unofficial Python interface for Google Trends used to fetch real-time search interest data for keyword pairs.
- **Pandas, NumPy (Data handling and preprocessing)**
  Used for cleaning, transforming, and managing structured time series data for analysis and modelling.

- ❖ **Seaborn, Matplotlib (Data visualization)**
  Employed to create comparative trend plots, enabling visual interpretation of search patterns and model results.
- ❖ **Prophet (Time series forecasting)**
  A forecasting model developed by Facebook used to analyse historical data and predict future trends with seasonality handling.

5.Exploratory Data Analysis (EDA)

EDA was conducted using pandas, seaborn, and matplotlib to examine historical search interest over time. Comparative line plots were created to visualize patterns such as: - Seasonal spikes and dips - Relative popularity of each keyword - Long-term trend behaviour between keyword pairs.

6.Time Series Forecasting

Facebook Prophet was used to forecast the search interest for each individual keyword. For each keyword, the time series was formatted with 'ds' (date) and 'y' (value) columns as required by Prophet. A 365-day future forecast was generated to predict upcoming trends, which were visualized using Prophet's built-in plotting tools.

7.Evaluation

Forecast accuracy was qualitatively evaluated by comparing predicted trends with the actual historical data plots. Prophet's output includes confidence intervals (upper and lower bounds) which provided insights into prediction stability. Further quantitative evaluation (e.g., MAE, RMSE) could be integrated in future iterations for more precise model validation.

8.Key Highlights

- Implemented time series analysis using Prophet to forecast search interest and popularity.

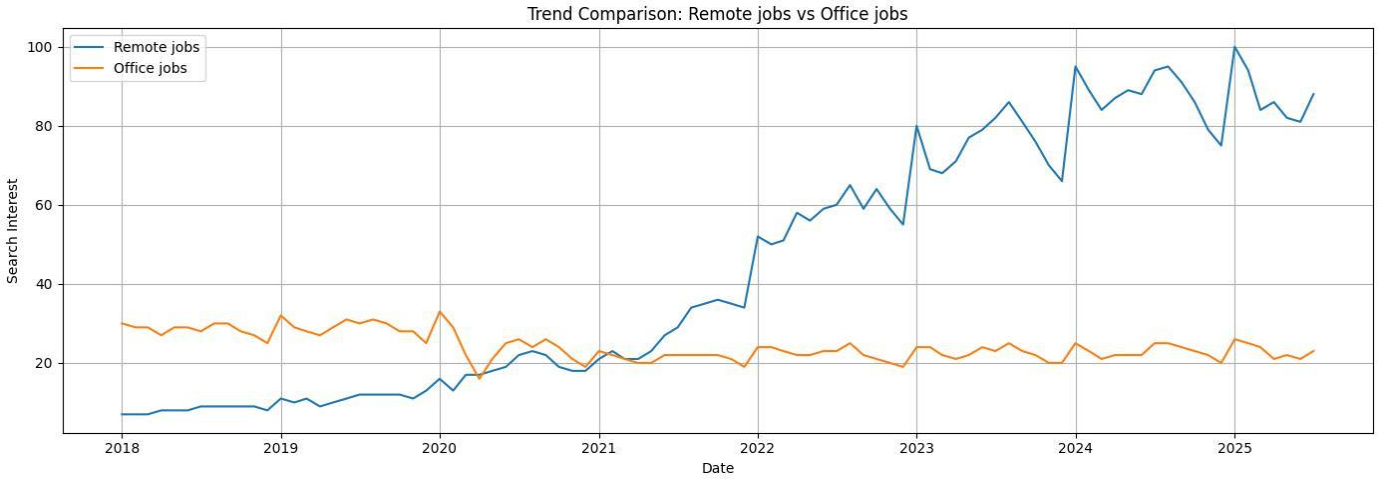
- Visualized and compared trends using Seaborn and Matplotlib.

-Extracted insights into career shifts, investment interest, and job platform preferences.

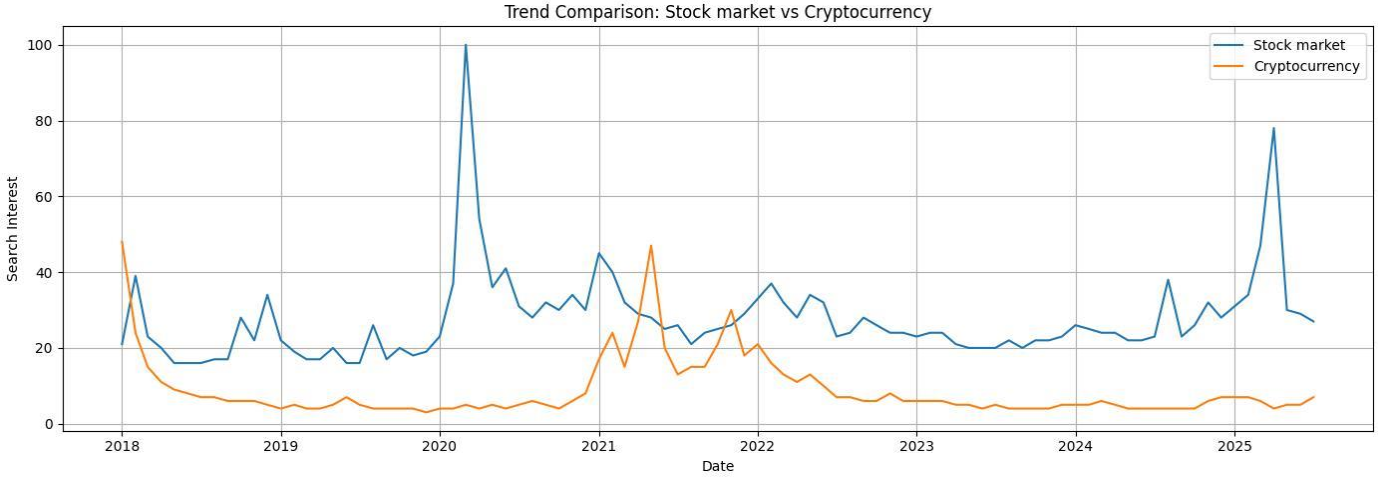
9.Outcome

This project demonstrates the application of real-world data science and time series forecasting skills. It highlights keyword search dynamics over time and successfully predicts future trends using Facebook Prophet.

Remote Jobs Vs Office Jobs Trend



Stock Market Vs Cryptocurrency Trend



LinkedIn Vs Indeed Trend