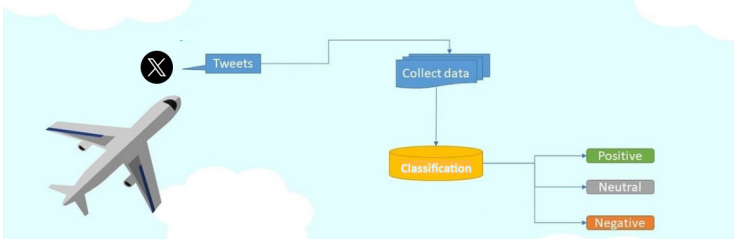
Aspect-Oriented Sentiment Analysis For Airlines

- LAKSHMI PRIYA IRAVA, MARIO M. KUBEK

INTRODUCTION

- Social media platforms like Platform X (Twitter) are vital for businesses, including airlines, to gather real-time **customer feedback**, influencing their understanding of **customer satisfaction, service quality,** and **brand reputation.**
- However, traditional sentiment analysis methods often fall short in capturing the nuanced feedback from complex domains like **airline experiences**.
- Our project aims to **improve sentiment analysis** by employing **aspect-based techniques** on Platform X data related to **airline customer experiences.**



RESEARCH OBJECTIVES

- Perform aspect-based sentiment analysis on Platform X data related to airline experiences to deepen the understanding of **customer sentiment**.
- Evaluate the performance of various machine learning classifiers, including **Multinomial Naive Bayes, Multi-Layer Perceptron, XGBoost, Random Forest,** and **Support Vector Machine (SVM),** for sentiment analysis on Platform X data.
- Identify the **top aspects** driving **positive** and **negative** sentiments towards airlines using Platform X data.
- Provide actionable insights derived from sentiment analysis findings to help airlines enhance **customer satisfaction and service quality**.
- Explore the potential impact of sentiment analysis on Platform X data for informing **strategic decision-making** and marketing efforts within the airline industry.

RESULTS

Here are the insights gleaned from the word cloud visualizations:

- Negative Words: **Staff, comfort**, punctuality, and service are the most prominent.
- Positive Words: **Staff, service** and comfort stand out prominently.
- Neutral Words: **Staff**, **price**, **punctuality**, and cleanliness are highlighted.

NEUTRAL WORDS:

POSITIVE WORDS:

NEGATIVE WORDS:

METHODOLOGY

Data Collection: Extracted data from the **Kaggle** dataset "**Twitter US Airline Sentiment**," consisting of tweets regarding **airline customer experiences.**

- Curated a comprehensive dataset covering diverse aspects of **customer feedback on airline services.**

Preprocessing: Applied **regular expressions** to eliminate stopwords, URLs, and special characters from the raw text data.

Feature Extraction: Utilized the **bag-of-words** technique to extract features from the preprocessed text data.

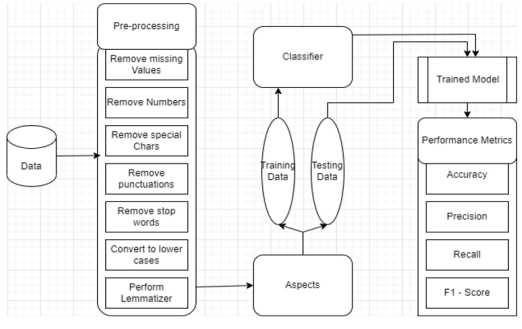
- Generated a numerical representation of the textual features, enabling machine learning algorithms to process and analyze the data effectively.

Machine Learning Classifiers: Implemented various machine learning classifiers, including **Multinomial Naive Bayes, Multi-Layer Perceptron, XGBoost, Random Forest**, and **Support Vector Machine (SVM)**, to perform sentiment analysis.

- Leveraged the diverse capabilities of each classifier to capture different aspects of sentiment and enhance overall analysis accuracy.

Training and Evaluation: Divided the dataset into training and test sets to facilitate model training and performance evaluation.

- Evaluated the trained classifiers using a range of evaluation metrics such as **accuracy, precision, recall, and F1 score** to assess their effectiveness in sentiment analysis.



CLASSIFIER	PRECISION SCORE	RECALL SCORE	F1 SCORE	ACCURACY
Multinomial Naive Bayes (MNB)	0.75	0.76	0.76	0.76
Multilayer Perceptron (MPC)	0.74	0.73	0.73	0.73
XGBoost (XGB)	0.75	0.76	0.74	0.76
Random Forest (RFC)	0.76	0.77	0.76	0.77
Support Vector Machine (SVM)	0.77	0.78	0.77	0.78

REFERENCES

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FUTURE STEPS

- **Advanced NLP Techniques:** Explore deep learning and transformer-based models for nuanced sentiment analysis.
- **Multimodal Analysis:** Integrate images and videos into sentiment analysis frameworks for a comprehensive understanding.

CONCLUSION

- Study Findings: Effective use of **machine learning classifiers** for sentiment analysis on airline-related Platform X data.
- Actionable Insights: Connecting sentiments to specific **airline service features,** offering actionable improvements for **service quality** based on sentiment analysis results.