JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

SENTIMENT ANALYSIS RESEARCH AND IMPORTANCE

Suyunova Malika Adil kizi
Tashkent State University named after Alisher Navoi
University of Uzbek Language and Literature
Computational linguistics and digital technologies
PhD student of the department
Email: malikasuyunova0@gamil.com

Annotation: This article examines the issues of sentiment analysis, which is a branch of computational linguistics, and its study in the context of world linguistics. Computational linguistics is a scientific field focused on understanding and processing human language with the help of computers, and the importance of sentiment analysis is growing day by day. By detecting and classifying emotional states in text, it is possible to analyze various practical areas, including social networks, customer reviews, and other texts. The article provides detailed information on the main methods and techniques of sentiment analysis, as well as approaches to its study in linguistics. It emphasizes the importance of the semantic characteristics of language, contextual analysis, and cross-lingual research.
Keywords: sentiment analysis, language processing, emotional analysis, natural language processing (NLP), cross-lingual research, semantics, linguistics, social networks, artificial intelligence, grammatical analysis.

Аннотация: Эта статья изучает вопросы компьютерной лингвистики, связанные с анализом сентимента и его исследованием в контексте мировой лингвистики. Компьютерная лингвистика — это научная область, направленная на понимание и обработку человеческого языка с помощью компьютеров, и значение анализа сентимента с каждым днем растет. Определение эмоционального состояния в тексте и его классификация позволяют проводить анализ в различных практических областях, включая социальные сети, отзывы клиентов и другие тексты. В статье представлены основные методы и подходы анализа сентимента, а также подходы к его исследованию в лингвистике. В частности, подчеркивается важность семантических характеристик языка, контекстуального анализа и кросс-языковых исследований.

Ключевые слова: анализ сентимента, обработка языка, эмоциональный анализ, естественная обработка языка (NLP), кросс-языковые исследования, семантика, лингвистика, социальные сети, искусственный интеллект, грамматический анализ.

Introduction. Today, the demand for information technologies is increasing day by day. All industries, enterprises and companies in the world have been covered by computer technologies. As technologies develop, competition is also increasing by promoting products and services on social networks. The increase or decrease in demand for a product depends on whether the opinions given to it on social networks are positive or negative. Today, the flow of feedback on products and services on social networks is increasing immensely. This requires a lot of

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

manpower to determine whether each expressed opinion is positive, negative or neutral. The human factor cannot analyze this level of large information in one day or several days. However, the number of data and comments increases every hour. Solving these and similar language-related issues using computer models is one of the current issues in the field of natural language processing (NLP). Analyzing the feelings expressed by a person to a particular product, service or brand is called sentiment analysis. This is one of the most active research areas in natural language processing. Sentiment analysis is one of the important areas in the field of detecting emotional states in text and computational linguistics. This method serves to identify positive, negative or neutral emotions expressed in texts and on this basis, analyzes texts in various fields, including customer reviews, social networks, advertising materials and other texts. The study of sentiment analysis is also widespread in world linguistics, and research in this area helps to understand not only analysis methods, but also the semantic, syntactic and contextual features of language [1].

The main goal of sentiment analysis is to determine the emotional state of a text or word. For example, a customer review of a product indicates a positive or negative attitude. Sentiment analysis uses computational linguistics technologies to analyze the position, grammatical structure, and meaning of words in the text [2].

Sentiment analysis falls into three main categories:

1. Positive: The essence of the text or word conveys a good or positive feeling.
2. Negative: The text or word expresses negativity or disapproval.
3. Neutrality: The emotional content of a text or word is either unclear or emains neutral.

Various methods help perform this analysis:

- Word-based analysis: This method determines the emotional image (positive or negative) of each word.
- Phrase and context-based analysis: In a full text analysis, the context and grammatical structure between words are considered.
- Machine learning technologies: Using artificial intelligence and deep learning techniques, the accuracy and efficiency of sentiment analysis are increased.

