Summary: Airline Sentiment Analysis Project

1. Introduction: Understanding the Voice of the Customer

This project's core purpose was to analyze thousands of customer tweets to automatically understand their feelings—whether positive, neutral, or negative—about major US airlines. The main goal was to transform unstructured social media chatter into clear, actionable insights that airlines can use to improve customer service and business operations. By listening to the "voice of the customer" at scale, we can pinpoint exactly what drives satisfaction and frustration. To achieve this, we employed a sophisticated deep learning model to decode the sentiment behind each tweet.

2. Our Approach: How We Analyzed the Tweets

To accomplish our goal, this project used a sophisticated deep learning model (DistilBERT) to read and classify 14,604 customer tweets. The model's effectiveness was high, achieving an overall accuracy of **88.45%** , which makes its conclusions highly reliable for business decision-making.In simple terms, the model performed the following tasks:

- Analyzed over 14,000 individual tweets.
- Automatically sorted each tweet into one of three categories: 🟢 **Positive** , ⚪ **Neutral** , or 🔴 **Negative** .
- Achieved a high level of accuracy in its classifications.With this highly reliable data as our foundation, we uncovered the following critical business insights.

3. Key Findings: What We Discovered

The analysis revealed several critical insights into the state of customer satisfaction in the airline industry, highlighting major challenges and clear opportunities for improvement.

3.1 The Overall Mood: A Dominance of Negative Feedback

The most significant finding was the overwhelming amount of negative sentiment across all airlines.**62.72%** of all tweets were **Negative** . The ratio of negative to positive feedback was nearly **4-to-1** .This indicates significant, widespread customer dissatisfaction. It's a clear signal that the industry faces systemic issues, though it also reflects a common social media dynamic where dissatisfied customers are more motivated to voice complaints than satisfied customers are to share praise.

3.2 The Core Problem: Customer Service is the Biggest Pain Point

Digging deeper into the reasons for negative feedback, the analysis uncovered a crucial insight: the number one complaint was **"Customer Service Issue,"** which accounted for nearly a third (31.7%) of all complaints. This is highly significant because it shows that poor human interactions are a greater source of frustration for customers than operational problems like flight delays or cancellations. This suggests that while operational problems are frustrating, poor service recovery or negative staff interactions compound the initial problem.A notable exception was Delta, whose primary complaint was "Late Flight," suggesting its main challenges are operational rather than service-related.

The analysis showed that customer sentiment varied significantly between airlines, creating distinct brand reputations. United Airlines received the most attention overall but struggled with perception, while Southwest Airlines emerged as a leader in customer satisfaction.

Metric	Airline Leader	Key Statistic
Most Negative Tweets	United Airlines	2,633 negative tweets
Most Positive Tweets	Southwest Airlines	570 positive tweets
Highest Mention Volume	United Airlines	3,822 total tweets

These metrics show that United Airlines faces a major reputation challenge. A staggering **68.9% of United's tweets are negative**, reflecting the highest volume of both mentions and negative feedback. Conversely, Southwest Airlines stands out as a clear leader, with a **23.6% positive sentiment rate—the highest among major carriers.** This data provides a clear quantitative measure of brand reputation and customer perception across the competitive landscape.

4. Conclusion and Strategic Recommendations

This project yields two critical conclusions that should guide future strategy for any airline:

1. The airline industry faces a significant challenge with customer satisfaction, as negative sentiment dramatically outweighs positive feedback online.

2. The primary driver of customer complaints is poor **customer service**, not operational failures like flight delays. The analysis clearly shows that airlines that prioritize and invest in their frontline staff—through better training, empowerment, and service recovery processes—are best positioned to build a stronger reputation and win customer loyalty. Southwest Airlines' relatively strong performance provides a blueprint for success. The path forward requires not just addressing individual complaints, but **transforming organizational culture to prioritize customer experience at every touchpoint.**