**Aspect-Based Sentiment Analysis Using NLP and Google Maps API for Restaurant Reviews**

**Introduction**

In today's digital world, online reviews play a vital role in shaping the reputation of businesses. With the rise of online platforms, customers have a powerful voice to express their opinions about products and services. Therefore, it has become essential for businesses to analyze customer reviews to gain insights into their customer experience. This is where sentiment analysis comes into play. In this project, we use the Google Places API to extract customer reviews for restaurants and perform sentiment analysis on them to gain insights into the customers' opinions and preferences.

**Why is this topic important:**

Sentiment analysis is a valuable tool that businesses can use to analyze customer feedback and improve their customer experience. It is particularly important in the food industry, where customer reviews and ratings can have a significant impact on a restaurant's reputation and revenue. By analyzing customer feedback, restaurants can identify areas for improvement and make data-driven decisions to remain competitive in the market.

**Applications and examples where this topic/skill can make an impact**

Sentiment analysis is applicable to various industries, including healthcare, retail, travel, and finance. For example, in healthcare, it can monitor patient feedback to improve the quality of care, and in the travel industry, it can analyze customer reviews to enhance the customer experience. In finance, sentiment analysis can be used to analyze customer feedback about financial products and services.

**Challenges encountered:**

The project encountered challenges in accurately extracting aspects from customer reviews and ensuring the accuracy of sentiment analysis. Aspects provide valuable insights into customer preferences, while sentiment analysis helps determine the overall sentiment of the feedback. The VADER sentiment analysis tool, while accurate, may not always capture the nuances of customer feedback.

**List of actual Libraries and packages used in python:**

The project utilized several libraries and packages in Python, including requests, json, re, pandas, nltk, VADER sentiment analysis tool, and matplotlib. These tools were used for various tasks, such as data preprocessing, sentiment analysis, data manipulation, and data visualization.

**Key take away points:**

Sentiment analysis is a powerful tool for analyzing customer feedback, enabling businesses to gain insights into their customer experience. It can be applied to various industries and domains to understand customer preferences and improve their experience. However, accurate identification of aspects and sentiment analysis can be challenging, and the results should be interpreted with caution.

**Conclusion:**

Sentiment analysis is crucial for businesses to monitor online reputation, analyze feedback, and improve customer experience. Our project showcased the application of sentiment analysis in the food industry and highlighted challenges encountered. It also demonstrated the use of Python libraries for data preprocessing, analysis, and visualization.

Chart, bar chart

Description automatically generated

This graph shows sentiment scores for food quality, service, and ambience of a restaurant. Customers have the most positive sentiment towards food quality (0.7), while service and ambience have lower scores (0.4 and 0.3, respectively).

**Citations:**

Ahmad, M., & Shahzad, M. (2019). Aspects-based sentiment analysis of customer reviews.

**Data sources:**

Google Maps API: <https://developers.google.com/maps>

**Data analysis sources:**

* Natural Language Toolkit (NLTK): <https://www.nltk.org/>
* Spacy: <https://spacy.io/>
* TextBlob: <https://textblob.readthedocs.io/>

**Additional person who assisted:**

No additional person assisted.

**Bonus**: Extending the concept of sentiment analysis assignment using Twitter API to aspect-based sentiment analysis for restaurants.