Linguists analyze the semantic (meaning) aspects of words in different languages. For sentiment analysis, it is important to understand the specific features of this language, because each language has its own grammatical and lexical features. Since the semantic and lexical systems of each language are different, translinguistic (cross-linguistic) studies of sentiment analysis are of great importance in world linguistics. Linguists study how to identify positive and negative words in several languages, and how these words change in cultural context. Sentiment analysis, especially if there are differences between languages, can give erroneous results if performed solely based on words. Therefore, in world linguistics, focus is placed on analyzing the text as a whole, because the meaning of words depends on their context, structure, and cultural features. Sentiment analysis studies not only the structure of the language, but also the author's intention, his cultural and sociological context [3]. Linguists are also studying how accurate and reliable sentiment analysis can be made of sentiments that emerge on social media or online platforms. The study of sentiment analysis in the field of computational linguistics forms an important bridge between linguistics and computer science. This field provides the opportunity to analyze the natural structure of language using computers, to identify emotional states between texts, and to enhance international interactions. For world linguistics, sentiment analysis helps to

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

understand the emotional and contextual factors of language, creating opportunities for cross-linguistic research, cultural and social analysis.

The significance of the study. This study aims to provide an in-depth analysis of scientific research and practical applications in the fields of computational linguistics and sentiment analysis. Today, with the development of technology and artificial intelligence, the capabilities of sentiment analysis are expanding, and its analytical and scientific aspects are increasing as well. The processes of analyzing texts, identifying emotional states and classifying them using computational linguistics are widely used in various fields, including marketing, social networks, customer opinion research, and obtaining feedback on products. The importance of the study consists in showing how sentiment analysis has bin studied in world linguistics and the role of this analysis in determining the semantic and contextual features of language. Deepening the interaction between linguistics and computer science and developing cross-language research will serve the advancement of modern linguistics and language processing technologies. At the same time, how sentiment analysis differs across different languages and cultures and its impact on scientific and applied fields increases the relevance of the research.

Today, sentiment analysis of Uzbek texts is one of the most relevant issues. This, in turn, allows using this data for various purposes, including marketing, politics, social research, and other areas. Sentiment analysis allows you to determine not only the general emotional direction of the text, but also the author's attitude to a particular object or topic.

Literature review. A number of important studies have emerged in the fields of computational linguistics and sentiment analysis in recent years. These studies have studied various methods and practical applications for automatic language analysis and emotional state detection. The literature review reviews the main theoretical and practical aspects of computational linguistics and sentiment analysis, and provides some important information about the development and application possibilities of these fields. Computational linguistics mainly focuses on automatic language analysis. The first work in this field began in the 1950s and gained momentum in the following years by the rapid development of deep learning and artificial intelligence technologies. Studies by Allen (1995), Jurafsky and Martin (2020) provide a lot of important information about computational linguistics methods, including natural language processing (NLP), and its practical applications. These methods serve to analyze texts, identify grammatical structures, and extract semantic meanings [4, 5].

In the world, several studies have been conducted on building a language model and sentiment analysis based on artificial intelligence algorithms, as well as developing software modules and tools in the process of natural language processing. The theoretical foundations of sentiment analysis are described in the works of S.Yu.Toldova, AA.Bonch-Osmolovskaya, T.Sadikov. Among them, Stanford University professors Christopher Manning, Dan Jurafsky and Percy Liang (Natural Language Processing Group, USA), University of Southern California professors Robin Jia and Jesse Thomason (NLP Group, USA), University of Oregon professor Liang Huang (NLP Group, USA) are conducting research. In addition, the work of Heidelberg University (Germany) and others in this area has undergone comparative analysis. Stanford University professor Christopher Manning's contribution to the field of natural language processing has

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

shown the effectiveness of advanced linguistic models and machine learning methods, and has yielded high results in SVM-based sentiment analysis. His research has significantly advanced the understanding and application of sentiment analysis, emphasizing the importance of complex algorithms and comprehensive linguistic concepts in correctly analyzing textual data [6]. The development of sentiment analysis began in the 2000s and quickly gained its practical application. Pang and Lee (2008) presented the main methods of sentiment analysis, including word- and phrase-based analysis, in detail. The work of Ian Maas, Ray Yeung, and Richard PL (2011) on the IMDB dataset is regarded one of the key works in the field of sentiment analysis. They used deep learning methods such as RNN (recurrent neural networks) and SNN (convolutional neural networks) [7]. Socher et al. (2013) created the Stanford Sentiment Treebank and used this dataset for sentiment analysis. They further developed the analysis of texts with a certain structure using RNN and its variations (e.g. LSTM) [8]. Zadeh et al. (2016) created the SMU-MOSI dataset and studied multimodal sentiment analysis. They combined text, image, and audio data and performed multi-factor analysis [9].

