

Quantum-Inspired Digital Annealing for Multi-Student Course Timetabling and Quantum Algorithm Validation

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In course registration, students face numerous challenges in course selection. In this study, we formulate these course-selection problems as a Quadratic Unconstrained Binary Optimization (QUBO) model, transforming course allocation into a complex combinatorial problem, and employ the Quantum Inspired Digital Annealing (QIDA) method for optimization.

While previous approaches such as Evolutionary Algorithms (EA) and Simulated Annealing (SA) have demonstrated certain effectiveness, their efficiency and solution quality are limited when handling large-scale datasets. We compare our results with those obtained by SA to demonstrate the advantage of QIDA to multi-student course timetabling optimization. Additionally, we validate quantum algorithm compatibility by comparing Quantum Approximate Optimization Algorithm (QAOA) outcomes, confirming the potential of quantum-inspired and quantum methods for timetabling optimization

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