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Machine Learning for Bio-Inspired Computing

Supervisor: Prof. Ing. Šenkeřík Roman, Ph.D.

Consultant: Ing. Viktorin Adam, Ph.D., ---

Department: Department of Informatics and Artificial Intelligence

Programme: Information Technologies

Abstract:

The Ph.D. thesis will explore new machine learning methods to improve and better understand bio-inspired algorithms. Recent advancements in this field have shown significant potential in data-driven autoconfiguration of bio-inspired optimizers. Furthermore, the research will delve into the intricate process of setting hyperparameters, a crucial step that can dramatically influence the efficiency. The latest techniques, including Bayesian optimization and meta-learning, have opened new avenues for more efficient and accurate hyperparameter tuning. One area of interest is the deepened understanding and prediction of performance of these algorithms, leveraging novel approaches in predictive analytics. Additionally, the thesis may investigate the prediction of transition points between algorithms. This involves identifying optimal moments for switching algorithms during a computational process to maximize efficiency and effectiveness. Another direction of the research may also be dedicated to exploring the applicability of reinforcement learning in both dynamic and static configuration of algorithms. Recent breakthroughs in reinforcement learning, especially in complex environments, offer promising strategies for algorithm configuration. These strategies could lead to more adaptive, robust, and efficient algorithmic solutions in various fields. Overall, the dissertation will not only contribute to the theoretical understanding of the connection between advanced machine learning techniques and bio-inspired algorithms, but also aim to provide practical frameworks and tools that can be applied in real-world scenarios, thus bridging the gap between theoretical research and practical application.

Literature:

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