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SENTIMENT ANALYSIS OF TEXTS USING NLP AND MACHINE LEARNING

In the context of the current development of text mining technologies based on natural language processing (NLP) and machine learning (ML), there is a paradigm shift in the field of sentiment analysis. Initially, the technological landscape, where artificial intelligence and NLP, ML were used mainly for automation and information processing tasks, has undergone a transformation stage, defining a new direction of development - the analysis and recognition of emotions in texts.

Modern NLP-based sentiment analysis technologies reveal a wide range of capabilities covering a variety of applications. From detecting user sentiment in social media reviews and news articles to improving the efficiency of interactive systems, these technologies are characterized by the ability to analyze and interpret the emotional connotation of textual information [1].

Emotional text analysis technologies based on natural language processing rely on the use of deep machine learning and neural networks to automatically determine the emotional connotation of a text. During training, the models process a huge amount of textual data, taking into account syntactic and semantic aspects, as well as the relationships of words in the context [2][3].

Consumer comment	Meaningful words	Sentiment weight	Sentiment score
"Employees are always so polite and helpful. They have almost everything larger stores have, which is good enough for me! They even have white sweet potatoes which you usually only find at specialty grocers. Great experience!"	Always Polite Helpful Good Great	1 2 2 1 2	8
"Nice store. Seems clean and well organized. It is a bit on the *smaller* size as far as other stores go, so prepare for it to perhaps feel a little *crowded*, even if there aren't that many people in the store. This also means that their stock of certain items may be a bit *smaller* than the larger locations, but that's to be expected."	Nice Clean Well Organized *Smaller* *Crowded* Larger	2 2 1 2 -1 (x2) -1 1	5
"Since a new manager took over this once best supermarket around has *fallen* way off. They *barely* have anything, produce is always *expired*, and the store is not kept up very well."	New Best *Fallen* *Barely* *Expired*	1 2 -1 -1 -2	-1

Fig. 1 - An example of sentiment analysis of a text by keywords

This includes analyzing the frequency of word usage, identifying keywords and phrases, text patterns, and using machine learning algorithms to classify texts according to the emotional spectrum, as shown on Fig. 1 and Fig. 2 [3]. Additionally, splitting the text into segments and taking into account their context improves the accuracy of the analysis. These technical solutions ensure the stability and high efficiency of sentiment analysis systems, and with effective management and impartiality in the selection of information, they provide versatility and accuracy.

Sentiment analysis technologies have a great potential in business. These innovative solutions open up new horizons for increasing the efficiency of customer communications, analyzing the market environment, and improving marketing strategies: identifying key themes and recognizing context allows businesses to gain valuable insights into the perception of their products or services, as well as determine consumer sentiment in real time [4].

The application of these technologies in business is expanding to a large number of aspects, including analyzing feedback, identifying customer needs, and supporting them in solving their problems. Interaction with emotional aspects helps to improve understanding with the audience and helps to implement business strategies that meet the needs and expectations of consumers [4].

References

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