PROJECT TOPIC

Customer Sentiment Analysis for Product Improvement

Abstract:

In an increasingly competitive market landscape, understanding customer sentiment is paramount for product development and enhancement. This project presents a comprehensive approach to extract valuable insights from customer feedback using advanced machine learning (ML), deep learning (DL), natural language processing (NLP), and generative artificial intelligence (AI) techniques. We focus on sentiment analysis as a means to understand customer satisfaction and feedback for product improvement. The project comprises data collection, preprocessing, word embeddings, ML and DL model implementation, sentiment analysis, and generative AI feedback synthesis.

Data collection involves gathering customer feedback from diverse sources such as reviews, social media, and surveys. Preprocessing techniques including tokenization, stopword removal, and lemmatization prepare the textual data for further analysis. Word embeddings, such as Word2Vec and BERT embeddings, transform the preprocessed data into numerical vectors, facilitating meaningful representations for ML and DL models.

We develop ML models like SVM, Random Forest, and Naive Bayes as baseline approaches for sentiment analysis. Additionally, DL models like recurrent neural networks (RNNs), long short-term memory (LSTM) networks, and transformer-based architectures (e.g., BERT) are employed for more nuanced sentiment analysis. The models are trained to predict sentiment labels, categorizing customer feedback into positive, negative, or neutral sentiments.

Incorporating generative AI, specifically language models like GPT-3, we synthesize feedback based on the analyzed customer sentiments. This generative feedback synthesis enables the creation of potential product improvement suggestions and responses to customer concerns.

Evaluation of the models is performed using various metrics, including accuracy, precision, recall, and F1 score. The resulting insights from sentiment analysis and generative feedback synthesis are integrated into a cohesive system, providing actionable recommendations for product enhancement based on customer needs and preferences.

By continuously updating and retraining the models with new customer feedback, the system remains adaptive and effective in capturing evolving customer sentiments. This project demonstrates the potential of leveraging advanced AI techniques to inform product development, fostering customer satisfaction and product enhancement in the competitive market landscape.

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