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Distributed quantum-inspired optimization solver

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The size and structure of discrete optimization problems remain a key limitation for existing solvers, as their computational complexity often scales exponentially with problem size. At QBroad, we have developed QIOPT (Quantum-inspired Optimizer), our proprietary solver capable of efficiently solving Quadratic Unconstrained Binary Optimization (QUBO) problems, which we have successfully applied in various technological and business fields.

In this work, we present Distributed QIOPT, a novel approach aimed at improving scalability by extending QIOPT through a decomposition strategy. Large optimization problems are partitioned into subproblems using heuristic methods and distributed across computational nodes of CloudOS, our cloud-based platform for high-performance computing. Each subproblem is solved independently, enabling parallelism and efficient use of resources. While initially developed for QUBO, this distributed optimization framework can be generalized to a broader class of discrete optimization problems. The proposed approach allows for obtaining high-quality solutions to large-scale problems that are otherwise intractable for conventional solvers.

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