IBM Naan Mudhalvan

Sentiment Analysis for Marketing

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Problem Definition:

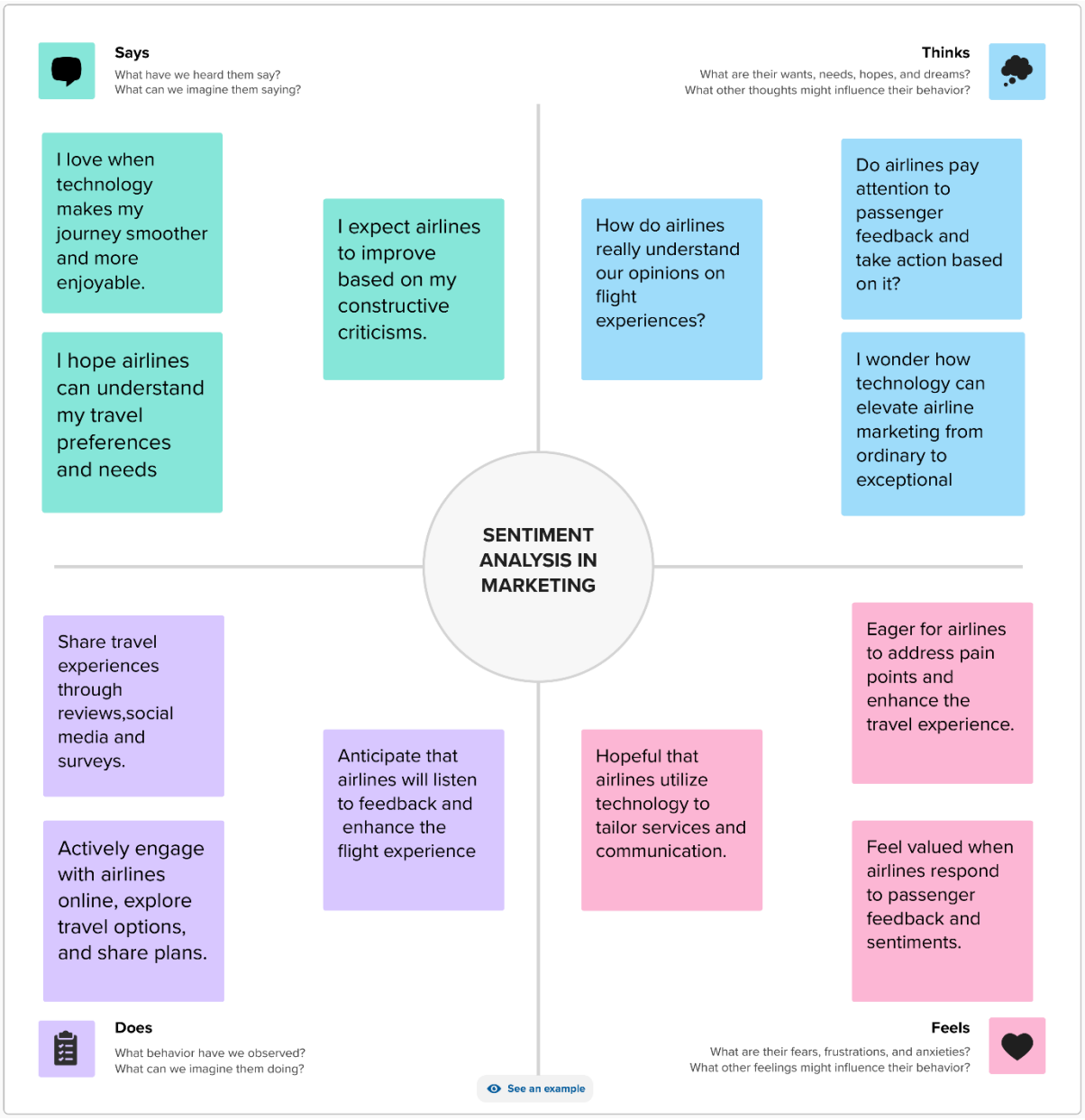
The central objective of this project is to conduct sentiment analysis on customer feedback to gain valuable insights into competitor products. Understanding customer sentiments allows companies to identify strengths and weaknesses in rival offerings, thus enhancing their own products. This project necessitates the utilization of various Natural Language Processing (NLP) methods for extracting insights from customer feedback.

