



Twitter Sentiment Analysis – Logistic Regression Model



Project Summary Report



Objective

This project aims to build a **Sentiment Analysis model** to classify tweets as either **Positive** or **Negative** based on the textual content. It helps businesses understand customer feedback, social trends, or product opinions in real time using machine learning.



Dataset

The dataset includes the following columns:

- ID – Unique identifier for each tweet
- Topic – Subject/topic related to the tweet (optional in modeling)
- Sentiment – The labeled sentiment (Positive/Negative)
- Review – Text content of the tweet or customer review



Tools & Libraries Used

- Python
- Scikit-learn
- Pandas, Numpy
- Matplotlib, Seaborn
- TfidfVectorizer



Data Preprocessing

The following steps were applied to clean and prepare the text data:

- Converted all reviews to **lowercase**
- Removed **punctuation marks** and special characters

- **Removed stopwords** (like "the", "is", "and", etc.)
- Tokenized the text and normalized spacing
- Used **TF-IDF Vectorization** (ngram_range=(1,2), stop words removed)

Model Training

- Algorithm: **Logistic Regression**
- Vectorization: **TF-IDF**
- Train-Test Split: 80/20
- Training set transformed using TfidfVectorizer, and the same was applied to test and new data

Evaluation Results


Metric	Value
Accuracy	88.5%
Precision (Positive)	90%
Precision (Negative)	87%
F1-Score (Overall)	~88%

Confusion Matrix:

[[4208 369]

[621 3477]]

Model Testing Examples

Input Text	Predicted Sentiment
"you are bad boy"	 <i>Positive</i> (Incorrect)

Input Text	Predicted Sentiment
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"I really love this phone!"	✔ Positive
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"Worst experience ever!"	✔ Negative
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Note: Early testing revealed bias in prediction due to TF-IDF mismatch during vectorization. Issue was resolved by using the same fitted vectorizer during both training and prediction.

Deliverables

- Clean and modular Python code (.py or Jupyter notebook)
- PDF Report with evaluation results
- GitHub repository containing:
 - Code
 - Preprocessing functions
 - Vectorizer and model training steps
 - Test examples and predictions

Key Learnings

- Importance of consistent TF-IDF vectorization across training and inference
- Handling text preprocessing for noisy social media content
- Logistic Regression as an effective baseline for sentiment classification

View Full Project on GitHub <https://github.com/Tanzeela00Sharif/Twitter-Sentiment-Analysis>