Airline Sentiment Tracker Dashboard — Project Documentation

Project Overview

This project is a comprehensive data analytics dashboard designed to track, analyze, and visualize customer sentiments toward different airlines based on social media feedback. The goal is to help airline companies understand public perception, pinpoint operational issues, and identify actionable opportunities for business improvement.

1. Objective

- To analyze and monitor customer sentiment about airlines using social media data.
- To uncover trends in positive, neutral, and negative feedback.
- To explore the root causes of customer dissatisfaction.
- To provide actionable insights for operational and service enhancements.

2. Data Description

- ***Data Source:***
  - Collected from social media platforms (primarily Twitter), containing posts and tweets where users mention one or more major airlines.
  - The data is typically acquired via APIs or web scraping tools targeting keywords and official airline Twitter handles.

- ***Data Fields:***
  - Airline: Name of the airline mentioned (e.g., American, Delta, Southwest, United, US Airways, Virgin America).
  - Sentiment: Labeled as “positive,” “neutral,” or “negative,” based on automated or manual annotation of tweet content.
  - Reason for Negative Feedback: Categorized reasons such as “Customer Service,” “Late Flight,” “Lost Luggage,” “Cancelled Flight,” etc. This column is present only for negative sentiment records.
  - Timestamp: Date and time when the tweet was posted, enabling temporal analysis (sentiment trends by day/hour).
  - Tweet Location: Geographical metadata with latitude and longitude (if available), or marked as “unknown” when not provided by the user or app.
  - Tweet ID: Unique identifier for each tweet (optional, for tracking or deduplication).

- ***Data Volume:***
  - Each sentiment category (positive, neutral, negative) in the dashboard is shown with an equal count of 14,640 records—the underlying dataset is either balanced by design or through preprocessing.

- ***Data Processing:***
  - Cleaning: Removal of duplicates, irrelevant tweets, and normalization of airline names.
  - Sentiment Analysis: Applied using NLP libraries (e.g., NLTK, scikit-learn) to assign sentiment labels, unless already present in the source.
  - Categorization: For negative tweets, text mining or keyword analysis groups them into common complaint categories.
  - Aggregation: Data grouped by airline, sentiment, time, and complaint reason to produce the dashboard visualizations.

- ***Data Limitations:***
  - Some tweets may lack location metadata ("unknown" on map).
  - Manual errors or "null" entries can occur in categorization (as observed in the "Null" bar under Negative Feedback Reasons).
  - Sample may not be perfectly representative of all airline customers, as social media users can be more vocal about negative experiences.

3. Dashboard Components

a. Sentiment Overview

Positive, Neutral, and Negative Feedback: Displays total counts for each sentiment type to provide an at-a-glance performance metric.

b. Sentiment Over Time

Visual pie chart showing sentiment (positive, neutral, negative) distribution over a selected period.

c. Airline-Wise Sentiment Comparison

Bar chart comparing sentiments for each airline, enabling benchmarking across competitors.

d. Negative Feedback Reasons

Horizontal bar chart presenting the most common reasons for negative feedback, such as:

- Poor customer service
- Late flights
- Lost luggage
- Cancelled flights

e. Sentiment by Time of Day

Line chart depicting how different sentiments fluctuate throughout the day, highlighting peak complaint times.

f. Tweet Location Analysis

World map showing geolocation of feedback, helping identify regional sentiment trends.

g. Airline-Wise Negative Reasons

Treemap focused on which airlines receive the most negative mentions and for what reasons.

4. Key Insights

- Negative feedback is the most common sentiment, followed by neutral and positive.
- Top reasons for negative sentiment are poor customer service and late flights.
- United and US Airways receive the highest number of overall feedbacks, with United notably high in negative sentiment.
- Sentiment trends spike during specific hours of the day, often aligning with standard travel and customer service windows.
- Tweet location analysis shows global distribution, but a significant number of locations remain unknown (possibly due to privacy settings).

