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Sentiment Analysis

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ABSTRACT

The project titled “product review sentiment analysis” aims to explain how the product works, what features it provides, and how it can be useful. Statement Analysis is mainly used to check, study, and understand written or spoken statements. It helps in finding truth, errors, or hidden meaning in words.

In this review, we will describe the product in simple terms. We will also explain its advantages, limitations, and overall usefulness. The aim is to give a clear idea to the reader before they decide to use the product.

Keywords: Explain how the product works, what features it provides, and how it can be useful. Statement Analysis is mainly used to check, study, and understand written or spoken statements. It helps in finding truth, errors, or hidden meaning in words.

1. Introduction

This manual presents a review of the product Statement Analysis in a clear and simple manner. The main purpose of this review is to explain what the product is, how it functions, and why it can be useful. Statement Analysis is mainly used to study written or spoken statements in order to check their correctness, understand their meaning, and identify any errors or hidden patterns. It is a tool that can be helpful for students, professionals, and organizations who need to examine information carefully.

The review highlights the important features of the product, along with its advantages and possible limitations. By describing these points, the manual aims to provide proper guidance to readers before they decide to use the product. Through this review, readers will gain a better understanding of Statement Analysis and how it can support accurate usage and correct decision-making in different situations.

2. Literature review

Online shopping applications have become one of the most common platforms for purchasing products. Customers usually share their experiences in the form of product reviews and ratings. These reviews contain valuable information that can guide future buyers and help companies improve their services. However, due to the large number of reviews posted every day, it is difficult to manually read and analyse them. For this reason, sentiment analysis has been widely applied to online shopping platforms.

Earlier research in this field focused on identifying positive and negative words in customer reviews. This simple keyword-based approach gave an idea about the overall opinion of buyers but lacked accuracy when dealing with sarcasm, mixed opinions, or complex sentences. To improve this, researchers introduced machine learning techniques such as Naïve Bayes, Logistic Regression, and Support Vector Machines. These methods allowed better classification of customer reviews into categories like positive, negative, or neutral.

3. Proposed Methodology

The methodology for sentiment analysis of product reviews in online shopping applications is explained in a simple and structured manner. The first step is data collection. In this stage, customer reviews are gathered from online shopping apps such as Amazon or Flipkart. These reviews usually include text feedback, ratings, and other basic details.

The next step is data preprocessing. Here, the reviews are cleaned by removing unwanted elements such as numbers, symbols, and stop words. The text is then normalized by applying processes like tokenization, stemming, and lemmatization so that it becomes suitable for further analysis.

After preprocessing, feature extraction is carried out. In this step, the review text is converted into numerical form using techniques such as Bag-of-Words, TF-IDF, or word embeddings. These features help the model understand and process the text effectively.

3.1 System Overview

The system designed for sentiment analysis of product reviews in online shopping applications is reviewed in terms of its components, performance, and usefulness. The main objective of the system is to automatically analyse customer reviews and classify them into positive, negative, or neutral categories.

The system begins with a data input stage, where reviews are collected from online shopping platforms. These reviews are then passed through a preprocessing unit that cleans and normalizes the text. After preprocessing, the system uses a feature extraction module to convert the reviews into numerical data, which can be processed by machine learning or deep learning models. The classification module then assigns sentiment labels to each review based on the trained model.

3.2. data collection and processing

The system starts with **data collection**. Product reviews are gathered from online shopping applications such as Amazon and Flipkart. The reviews include customer comments, star ratings, product information, and review dates. This raw data is used as the input for sentiment analysis.

After collection, the data goes through **data preprocessing**. In this step, unnecessary elements such as numbers, symbols, punctuation, and stop words are removed. The text is converted into lowercase to maintain uniformity. Duplicate reviews and unwanted characters are also cleaned from the dataset.

3.3 Company manufacture

The proposed system for sentiment analysis of product reviews in online shopping applications has been designed and developed as an academic project. It is not manufactured by any commercial company. The system is created only for research and learning purposes.

