Sentiment Analysis Using Deep Learning

A Machine Learning Approach to Classifying Sentiments

Martin Waweru | 10th February 2025

by Martin Peterson

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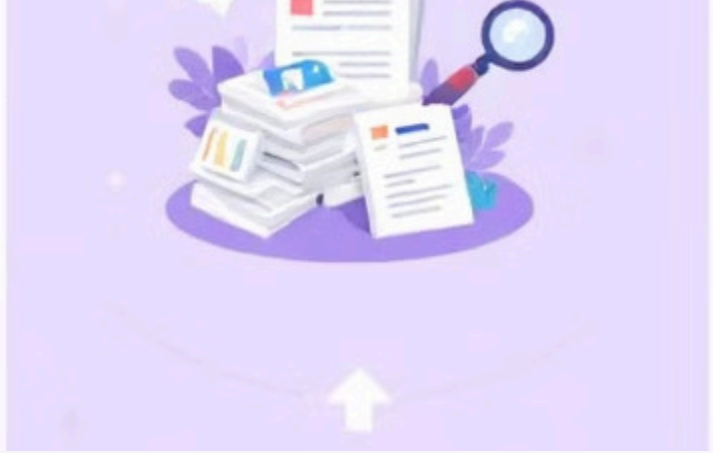

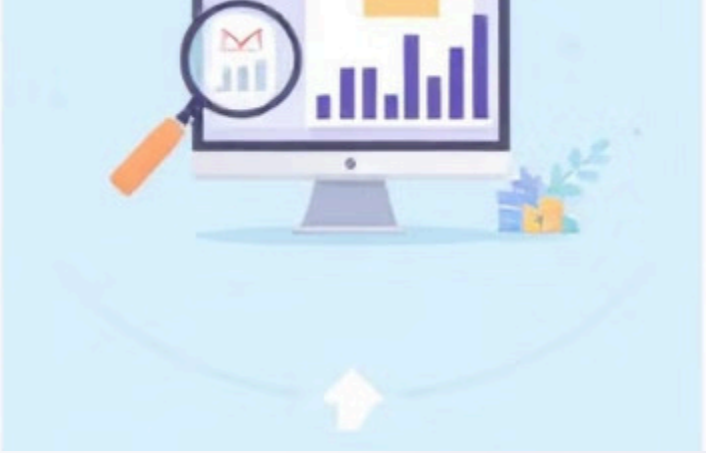

Project Overview

1 **Objective**

Predict sentiment (Positive, Neutral, Negative)

2 **Approach**

Deep learning: tokenization, padding, embedding

3 **Dataset**

Preprocessed tweets for sentiment analysis

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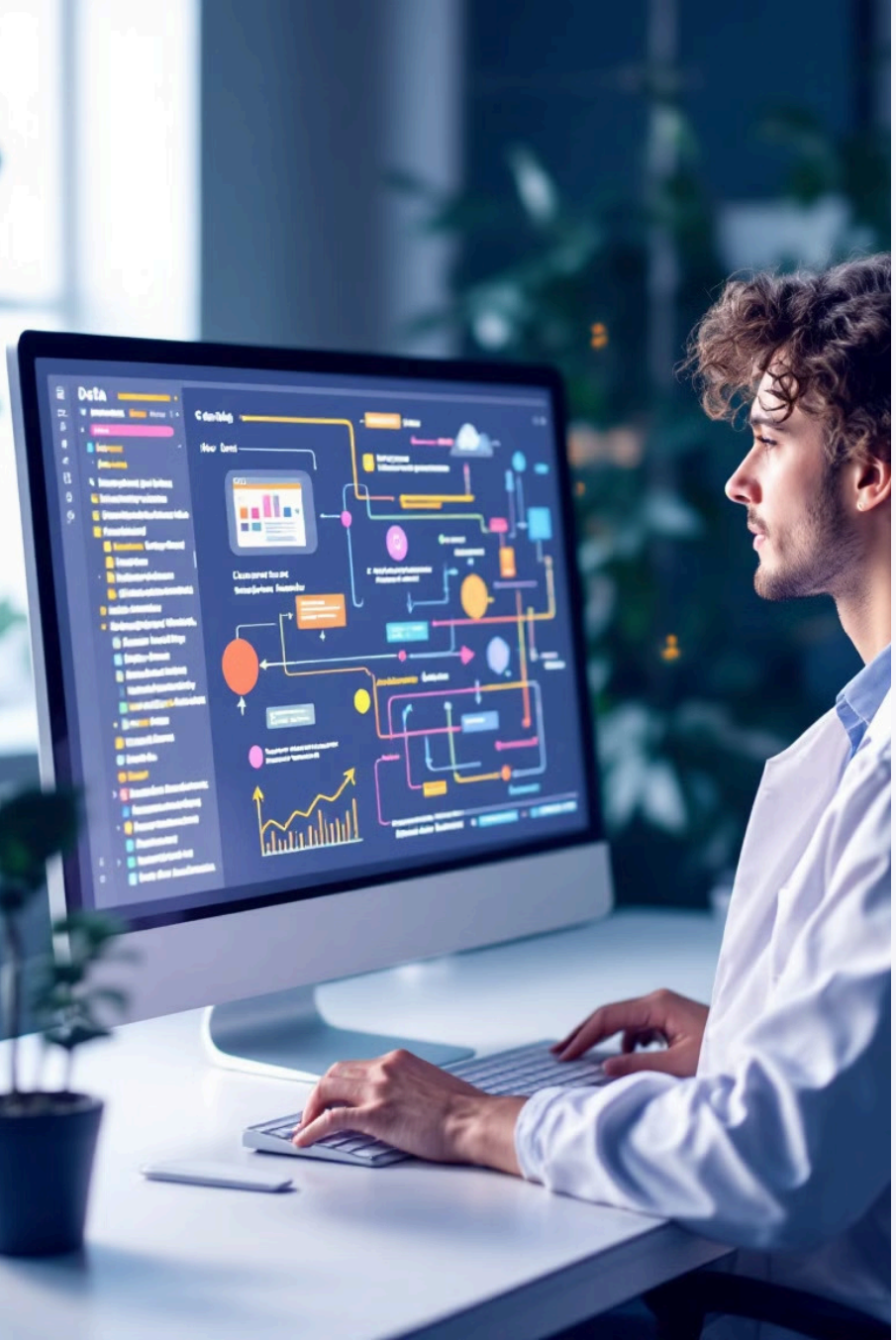

Data Preprocessing

1

Remove

Stopwords and punctuation removed

2

Tokenize

Text tokenized into sequences

3

Padding

Applied padding for uniform length

Ensures text is suitable for deep learning models.

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Model Architecture

Embedding Layer

Word representation

LSTM/GRU

Sequence learning

Dense Layers

Classification

Optimized using categorical cross-entropy loss and Adam optimizer.

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Model Performance

Training Accuracy

Improved from 63.6% to 91.8%

Validation Accuracy

Peaked around 72.1%

Observations

Overfitting suggests tuning needed

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Testing & Predictions

Real-world Input

Sentiment prediction with live user generated data

Example

“congratulations team, we won, i knew this team was strong” → **Positive**

Challenges

Handling negation words, contextual understanding limitations

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Conclusion

Sentiment analysis project completed

1 Key Takeaways

Deep learning model effectively classifies sentiment

2 Next Steps

Further tuning needed to improve validation accuracy

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