

FINAL YEAR PROJECT

Sentiment Analysis System

Analyzing Social Media Comments Using Natural Language Processing

Project: Sentiment Sense

Academic Year: 2025–26

Domain: AI & Natural Language
Processing

Degree: B.Tech Computer Science
& Engineering



💡 SOLUTION

AI-Powered Sentiment Classification

Intelligent system leveraging Natural Language Processing and Machine Learning to automatically understand customer sentiment



Positive

Satisfaction & approval



Neutral

Factual & balanced



Negative

Criticism & concerns

100%

Automated

Zero manual intervention required

<1s

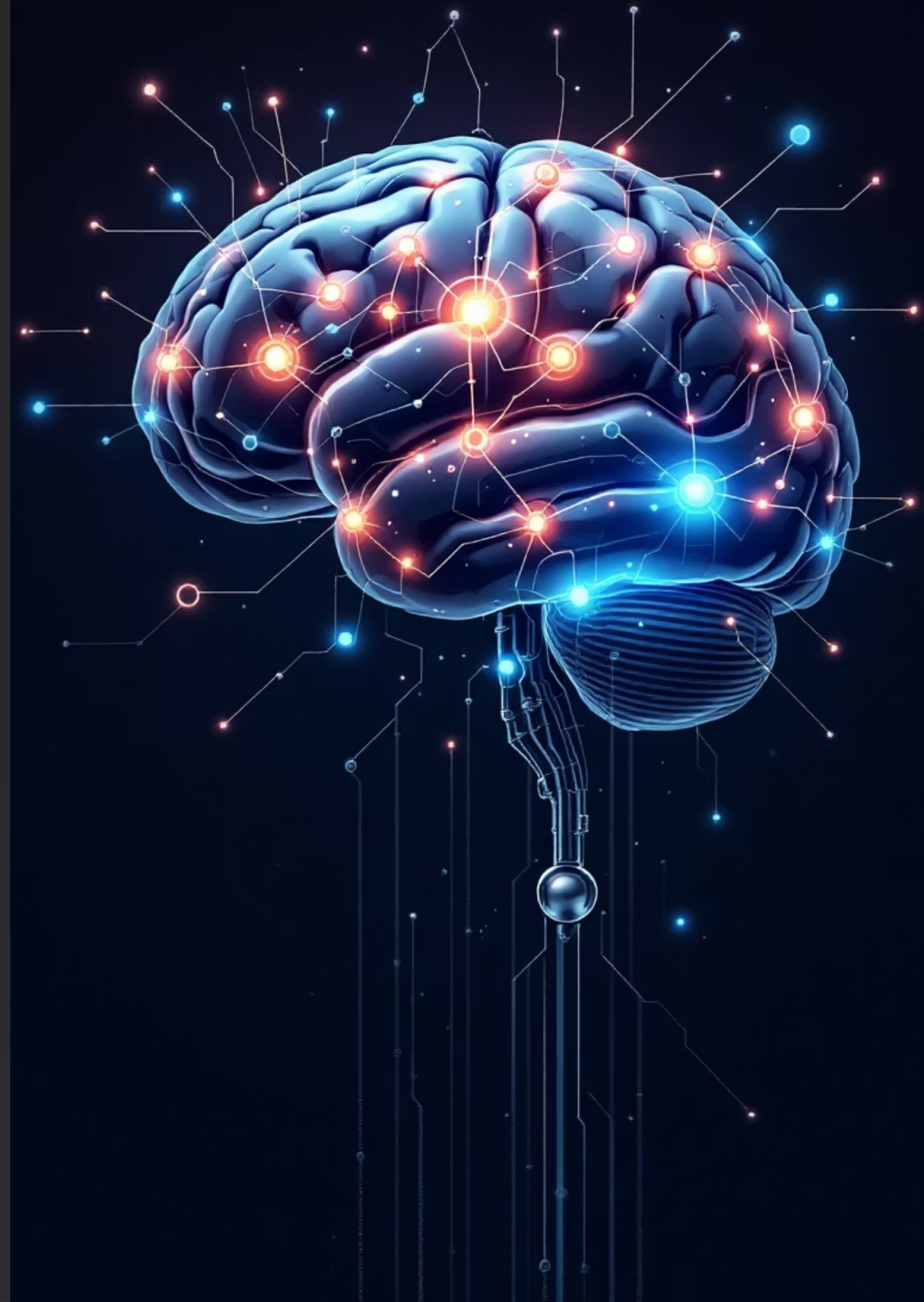
Real-Time

Instant sentiment classification

85%

Confidence

Accuracy with score



Market Research & Applications

Industry Leaders Using Sentiment Analysis



Amazon

Product review monitoring



Twitter/X

Public opinion analysis



Google

Feedback analytics

Market Demand

- Opinion mining tools
- Customer experience analytics
- Social media monitoring platforms

