Proposition de recherche doctorale

Modelling Strategic Interaction Within and Between Blockchains via cooperative games

Mots clés :
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Résumé du projet de recherche (Langue 1)

Cooperative game theory focuses on modeling the strategic behavior of decision makers, encompassing the attitude of seeking cooperations in the formulation of utility functions and allocation or sharing strategies. Among its practical outcomes, it can allow predicting coalitions, joint possible actions for subsets of agents, and computing accordingly resulting collective payoffs. Cooperative game modeling goes beyond non-cooperative game theory in that it allows predicting individual players' actions and payoffs taking into account possible binding agreements among subset of players.

The objective of the thesis is to model several strategic aspects related to blockchain technology and its recent evolutions, using cooperative game modeling.

We will focus on the blockchain-based distributed autonomous organizations, i.e., a novel recent problem rising when interconnecting, directly or indirectly different blockchains. An indirect relationship between blockchains can for example be due to cryptocurrency, with an electronic monetary amount being transitioned across cryptocurrencies and hence related blockchains. A direct relationship can rise in permissionless blockchains where smart-contract in a blockchain can be allowed to include interactions with other independent blockchains; permissionless blockchains we will be focusing on are in particular those about to manage assets related to resource allocations in computing and networking, and those able to manage assignments in smart city usecases.

We will investigate at which extent multiple blockchain organizations may ally to achieve high control and stability of related assets.

We will also identify strategies that have to be incorporated in the new blockchain-based autonomous organizations in order to avoid phenomena such as "majority tyranny" or "anarchy". Moreover, the interaction between different autonomous organizations with different objectives will be studied.