The research papers reviewed collectively contribute to the overarching theme of the proposed research on enhancing sentiment analysis in e-commerce through the integration of emojis. Emphasizing the nuanced usage of emojis in digital communication, these studies reveal how emojis can significantly indicate emotional depth, especially where verbal expression is limited. They offer insights into the standardized meanings of emojis across cultures, relevant to identifying emoji usage trends in different e-commerce sectors. Furthermore, innovative approaches in sentiment analysis incorporating emojis, such as using bi-sense emoji embedding and attention-based LSTM networks, align with the objective of developing sophisticated sentiment analysis models. These studies highlight the importance of including emojis to capture the nuances of sentiment in e-commerce reviews, suggesting their potential in providing a more accurate understanding of consumer sentiments. The findings also underscore the effectiveness of machine learning and deep learning in e-commerce sentiment analysis, contributing to the broader understanding of data analytics in this domain.

1. The study "A case for emojis, more or less" by Allan and Budd (2023) provides critical insights into the use of emojis in digital communication, which is highly relevant to our research on enhancing sentiment analysis in e-commerce. This research delves into how different levels of alexithymia among individuals affect their use of emojis in text messaging, shedding light on the significant role emojis play in supplementing non-verbal communication. Such findings are particularly pivotal for understanding how emojis can serve as indicators of emotional nuances in e-commerce reviews, where verbal cues are often limited. This aligns with our objective to assess the impact of emojis on sentiment analysis outcomes, suggesting that incorporating emoji sentiment into analysis models could lead to a more nuanced and accurate interpretation of consumer sentiments.
2. The study "Content Analysis of Emoji and Emoticon Use in Clinical Texting Systems" by Halverson et al. (2023) is notably aligned with our research objectives, particularly in demonstrating the effective use of emojis within professional communication settings. This research reveals that emojis can enrich emotional content in messages without causing confusion, thus challenging the traditional views on their professionalism. This aspect is crucial for our hypothesis regarding the significant influence of emojis in interpreting sentiment in e-commerce environments. The findings of Halverson and colleagues support the notion of integrating emojis into sentiment analysis models for e-commerce reviews, highlighting the potential of emojis in conveying complex emotions and enhancing the understanding of customer interactions. This underscores the versatility of emojis as tools for sentiment expression, not just in casual but also in professional and commercial communications.
3. The study "View of Customers' perception on SEM & PPC Advertising" by Kumar (2023) provides a thorough examination of consumer attitudes towards Search Engine Marketing (SEM) and Pay-Per-Click (PPC) advertising in the context of e-commerce, particularly focusing on platforms like Amazon and Flipkart. By utilizing survey methodologies, the research assesses how these advertising strategies influence consumer behavior and purchasing decisions, shedding light on customer preferences and satisfaction levels. This study is integral to understanding the broader impact of digital marketing on consumer engagement and behavior within the e-commerce sector. The insights gained from Kumar's research are crucial for informing the development and enhancement of digital advertising strategies, making it highly relevant to our exploration of how marketing tactics in e-commerce settings affect customer sentiment and decision-making processes.
4. The master's thesis by Kashilkar (2023), "Determining the Effects of Consumer Sentiments on E-commerce Sector Using Sentiment Analysis: A Deep Learning Approach," is particularly relevant to our research goals. Kashilkar's work delves into the impact of consumer reviews on e-commerce through the lens of advanced sentiment analysis, employing machine learning techniques such as SVM and Bi-LSTM. This analysis of Amazon reviews demonstrates the efficacy of blending traditional and innovative sentiment analysis methods. Such an approach is in line with our objective of enhancing sentiment analysis in the e-commerce sector. It underscores the importance of these techniques in accurately deciphering customer feedback, showcasing the practicality and utility of deep learning approaches in understanding and interpreting consumer sentiments in e-commerce settings.
