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Automated Design of Metaheuristic Algorithms with Large Language Models

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Abstract:

In this thesis, the potential of large language models (LLMs) for the autonomous design and refinement of metaheuristic algorithms for complex optimization problems is explored. The vast knowledge and pattern recognition capabilities of LLMs are leveraged to establish a framework that enables these AI systems to generate novel metaheuristic strategies in a structured format, including pseudo-code and algorithmic logic.

The objectives are to assess the performance of algorithms generated by LLMs against standard optimization benchmarks and to iteratively improve these algorithms through a feedback loop informed by performance data. An expected outcome is the creation of a repository of innovative metaheuristic algorithms with the potential for enhanced problem-solving abilities across various domains.

The research underscores the potential to reduce the reliance on human expertise in the development of algorithms, streamline the creation process, and discover new algorithmic structures that could lead to advancements in the field of optimization.

Literature:

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