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Decision Making in Intractive Environments

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Abstract

In many competitive interactions such as pricing competition, decision-makers or agents must make choices simultaneously, and the final outcome depends on the decisions of others. In such a situation, each agent is not aware of what the other agents do but their choices directly influence the final outcome. These competitive interactions that lie at the heart of contemporary economics, sociology, biology, political science and the other fields are conceived in the theoretical framework of game theory as non-cooperative games.

In this talk, we first review the concept of Nash equilibrium as the most important solution concept in game theory in the framework for the paradox of Prisoner's Dilemma (PD). We discuss the influence of social norms on decision making of individuals in the PD and observe that agents would not play the behavior expected from the NE, since in many situations rational agents do not seem to behave in their self-interest, but rather behave pro-socially, and to justify the related experimental results, we introduce the concept of bounded rationality. In the second part, we introduce a Bayesian game to model a social aspect of agents which affords on their decision making as rational agents. Finally, as an application of game theory in market, we talk about product portfolio management problem in a competitive environment where each firm's objective is to maximize its expected shared surplus. We model the competition with an n-player game that optimal product portfolios are driven from its Nash equilibrium. We analyze the strategic behavior of firms to determine their optimal product portfolios.

Biography

Samira Hossein Ghorban is a postdoc fellow at Institute for Research in Fundamental Sciences (IPM). She received her PhD in computer science from Institute for Research in Fundamental Sciences (IPM) in 2018. Her research interests include game theory and its application in economics, computational game theory and synchronization in complex networks.

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