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Editors

Evaluation and Application of Utility-based Approaches to Privacy in Distributed Constrained Problems

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In artificial intelligence, many distributed problems can be treated using the constraint programming paradigm, as well as the related frameworks (Distributed Constraint Satisfaction and Optimization Problems) and algorithms. In such problems, agents' privacy has been a major motivation for the distribution of the problem. Several approaches have been proposed in existing works, both based on cryptographic techniques or not. However, they may require resources that may not be available or have limitations in practical applications. Thus, privacy in distributed constrained problems remains an open issue. We propose an approach using utilities that integrates privacy directly in the decision making process of the agents, where the reward associated to the solving of the problem is compromised by the cost for revealing confidential data. We evaluate this utility-based approach on distributed meeting scheduling problems with privacy requirements, commonly used in the field of distributed constraint satisfaction and optimization problem for their properties and simplicity of understanding. At http://UDisCPs.fit.edu, we present our distributed meeting scheduling problem generator as well as the file format used to describe such problems using constraints. We present possible practical applications, namely autonomous vehicles problems, where participants want to calculate their itineraries and coordinate their actions while retaining their personal information private.