

FINAL YEAR PROJECT

Sentiment Analysis System

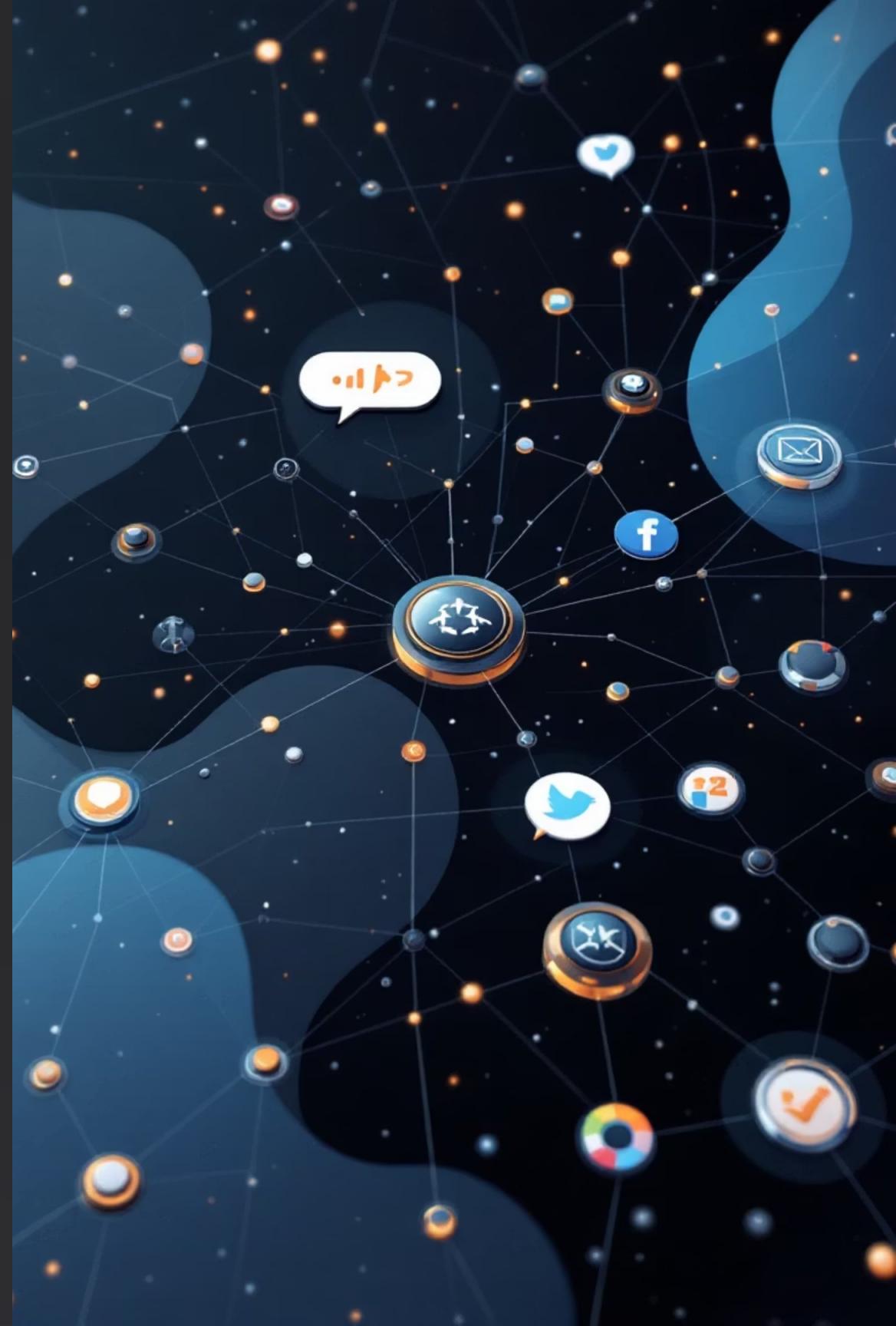
Analyzing Social Media Comments Using Natural Language Processing

Project: Sentiment Sense

Academic Year: 2025–26

Domain: AI & Natural Language
Processing

Degree: B.Tech Computer Science
& Engineering





CHALLENGE

The Social Media Feedback Challenge

The Problem

Organisations receive thousands of user comments daily across social media platforms. Manual analysis is impossible to scale.

Time-Consuming

Hours spent reading individual comments

Error-Prone

Human bias affects accuracy

Not Scalable

Cannot handle volume

Critical Questions

- What do customers really think?
- How satisfied are users?
- Is brand reputation improving?
- Which products need attention?