5. The research conducted by Neel et al. (2023) in the study "Emoji Alter the Perception of Emotion in Affectively Neutral Text messages" offers significant insights into the role of emojis in modifying emotional perceptions in text messages. This study is particularly relevant to our exploration of sentiment interpretation in e-commerce reviews. It uncovers that the inclusion of emojis can substantially alter the perceived emotional tone of a message, a finding that has direct implications for e-commerce sentiment analysis. The ability of emojis to shift emotional perception in text indicates their potential for providing a more accurate assessment of consumer sentiments in online environments. This aligns with our goal to refine sentiment analysis techniques in e-commerce, emphasizing the integration of emojis to achieve a more comprehensive understanding of customer feedback and emotional nuances.
6. The work by Reddy and Dr. Varsha PS, "Emoji Analytics: New Frontiers of Data-Driven Techniques," presents an in-depth exploration into the evolving field of emoji analytics within the realm of marketing. This research underscores the increasing significance of emojis in digital communication, particularly focusing on their utility in understanding consumer behavior and preferences. The study offers a fresh perspective on how emojis can be leveraged for data-driven marketing strategies. The findings from this research are particularly pertinent to our objectives, as they highlight the importance of emojis as key elements in sentiment analysis, especially within the e-commerce sector. The insights provided by Reddy and Dr. Varsha PS align with our goal to enhance sentiment analysis models by incorporating emoji analytics, thereby enriching the understanding of consumer sentiments in e-commerce settings.
7. The study "Emoji meanings: pleasure-arousal-dominance dimensions in consumer research" by Schouteten et al. (2023) provides a significant contribution to understanding emoji interpretations across different cultural contexts. Utilizing the Pleasure-Arousal-Dominance model, the research examines how emojis are perceived in various cultural settings, finding only minor cross-cultural differences in their understanding. This implies a global consistency in emoji meanings, a finding of great relevance to the field of e-commerce. The study’s insights suggest that emojis can be utilized to offer universally applicable insights into consumer emotions and preferences. This is highly pertinent for the development of sentiment analysis models in e-commerce, as it enhances the accuracy and cultural applicability of these tools, ensuring they are effective across diverse cultural settings. Schouteten et al.'s research thereby contributes to a more nuanced understanding of how emojis can be integrated into sentiment analysis models, improving their effectiveness in capturing and interpreting consumer sentiments in a global e-commerce environment.Top of Form
8. The research by Gupta, Singh, and Kumar (2023), titled "Emoji, Text, and Sentiment Polarity Detection Using Natural Language Processing," introduces a groundbreaking natural language processing (NLP) framework that synergizes text and emojis for improved sentiment polarity detection in online communication. This innovative approach is highly relevant to our research, particularly in the context of e-commerce sentiment analysis. The study demonstrates the importance of incorporating emojis alongside textual data to capture more nuanced sentiment expressions in customer reviews. This finding is crucial for our hypothesis, which posits that sentiment analysis models enriched with emoji data can achieve greater accuracy in interpreting consumer emotions and opinions within e-commerce settings. Gupta, Singh, and Kumar's work underscores the potential of combining traditional NLP techniques with emoji analysis, paving the way for more sophisticated sentiment analysis tools in e-commerce that can understand and interpret a broader range of consumer feedback.
9. The article "Emoji-Based Sentiment Analysis Using Attention Networks" by Lou et al. (2020) presents an innovative approach to sentiment analysis, utilizing Bi-LSTM and attention mechanisms specifically designed for integrating emojis. This method significantly improves sentiment polarity detection, particularly in microblogging platforms, highlighting the substantial role of emojis in conveying sentiment. The research aligns closely with our objective to enhance sentiment analysis models for e-commerce reviews. Lou et al.'s approach, which emphasizes the use of attention-based models, is especially adept at interpreting the emotional nuances expressed through emojis. This study is a significant contribution to the field, demonstrating how advanced techniques like Bi-LSTM and attention mechanisms can be effectively employed to augment sentiment analysis in e-commerce, ensuring that both textual and emoji data are comprehensively analyzed for a more accurate interpretation of consumer sentiments.