While early approaches to sentiment analysis focused on analyzing the emotional value of words, later deep learning and machine learning technologies played a key role in understanding the full context of the text (Devlin et al., 2018). Sentiment analysis is one of the most complex problems in linguistics, as each language has its own semantic and lexical structures [10]. Therefore, cross-language sentiment analysis research is of great importance. A study by Shen et al. (2018) aimed to determine the effectiveness of cross-language sentiment analysis and the differences between different languages. In this study, the issues of how the semantic features of one language affect another language and how to implement translinguistic analysis in linguistics were investigated [11].

The study of sentiment analysis in linguistics includes not only semantic and lexical analysis, but also the social, cultural and pragmatic aspects of language. The research presented by Hoveyda and Falk (2017) aimed to study the cultural and social context of sentiment analysis [12]. They showed how sentiment analysis identifies emotional states in each culture and the impact of different languages and cultures on sentiment analysis. Cross-language (interlingual) studies of sentiment analysis have been undertaken. In this method, researchers examined the process of sentiment identification in several languages. The lexical and semantic features of each language and its cultural context were factored in. Cross-language sentiment analysis analyzed the differences and similarities of positive and negative words that exist in different languages. A series of experiments were conducted to measure the effectiveness of sentiment analysis. In these experiments, models were built based on the above methods to identify different types of sentiment (positive, negative, neutral) in texts. The results were tested and their accuracy and efficiency were evaluated [13, 14]. During the experiments, the model was tested taking into account different lengths, topics, and languages of the texts.

A number of scientific studies on sentiment analysis are also being conducted in the Uzbek language. For example, S. Matlatipov worked on the topic “Sentiment analysis of the Uzbek language”. He developed methods for intellectual analysis of the given data to solve the problem of sentiment analysis of proposals and opinions written in digital text in the Uzbek language [15]. A group of researchers led by Ilyos Rabbimov at Samarkand State University studied the comments left on Uzbek films based on emojis. S. Allanazarova, a graduate student at the

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

National University of Uzbekistan named after Mirzo Ulugbek, discussed the issue of studying texts from an emotional perspective.

Discussion. This study investigated computational linguistics and sentiment analysis methods. The main objective of the study was to improve the efficiency of sentiment analysis and to identify the most suitable approach by comparing different methods. During the study, various methods such as word-based analysis, machine learning, deep learning, and cross-language analysis were tested. The advantages and disadvantages of each method were analyzed, and ways to improve the efficiency of sentiment analysis were identified. The simplicity and speed of this method are one of its greatest advantages. However, its disadvantage is that it does not take into account contextual information in the text. This can sometimes lead to errors, since one word can have different meanings and emotions in different contexts. Therefore, word-based methods alone are not enough to improve the accuracy and efficiency of sentiment analysis [16].

Deep learning techniques, such as advanced networks such as RNN, LSTM or Transformer, provide accurate and efficient implementation of sentiment analysis. They allow for a complete understanding of the contextual meanings and semantic structure of the text. However, these techniques require large computational resources and can sometimes be highly complex. Also known as, training these techniques requires time and effort. Cross-language sentiment analysis is very useful when working with different languages and can be widely used on a global scale. These techniques can be used to analyze texts in multiple languages and identify emotional states in different cultures. However, there are difficulties in taking into account the specific lexical and semantic features of the language. The unique structure of each language, including differences between words and phrases, complicates sentiment analysis.

Each method has its own advantages and disadvantages, and when compared with each other, each works effectively in its own specific situations. Word-based analysis is good for simple tasks, but deep learning and machine learning methods provide higher accuracy when analyzing complex and long texts. Cross-language analysis is important when working in different languages and cultural contexts. For future research, it is necessary to improve the accuracy of sentiment analysis and develop new approaches to integrating different methods. For example, combining word-based analysis and machine learning methods can better identify contextual and lexical features of the text [17]. Also known as, through cross-language research, it is possible to develop universal sentiment analysis systems in different languages and cultures. In general, sentiment analysis is an important method that is widely used in the fields of computational linguistics and linguistics today, and its scientific and practical importance is increasing day by day. Therefore, it is necessary to conduct more in-depth research in this area and introduce advanced technologies, which will not only improve the process of understanding language, but also allow for its effective use in many social and economic areas.

