Research topics	Reinforcement Learning Information Theory and Decentralized Control
Position (M/F)	PhD, thesis offer
Reference offer	CS_FS_PhD_Appren_autom_112026
Research Department	Communication Systems (CS)
Publication date	17/11/2026
Start date	ASAP
Type of employment contract	Three-year fixed-term doctoral contract in private law

Description

We invite applications for a funded PhD position in the Communication Systems Department at EURECOM. The project will develop theoretical foundations and scalable algorithms at the intersection of reinforcement learning, information theory and decentralized control. Research directions include developing efficient learning and decision-making policies, designing communication strategies for distributed agents, and establishing performance guarantees for reliable control under information and communication constraints. The position is supported through an industrial partnership at EURECOM, with a focus on fundamental research.

Research topic

How can intelligent agents learn to communicate, coordinate, and make reliable decisions when information and communication resources are limited? To answer this question, this PhD project will explore fundamental questions at the intersection of modern machine learning, information theory, and decentralized decision-making. We seek candidates interested in developing new mathematical foundations and efficient algorithms for learning and reliable control in networked systems.

The precise research direction will be shaped by the candidate's background and interests within the following broad areas:

- Reinforcement learning and sequential decision-making: Developing scalable learning methods under communication and information constraints.
- Information theory and communication-efficient learning: Investigating sequential coding, information compression, and rate-distortion trade-offs for learning and decision-making.
- Multi-agent learning and decentralized control: Designing communication and coordination strategies for agents operating with partial information and limited communication.
- Scalable learning algorithms with performance guarantees: Developing theoretically grounded algorithms and characterizing their performance under limited communication and imperfect model knowledge.

For example, a network of sensors and controllers may need to coordinate over limited communication links. Possible questions include what information agents should communicate, how they can learn effective communication and decision policies, and how to guarantee reliable performance despite communication limitations and imperfect knowledge of the underlying system. (This last paragraph repeats many of things said before, maybe we can remove or integrate above.)

The work will combine mathematical analysis with numerical experiments. The research will be conducted under the supervision of Prof. Photios A. Stavrou and Prof. Matteo Zecchin.

Requirements

- A Master's degree, completed or nearing completion, in applied mathematics, electrical engineering, control, computer science or a related field.
- Strong mathematical and analytical skills, particularly in probability, stochastic processes, linear algebra and optimization.
- Knowledge of at least one of reinforcement learning, information theory, stochastic control or statistical learning along with a strong interest in developing theoretical results.
- Scientific programming skills, preferably in Python, and clear written and spoken English. Ability to work independently and collaboratively.

Application

Please email both Prof. Photios A. Stavrou (fotios.stavrou@eurecom.fr) and Prof. Matteo Zecchin (matteo.zecchin@eurecom.fr), using the subject line "PhD Application - Learning Information and Control". Include a detailed CV, academic transcripts, contact details of at least two referees, and a one-page research statement explaining your interests, relevant experience and motivation for this project.
Applications will be reviewed until the position is filled. The starting date will be agreed with the selected candidate. Informal enquiries are welcome.
EURECOM welcomes applications from all qualified candidates and is committed to equal opportunities, diversity and inclusion. Candidates with disabilities are encouraged to apply.

About EURECOM

EURECOM is a major Engineering School and a Research Center in digital sciences founded in 1991 as a consortium in the international technology park of Sophia Antipolis. The IMT is a founding member of the GIE. Teaching and research activities are organized around 3 promising fields: digital security, communication systems and Data Science.

EURECOM has a staff of 190 (researchers and support teams) and welcomes 400 international students on the Campus Sophia Tech, the largest information science and technology campus of the region. EURECOM enjoys a privileged geographical environment on the French Riviera (Côte d'Azur), between sea and mountains, at the heart of a dynamic and multidisciplinary ecosystem that promotes high-level scientific and technological innovation.

Social advantages

- International and multicultural environment
- Attractive salary - Corporate saving plans
- Private retirement plan (executive, employer participation of 100%)
- Employee profit sharing policy
- Company health insurance (mutuelle) with high levels of guarantees for the whole family (employer participation of 60%)
- Restaurant vouchers (employer contribution of 60%)
- Corporate and Social Council (CSE)

EURECOM is one of Europe's leading engineering schools specializing in digital technologies. It is located in the heart of the Côte d'Azur, in Europe's Silicon Valley (Tech Park Sophia-Antipolis). EURECOM's research teams work in an international, multicultural environment.

EURECOM has a dynamic policy in terms of inclusion and quality of life at work. We are committed to diversity and give equal consideration to all applicants, without discrimination. Above all, we look for competence and team spirit.

All our positions are open to people with disabilities. EURECOM has set up a disability advisor to provide support and advice, organize accommodation and make positive commitments to personal integration.

As part of its gender equality plan, EURECOM encourages gender diversity within its teams. In accordance with its recruitment policy, EURECOM examines applications with the utmost care, based solely on candidates' skills, qualifications and professional experience, in line with the principles of non-discrimination, gender diversity and equal treatment.

EURECOM is taking positive action as part of its CSR policy. A CSR representative oversees EURECOM's CSR and energy transition policies (electric charging stations, solar panels, waste sorting, etc.).

Web site EURECOM: https://www.eurecom.fr/fr/eurecom/presentation
EURECOM in VIDEO: https://www.youtube.com/watch?v=uIlFcgNijnM
Employee experience: https://www.youtube.com/watch?v=BHv9zIduzuQ