Final Artificial Intelligence Project

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ADMN5015: Artificial Intelligence in Marketing

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Project Title: Enhancing and facilitating Marketing Strategies and goals using Sentiment Analysis of Google Reviews for Tim Hortons in Kingston, Ontario

Project Overview

This project undertakes a comprehensive analysis of customer feedback for Tim Hortons locations across Kingston, Ontario, by leveraging advanced data extraction and analysis techniques. The methodology encompasses several stages to ensure a thorough evaluation of sentiment and safety attributes(using moderation AI)in customer reviews. Here's a breakdown of the tasks completed:

1. Data Collection:

- Utilized web scraping techniques to compile a list of Tim Hortons locations from their official site.
- Obtained geographical coordinates for each location using the Google Maps API to facilitate precise analysis.

2. Review Analysis:

- Extracted five recent reviews for each location from Google Places API, focusing on the most current customer experiences.
- Employed Google Cloud Platform's sentiment analysis tools to assess the sentiment score and magnitude of each review, offering insights into customer emotions and the intensity of their opinions.
- Adapted Google Cloud's language AI for a novel application: instead of traditional moderation, we analyzed reviews for safety attributes. This approach allows us to gauge customer dissatisfaction or anger through specific indicators, transforming how we understand and respond to feedback.

3. Data Integration and Visualization:

- Established a connection to a PostgreSQL database using Python, enabling efficient data management and retrieval.
- Stored sentiment scores, magnitudes, and identified safety attributes in dedicated tables for structured analysis.
- Integrated review data into Firestore for enhanced accessibility and real-time analysis capabilities.
- Facilitated data-driven decision-making through a direct connection between the PostgreSQL database and Power BI, allowing for dynamic visualization of geolocation data, average sentiment scores, and magnitude for each Tim Hortons in Kingston.

Marketing Implications

This project offers invaluable insights for marketing strategies at Tim Hortons. By analyzing real-time customer feedback, the brand can:

- Identify Areas for Improvement: Understanding sentiment scores and the intensity of customer emotions helps pinpoint specific areas needing attention, whether related to service, product quality, or overall customer experience.
- Tailor Marketing Strategies: Insight into customer sentiments and safety concerns enables the development of targeted marketing campaigns that address customer needs, build loyalty, and enhance brand reputation.

- Proactively Manage Brand Image: Analyzing safety attributes and indicators of customer dissatisfaction or anger allows Tim Hortons to address potential issues proactively, maintaining a positive brand image and customer trust.
- Enhance Customer Engagement: By addressing customer feedback effectively, Tim Hortons can foster a stronger connection with its customer base, encouraging repeat business and positive word-of-mouth.

Overall, this project not only refines how Tim Hortons can monitor and improve customer satisfaction but also provides a strategic edge in adapting marketing strategies to meet evolving customer expectations, ultimately driving business growth.

