5. Anjali G. Jivani. A Comparative Study of Stemming Algorithms / Anjali Jivani Ganesh // Department of Computer Science & Engineering. – India, Baroda: The Maharaja Sayajirao University of Baroda, 2016. – P. 1930-1928.

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MACHINE TRANSLATION WITH THE USE OF DEEP LEARNING

Introduction. Deep learning is one of many methods of machine learning that is based on training the data characteristics. Nowadays when considering deep learning we can distinguish three of its historical stages. The first one is related to cybernetics and dates back to the 1940–1960's, when the theory of biological education was developed and the first models, including the perceptron, which allowed one neuron to be trained, were implemented. The second phase of the 1980–1990's period is associated with the connectionist approach when the backpropagation method was applied to train a neural network with one or two hidden layers. The third stage – deep learning – started around 2006.

Objective of the paper is to investigate the concept of machine translation and to discuss the translation procedure under consideration in the plane of the deep learning use.

Results of the research. Artificial neural networks are mathematical models built on the principle of the organization and operation of biological neural networks. Today there is a large number of varieties of artificial neural networks, aimed at solving various problems.

The tasks performed by artificial neural networks include:

1. Recognition (classification) of samples;
2. Approximation of multidimensional functions;
3. Clustering of samples;
4. Restoration of samples;
5. Reducing the dimension of data;
6. Forecast;
7. Filtration;
8. Management;
9. Identification of model parameters.

A recurrent neural network (RNN) is one of the architectures of deep learning. Such networks are successfully used in various fields, including machine translation.

Today RNNs called Long-Short-Term Memory (LSTM) networks, are often used. Such network was suggested by S. Hochreiter and J. Schmidhuber in 1997. It is a system that, unlike traditional recurrent neural networks, does not have problems with the 'disappearance of the gradient'. This is a complication that arises during the

training of artificial neural networks while using learning methods based on the gradient and reverse distribution.

Let us look at the stages of creating a simple model of machine translation using deep learning. The TensorFlow framework and the Keras library were used as the base for this network:

1. Text preparation (text loading, normalization and saving).
2. Selecting a certain percentage of the material for checking the network (test dataset), the rest is used for its training (training dataset).
3. Describing LSTM-network, consists of an encoder (transforms the sentence in the source language into a vector representation) and a decoder (transforms the vector representation into sentences in the target language).
4. Using the Adam algorithm to optimize deep learning.
5. After that you can go to the network training on the dataset. The epochs parameter shows the number of training epochs. After each epoch, intermediate results are stored in a file.
6. Performing learning quality assessment by checking the translation using the pairs from the test set.

As a text material for the given network, it was suggested to use linguistic terms. 1300 keywords were selected from linguistic articles, of which 10,000 combinations were created to increase the number of repetitions. This is due to the fact that the neural network shows better results while increasing material amount. According to the results of the test dataset, the overwhelming number of combinations is translated accurately. In order to improve the results, the material base addition appears to be appropriate.

Conclusion. Thus, we can conclude that in recent years an increase in the amount of training data and the availability of computing resources, that are sufficient to work with much larger models, gave a new life to deep learning. Its application, in turn, has led to a significant development of machine translation compared with developments in this field from the previous decades. For example, Google's neural machine translation, based on their own research, reduces translation errors by more than 55%-85% on several major language pairs measured on sampled sentences from Wikipedia and news websites with the help of bilingual human raters. However, further research on machine translation is still relevant, since its tasks for today are not yet fully resolved.

References

1. Федоров Е.Е. Искусственные нейронные сети: монография / Е.Е. Федоров. – Красноармейск: ДВНЗ «ДонНТУ», 2016. – 338 с.

Fedorov E. E. Iskusstvennye neironnye seti: monografiia [Artificial neural networks: a monograph] / E. E. Fedorov. – Krasnoarmeisk: DVNZ «DonNTU», 2016. – 338 s. [in Russian].

2. Goodfellow, I. et al. Deep learning. Vol. 1. Cambridge: MIT Press, 2016.

3. Hochreiter, Sepp, and Jürgen Schmidhuber. "Long short-term memory." Neural computation 9.8 (1997): 1735-1780.

4. Hutchins, J. Machine translation: History of research and applications. 1995.
5. Hutchins, J. The history of machine translation in a nutshell. *Retrieved December*, 2005, 20: 2009.
6. Neural Network for Machine Translation, at Production Scale. – Retrieved from: https://ai.googleblog.com/2016/09/a-neural-network-for-machine.html

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INTONATIONAL PHRASEOLOGISMS OF THE UKRAINIAN LANGUAGE

Introduction. The phraseology as a special linguistic discipline is characterized by the wide range of problems that are studied within its limits. It explores the specifics of phraseological units, the features of its sign function, structural and semantic peculiarities, which are manifested in the main features of phraseological stability and reproducibility, examines the nature of the components of phraseology, the semantic and morphological structure of phraseological conversions, the nature of their syntactic connection with other units of language and forms implementation in the broadcast. Nowadays, one of the least investigated aspects of PUs is their intonational design, the clarification of the role of intonation in formation.

Firstly, traditionally phraseologisms are explored mainly on the basis of written sources, attracting information of phraseological dictionaries. Since in the written texts the intonational properties of phraseologisms are not explicitly embodied, they remain beyond the attention of the researchers. [2: 243].

Secondly, the study of the material side of the language (the height of the main tone of the voice, the strength (intensity), the duration of individual parts of the statement, the speed of their proclamation (tempo), pause and timbre) are traditionally considered as the subject of a special linguistic discipline – experimental phonetics. Intonational registration of phraseological units as a special unit of language was not a topic of scientific researches, but certain aspects of this problem were partially investigated in the works of well-known domestic scientists, and also became the reason for a special study of these issues.

Review of recent publications. Attempts to establish the role and peculiarity of the intonation of phraseologisms are found in works of I. A. Fedosov, L. I. Royzenzon, M. M. Kopylenko, Z. D. Popova. Intonation is an essential factor in securing of the phraseological meaning. This is often observed in different kinds of spoken PU, which express their significance. The significance of intonational means in shaping the general communicative value of utterances makes it possible to