Diploma Topics 2021-2022, AI-MAS Laboratory

Multi-Agent Systems

Title: Automated Negotiation Framework in Multi-Agent Systems

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Description:

The research involves the development of an automated negotiation framework between providers and consumers in order to reach mutually acceptable agreements. Real negotiations pose several problems in the development of automated negotiation systems. The focus of the research will be on multi-issue negotiations, i.e., when the negotiation process involves reaching an agreement on several terms, in contrast with other negotiation processes where only price or price and quantity are negotiated. Therefore, an automated negotiation system must be able to represent complex agreements and support protocols that enable a multi-issue negotiation.

There will be many different scenarios depending on the negotiation context (e.g. the number of terms that must be negotiated, the eagerness of the parties to reach an agreement, or the trust a party has about the other parties). Therefore, an automated negotiation system must be able to adapt itself to these different scenarios.

Title: Autonomous Negotiation in Supply Chain Management

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Description:

Supply chain management (SCM) is concerned with planning and coordinating the activities of organizations across the supply chain, from raw material procurement to finished goods delivery.

The Trading Agent Competition Supply Chain Management (TAC SCM) scenario provides a unique testbed for studying and prototyping supply chain management agents by providing a competitive environment in which independently created agents can be tested against each other over the course of many simulations in an open academic setting.

Built upon the setting of TAC SCM game, the research aims to achieve two basic goals: to strengthen the understanding on Multi-agent System (MAS) theories through a semi-real-world-and-game-like SCM application, and to explore the implementation of approaches and algorithms related to some relevant MAS topics, e.g. communication, coordination, and multi-agent learning and adaptation.

Title: Argument-based Negotiation in Multi-Agent Systems

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Description:

Argumentation is gaining increasing importance as a fundamental concept in multi-agent interaction, mainly because it enables rational dialogue and because it enables richer forms of negotiation.

The research deals with automated negotiation between autonomous agents, with different behaviors, in an open environment. The agents negotiate using arguments, in order to persuade the opponent, for fulfilling their goals. In time, the agents should learn patterns of behavior used during negotiation and should improve their negotiation strategies. The negotiation model will be applied to different business models and several use case scenarios will test the performance of the agents obtained after negotiation.