



Sentiment Analysis:
Detecting Customer
Satisfaction



A Deep Learning
Approach Using CNN and
LSTM

Introduction

- The goal of this project is to develop a deep learning model for sentiment analysis.
- It aims to analyze customer opinions in both text.
- Comparison between CNN and LSTM models for performance evaluation.
- The system will be scalable for real-world application.

Project Scope & Data

- **Application Domain:** Customer satisfaction management.
- **Data Types:** Text (customer reviews) .
- **Models Used:** CNN and LSTM for text processing.
- **Data Collection:** customer reviews from kaggle

Model Development & Training

➤ **Preprocessing:**

- Text: Tokenization, stop-word removal, normalization.
- Image: Resizing, normalization.

➤ **Models Implemented:**

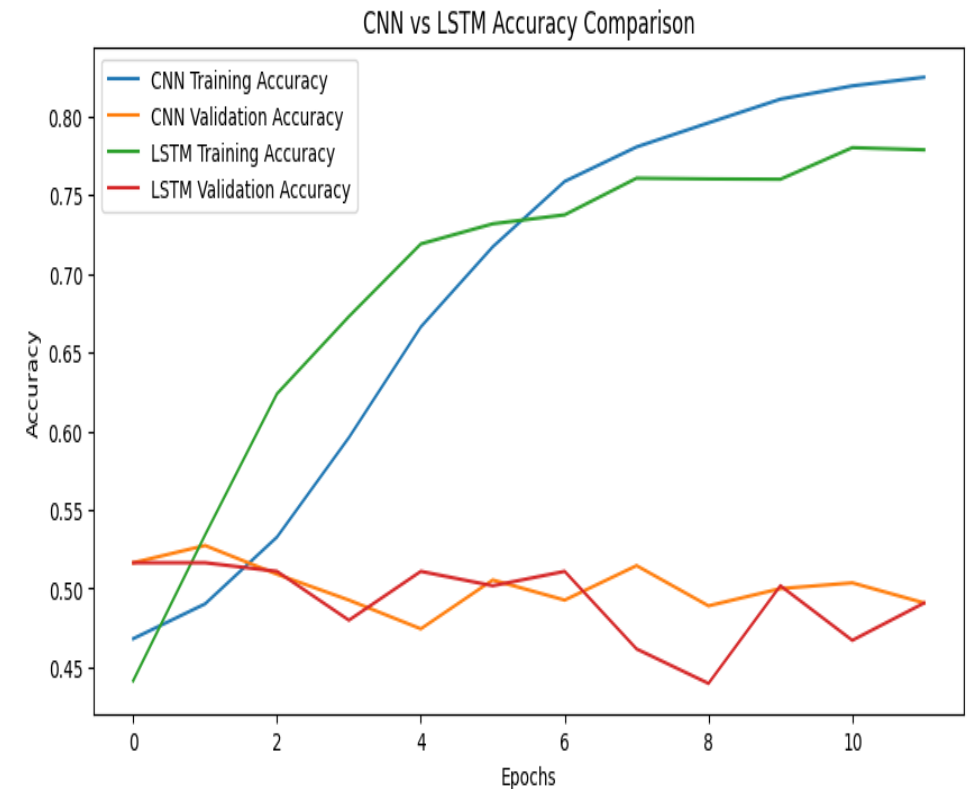
- CNN: Convolutional layers for feature extraction.
- LSTM: Recurrent layers for sequential data processing.

➤ **Hyperparameter Tuning:** Learning rate, batch size, optimizer.

➤ **Data Split:** 80% training, 10% validation, 10% testing.

Results & Performance Comparison

- **Performance Metrics:** Accuracy, loss evaluation.
- **CNN vs. LSTM:**
 - CNN achieved test accuracy of 0.46%.
 - LSTM achieved test accuracy of 0.43 %.
- **Findings:**
 - CNN is better for feature-rich data.
 - LSTM is more effective for sequential data.



Deployment & Conclusion

- **Deployment Strategy:**
 - API development for model inference.
 - Streamlit-based user interface.
- **Key Takeaways:**
 - A scalable system for sentiment analysis is developed.
 - CNN and LSTM models effectively analyze customer satisfaction.
 - Future work: Expanding dataset and optimizing model performance.

The image displays four screenshots of a web application titled "Zomato Review Sentiment Analysis". Each screenshot shows a form with an input field for a review, radio buttons to choose a model (LSTM or CNN), a "Predict" button, and the resulting prediction.

- Top Left:** Input: "Excellent", Model: LSTM (selected), Prediction: positive.
- Top Right:** Input: "Good", Model: CNN (selected), Prediction: neutral.
- Bottom Left:** Input: "Bad", Model: CNN (selected), Prediction: negative.
- Bottom Right:** Input: "Good", Model: LSTM (selected), Prediction: positive.