

SMA Team

Multi-Agents Systems

Laboratoire d'InfoRmatique en Image et Systèmes d'information

LIRIS UMR 5205 CNRS / INSA de Lyon / Université Claude Bernard Lyon 1 / Université Lumière Lyon 2 / Ecole Centrale de Lyon

The research activity of the team concerns multi-agent systems as a paradigm for study and development of Socially Intelligent ICT. The team's work is organized around three themes:

- Self systems - interested in bio-inspired approaches of intelligence, and self- * mechanisms as means of decentralized control in complex systems;
- Multi-Agent Learning and Developmental AI, relying on one hand on the extension of self- * mechanisms to consider cognitive self-development (developmental learning) as a way to achieve constitutive autonomy of artificial systems; and on another hand on Reinforcement Learning and MDP based Decision-making;
- Models for Interaction and Coordination in MAS and in particular Negotiation through Coalition Formation.

The team

Members

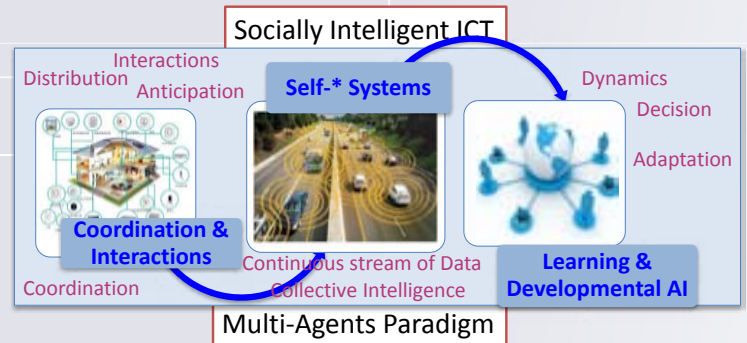
2 Professors
3 Associate Professors
9 PhD students

Defended PhD Thesis

1 to 2 per year in average

Highlights

- General Chair of the International Conference on Self * -Systems IEEE SASO in 2012, Steering Committee Chair of the conference since late 2013
- Innovation Award at "Carrefour du PREDIT" competition, for ANR-PREDIT project (ALF) (18 winners out of 370 applicants)
- Marketing of an IT solution from 2 (CIFRE) PhD theses (AREVA and Private Sales)
- Publications and demonstrations in the top conferences (A, A *) of the research domain (ALIFE'2014, AAI'2015, AAMAS'2015) and application domain (TRB'2013, 2015)



Scientific skills and societal challenges

Scientific skills

- Multi-Agents based modeling of complex systems
- Collective and decentralized problem solving using Multi-Agents Systems (MAS)
- Algorithms and self- * systems (self-organization, self-adaptation, cognitive self-development)
- Multi-Agents learning: constructivist (developmental) learning, reinforcement learning (MARL) and MDP based decision models
- Negotiation and coalition formation in MAS
- Policy making based on social data and interactions, Social computing

Societal challenges

- Ambient Intelligence and smart environments: Smart Home, Smart Energy, Smart City, etc. considering human in the loop, at the individual and collective level, co-adaptation and co-evolution of socio-technical systems
- Intelligent Transportation Systems, Cooperative traffic, Self-regulation and decentralized control
- Social System on the Internet: Hybrid Societies of Human and Intelligent Devices (Social Recommendation, Policy Making taking into account Users Data, Opinions, Sentiments, Participatory Approaches)
- Collective Robotics, Hybrid Societies of Robots and Humans

Contacts

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Softwares and platforms

- OSLO-Suite Software (Software for Solving Critical Resource Sharing Problems) - US Patent US2008040178 (A1)
- Urban-Pad Software (Negotiation Module) developed by the company GAMR 7 - Patent US2009051686 (A1) Classification: - International: G06T17 / 50; G06T17 / 50, -European: A63F13 / 10
- Software Hemis (Ambient Intelligence Engine) developed by UBIANT to optimize energy consumption and comfort in a Smart Home
- Platforms: Guided CESNA (Stigmergic Negotiation), Platform for Resilient Cooperative Traffic Simulation (extension of MovSim Simulator)

Positioning

International context

- Member of Editorial Board of International Journals (ACM TAAS, Springer FCS)
- Member of Steering Committees and Program Committees of Main Conferences of the domain (AAMAS, IJCAI, SASO...)
- Organization of international conferences and workshops (SASO 2012, MALLOW 2010)
- Chairing committees of international conferences (SASO, SSS)
- Invitation as lecturers, instructors and guest researchers (Algeria, Austria, Japan, Vietnam)
- International Expert: Europe (H2020, FP7), Germany, Netherland, Canada, Norway
- International PhD Jurys: Algeria, Austria, Spain, Vietnam, Qatar, Romania, Switzerland

National context

- Organization of national / french speaking conferences and workshops: JFSMA'2009
- Participation in National PhD and HDR Jurys
- Project Expertise for National (ANR, CIFRE...) and Regional (Emergence...) Programs
- Animation of a RNSC network in 2012 and 2013
- Projects: PREDIT ALF, PEPS CNRS

Regional context

- Collaboration IFFSTAR, ARC 6, ARC 7, IXXI, IMU, Xerox Research Centre Europe

Industrial partnerships

- Bouygues-Construction, OSLO-Software, Thales, UBIANT

Relations internationales

- Algeria, Austria, Brazil, Israel, Japan, Switzerland, Vietnam

International journals and conferences

- Artificial Intelligence
- Journal of Artificial Intelligence Research
- Journal on Autonomous Agents and Multi-Agents Systems
- ACM Transaction on Autonomous and Adaptive Systems,
- Journal GDN (Group Decision and Negotiation)
- IEEE Computational Intelligence Magazine
- Swarm Intelligence
- AAAI Conference on Artificial Intelligence (AAAI)
- International Joint Conferences on Artificial Intelligence (IJCAI)
- International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)
- International Conference on the Synthesis and Simulation of Living Systems (ALIFE)
- European Conference on Artificial Intelligence (ECAI)
- European Conference on Artificial Life (ECAL)
- IEEE International Conference on Tools with Artificial Intelligence (IEEE ICTAI)
- IEEE Conference on Self-Adaptation and Self-Organization (IEEE SASO)
- IEEE International Conference on Robotics and Automation (IEEE ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- Transportation Research Board (TRB)

