Report Customer Feedback Sentiment Analysis of CIH Bank

Introduction

This project builds a data warehouse solution to analyze customer feedback for CIH Bank branches in Morocco, aiming to enhance customer satisfaction through actionable insights. Data is extracted from Google Maps reviews using the Apify Google Maps Scraper API, and sentiment analysis is performed using a Hugging Face BERT-based model.

Key Concepts

- **Data Warehouse:** Central repository optimized for reporting and analysis.
- **ETL Process:** Extract data via API → Transform (clean, process, analyze) → Load into PostgreSQL database.
- **Data Mining:** Use of machine learning to uncover patterns in customer sentiment.

System Design

- **KPIs:** Review Score categorized into Positive (1), Neutral (0), Negative (-1) sentiment.
- **Database Schema:** Includes Agency, Date, and Fact (review) tables linked with foreign keys.

Data Pipeline

Apache Airflow DAG for ETL

- Automates and orchestrates data flow: extract → transform → load.
- Runs monthly to update data warehouse with fresh review data.

Data Extraction

- Configuration of Apify Google Maps Scraper to collect up to 50 places per search term ("CIH Bank") limited to Morocco and English reviews.

Data Transformation

- Clean missing data, extract latitude/longitude, split dates.
- Sentiment analysis via Hugging Face transformer model (BERT multilingual).
- Sentiment scores assigned as -1, 0, or 1.

Data Loading

- Transformed data loaded into PostgreSQL ‘banks’ table for querying and analysis.

Visualization & Interpretation

- **Heatmaps** showing sentiment distribution by branch location:
    - Red for negative, blue for neutral, green for positive sentiment.
- Additional visualizations support identification of branches needing attention.

Technologies Used

- **Apache Airflow:** ETL orchestration and scheduling.
- **Apify:** Web scraping for data collection from Google Maps.
- **PostgreSQL:** Structured storage for transformed data.
- **Power BI:** Data visualization tool for interactive reports.

Conclusion

The project successfully creates a robust and automated data warehouse pipeline integrating advanced web scraping and AI-powered sentiment analysis to provide CIH Bank with deep, actionable insights on customer feedback. These insights enable data-driven decision making to improve customer satisfaction and service quality across branches.

This condensed report highlights the workflow, tools, and outcomes of the CIH Bank customer sentiment analysis project with clarity and brevity.