**Problem Statement:**

The goal of the project is to leverage data analytics to understand website traffic patterns and user behaviour. This involves:

Predicting future traffic trends.

Identifying peak usage periods.

Analysing user engagement and behaviour on the website.

**Design Thinking Process:**

***Empathize:*** Understand user needs and challenges in tracking and analysing website traffic. Conduct surveys, interviews, or user studies.

***Define:*** Define the project's scope, objectives, and specific metrics to be analysed, such as page views, unique visitors, session duration, and bounce rates.

***Ideate:*** Brainstorm approaches to gather, process, and interpret website traffic data. Consider different analytical models and visualization methods.

***Prototype:*** Develop a structured plan outlining the data collection methods, pre-processing techniques, potential models, and evaluation strategies.

Test: Implement the plan, analyse the data, and refine approaches based on insights and outcomes.

**Phases of Development:**

***Data Collection:*** Gather website traffic data from various sources such as Google Analytics, server logs, or third-party tools. The data may include metrics like date-time stamps, page views, unique visitors, and referral sources.

***Data Pre-processing***: Clean the data by handling missing values, converting date-time features, and performing tasks such as normalization or encoding categorical variables. This phase might also involve segmentation based on demographics or traffic sources for deeper analysis.

***Model Training:*** Employ appropriate models, such as time series forecasting (e.g., ARIMA, SARIMA) for predicting future traffic or machine learning models for behavioural analysis. Train models on historical data and tune their parameters.

***Model Evaluation:*** Validate the models using suitable evaluation metrics to assess performance and accuracy.

***Deployment:*** Implement insights gained from the analysis to optimize marketing strategies, improve user experience, and enhance website performance.

Dataset Used and Data Preprocessing Steps:

The dataset will likely encompass various features like date-time stamps, page views, unique visitors, referral sources, user locations, and devices used. Preprocessing steps include handling missing data, transforming date-time features for analysis, normalizing or scaling numerical attributes, and potentially segmenting the data to enable specific analyses based on different parameters.

**Model Training Process:**

Select appropriate algorithms based on the nature of the analysis. For time series forecasting, consider models like ARIMA or SARIMA. For behavioral analysis, machine learning models such as Random Forest, Gradient Boosting, or neural networks might be suitable. Train the models on historical data, validate on unseen data, and fine-tune as necessary.

**Choice of Algorithm and Evaluation Metrics:**

The choice of algorithm depends on the specific analysis required - time series forecasting for traffic prediction or machine learning for user behavior analysis. For evaluation, metrics like MAE, RMSE, MAPE, or R-squared for regression tasks, and accuracy, precision, recall, or F1-score for classification or segmentation tasks are commonly used.

This structured approach, integrating design thinking, meticulous data handling, accurate modeling, and rigorous evaluation, forms the foundation for a successful website traffic analysis project.

**Github ID:** https://github.com/AIOMPRAKASH/web\_traffic\_analysis