

Reinforcement Learning Optimization: Unraveling Trends and Advancements in Metaheuristic Algorithms

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Abstract : The field of machine learning (ML) is experiencing rapid development, resulting in a multitude of theoretical advancements and extensive practical implementations across various disciplines. The objective of ML is to facilitate the ability of machines to perform cognitive tasks by leveraging knowledge gained from prior experiences and effectively addressing complex problems, even in situations that deviate from previously encountered instances. Reinforcement Learning (RL) has emerged as a prominent subfield within ML and has gained considerable attention in recent times from researchers. This surge in interest can be attributed to the practical applications of RL, the increasing availability of data, and the rapid advancements in computing power. At the same time, optimization algorithms play a pivotal role in the field of ML and have attracted considerable interest from researchers. A multitude of proposals have been put forth to address optimization problems or improve optimization techniques within the domain of ML. The necessity of a thorough examination and implementation of optimization algorithms within the context of ML is of utmost importance in order to provide guidance for the advancement of research in both optimization and ML. This article provides a comprehensive overview of the application of metaheuristic evolutionary optimization algorithms in conjunction with RL to address a diverse range of scientific challenges. Furthermore, this article delves into the various challenges and unresolved issues pertaining to the optimization of RL models.

Keywords : machine learning, reinforcement learning, loss function, evolutionary optimization techniques

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