Subject: *Multi-agent adaptive team pairing in an Open Science context*

Description: In the context of the European University EUNICE (https://eunice-university.eu/), the objective is to encourage the local and/or global cooperation between its members (seven European universities), and with their partners (from civil society and public authorities),

The REUNICE project (https://eunice-university.eu/reunice-project/) aims to guide, support and consolidate effective cooperation between researchers, teachers, students, social and industrial partners within EUNICE University as well as with external partners.

Based on the Open Science philosophy, the objective is to make research more open, collaborative, and closer to society.

The REUNICE project will provide a secure (thanks to blockchain technology) and collaborative environment in which each participant can give their opinion, suggest potential improvements, in order to build common and coherent projects (for research, education or industry).

Adaptive teams pairings. More precisely, the subject of the thesis is to define, taking into account the public data deposited on the portal by the participants (profile, research articles, courses, projects, ...), an _agent-based model_ allowing to identify common interest groups, and above all, groups with an interest in cooperation.

Several levels of pairings are planned: between people for the creation of teams, between teams to meet identified social and industrial needs.

The objective is to define _coalitions of agents_ with the notion of cohesion, trust and social behavior. The notion of distributed task allocation in teams is also important.

Learning, from matching success and non-success, will be integrated to improve the proposed algorithms; and interactions with end users will have to be taken into account to ensure acceptance: trust, robustness and transparency are the key points of the project.

It is essential to keep in mind that the result of the proposal will be applied in the real world.

Keywords: Multiagent systems, Pairing, team coordination, Open Science, education.

Bibliography:
Samir Aknine, Suzanne Pinson et Melvin F Shakun. *A multi-agent coalition formation method based on preference models.* Group Decision and Negotiation, vol. 13, no. 6, pages 513–538, 2004.

Filippo Bistaffa, Alessandro Farinelli, Jesús Cerquides, Juan Rodríguez-Aguilar et Sarvapali D Ramchurn. *Algorithms for graph-constrained coalition formation in the real world.* ACM Transactions on Intelligent Systems and Technology (TIST), vol. 8, no. 4, pages 1– 24, 2017.

Alessandro Farinelli, Manuele Bicego, Filippo Bistaffa et Sarva- pali D Ramchurn. *A hierarchical clustering approach to large-scale near-optimal coalition formation with quality guarantees.* Engineering Applications of Artificial Intelligence, vol. 59, pages 170–185, 2017.

Zina Houhamdi et Belkacem Athamena. *Collaborative Team Construction in Open Multi-Agents System.* In 2020 21st International Arab Conference on Information Technology (ACIT), pages 1–7. IEEE, 2020.

Environment: The candidate will work at the Computer Sciences department of LAMIH (UMR CNRS 8201), UPHF, Valenciennes, France.

The working language could be French, good English ability is required.

Date: The expected startup date is **September 1st, 2022**, but may however be flexible.

Required competences for the applicant:
- Artificial Intelligence, Multi-agents systems
- Java, Python programming.
- Good understanding of blockchain protocols is appreciated.

How to apply & contacts:
Applicants must submit an official academic transcript of records for their bachelor and masters education. It is a requirement to hold a masters or an equivalent degree for being considered for this position.

At least two references (name, position, e-mail, and telephone number) should be included in the application.

Candidates should send by e-mail a CV and a statement of purpose to:

- Mourad Abed, mourad.abed@uphf.fr

- René Mandiau, rene.mandiau@uphf.fr

- Emmanuel Adam, emmanuel.adam@uphf.fr