

Automating the detection of customer sentiment using machine learning

Faculty:

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INTRODUCTION

- **Sentiment Analysis** is a natural language processing (NLP) technique used to determine the emotional tone behind a body of text. By categorizing text into sentiments such as positive, negative, or neutral, businesses can gauge customer satisfaction and identify areas needing improvement.
- Customer sentiment analysis is a crucial tool for businesses to understand customer opinions and emotions.
- This project leverages Natural Language Processing (NLP) techniques to analyze customer transcripts.
- The goal is to determine sentiment towards various companies, identifying key insights and patterns.
- Customer feedback from voice, chat, and email transcripts is analyzed using machine learning algorithms.
- Sentiment is classified as positive, negative, or neutral .
- Insights gained enhance customer understanding, product development, and reputation management.
- Effective sentiment analysis enables data-driven decision-making and personalized customer experiences.

Problem statement

- Automating the detection of customer sentiment using machine learning.

Current Challenges:

Manual sentiment analysis is time-consuming.

Businesses struggle to analyze large-scale customer feedback.

Difficulty in understanding customer sentiment trends.

Scope of the Project

- **Objective:** Develop a customer sentiment analysis system
- **Functional Scope:**
 - Data collection from social media, reviews, and feedback.
 - Preprocessing (text cleaning, tokenization).
 - Model development (ML and deep learning).
 - Sentiment classification (positive, negative, neutral)/(Yes ,No).
- **Technical Scope:**
 - Tools: Python, NLTK, Scikit-Learn, TensorFlow.
 - Deployment on cloud services (AWS, GCP).

Proposed system

Proposed Solution:

Automate sentiment detection using machine learning.

Provide businesses with real-time insights for decision-making.

