

Fake Review Classification and Topic Modeling

1. Introduction

In the digital age, user reviews significantly influence purchasing decisions. However, fake reviews undermine customer trust and mislead consumers. This project focuses on detecting fake reviews using advanced machine learning and deep learning techniques. Additionally, it extracts key topics from reviews to gain insights into customer sentiments and issues.

2. Dataset Description

The dataset contains labeled reviews categorized as fake or real. Features include:

- Text: The review content.
- Rating: User-provided rating.
- Label: Fake or Real.

This data enables supervised learning for fake review detection and unsupervised learning for topic modeling.

3. Methodology

The project involves the following steps:

1. Text Preprocessing: Cleaning and tokenizing text, removing stopwords, and lemmatization.
2. Classification:
 - Naive Bayes: A lightweight model for baseline classification.
 - LSTM: A deep learning model for sequential data.
3. Topic Modeling: Using Latent Dirichlet Allocation (LDA) to extract key themes.
4. Sentiment Analysis: Assessing overall sentiment in the reviews.
5. Clustering: Grouping similar reviews to identify patterns.

4. Results and Analysis

1. Naive Bayes achieved an accuracy of 0.8430814888092% with balanced precision and recall.
2. LSTM outperformed Naive Bayes with an accuracy of 0.9044144923952022%, benefiting from sequential context.
3. LDA identified key topics such as Product Quality, Customer Service, and Delivery Issues.
4. Sentiment Analysis revealed that fake reviews often have overly positive language.

5. Recommendations

1. Enhance dataset diversity by including reviews from multiple domains.
2. Experiment with advanced transformer-based models like BERT for better accuracy.
3. Incorporate metadata such as review timestamps for richer analysis.
4. Deploy the model for real-time detection and feedback analysis.