2-years postdoctoral position
Université Grenoble-Alpes, France

Implementation of an Infrastructure for a General Auction Playing Competition

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Starting date: September 1, 2020 (or later, ASAP according to the pandemic situation)
Duration: 2 years
Location: Grenoble, France (with regular visits to Paris and Toulouse)
Gross salary: between €2395 and €2570 depending on professional experience

Local contact: Sylvain Bouveret (sylvain.bouveret@univ-grenoble-alpes.fr)
Project coordinator: Laurent Perrussel (laurent.perrussel@ut-capitole.fr)

Project description

AGAPE[1] is an ANR[2] project which aims at designing and implementing a General Auction Player (GAP) that can interpret and reason about the rules governing an auction-based market. To reach this scope, the project aims at developing a general Auction Description Language (ADL), a logic-based language for representing the rules of an auction market, which will then allow our GAP to reason strategically in different environments. This project will provide insights on the practical feasibility of the logic-based approach to strategic reasoning.

One of the main objectives of the AGAPE Project is to organize a competition of General Auction Playing. This contest, closely inspired by General Game Playing competitions[3], should attract artificial

[1] https://www.irit.fr/agape
[2] Agence Nationale de la Recherche (National Agency for Research). A major French research funding public agency.
[3] http://ggp.stanford.edu/iggpc/

bidders from several labs in the world, competing with each other through a centralized web server. The objective of this postdoc will be to develop the building blocks of this competition.

Even if the main goal concerns implementation, there are several theoretical difficulties to overcome. This is why we expect publications in top-ranked scientific journals and conferences as one major outcome of this postdoc.

The first theoretical difficulty is to find the right modeling language to represent a large variety of auctions in terms of protocol, allocation and payment rules. This modeling language should be such that the rules are not ambiguous to the players, and that both players and the game server are able to efficiently compute which bidding actions are legal at which time. A first step towards this goal has been made in the project, and a logic-based Auction Description Language has been developed [Mittelman and Perrussel, 2020], as well as an extension to combinatorial auctions (work in progress). These languages are directly inspired from the Game Description Language – see the tutorial by Jiang and Perrussel [2019] for an introduction to GDL.

A second step would be to properly define the competition rules, which calls for a precise definition of how the bidders will be evaluated, the winning conditions, the information disclosed to the bidders, and so on. Then, an exchange protocol between the game server and the players has to be specified. Finally, the server will have to be developed. It should be able to generate the auctions proposed to the bidders, to organize the matches, to communicate with the artificial players, to evaluate the legality of the actions returned by the bidders, and to compute and display the results.

The research agenda is ambitious, but will benefit from a close collaboration with the AGAPE project partners.

Location

The proposed postdoctoral position is located in Grenoble, France. With approximately 600,000 inhabitants in the metropolitan area, among which 60,000 students, Grenoble is an attractive hub of higher education and research. On top of that, surrounded by mountains, the city benefits from exceptional natural landscapes at the heart of the French Alps. This is why Grenoble is regularly cited as one of the best student cities in France.

The research will be conducted at Grenoble Informatics Laboratory (LIG[4]), one of the largest computer science laboratories in France, with about 500 members. The research group is located on the main campus of Université Grenoble-Alpes[5], which can be reached directly by tram from the city center.

The applicant should be prepared to make regular visits to the project partners in Toulouse (IRIT) and in Paris (IBISC, LAMSADE, LIPADE), as well as to participate to several international conferences.

Expected skills

The applicant should have a background in at least one of the following domains: logic and knowledge representation, multi-agent systems, computational economics. We also expect skills in computer programming and a taste for implementation. The applicant should be fluent in English.

How to apply

Any interested applicant should send an e-mail to:

[4] http://www.liglab.fr/
[5] https://www.univ-grenoble-alpes.fr/campus-/

- Sylvain Bouveret (sylvain.bouveret@univ-grenoble-alpes.fr) and
- Laurent Perrussel (laurent.perrussel@ut-capitole.fr).

This e-mail should contain at least:

- a CV;
- a motivation letter;
- the names of two referees for recommendation.

There is no deadline for application. We will hire the best possible applicant as soon as possible.[6]

References

Guifei Jiang and Laurent Perrussel. Game description languages and logics. Tutorial at the 28th International Joint Conference on Artificial Intelligence (IJCAI'19), 2019. https://www.irit.fr/agape/wp-content/uploads/2019/08/tutorialIJCAI19GJLP.pdf.

Munyque Mittelman and Laurent Perrussel. Auction Description Language (ADL): a General Framework for Representing Auction-based Markets. In *Proceedings of the European Conference on Artificial Intelligence (ECAI'20)*, 2020. (to appear).

[6] https://en.wikipedia.org/wiki/Optimal_stopping