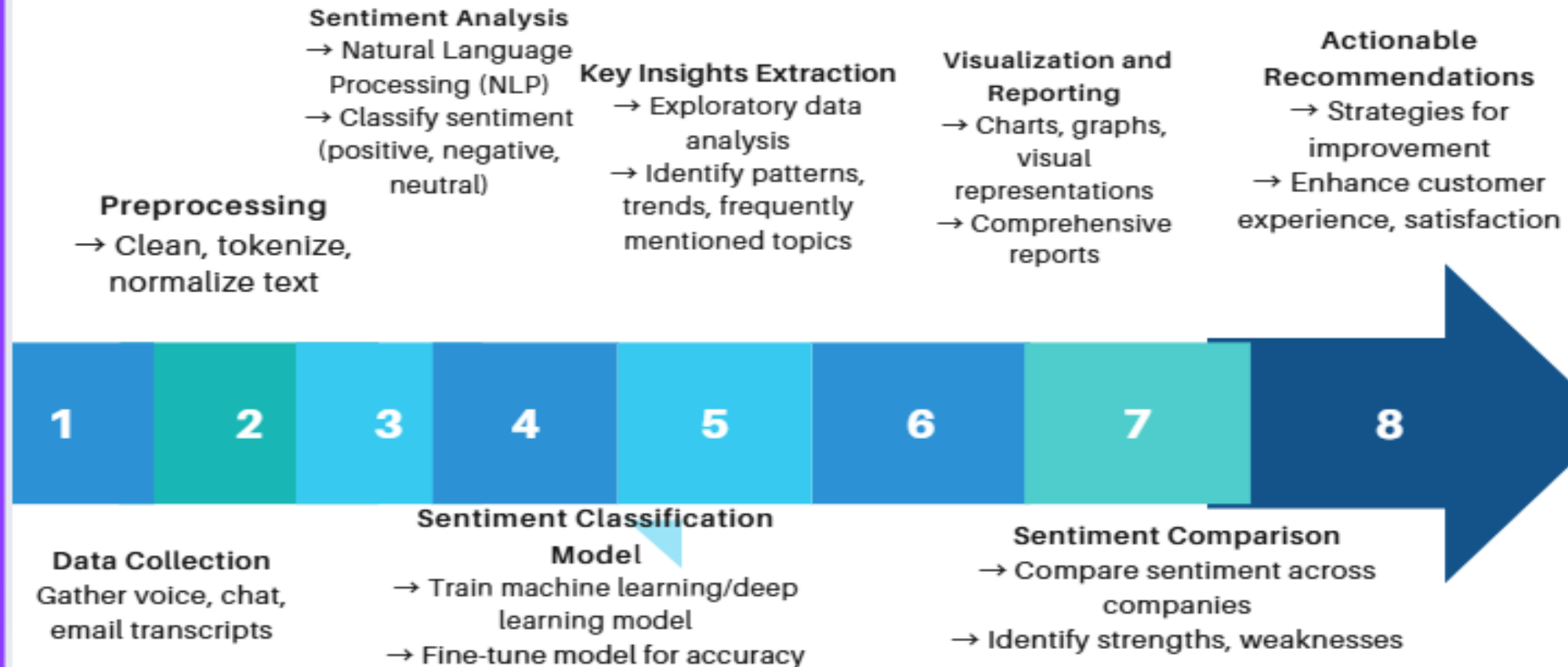
OBJECTIVES

- 1. Accurate Sentiment Classification: Analyse customer feedback to classify sentiment as positive, negative, or neutral with 80% accuracy.
- 2. Improve Customer Experience: Identify key drivers of customer satisfaction and dissatisfaction to inform product and service enhancements.
- 3. Inform Business Decisions: Provide data-driven insights to inform business decisions and optimize customer-facing strategies.
- 4. Enhance Customer Retention: Reduce customer complaints by 20% and increase customer loyalty program enrolment by 15%.
- 5. Measure Sentiment Impact: Track and measure the impact of sentiment analysis on key business metrics, such as Net Promoter Score (NPS) and customer lifetime value