An automated AI solution is essential for modern businesses

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

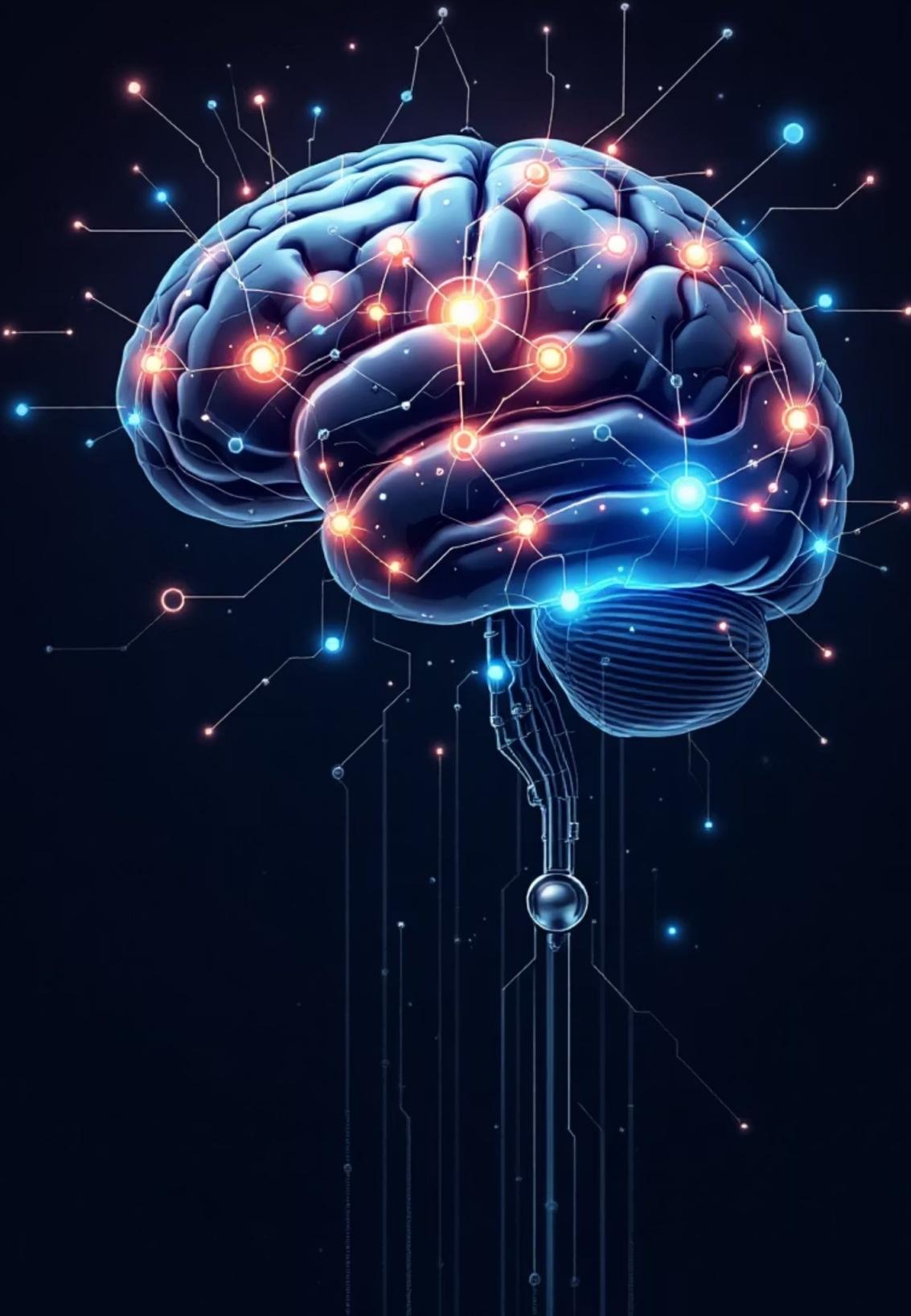
Real-Time

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

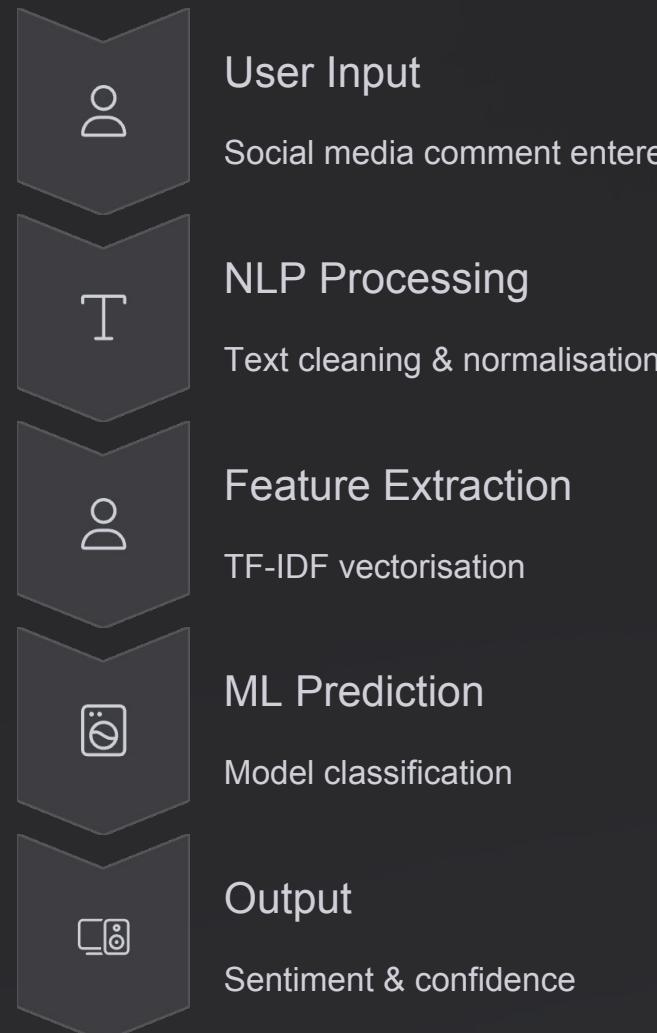


Customer Systems

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



Technology Stack



Python

Core programming language for implementation



NLTK / SpaCy

Natural Language Processing libraries



Scikit-learn

Machine Learning framework



TF-IDF

Feature extraction technique



Logistic Regression

Classification model with Naive Bayes alternative



Streamlit

Interactive web frontend



Development accelerated using **Lovable AI** for rapid prototyping and code generation

Development Process

01

Dataset Acquisition

Collected open-source sentiment-labelled dataset for training

02

