Programmatic Advertisement Scheduling Using Quantum Approach

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Abstract:

Quantum computing is an interdisciplinary field that merges computer science, physics, and mathematics, leveraging the principles of quantum mechanics to solve complex problems faster than traditional computers. This study applies quantum methodologies, particularly the Quantum Approximate Optimization Algorithm (QAOA), to enhance programmatic advertisement scheduling. Our approach optimally assigns digital ads to slots while adhering to constraints such as budget limitations and audience overlap. By modelling ads as quantum states and formulating the scheduling task as an optimization problem using quantum Hamiltonians, we employ QAOA to minimize the system's total energy, ensuring efficient ad placement. The objective is to optimize ad reach while avoiding conflicts, such as scheduling similar ads simultaneously. The novelty of this research lies in its focus on developing a quantum optimization algorithm tailored for programmatic advertising, paving the way for further applications in high-precision scheduling across various domains.

Keywords:

Digital advertising, optimization algorithms, programmatic ad scheduling, quantum computing.