AMRITA VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF THE UGC ACT, 1956

Bachelor of Technology (B. Tech)
Amrita School of Engineering
Amrita Vishwa Vidyapeetham University
Ettimadai
Coimbatore

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Final Year Project

TAG 1

EvOLve(Evolutionary Optimization, Learning and Adaptive Systems)

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PROJECT TITLE: Traveling Thief Problem Using Reinforcement Learning with Evolutionary Algorithm.

Abstract

In this work, we address the Traveling Thief Problem (TTP), a complex optimization problem that combines elements of the Traveling Salesman Problem (TSP) and the Knapsack Problem (KP). The TTP requires finding an optimal route for a thief to visit a series of cities, while simultaneously maximizing the total value of items collected without exceeding the knapsack's capacity. To tackle this challenge, we propose a hybrid approach that integrates Evolutionary Algorithms (EAs) with Reinforcement Learning (RL). Our methodology leverages the global search capabilities of EAs to explore diverse solutions and the adaptive learning potential of RL to refine decision-making policies. Through extensive simulations and comparative analysis, we demonstrate that our approach effectively balances the trade-offs between route optimization and item selection, yielding superior performance compared to traditional methods. The results highlight the potential of combining EAs and RL in solving complex multi-component optimization problems, providing a robust framework for future research and applications in related domains.