5. Business Recommendations

Issue Identified	Recommendation	Expected Benefit
High negative feedback (customer service, delays)	Invest in customer service training and communication; streamline delay notifications and compensation policy	Improved customer satisfaction, reduced negative PR
Frequent late flights	Review root causes for delays, optimize scheduling, or increase staff allocation	Fewer delays, increased reliability perception
Lost luggage & flight cancellations	Enhance luggage tracking, automate rebooking processes	Retain customers, improve experience
Peak times for negative feedback	Increase staff availability during peak hours; proactive social media engagement	Quicker response times, reduced customer frustration

6. Potential Extensions

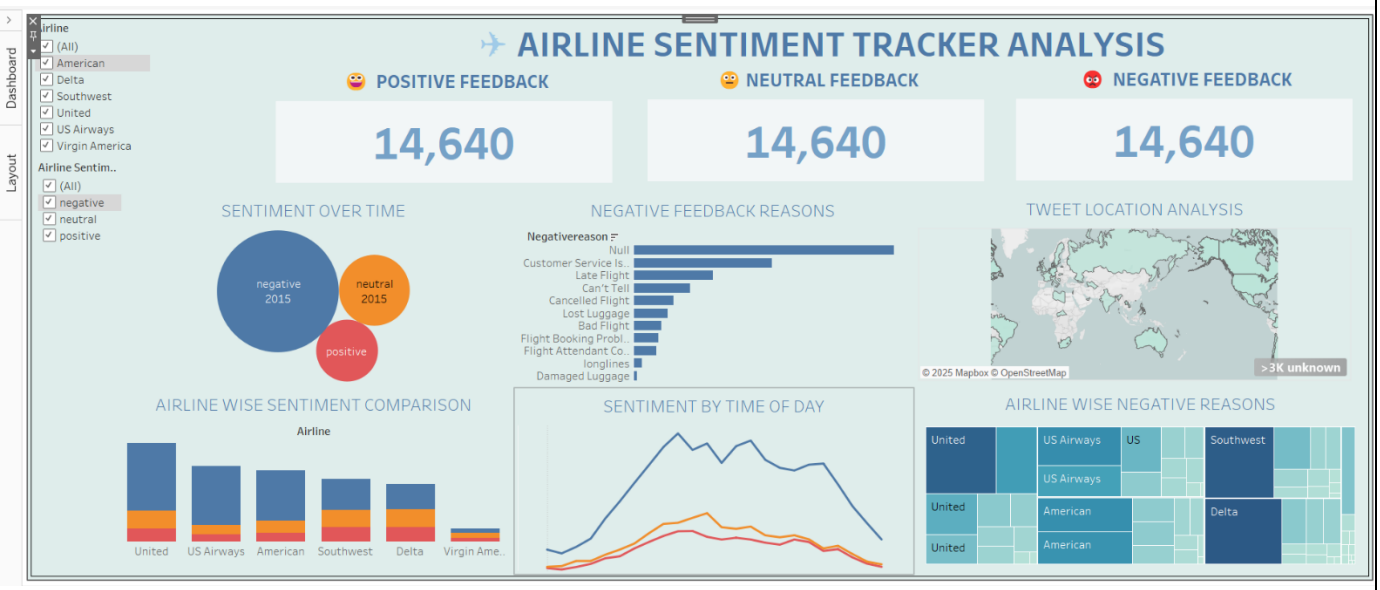
- **Predictive Analysis**: Forecast future sentiment trends using machine learning.
- **Automation**: Real-time alerts to management when negative sentiment surges.
- **Deep Dive**: Drill down by route, flight number, or customer profile for targeted improvements.

7. Sample Use Case

“A major airline uses this dashboard for weekly operational reviews. On identifying a surge in ‘late flight’ complaints during Friday evenings, management increases ground staff and improves real-time communication, resulting in a 15% reduction in negative feedback the following quarter.

8. Deliverables

Interactive dashboard (as shown in the image)



Executive summary and detailed documentation (this document)

Key insights report and business improvement suggestions

9. Technologies Used

Data Extraction and Cleaning: Python (pandas, numpy)

Sentiment Analysis: Python (NLTK, scikit-learn)

Visualization and Dashboard: Tableau or Power BI

10. How to Use

Filter by airline or sentiment to investigate specific issues/trends.

Use feedback timing and location charts to allocate customer resource teams efficiently.

Review top reasons for negative sentiment to prioritize operational changes.

This documentation can be included alongside your dashboard portfolio as proof of end-to-end analytics, business reasoning, and actionable value delivered in the sample project.