BCT4MAS - 2020

3rd International Workshop on Blockchain Technology for Multi-Agent Systems (BC4MAS)

1. Topic Description

Multi-agent systems (MAS) are composed of loosely coupled entities (agents) interconnected and organized in a network. Every agent has the ability to *solve problems* and *attain its goals* by interacting with each other through *collaboration*, *negotiation*, and *competition* patterns. MAS are increasingly dealing with sensitive data. Therefore, enforcing the notion of reputation, ensuring trust and reliability, is essential for modern MAS.
Blockchain (BCT) is a P2P distributed ledger technology providing shared, immutable, transparent, and updatable (append-only) registers of given values characterizing a given network (e.g., all the actions intercurred among the participants and information about the participants themselves).
However, employing the BCT ``as-is'' and by itself in dynamic and quickly evolving scenarios can represent an unlucky choice. The reasons span from fundamental properties of BCT to application/domain specific constraints. Reaching consensus in distributed multi-stakeholder networks with possible unaligned interests can be considerably complex or unsustainable.
Therefore, if properly managed, combining BCT and MAS can represent a win-win solution:
(i) the adoption and adaption of BCT can help to overcome trust and reliability limitations broadly known in MAS literature, enabling secure, autonomous, flexible and even profitable solutions.
(ii) MAS can contribute with its features to address limitations of BCT.

2. Call for papers

Human beings are increasingly connected through uncountable interlinked electronic devices that perform ubiquitous computing. As a consequence, scientific research is pushing towards the design and development of autonomous and collaborative systems and devices that interact and compete with each other, often emulating humankind's dynamics.
Multi-Agent Systems (MAS) are widely used for the development of intelligent distributed systems, including cases that deal with highly sensitive data, such as ambient assisted living, healthcare, and energy trading. An agent can be rationalized as an autonomous entity observing its surrounding environment through a perception layer, and possibly interacting with it, as well as with other agents. These intelligent agents are also able to perform distributed reasoning exploiting their knowledge base. It can be extended and updated, thus renewing their plans to achieve the desired goals. In MAS, a solution to given problems to be solved is delivered through autonomous actions and interactions between many agents rather than by any single “smart” agent. Hence, MAS are generally composed of loosely coupled agents interconnected and organized in a network, each of them having the ability to solve problems and attain its goals by interacting with each other through collaboration, negotiation, and competition patterns.

Recently, BCT has been proposed as a peer-to-peer distributed ledger technology that can provide a shared, immutable, and transparent history of all the events intercurred among all the participants in a given network. Currently, MAS require trusted mediators storing the transactions among the agents. These mediators can be replaced with a distributed ledger technology: BCT properties can ensure that no corruption of topics or moderators would impact on the reliability of the network.
For example, systems handling societal information and dealing with hundreds/thousands of nodes to manage sensitive information can benefit from the combination of MAS and BCT. Such systems need the crucial feature guaranteed by MAS, as much the traceability and immutability ensured by the BCT.

This workshop aims at offering common ground to researchers from diverse areas to share experiences about possible outcomes of combining MAS and BCT.
In particular, the submitted papers should address how MAS and BCT can be used together in one or more of the following (scientific and applied) topics:

4. Topics

Theoretical track:	**Applied track:**
Main properties of blockchain technology Self-aware and smart contracts Reputation management Decision-making for policy Secure identity assurance Security and privacy management Trust and data integrity Procurement Conflict resolution in business collaboration Task allocation, coordination, and supervision Agreement technologies and artificial institutions Big data management in highly distributed environments Anonymization of distributed data Trustworthy collective intelligence on the internet Incentives and fairness of blockchain systems Self-regulated multi-agent systems	Distributed energy grids Collaborative governance Distributed Autonomous Organisations (DAO) Distributed artificial intelligence Swarm robotics Coordination models in Internet-of-Things (IoT) E-commerce and demand-supply relationships Software life-cycle management E-government Sharing economy Blockchain and Industry 4.0 Decentralized business models for agents Blockchain for networked systems and IoT Autonomous cyber-physical systems Trustworthy agent -- human interaction

5. Important Dates

Deadline for Submission: 20 February 2020
Notification of Acceptance: 09 March 2020
Camera-ready: 30 March 2020
Workshop day(s): 17-19 June 2020

6. Organizers

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