Figure 1

Screenshot of console output after running main.py

Figure 2

Screenshot of Querying data in PostgreSQL after insertion using python library

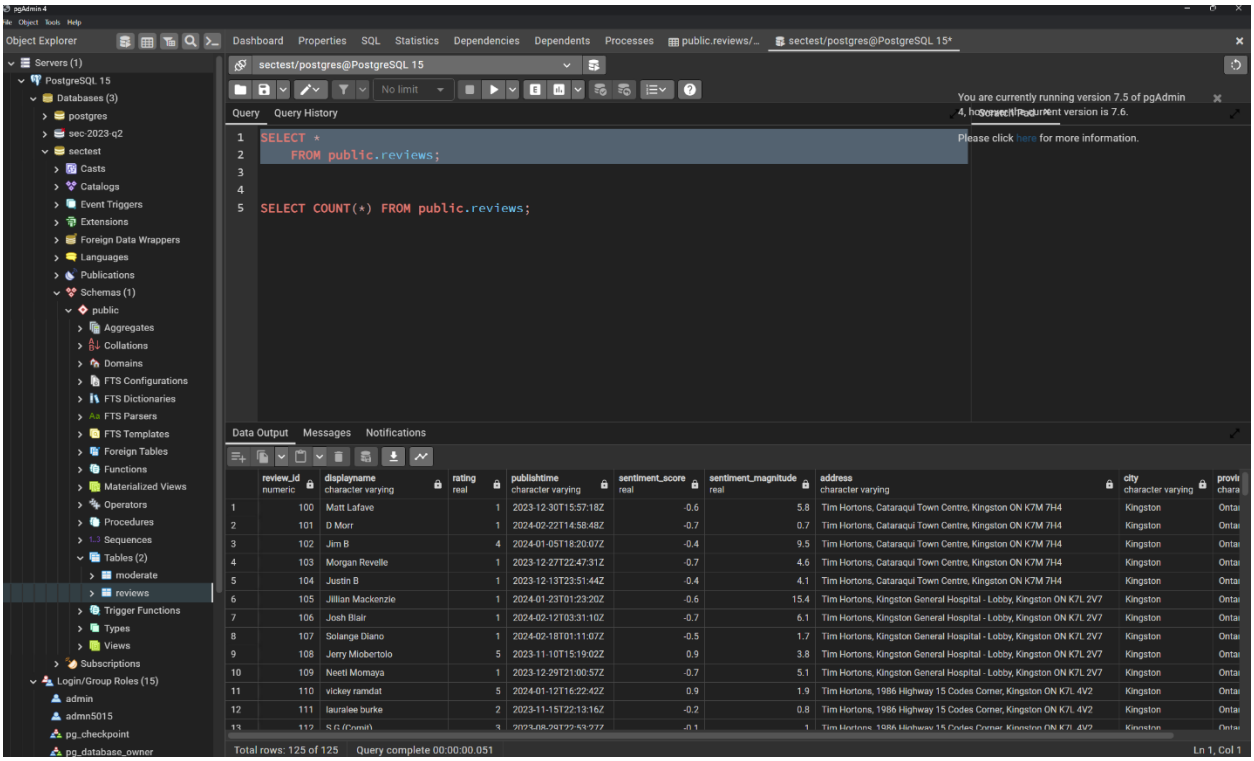

Figure 3

Screenshot of psqlODBC(pgadmin) setup for Power BI data connection

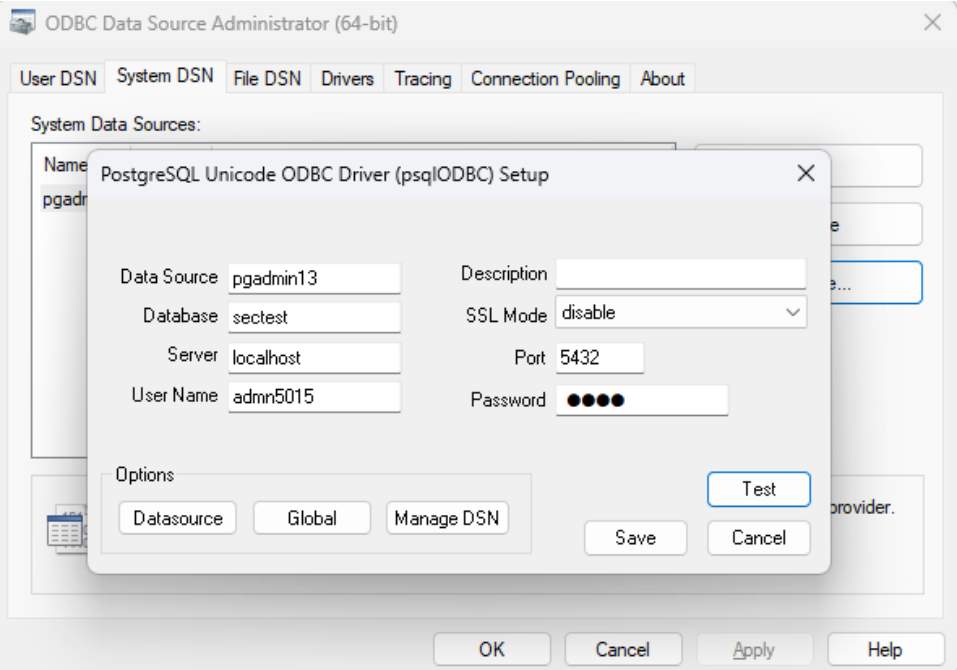

Figure 4

Screenshot of using PostgreSQL(pgadmin) as data source in Power BI

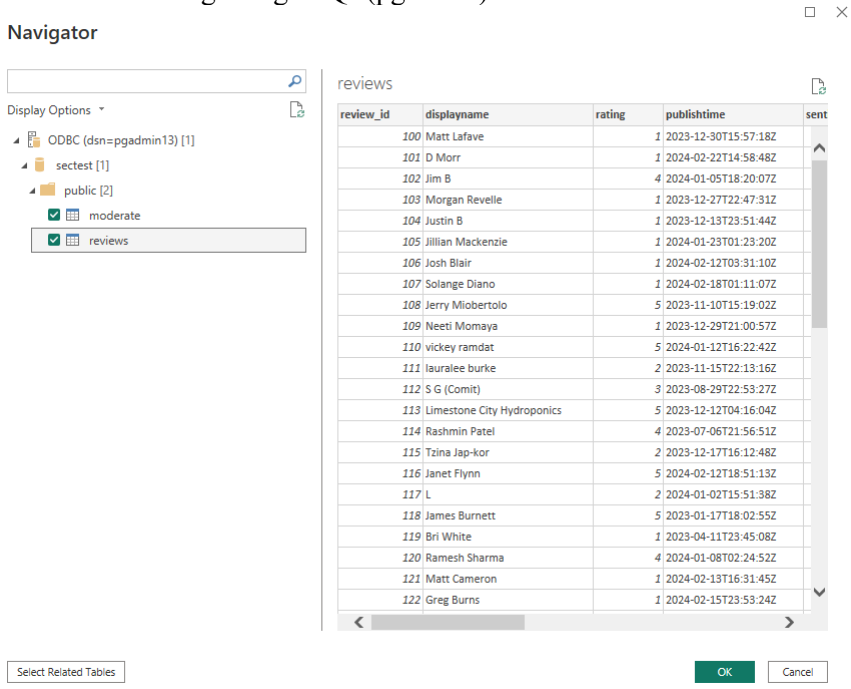

Figure 5

Screenshot of Power BI dashboard – Main

- We can see that each reviews have an average rating of 2.38 and an average sentiment score of -0.22 which can be interpreted as absolute neutral in both rating and sentiment of reviews.
- All Tim horton's locations can be viewed on the Kingston map along with their rating and review sentiment score attributes.
- The 1986 Highway Tim Hortons is both a outlier in terms of location and highest average review ratings