Primary Goals:

1. **Understanding Customer Sentiment:**
    - **Objective**: Gain a comprehensive understanding of customer sentiment toward a product, service, or brand.
    - **Significance**: Sentiment analysis helps identify whether customers express positive, negative, or neutral feelings and opinions. This understanding is vital for evaluating customer satisfaction, loyalty, and areas in need of improvement.
2. **Informing Data-Driven Marketing Strategies:**
    - **Objective**: Utilize sentiment analysis insights to inform data-driven marketing strategies.
    - **Significance**: Marketers can tailor messaging, content, and advertising campaigns based on sentiment analysis. This approach ensures better resonance with the target audience. Additionally, sentiment analysis aids in identifying trends, market shifts, and emerging issues that influence marketing decisions and product development.

Ideation:

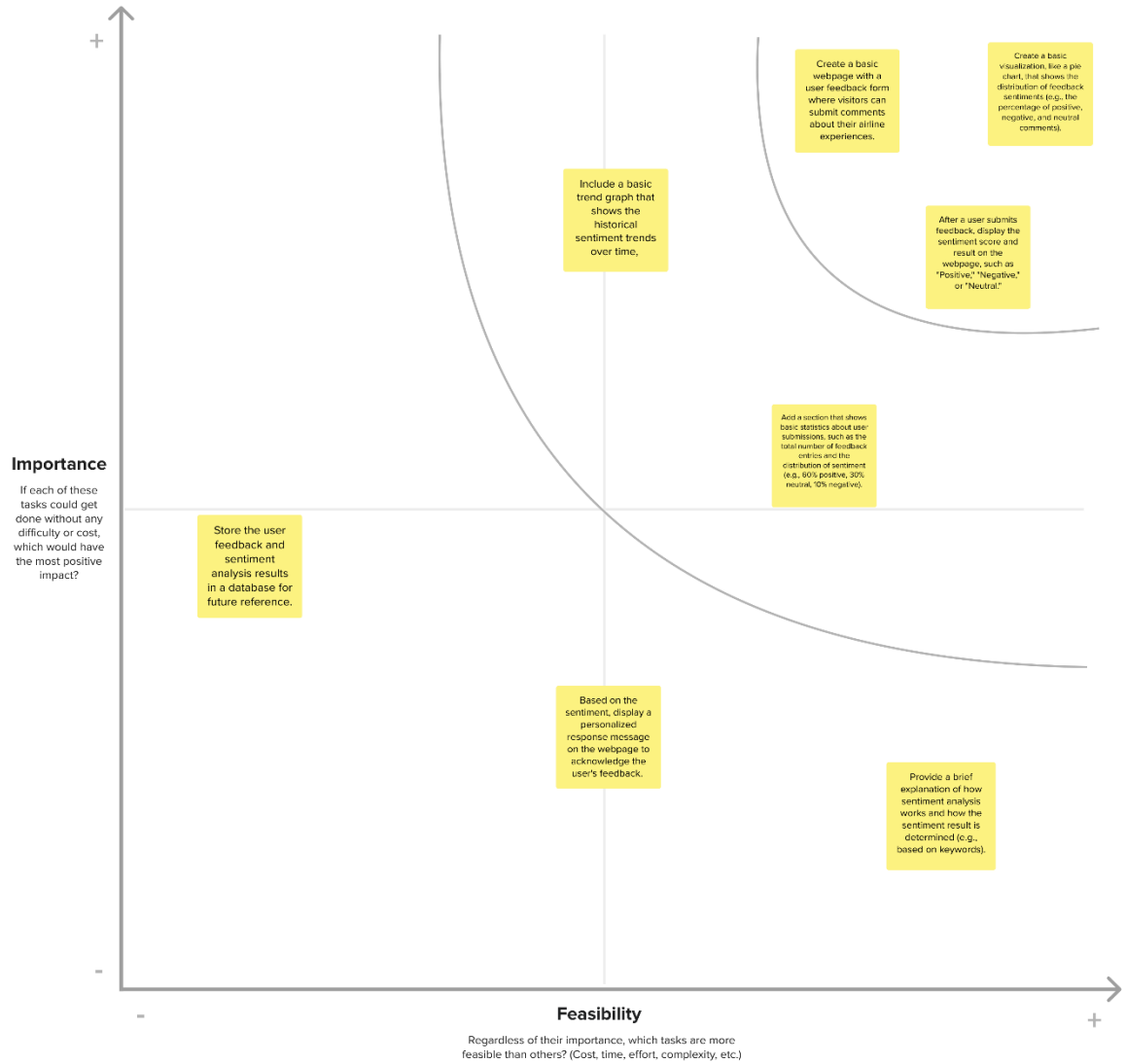
Empathy Map:



Brainstorming Ideas:

Team Leader	Team Member 01	Team Member 02	Team Member 03
Create a basic webpage with a user feedback form where visitors can submit comments about their airline experiences.	Store the user feedback and sentiment analysis results in a database for future reference.	Based on the sentiment, display a personalized response message on the webpage to acknowledge the user's feedback.	Include a basic trend graph that shows the historical sentiment trends over time,
After a user submits feedback, display the sentiment score and result on the webpage, such as "Positive," "Negative," or "Neutral."	Provide a brief explanation of how sentiment analysis works and how the sentiment result is determined (e.g., based on keywords).	Create a basic visualization, like a pie chart, that shows the distribution of feedback sentiments (e.g., the percentage of positive, negative, and neutral comments).	Add a section that shows basic statistics about user submissions, such as the total number of feedback entries and the distribution of sentiment (e.g., 60% positive, 30% neutral, 10% negative).

