Sentiment Analysis of Food Reviews Using RNN

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Capstone project

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Problem Statement

In today?s digital era, customer reviews are abundant and valuable. Manually analyzing thousands of Swiggy food delivery reviews is inefficient and error-prone. Automating this analysis can help businesses extract useful insights and improve customer satisfaction.

In today's digital age, customer feedback plays a crucial role in shaping business strategies. Food delivery platforms generate vast amounts of user reviews. However, manually analyzing these reviews is inefficient. There's a need to automate the sentiment analysis to gain actionable insights from customer feedback.

Proposed Solution

We propose a sentiment analysis model using a Recurrent Neural Network (RNN) to classify Swiggy customer reviews as positive or negative. The model is trained using both the textual review and its average rating to generate sentiment labels.

We propose a machine learning-based sentiment analysis system using a Recurrent Neural Network (RNN). This model processes food delivery reviews to predict sentiment (positive or negative) based on textual content and corresponding ratings.

System Development Approach

Technologies Used:

- Python 3.x
- TensorFlow / Keras
- NumPy, Matplotlib
- Scikit-learn

Steps:

1. Data Cleaning & Labeling: Reviews labeled as positive if rating > 3.5
2. Tokenization & Padding: Standardize input text lengths
3. Model Training: Simple RNN with embedding
4. Evaluation: Accuracy and confusion matrix analysis

- Dataset: Swiggy food delivery reviews
- Preprocessing: Text cleaning, tokenization, and padding
- Labeling: Binary sentiment labels based on average ratings
- Tools Used: Python, Pandas, Keras, TensorFlow
- Libraries: scikit-learn, TensorFlow Keras

Algorithm & Deployment

Model Architecture:

- Embedding Layer: Converts tokens to dense vectors (16 dims)
- RNN Layer: 64 units, tanh activation
- Dense Output Layer: Sigmoid activation for binary classification

Training Details:

- Epochs: 5
- Batch Size: 32
- Loss Function: Binary Crossentropy
- Optimizer: Adam

Deployment: Jupyter Notebook via GitHub

- Algorithm: Simple RNN with Embedding Layer
- Model Architecture: Embedding ? SimpleRNN ? Dense
- Loss: Binary Crossentropy, Optimizer: Adam
- Trained over 5 epochs with ~72% test accuracy
- Sample Prediction: ?The food was great.? ? Positive (0.73)

Result

- Accuracy: ~72% on test data
- Prediction Sample:

  Input: "The food was great."

  Predicted Sentiment: Positive (0.73)
- Training curves and confusion matrix available in notebook

- Test Accuracy: 72%
- Epoch Performance: Accuracy improved slightly but plateaued
- Sample Output:

  Input: "The food was great."

  Predicted: Positive

Conclusion

The RNN-based model shows promising results for classifying Swiggy food review sentiments. Effective preprocessing and model tuning were key to performance.

The RNN-based model effectively classifies sentiments in food reviews, demonstrating the potential of NLP in the food-tech domain. Preprocessing and hyperparameter tuning significantly impact performance.

Future Scope

- Use LSTM, GRU, or BERT for better performance
- Integrate with a real-time dashboard
- Extend to multilingual reviews
- Explore image/audio feedback analysis

- Use LSTM or BERT for better accuracy
- Integrate into a web dashboard for real-time sentiment monitoring
- Extend to multilingual reviews
- Incorporate image and audio review inputs

References

- GitHub: https://github.com/ushalakshmi75/Sentiment_analysis_with_rnn
- TensorFlow and Keras Docs
- NLP Research Papers
- Swiggy Review Dataset

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- TensorFlow & Keras Documentation
- NLP Research Papers
- Swiggy review dataset

References

List and cite relevant sources, research papers, and articles that were instrumental in developing the proposed solution. This could include academic papers on bike demand prediction, machine learning algorithms, and best practices in data preprocessing and model evaluation.

GitHub Link: capstone project

Thank you