Text Preprocessing

Cleaned and normalised text data

03

Vectorisation

Converted text to numerical feature vectors

04

Model Training

Trained classification algorithm on processed data

05

Model Persistence

Saved trained model for reuse

06

Web Integration

Built user interface with Streamlit

NLP Preprocessing Pipeline

Stopword Removal

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

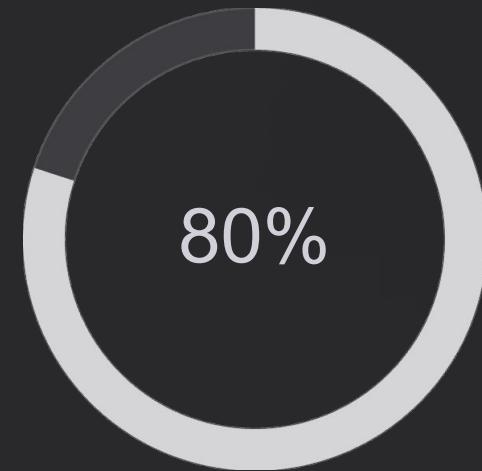
Lemmatisation

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

Tokenisation

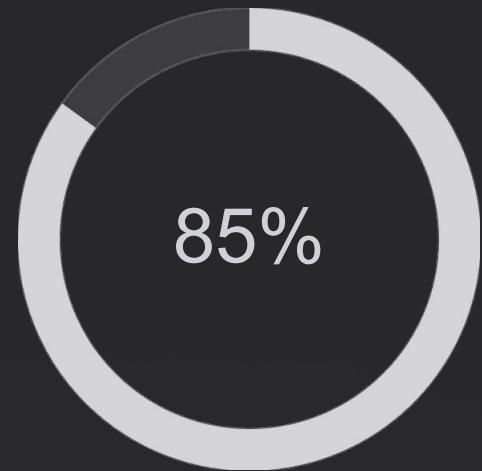
Breaking text into individual words

Performance & Output



Minimum Accuracy

Baseline performance



Target Accuracy

Achieved performance



100%

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



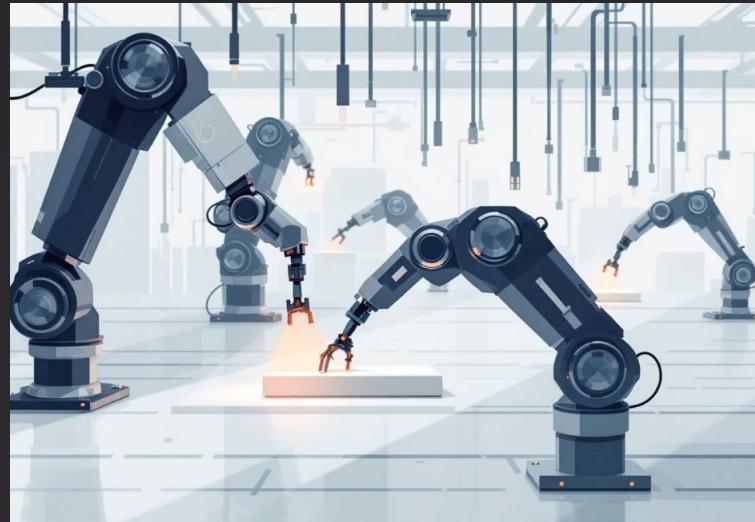
User-Friendly

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

