

доставки забезпечує прозорість відстеження та мінімізує час очікування товару. Це дозволяє магазинам на Shopify забезпечити повноцінний користувацький досвід, що відповідає очікуванням сучасних споживачів.

Розробка та впровадження додатку для Shopify не лише оптимізує процеси оформлення замовлень, але й надає українським підприємцям додаткові можливості для масштабування бізнесу. Запропоноване рішення є гнучким та готовим до інтеграції нових функцій, зокрема можливостей для персоналізації замовлень, підключення нових платіжних методів і логістичних партнерів у майбутньому.

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## APPROACH TO USING CLOUD SERVICES FOR VISUAL ANALYTICS OF NEURAL NETWORK ANALYSIS OF TEXTS EMOTIONAL TONALITY

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Social networks, forums and other platforms have become the main channels of communication where people exchange ideas, express their emotions and react to events. The importance of analyzing the emotional tone of such messages lies in the possibility of identifying general moods, trends and potential social risks [1]. However, the results of neural network analysis are often difficult to understand and require additional explanation. The creation of an effective method of visualizing these results will help to facilitate the understanding of the detected emotional states, contribute to more informed decision-making and increase the transparency of the

analysis [2, 3]. In this context, the use of visual explanation methods is of particular importance, as it allows reducing the information load on users and ensuring the availability of analytical data for a wide range of interested parties.

Tonality reflects the emotional attitude of the author of the statement to a certain object (real object, event, process or their properties / attributes), which is transmitted through the text [4]. The emotional component expressed at the level of lexemes or communicative fragments is called lexical tonality (or lexical sentiment). The tonality of the entire text can generally be determined as a function (in the simplest case – the sum) of the lexical tonalities of its constituents (sentences) and the rules of their combination [5, 6].

In the process of interaction, users of socially oriented services exchange various content, which includes both semantic and sentimental elements of text messages [7]. As a result, the development of information technologies for the analysis of processes that take place in socially oriented services, in particular the processing and analysis of textual content [8].

The availability of similar tools in the service sector makes it possible to organize effective feedback from customers, which contributes to the analysis and improvement of the quality of the services provided [9]. In this context, it is worth highlighting two key aspects. The first aspect is related to the need to analyze the textual content of customers by specialists of service companies, such as marketers, logisticians, advertising specialists, analysts, etc. [10, 11]. The second aspect concerns the development of automated services, for example, chatbots that can independently analyze customer messages and make appropriate decisions.

Practical experience shows that when receiving feedback from customers, it is important to identify trends in their emotional reactions to certain events as soon as possible and to monitor the dynamics of these emotions in the future. Such a task may require the simultaneous analysis of information from many hundreds or even thousands of sources of client content [12, 13, 14].

The tonality of publications is an indicator that applies the analysis of the mood of the text taking into account its emotional component to classify mentions of a company, brand or product as positive, negative or neutral [15]. Metrics based on tonality are most often used to evaluate the performance of PR specialists and communications managers [16]. In addition, tonality is one of the key parameters when conducting a reputation audit of a company and media analysis of competitors.

Tonality refers to the qualitative parameters of media analytics and is the basis of the Media Favorability Index. MFI is a media favorability index that reflects the ratio of positive to negative mentions. If the number of positive publications for a certain period exceeds the number of negative ones, then the MFI is greater than 1; if negative mentions prevail, then MFI is less than 1. The advantage of MFI is that this indicator reflects not only the ratio of positive and negative publications, but also how they interact with each other and what result they produce [17]. In addition, the MFI is provided in the form of a consolidated numerical value, which greatly simplifies the work of PR professionals and communication specialists.

In monitoring systems, the tonality indicator can be assigned automatically using artificial intelligence or specially developed algorithms. However, this

approach has its drawbacks, as the authors of the texts can use humor, irony, sarcasm, exaggeration, slang, idioms and ambiguous wording. These factors can make it difficult to achieve 100% accuracy of results offered by automated systems [18].

The purpose of the work is the development of approach to using cloud services for visual analytics of neural network analysis of texts emotional tonality.

For the neural network analysis of the emotional tonality of messages, it is proposed to use a hybrid architecture neural network that combines the simultaneous advantages of the CNN and BiLSTM architectures. The architecture of the proposed neural network is shown in Figure 1.