10. The study "Exploring the role of the Amazon effect on customer expectations" by Vollero, Sardanelli, and Siano (2021) provides a comprehensive examination of how Amazon's service standards influence customer expectations in the consumer electronics sector. By analyzing user-generated content on social media and reviews, the research sheds light on the impact of customer interactions with Amazon on their satisfaction levels with other retailers. This study is particularly valuable in understanding the evolving landscape of customer expectations in e-commerce. It highlights the importance of considering the broader competitive context, such as the influence of major online retailers like Amazon, in understanding customer sentiment. The insights derived from this study emphasize the need for e-commerce businesses to adapt and respond to the established standards of service and customer satisfaction set by industry leaders, which significantly shape consumer expectations and preferences.
11. The research titled "Implementation of the Naive Bayes Classifier for Sentiment Analysis of Shopee E-Commerce Application Review Data on the Google Play Store" by Rizkya, Rianto, and Gufron (2023) is a significant contribution to the field of sentiment analysis in e-commerce. This study employs the Naive Bayes Classifier to analyze customer reviews of the Shopee e-commerce application, categorizing sentiments into positive, neutral, and negative classes. The methodology and findings from this research are especially relevant for advancing sentiment analysis models. By demonstrating the effectiveness of machine learning in categorizing sentiments, this study provides essential insights into the complex nature of customer feedback on e-commerce platforms. It supports the development of sentiment analysis models that can integrate both textual and emoji data, offering a more comprehensive perspective on customer opinions and experiences in e-commerce settings.
12. The paper "Improving Sentiment Analysis Accuracy with Emoji Embedding" by Liu et al. (2021) introduces an innovative sentiment analysis model, the CEmo-LSTM, which integrates emojis with text for sentiment analysis, particularly enhancing emotion recognition in online Chinese texts. This research is pivotal in supporting the hypothesis that the inclusion of emojis can significantly boost the performance of sentiment analysis algorithms. The CEmo-LSTM model represents a substantial advancement in the field of sentiment analysis, as it effectively combines textual and emoji data, thus providing a more nuanced and comprehensive approach to understanding emotions in e-commerce reviews. The findings from this study underscore the importance of integrating both textual and emoji elements in sentiment analysis tools, aligning perfectly with the goal of developing more refined and accurate sentiment analysis models for e-commerce review analysis. This approach is particularly effective in capturing a wide range of emotions, proving essential for understanding the complexity of consumer sentiments in online interactions.
13. The study "Opinion Mining on Integrated Social Networks and E-Commerce Blog" by Maheswari and Dhenakaran (2021) presents an innovative approach to opinion mining, utilizing Big Data techniques to amalgamate customer reviews from both social networks and e-commerce platforms. This integration allows for a more comprehensive analysis of customer sentiments, making it a valuable tool in understanding consumer opinions within the e-commerce sector. The methodology proposed by Maheswari and Dhenakaran offers a novel framework that can substantially enhance sentiment analysis models in e-commerce applications. Their work is instrumental in showcasing how the blending of data sources from diverse platforms can provide a richer, more holistic view of customer opinions, which is crucial for businesses looking to understand and respond to consumer needs and preferences in the digital marketplace.
14. The paper "Prediction of the Customers’ Interests Using Sentiment Analysis in E-Commerce Data for Comparison of Arabic, English, and Turkish Languages" by Savci and Das (2023) delves into the realm of consumer sentiment analysis in e-commerce, highlighting the critical importance of language-specific approaches. The study utilizes machine learning to analyze customer reviews across Arabic, English, and Turkish languages, demonstrating the efficacy of sentiment analysis in varied linguistic contexts. This research is particularly valuable as it underscores the necessity of incorporating language considerations in sentiment analysis models tailored for e-commerce. The insights provided by Savci and Das align with the objective of developing more nuanced and culturally sensitive tools for sentiment analysis, acknowledging the diversity of consumer bases in the global e-commerce landscape. Their work emphasizes that understanding customer interests and sentiments in e-commerce is significantly enhanced by considering linguistic variations, which is crucial for businesses aiming to cater to a diverse global market effectively.