Application Scope



Business Analytics

Customer satisfaction tracking and competitive analysis



Political Analysis

Public opinion and voter sentiment monitoring



Product Monitoring

Review analysis and quality feedback

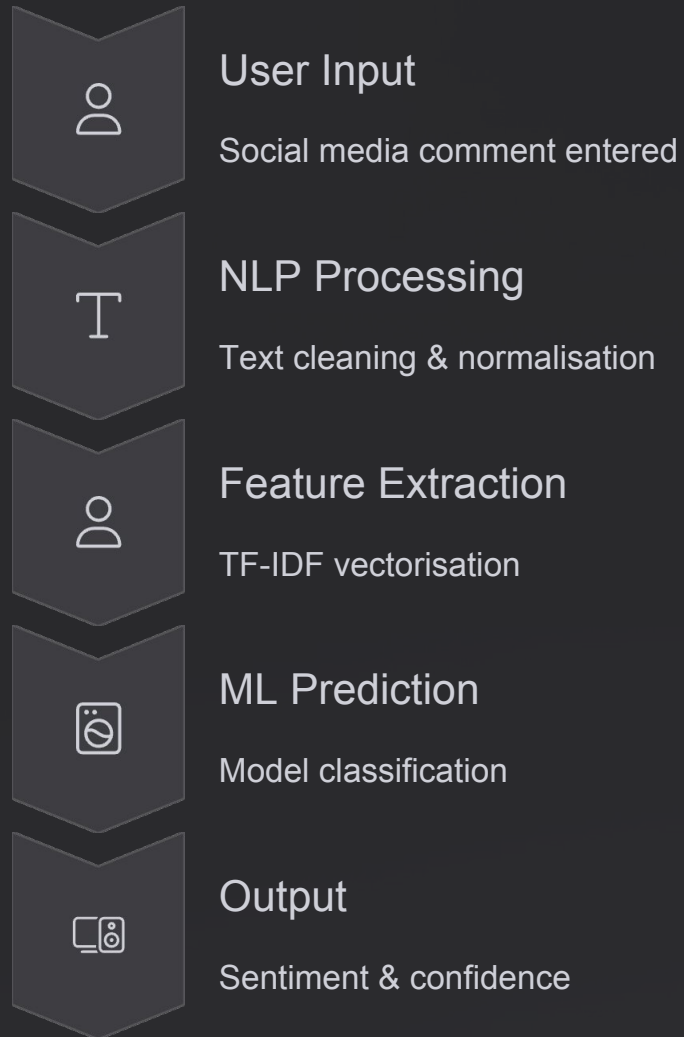


Customer Systems

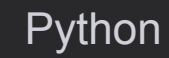
Support ticket prioritisation and feedback loops

System Architecture Overview

Modular, scalable design enabling efficient sentiment classification



The architecture prioritises **modularity** and **scalability**, allowing easy integration and future enhancements



Core programming language for implementation



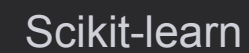
Feature extraction technique



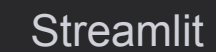
Natural Language Processing libraries



Classification model with Naive Bayes alternative



Machine Learning framework



Interactive web frontend



Development Process

01

Dataset Acquisition

Collected open-source sentiment-labelled dataset for training

03

Vectorisation

Converted text to numerical feature vectors

05

Model Persistence

Saved trained model for reuse

02

Text Preprocessing

Cleaned and normalised text data

04

Model Training

Trained classification algorithm on processed data

06

Web Integration

Built user interface with Streamlit

NLP Preprocessing Pipeline

Stopword Removal

Eliminating common words like "the", "is", "and"