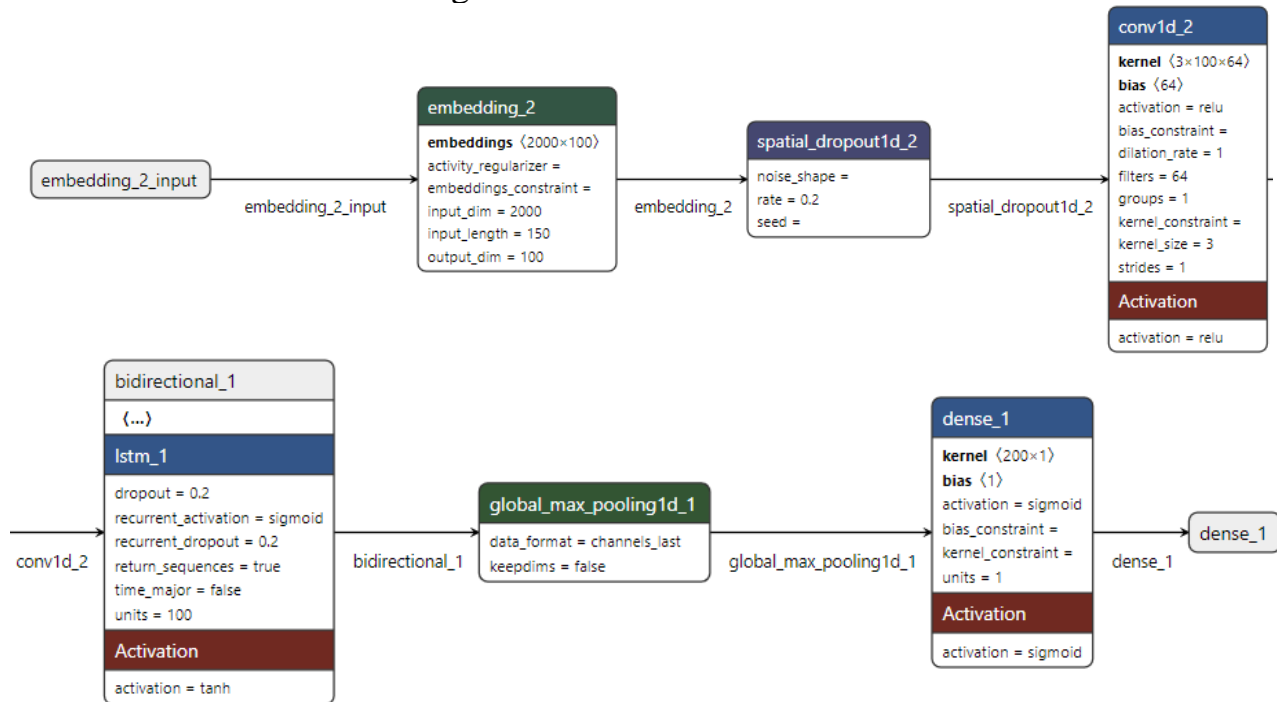


Figure 1. Neural network architecture for determining emotional tonality.

The model starts with the Embedding layer, which transforms the input text into numerical vectors of a given dimension. A SpatialDropout1D layer is then used, which randomly "turns off" a portion of the neurons (20%) to prevent overtraining.

Next is the Conv1D layer, which applies single convolutions to the input data, detecting local patterns. After that, the model has a bidirectional LSTM layer that is able to remember information from both ends of the sequence. This layer also has built-in mechanisms to randomly turn off neurons for better generalization ability.

The LSTM layer is followed by the GlobalMaxPooling1D layer, which selects the maximum values from all the obtained features, reducing the dimensionality of the data. The model is completed by a dense Dense layer with one neuron and a sigmoidal activation function, which gives the probability that the input text belongs to the "Positive tonality" class.

As part of the proposed approach based on the visual explanation of the results of neural network analysis of emotional tonality, it is proposed to use the LIME model, which is a local model of interpreted model-agnostic explanations.

Therefore, for the neural network analysis of the emotional tonality of messages, it is proposed to use a hybrid architecture neural network that combines the simultaneous advantages of the CNN and BiLSTM architectures. A neural network

architecture was developed for determining emotional tonality, and the LIME model of interpreted model-agnostic explanations was used to visually explain the results of the neural network analysis of emotional tonality. This approach will make it possible to use all the advantages of neural network solutions, but to have an understanding for the user of what influenced these solutions. This will increase confidence in the results of the neural network and allow you to see the mistakes it makes. In general, the detection of emotional tonality is a task of content analysis, which is an important task of information technology. The effect of automation will increase the efficiency and speed of analysis of large volumes of data. Thanks to automated systems, it is possible to quickly track changes in user attitudes, identify trends and potential problems in communications. This, in turn, allows companies to quickly respond to negative mentions and amplify positive ones, which helps improve brand reputation and strengthen customer trust.

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## **ІНТЕГРАЦІЯ MICROSOFT ДЛЯ ОПТИМІЗАЦІЇ РОБОЧИХ ПРОЦЕСІВ У СУЧАСНИХ КОМПАНІЯХ**

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Швидкий розвиток інформаційних технологій став значущим фактором трансформації бізнесу у всьому світі. В умовах поширення цифрових технологій основні тенденції в роботі компаній зміщуються до автоматизації процесів, що сприяє підвищенню ефективності операцій, зниженню витрат і покращенню взаємодії між працівниками. Однією з найбільш вагомих змін останнього десятиліття є розвиток хмарних технологій, які перенесли більшу частину робочих процесів до Інтернету. Microsoft, як один із лідерів у сфері ІТ, пропонує рішення, що поєднують у собі багатофункціональні інструменти для роботи та співпраці, серед яких Microsoft 365 займає центральне місце.

Хмарні технології та їхня роль у бізнесі. Поява хмарних технологій кардинально змінила підхід до обробки, зберігання та передачі даних. У багатьох країнах понад 40% компаній активно використовують хмарні сервіси для повсякденних бізнес-завдань. Microsoft пропонує платформу Microsoft 365, яка забезпечує компанії необхідними інструментами для організації робочих процесів, включаючи електронну пошту, управління файлами, комунікаційні платформи та інші послуги.

Основні можливості Microsoft 365 для бізнесу:

1. Масштабованість та адаптивність.

Microsoft 365 є масштабованою системою, яка підходить як для малих підприємств, так і для великих корпорацій з необмеженою кількістю користувачів. Компанії можуть легко додавати нових співробітників, інтегрувати інші бізнес-додатки та налаштовувати систему під конкретні потреби.

2. Інструменти для продуктивності та комунікації.

У межах Microsoft 365 пропонуються онлайн-версії найпопулярніших офісних програм (Word, Excel, PowerPoint), які дозволяють працювати з документами у режимі реального часу. Крім того, платформа надає можливість зберігання файлів на OneDrive, який забезпечує кожного користувача 1 ТБ