ID de Contribution: **23** Type: **Non spécifié**

Quantum-inspired anomaly detection, a QUBO formulation

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Abstract (20 lines max) Anomaly detection is a crucial task in machine learning that involves identifying unusual patterns or events in data. It has numerous applications in various domains such as finance, healthcare, and cybersecurity. With the advent of quantum computing, there has been a growing interest in developing quantum approaches to anomaly detection. After reviewing traditional approaches to anomaly detection relying on statistical or distance-based methods, as well as quantum computing formalism used by this formulation, I will describe a Quadratic Unconstrained Binary Optimization (QUBO) model of anomaly detection, compare it with classical methods, present benchmark results showing accuracy improvement over classical methods on real-world use-cases, and discuss its scalability on current Quantum Processing Units and how to solve this quantum-inspired algorithm efficiently.

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Classification de Session: Contributed