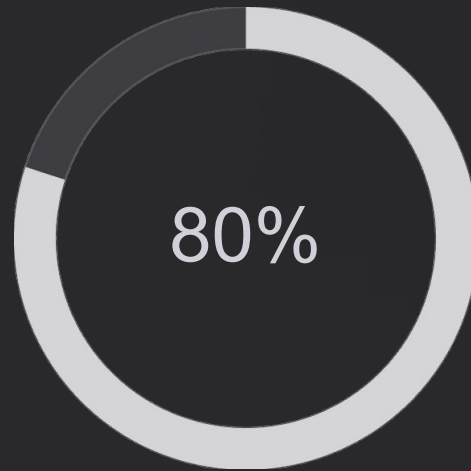
Lemmatisation

Reducing words to root form ("running" → "run")

Tokenisation

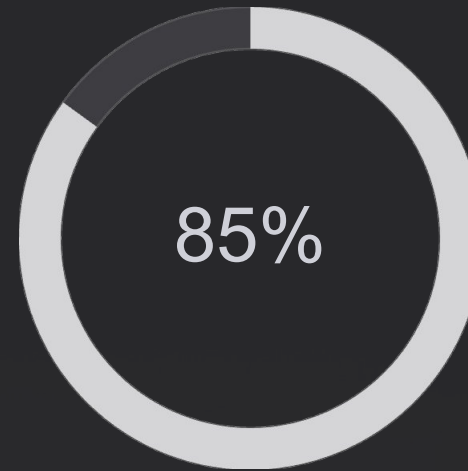
Breaking text into individual words

Performance & Output



Minimum Accuracy

Baseline performance



Target Accuracy

Achieved performance



Real-Time

Instant predictions

System Output Components

Sentiment Label

Positive, Neutral, or Negative
classification

Confidence Score

Percentage certainty of prediction

Web Interface

User-friendly real-time interaction

Example Classification

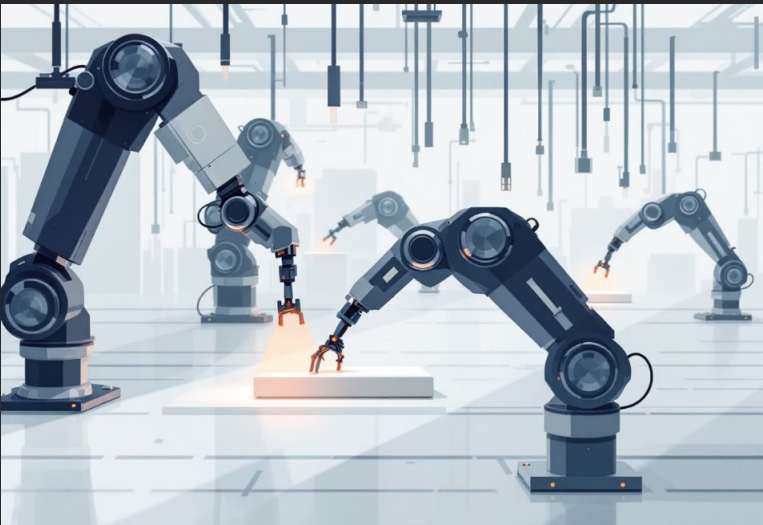
"This product is amazing!"

→ **Positive** (92% confidence)

Critical Evaluation

Key Advantages

- Fully Automated
No manual intervention required for sentiment classification
- Fast & Scalable
Handles thousands of comments in seconds
- User-Friendly
Simple web interface requiring no technical expertise
- Efficient Operations
Dramatically reduces manual effort and costs




Current Limitations

- Dataset Dependency
Performance relies heavily on training data quality and diversity
- Sarcasm Challenge
Difficulty detecting irony and sarcastic comments accurately
- Context Understanding
Limited ability to grasp complex contextual nuances
- Language Constraints
Currently supports English only




Future Enhancements & Conclusion

Roadmap for Enhancement




Multilingual Support

Expand to analyse sentiment in multiple languages including Hindi, Spanish, Arabic




Deep Learning Models

Implement LSTM and BERT for improved accuracy and context understanding



API Integration

Direct connection to Twitter, Facebook, Instagram for live analysis



Advanced Emotions

Detect specific emotions: joy, anger, fear, surprise beyond basic sentiment

Project Conclusion

This project successfully demonstrates practical application of **Artificial Intelligence** and **Natural Language Processing** technologies to solve real-world business challenges.

The system provides an automated, scalable solution for sentiment analysis, enhancing understanding of machine learning applications in commercial contexts.

- Successfully bridges theoretical knowledge with practical implementation