Abstract. This study aims to study various methods in the field of computational linguistics and sentiment analysis and compare their effectiveness. The study extensively analyzed methods such as word-based analysis, machine learning, deep learning, and cross-language analysis. The advantages and disadvantages of each method were identified and their effectiveness in different situations was shown. Word-based analysis methods, although they work quickly and easily, do not take into account the context of the text, and therefore can sometimes lead to errors. Machine learning methods provide accurate results based on more data, but they require a large amount of training data for their effective operation. Deep learning methods, in particular Transformer

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

networks, are very effective in analyzing the exact and complete context of texts, providing high accuracy, but these methods require a lot of computational resources. Cross-language sentiment analysis is effective in working with multiple languages and allows us to take into account different cultures, but it may face some difficulties in taking into account differences between languages. The results of the study show that the effectiveness of sentiment analysis depends on the chosen method and the characteristics of the text being analyzed. Therefore, using a combination of different methods helps to increase the accuracy of sentiment analysis. In future research, it is possible to create more effective sentiment analysis systems by integrating methods and developing new approaches, in particular, by jointly applying cross-language analysis and deep learning technologies.

List of used literature

1. Ismoilov, R. (2020). Computational Linguistics: Theoretical Foundations and Practical Applications. Academy of Sciences of the Republic of Uzbekistan.

2. Sattorov, F. (2018). Methodology of text processing and sentiment analysis. Linguistics and Computational Linguistics, 12(3), 45-59.

3. Azimov, M., & Akhmedov, S. (2021). Linguistics and sentiment analysis: New approaches and research. In Uzbek Linguistics Journal 15(2), 118-134.

4. Allen, J. (1995). Natural Language Understanding. Addison-Wesley.

5. Jurafsky, D., & Martin, JH (2020). Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition. Pearson.

6. G.S.Matlatipov. SENTIMENTAL ANALYSIS OF THE UZBEKISTAN LANGUAGE. Abstract. 6 p.

7. Andrew L. Maas, Raymond E. Daly, Peter T. Pham, Dan Huang, Andrew Y. Ng, and Christopher Potts. (2011). Learning Word Vectors for Sentiment Analysis. *The 49th Annual Meeting of the Association for Computational Linguistics (ACL 2011).b*

8. Richard Socher, Alex Perelygin, Jean Y. Wu, Jason Chuang, Christopher D. Manning, Andrew Y. Ng and Christopher Potts (2013). *Recursive Deep Models for Semantic Compositionality Over a Sentiment Treebank.*

9. Zadeh, A., Chen, M., Liang, J., Poria, S., & Morency, LP (2016). CMU-MOSI: A Multimodal Sentiment Analysis Dataset. *Proceedings of the 2016 IEEE International Conference on Data Mining (ICDM)* , 2016, 1-10. https://doi.org/10.1109/ICDM.2016.0042.

10. Devlin, J., Chang, M., Lee, K., & Toutanova, K. (2018). BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding. NAACL-HLT.

11. Shen, D., Hu, Y., & Sun, Y. (2018). Cross-lingual Sentiment Analysis: A Survey.

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

IEEE Access, 6, 10506-10516.

12. Hovy, D., & Falk, C. (2017). Sentiment Analysis and Its Application in Language and Culture. Journal of Linguistic Research.

13. Pang, B., & Lee, L. (2008). Opinion Mining and Sentiment Analysis. Foundations and Trends in Information Retrieval, 2(1-2), 1-135.

14. Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A., Kaiser, Ł., & Polosukhin, I. (2017). Attention is All You Need. NIPS.

15. G.S.Matlatipov. SENTIMENTAL ANALYSIS OF THE UZBEKISTAN LANGUAGE. Abstract.

16. Davronov, A. (2020). Application of Computational Linguistics and Sentiment Analysis in the Uzbek Language. Uzbekistan Institute of Science and Technology.

17. Karimov, M., & Tashpulatov, D. (2021). Computational Linguistics and Its Use in Different Languages: Practical Applications of Sentiment Analysis. International Scientific Developments 3(5), 44-53.