Prioritization of Ideas:



Design Thinking:

To ensure the effective realization of these objectives, we have devised a structured approach:

Step 1: Data Collection

- The main objective is to gather customer reviews and sentiments about the airline's services.
- The initial step involves collecting a comprehensive dataset comprising customer feedback. This dataset will serve as the foundational source of information for our sentiment analysis.
- Data sources include online customer reviews, social media platforms, the airline's website, and pre-existing datasets available from various repositories.

Tech Stack:

- *Data Source*: Online customer reviews, social media, airline's website etc.
- *Datasets*: Datasets from sources like Kaggle or academic repositories.

Step 2: Data Preprocessing

Before performing sentiment analysis, we need to clean and preprocess the textual data to ensure its quality and uniformity. This involves:

- Removing special characters, HTML tags, and irrelevant information.
- Tokenization: Splitting text into words or subword units.
- Lowercasing all text to maintain consistency.
- Removing stop words (common words like "the," "and," "is") that do not carry significant meaning.
- Handling misspellings and abbreviations.
- Lemmatization or stemming to reduce words to their root form.

Tech Stack:

- *Python Libraries*: Utilize NLTK (Natural Language Toolkit), spaCy, or similar libraries for efficient preprocessing.

Step 3: Sentiment Analysis Techniques

- This step focuses on the application of sentiment analysis techniques such as NLP to understand the emotional tone of the customer feedback.
- Techniques may include Bag of Words (BoW), Word Embeddings (Word2Vec, GloVe), or advanced deep learning models like Transformer models (e.g., BERT, GPT-3).
- The choice of technique will depend on the complexity of the problem and the availability of computational resources.

Tech Stack:

- *Bag of Words (BoW)*: Implement a count-based technique to convert text into numerical data.
- *Word Embeddings*: Transform words into vector representations for richer context.
- *Transformer Models*: Utilize advanced deep learning models for sophisticated sentiment analysis.
- *Python Libraries*: Rely on libraries such as scikit-learn, TensorFlow, PyTorch, and Hugging Face Transformers for pre-trained models.

Step 4: Feature Extraction

Once we have applied sentiment analysis techniques, we will extract features from the text data. These features may include:

- Sentiment scores (positive, negative, neutral) for each review.
- Keywords or phrases associated with positive and negative sentiments.
- Summary statistics of sentiment distributions.

Tech Stack:

- *Feature Engineering*: Create sentiment-related features to capture insights.
- *Python Libraries*: Leverage scikit-learn, pandas, and numpy for efficient feature extraction.

Step 5: Visualization

- Visualizations play a pivotal role in understanding sentiment patterns within the dataset.
- Creation of visualizations helps to depict the sentiment distribution and analyze trends.
- Common visualizations include sentiment distribution plots, word clouds, and trend analysis to visualize how sentiments change over time.

Tech Stack:

- *Visualization Tools*: Utilize libraries such as Matplotlib, Seaborn, Plotly, or similar tools for creating informative visualizations.
- *Types of Visualizations*: Craft sentiment distribution plots, word clouds, and trend analysis graphs to facilitate data interpretation.

Step 6: Insights Generation

- In this step, we delve into the sentiment analysis results to derive valuable insights that can inform the airline's strategic decisions.
- Insights may encompass identifying customer preferences, pinpointing areas of strength and improvement, and identifying emerging trends.

Tech Stack:

- *Statistical Analysis*: Conduct statistical analyses to identify significant patterns and trends in sentiment data.
- *Textual Analysis*: Apply text analysis techniques to extract valuable insights from customer feedback.
- *Python Libraries*: Leverage pandas, numpy, and Natural Language Toolkit (NLTK) for comprehensive insights generation.

Conclusion:

In conclusion, our approach to solving the problem of sentiment analysis on customer feedback involves a structured design thinking process. We will collect and preprocess data, apply various sentiment analysis techniques, extract relevant features, visualize the results, and generate actionable insights. By following this plan, we aim to help companies gain a competitive edge by understanding their competitors' products from the perspective of their customers.