In a real-world scenario, such a system can be manufactured and deployed by software companies that work in artificial intelligence, machine learning, and data analytics. These companies can build the complete system, test its performance, and integrate it into online shopping platforms. They would also be responsible for system maintenance, updates, and customer support.

At present, the system described in this manual represents a prototype model. Its purpose is to demonstrate how sentiment analysis can be applied to product reviews and how it can benefit both customers and businesses.

3.4. Implementation

The implementation of the sentiment analysis system is carried out in a step-by-step manner to ensure smooth functioning. The system begins with the integration of the data collection module, which gathers customer reviews from online shopping platforms. This module stores the reviews in a database for further processing.

The next stage involves implementing the data preprocessing unit. This unit is coded to clean the reviews by removing special symbols, stop words, and irrelevant data. Text normalization techniques such as tokenization, stemming, and lemmatization are applied during this stage.

After preprocessing, the feature extraction module is implemented. This module converts the clean text into numerical values using methods like Bag-of-Words, TF-IDF, or word embeddings. These values are then sent to the classification module.

3.5. Algorithm

The algorithm for sentiment analysis of product reviews in online shopping applications follows a structured process. The system begins by collecting customer reviews from e-commerce platforms and storing them for further use. Once the data is collected, it is preprocessed by removing unwanted elements such as stop words, numbers, and special symbols. The text is then normalized through tokenization, stemming, and lemmatization to bring all words into a standard form. After preprocessing, feature extraction techniques such as Bag-of-Words, TF-IDF, or word embeddings are applied to convert the cleaned text into numerical values that can be understood by the model. These features are passed to a classification algorithm such as Naïve Bayes, Support Vector Machines, LSTM, or BERT, which categorizes the reviews into positive, negative, or neutral sentiments.

4. Result and discussion

The system was implemented to analyse product reviews collected from online shopping applications. After preprocessing and classification, the system successfully identified the sentiment of customer reviews as positive, negative, or neutral. The results were displayed through tables, graphs, and charts for better understanding.

The analysis showed that the majority of customer reviews were positive, which indicated overall satisfaction with the products. A smaller portion of reviews was classified as negative, highlighting issues such as poor product quality, late delivery, or packaging problems. Neutral reviews mostly contained short and general feedback without strong opinions.

The system was evaluated using accuracy, precision, recall, and F1-score. The results demonstrated that advanced models such as LSTM and BERT provided higher accuracy compared to traditional machine learning methods like Naïve Bayes or Support Vector Machines. This proved that deep learning approaches are more effective in understanding the context of customer reviews.

5. Conclusion

The system developed for sentiment analysis of product reviews in online shopping applications has shown that customer opinions can be automatically classified into positive, negative, and neutral categories with good accuracy. By applying preprocessing, feature extraction, and classification techniques, the system was able to process large volumes of reviews efficiently and provide meaningful insights.

The results indicated that advanced models such as LSTM and BERT gave higher accuracy compared to traditional methods, proving the importance of deep learning in understanding natural language. The system also demonstrated the usefulness of visualizing results through graphs and charts, which makes the analysis easier to interpret.

From the discussion, it can be concluded that sentiment analysis is beneficial for both customers and companies. Customers can rely on summarized reviews for better decision-making, while companies can use the insights to improve product quality, services, and customer satisfaction.

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7. Reference

Bing Liu, *Sentiment Analysis and Opinion Mining*, Morgan & Claypool Publishers, 2012. Pang, B., & Lee, L. (2008). *Opinion Mining and Sentiment Analysis*. Foundations and Trends in Information Retrieval, 2(1–2), 1–135. Devlin, J., Chang, M. W., Lee, K., & Toutanova, K. (2019). *BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding*. Proceedings of Hassan, A., & Korashy, H. (2014). *Sentiment Analysis Algorithms and Applications: A Survey*. Ain Shams Engineering Journal, 5(4), 1093–1113. Zhang, L., Wang, S., & Liu, B. (2018). *Deep Learning for Sentiment Analysis: A Survey*. Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery, 8(4). Online resources: Amazon Product Review Dataset, Flipkart Review Dataset (publicly available datasets for research purposes).