15. The study "Sentiment Analysis of Amazon Reviews using Deep Learning Techniques" by Noriega, Alvarez, Ramírez, and Cantu-Ortiz (2023) represents a significant stride in the application of advanced deep learning models for sentiment analysis in e-commerce. The research employs state-of-the-art Natural Language Processing (NLP) models, including BERT, RoBERTa, XLNet, and ULMFiT, to analyze sentiment in Amazon product reviews. This approach is not only crucial for categorizing reviews by sentiment but also for identifying characteristics of highly-rated products. The utilization of these sophisticated NLP models is perfectly aligned with the aim of enhancing sentiment analysis within the e-commerce sector. It showcases the immense potential and efficacy of deep learning techniques in understanding and interpreting complex customer feedback, thereby contributing valuable insights into consumer behavior and preferences.
16. The paper "Sentiment Analysis of Online Product Review using Deep Learning in Distributed Sensor Networks" by Jun Yao (2023) presents a novel approach to sentiment analysis in the context of e-commerce. Yao's research focuses on the application of deep learning techniques within distributed sensor networks (DSN) for analyzing online product reviews. This methodology significantly enhances both the accuracy and timeliness of sentiment analysis, marking a considerable progression in the way customer feedback is processed and understood in e-commerce. The utilization of deep learning in distributed sensor networks offers an advanced means of extracting and interpreting consumer sentiments from online reviews. This approach is especially valuable for its ability to handle vast amounts of data efficiently, providing real-time insights into customer opinions and preferences. Yao's study contributes to the understanding of how sophisticated computational techniques, such as deep learning and distributed sensor networks, can be effectively employed to deepen the understanding of consumer sentiment in the rapidly evolving e-commerce sector.
17. The study "Sentiment Analysis of the Top 5 E-commerce Platforms in Indonesia using Text Mining and Natural Language Processing (NLP)" by Virgana et al. (2023) offers a comprehensive analysis of customer reviews across major e-commerce platforms in Indonesia. Using text mining and Natural Language Processing (NLP) techniques, the research aims to identify and categorize sentiment polarity in user feedback. This approach is particularly significant in understanding customer sentiments within diverse e-commerce contexts. The findings from this study highlight the effectiveness of NLP and text mining in extracting valuable insights from online customer feedback, proving essential for businesses looking to adapt and respond to customer needs and preferences. This research is especially relevant for e-commerce platforms seeking to enhance their understanding of customer sentiments and improve their services accordingly.
18. In the paper "Sentiment Classification based on Machine Learning Approaches in Amazon Product Reviews," Kausar et al. (2023) delve into the application of machine learning techniques for sentiment analysis within the context of e-commerce, specifically analyzing Amazon product reviews. The study employs decision trees and logistic regression methods, with the decision tree model achieving remarkable accuracy levels. Demonstrating a 99% accuracy rate, it notably outperforms the logistic regression model, which achieved 94% accuracy. This research not only underscores the efficacy of machine learning techniques in sentiment analysis but also provides valuable insights into their potential applications in e-commerce. The findings from this study highlight the importance of these technologies in accurately understanding and interpreting customer feedback and preferences, which is essential for businesses looking to enhance customer experience and tailor their services effectively.
19. In the study "The Identification of Depressive Moods from Twitter Data by Using Convolutional Neural Network with Text Data along with Emoji," Jadhav, Sonia, and Kulkarni (2023) utilize a Convolutional Neural Network (CNN) model to analyze Twitter data for identifying depressive moods. This research is notable for its integration of both text and emoji data, enhancing the accuracy of sentiment analysis, particularly in detecting negative sentiments. The CNN model's effectiveness is rigorously evaluated through metrics like accuracy, precision, recall, and F1-score, which demonstrate its proficiency in classifying sentiments. This study is particularly relevant in the context of social media, where the expression of emotions is often nuanced and multifaceted. The ability of the CNN model to effectively identify negative moods by analyzing a combination of textual and emoji data showcases the potential of such advanced machine learning techniques in sentiment analysis. This approach is significant for understanding the complexity of emotional expressions on social media platforms and can provide valuable insights for mental health monitoring and support.