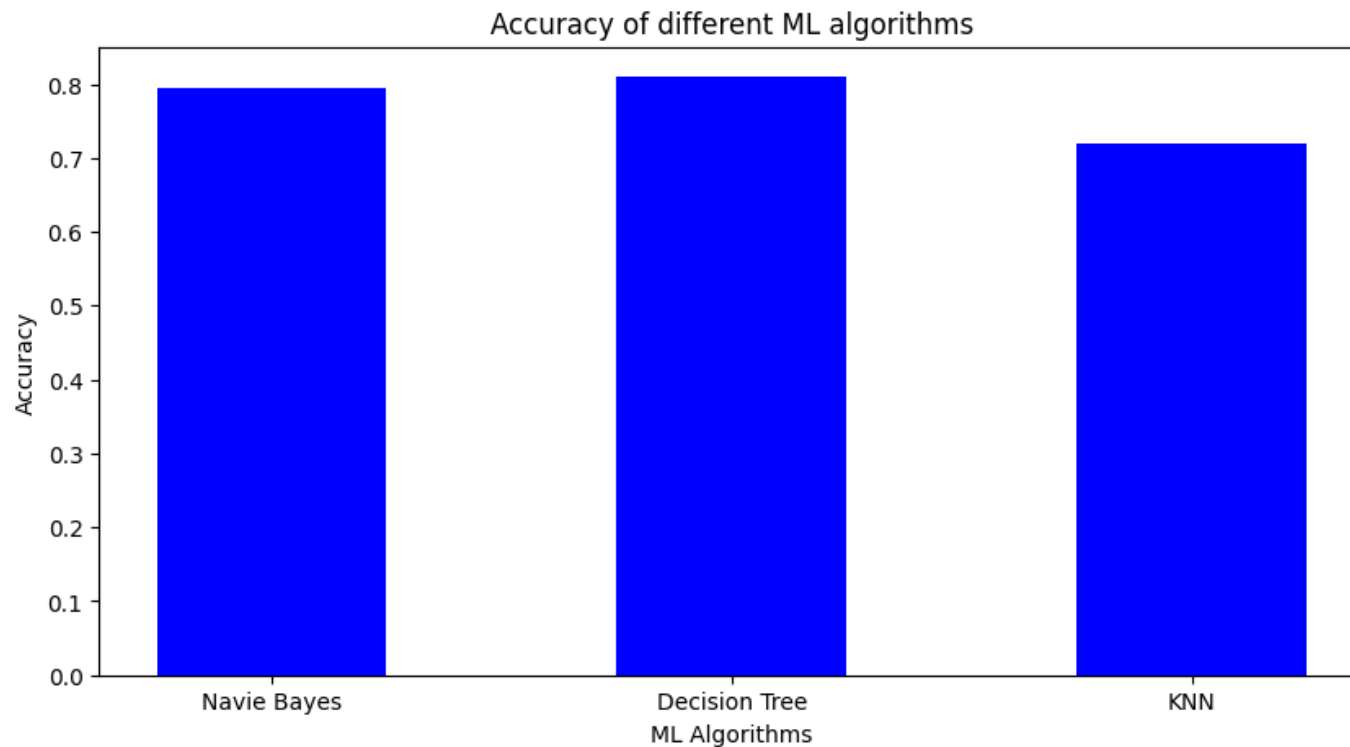
LITERATURE SURVEY

Title	Objective	Author(s)	Merits	Demerits
Sentiment Analysis Using Simple Lexicon-based Approach	To analyze sentiment using basic lexicon-based methods.	J. Smith, A. Jones	Simple and easy to implement.	Limited to basic lexicon-based methods, which may lack accuracy and robustness compared to advanced techniques.
A Review of Sentiment Analysis in E-commerce	To review sentiment analysis approaches specifically for e-commerce reviews.	L. Brown, T. Green	Focused on e-commerce, offering relevant context.	Narrow scope and may not incorporate recent advancements in sentiment analysis methods.
Challenges in Sentiment Analysis for Social Media Data		R. Patel, K. Sharma	Identifies specific challenges in social media sentiment analysis.	Focuses mainly on challenges without providing comprehensive solutions or advanced methodologies.
Sentiment Analysis Using Traditional Machine Learning Algorithms	To analyze sentiment using traditional machine learning algorithms like SVM and Naive Bayes.	A. Kumar, S. Agarwal	Provides a good foundation in traditional machine learning methods.	Limited to traditional algorithms; does not explore recent advancements in deep learning or neural networks.

METHADODOLOGY



RESULTS



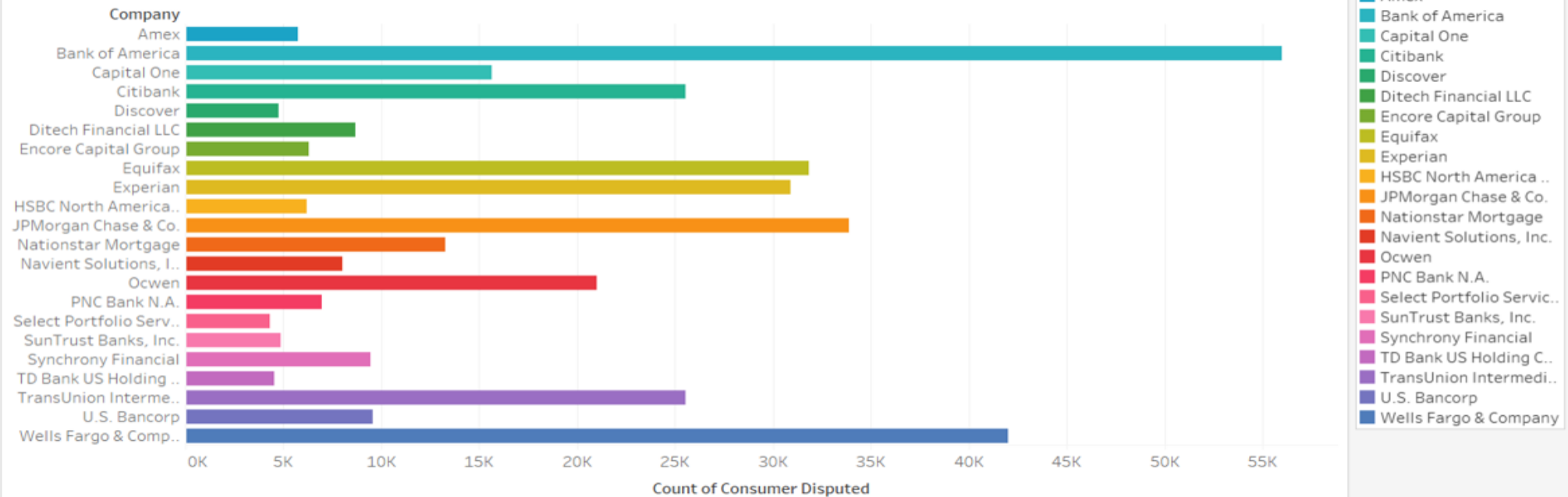
- Navie Bayes Accuracy = 0.7945412238224011

