MIAI Doctoral Thesis Proposal

SECTOR: Higher Education Institution

LOCATION: Grenoble, France

RESEARCHER PROFILE:

□ First stage researcher,

INSTITUTION: Univ. Grenoble Alpes, University of Innovation

One of the major research-intensive French universities, Univ. Grenoble Alpes\(^1\) enjoys an international reputation in many scientific fields, as confirmed by international rankings. It benefits from the implementation of major European instruments (ESRF, ILL, EMBL, IRAM, EMFL*). The dynamic ecosystem, grounded on a close interaction between research, education and companies, has earned Grenoble to be ranked as the 5th most innovative city in the world. Surrounded by mountains, the campus benefits from a natural environment and a high quality of life and work environment. With 7000 foreign students and the annual visit of more than 8000 researchers from all over the world, Univ. Grenoble Alps is an internationally engaged university.

A personalized Welcome Center for international students, PhDs and researchers facilitates your arrival and installation.

In 2016, Univ. Grenoble Alpes was labeled «Initiative of Excellence ». This label aims at the emergence of around ten French world class research universities. By joining Univ. Grenoble Alpes, you have the opportunity to conduct world-class research, and to contribute to the social and economic challenges of the 21st century ("sustainable planet and society", "health, well-being and technology", "understanding and supporting innovation: culture, technology, organizations" "Digital technology").

* ESRF (European Synchrotron Radiation Facility), ILL (Institut Laue-Langevin), IRAM (International Institute for Radio Astronomy), EMBL (European Molecular Biology Laboratory), EMFL (European Magnetic Field Laboratory)

Key figures:

- + 50,000 students including 7,000 international students
- 3,700 PhD students, 45% international
- 5,500 faculty members
- 180 different nationalities
- 1st city in France where it feels good to study and 5th city where it feels good to work
- ISSO: International Students & Scholars Office affiliated to EURAXESS

\(^1\) https://edu.univ-grenoble-alpes.fr/en/
SUBJECT TITLE: Conversational Description of Manipulation Activities

This doctoral research project will build on the recent results in the Pervasive team at the Informatics Laboratory (LIG) of Univ Grenoble Alpes and is at the convergence of research on Perception, Action and Conversational AI. The goal is to develop the enabling technologies for an automatic conversational description of human manipulation activities. The candidate will investigate techniques to enable an AI system to answer questions such as What, Where, How, When and Why with regard to the observation of humans engaged in manipulation activities. This system should be able to use conversation AI technologies such as the Stanford Genie system to produce natural language answers to questions using multi-modal analysis of narrated video recording of activities such as cooking or product assembly.

Current techniques for action recognition simply record a sequence of actions recognized from the spatio-temporal signals in the video. Such techniques can be completed with techniques for recognizing entities (objects and other phenomena) and relations (predicates) to proved a state-based description. In this doctoral research, we propose to build on such techniques to construct a system that describes an observed activity as a sequence of actions and the resulting situations. Situations will be completed with contextual information that interprets entities and relations as concepts with associated linguistic and operational concepts. This interpretation should enable construction of responses to questions about the activity. The research challenge to be addressed include development of methods to automatically construct contextual information from interaction with a human tutor, and techniques to generalize this information to enable recognition of entities and interpretation of previously unseen activities.

This project will be conducted in collaboration with partners at DFKI, Charles Univ. (Prague) and the Stanford University Open Virtual Agents Laboratory (OVAL), in the context of the European Network of Centers of Excellence "Humane AI Net" (H2020 ICT 48).
ELIGIBILITY CRITERIA:

Applicants must hold a Master's degree or have a university degree equivalent to a European Master's (5-year duration).

Applicants will have to send an application letter in English and attach:
- Their last diploma
- Their CV
- A short presentation of their scientific project (2 to 3 pages max)
- Letters of recommendation are welcome.

Address to send their application: James.Crowley@inria.fr, Dominique.Vaufreydaz@inria.fr