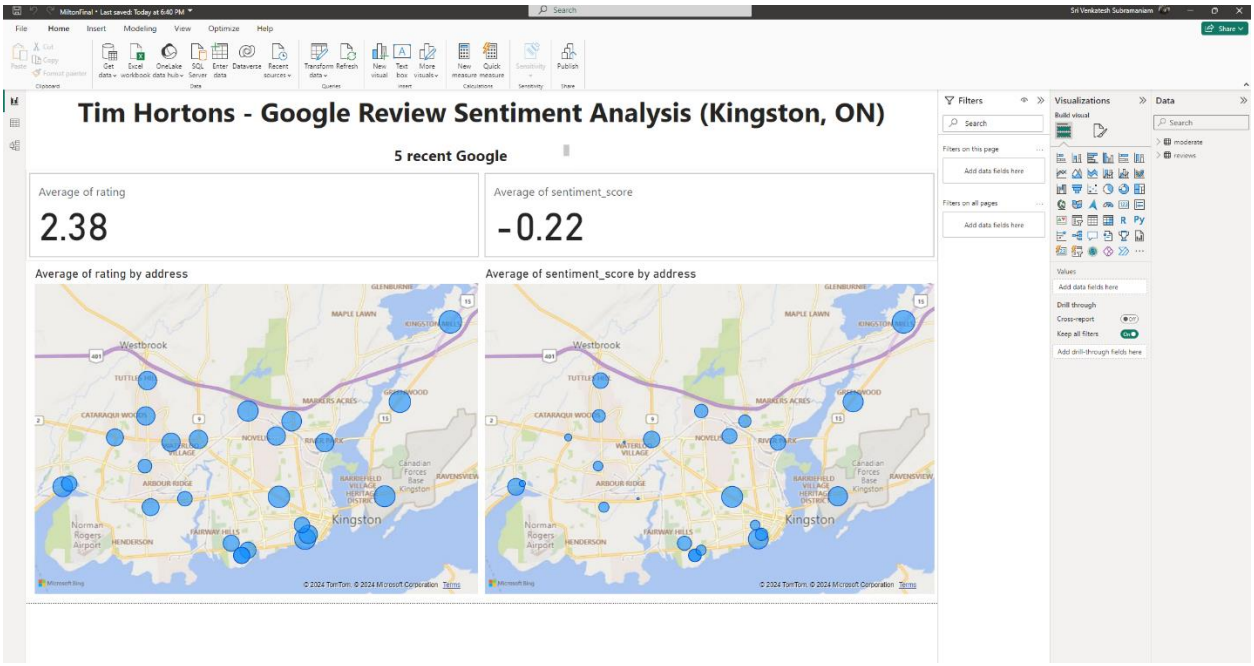

Figure 6

Screenshot of Power BI dashboard – Scatter plot of Sentiment score and magnitudes

- The line represents the neutral sentiment, towards the left side there appears to be a greater number of reviews than towards the right. Which signifies a greater number of negative reviews.
- Towards the left we see reviews if all ratings from 1 to 5 star
- On the right we see only 3,4,5 star reviews

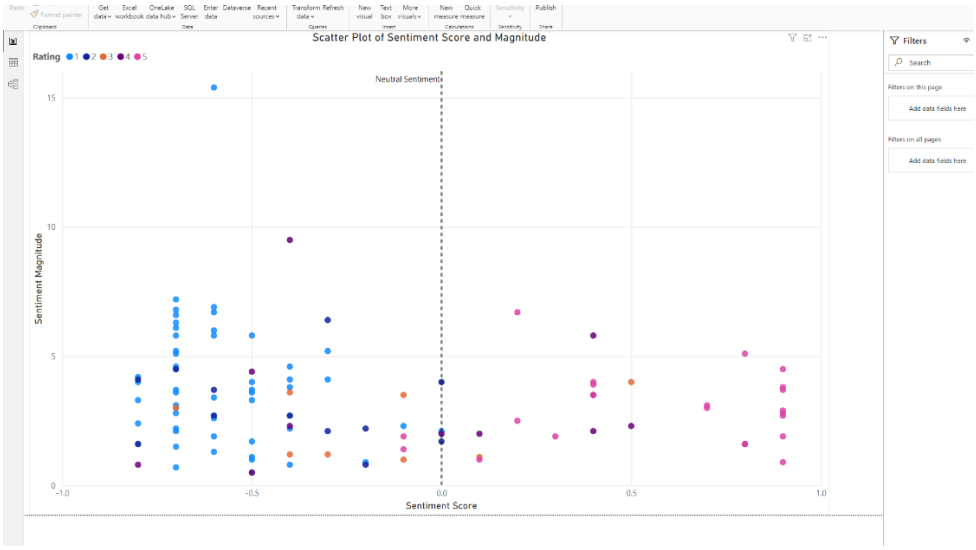

Figure 7

Screenshot of Power BI dashboard – Tree Map of Moderation Attributes

- The tree map is dominated by “Health” moderation attribute, which means that the reviewers are concerned about the uncleanliness of Tim Hortons.
- The other attributes are roughly the same such as Toxicity, financial, insult and public safety.
- Derogatory terms are the least appearing in the reviews.