- Decision Tree Accuracy = 0.8100119489340293

- KNN Accuracy = 0.718759826426011
Accuracy 0.789358946686812

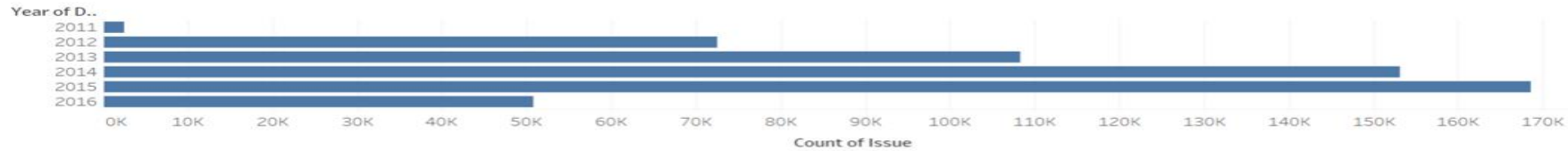
sentiment analysis and key insights for each company

Company Vs Count of Dispute



Compare the customer sentiment across different companies

Issues in which Year reported



Products and Companies

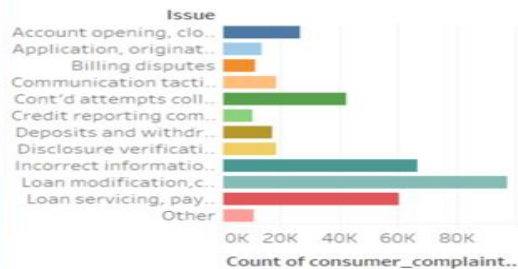
Company	
Amex	5,752
Bank of America	55,998
Capital One	15,628
Citibank	25,540
Discover	4,765
Ditech Financial L..	8,679
Encore Capital Gr..	6,304
Equifax	31,828
Experian	30,905
HSBC North Amer..	6,180
JPMorgan Chase ..	33,881
Nationstar Mortg..	13,250
Navient Solution..	8,007
Ocwen	20,978
PNC Bank N.A.	6,974
Select Portfolio S..	4,318
SunTrust Banks, I..	4,855
Synchrony Financ..	9,435
TD Bank US Holdi..	4,528
TransUnion Inter..	25,534
U.S. Bancorp	9,554
Wells Fargo & Co..	42,024

Customer Sentiment Analysis

Customer Complaints vs States



Which Issue has MAX complaints



Issues faced through every product



Year Wise No. Of Issues



CONCLUSION

Automating customer sentiment detection through machine learning significantly enhances the ability to understand customer opinions at scale. By leveraging natural language processing and advanced algorithms, businesses can gain real-time insights, improve customer experiences, and make data-driven decisions. This approach not only saves time and resources but also provides a competitive edge in responding effectively to customer needs.

