

**Doctoral School of Information and Biomedical Technologies
Polish Academy of Sciences (TIB PAN)**

SUBJECT:

Study on the behavior of third-generation neural network models in NLP applications

SUPERVISOR:

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DESCRIPTION:

The aim of the thesis will be the study of the behavior of third-generation neural network models (Spiking Neural Networks) in natural language processing (NLP) applications. Different neural network architectures such as transformers and GPT-3 will be analyzed to understand the factors that affect their performance. The research will focus on several NLP topics such as speech recognition, machine translation, and text generation.

Multiple experiments, including performance tests, will be conducted to evaluate the effectiveness of individual models. Techniques such as data augmentation and novel learning methods like meta-model learning will be used to improve machine translation quality and overall network performance. This thesis will contribute to the development of NLP technology and aid in understanding the mechanisms of third-generation neural networks.

In addition to the aforementioned research areas, computational and memory complexities for each model will also be investigated. This will provide insight into the feasibility of deploying these models in real-world NLP applications, which often require a balance between model accuracy and computational efficiency. The analysis of computational and memory requirements will be based on empirical measurements, enabling a comprehensive understanding of the practical considerations for implementing these third-generation neural network models in NLP applications.

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