20. The study "The Impact of COVID-19 on Direct Marketing E-commerce Platforms in Japan - Based on a Quantitative Text Analysis of Twitter Data" by Sugita N. (2022) provides a crucial analysis of how the COVID-19 pandemic has influenced direct marketing and e-commerce in Japan. Utilizing quantitative text analysis of Twitter data, the research investigates the changes in consumer and producer behaviors and perceptions towards direct e-commerce during the pandemic. This study is significant for highlighting the shift in e-commerce dynamics, particularly the increased reliance on direct marketing strategies amid COVID-19. It also underscores the importance of leveraging social media data to gain insights into market trends and consumer behavior, especially during periods of widespread disruption like the pandemic. Sugita's work demonstrates how external factors like health crises can dramatically reshape the landscape of e-commerce and consumer engagement, providing valuable lessons for understanding and adapting to these changes. The findings from this study are particularly relevant for businesses and marketers in the e-commerce sector, as they offer insights into the evolving needs and preferences of consumers in a rapidly changing environment.
21. The study "The Method of Analyzing the Role of Influencers: Marketing on Improving Brand Reputation in E-commerce Sector in China" by Wenyan Zhang (2023) delves into the impact of influencer marketing within the Chinese e-commerce landscape. This research is crucial for understanding how influencers affect brand reputation, employing theoretical frameworks such as the Theory of Reasoned Action and the Howard-Sheth Behavioral Model. Zhang's study illuminates the strategies used in influencer marketing and their effectiveness in boosting sales and enhancing brand recognition. The findings emphasize the significant role that influencers play in molding consumer perceptions and influencing their purchasing decisions. This research is particularly insightful as it underscores the growing importance of social media marketing in the e-commerce sector, highlighting how influencers can be pivotal in shaping brand narratives and consumer engagement in the digital marketplace.
22. In the study "The Process of Providing Security Protection in the Amazon E-commerce System," Ghosal and Balaji (2022) conduct a thorough examination of how Amazon's commitment to robust data protection has significantly contributed to its financial growth, particularly during the challenging times of the COVID-19 pandemic. The research focuses on the impact of enhanced cybersecurity measures on Amazon's market performance, utilizing secondary data collection and thematic analysis to identify the key factors driving the company's revenue growth. The findings from this study underline the importance of web-based security services in building customer trust and fostering business expansion in the e-commerce domain. Ghosal and Balaji's work highlights the critical link between cybersecurity and commercial success in the digital marketplace, demonstrating how effective security measures can not only protect but also enhance a company's market position and customer relations.
23. The study "The Lexicon of Emoji? Conventionality Modulates Processing of Emoji" by Weissman et al. (2023) offers significant insights into the lexicalization of emojis and their conventional meanings. This research utilizes experimental methods to determine the extent of meaning agreement among different emojis and investigates how this consensus affects the cognitive processing of emojis in real-time communication. One of the key findings of the study is that emojis with higher meaning agreement are processed in a manner akin to traditional words. This suggests that emojis can acquire entrenched lexicalized representations within the lexicon, functioning as a unique form of visual language. The implications of this study are profound in understanding how emojis contribute to and influence communication, highlighting their role not just as emotive symbols but as integral components of language and cognition.
24. In the paper "Twitter Sentiment Analysis via Bi-sense Emoji Embedding and Attention-based LSTM," Chen et al. (2018) introduce an innovative method for sentiment analysis on Twitter that incorporates bi-sense emoji embedding and attention-based Long Short-Term Memory (LSTM) networks. This approach is particularly notable for its ability to address the dual sentiment nature of emojis – capturing both positive and negative emotions – in Twitter data. By employing this method, the study achieves improved accuracy in sentiment analysis compared to traditional models. This research is significant for its contribution to the understanding of emoji semantics in sentiment analysis, highlighting the complex nature of emotional expression on social media platforms. The findings from Chen et al. illustrate the effectiveness of advanced machine learning techniques in decoding the nuanced emotional content conveyed through emojis, providing deeper insights into the sentiment dynamics present in social media interactions.

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