

Doctoral School of Information and Biomedical Technologies Polish Academy of Sciences

Domain: IT

SUBJECT: Hybrydowe metody uczenia głębokich struktur sieci neuronowych.

Hybrid methods of learning deep structures of neural networks.

Supervisors, contact: Piotr A. Kowalski PhD, DSc, Professor AGH

Assistant supervisors, contact: n/a

Place of research: Kraków/Warszawa or off-line via Google Meets or MS-Teams.

Recruitment & Selection: based on general recruitment roles

Number of positions: 1

Project Description

(220 words)

In the modern world, neural networks are widely used in practice. Thanks to its universal structure, it is possible to extract information based on examples hidden in the training data. Currently, deep neural structures are very popular. Thanks to the natural combination of data processing and feature extraction, it is possible to analyze data much easier. Unfortunately, some neural structures cannot be used in practice due to certain limitations that do not meet the assumptions of the training algorithms.

The aim of this research is to create modern and universal learning methods for hybrid structures of deep neural networks. These methods include both classic layer stacking methods and the possibility of using nature-inspired heuristic methods.

Thanks to the achievement of a universal algorithm for learning deep neural networks, it will be possible to try to create any neural structure, which does not always have to meet the assumptions required by classic learning methods, e.g. gradient. The structures created in this way, together with an innovative learning algorithm, will be used in data analysis including examples from technical, medical or business issues. On the basis of a comprehensive analysis (including numerical), the advantages and disadvantages of the developed method will be shown.

References

This research will be supported by a cloud environment. It is planned to apply for a computational grant to the Academic Computer Center CYFRONET AGH. The CYFRONET-AGH center has two supercomputers on the list of the fastest supercomputers in the world (ISC High Performance 2021 Digital): Prometheus (for the thirteenth time in the ranking) and Ares (for the first time in the ranking).

Date: