Call for One Early Stage Researchers position as PhD scholarships available at the Università degli Studi di Milano (ITALY), in the framework of the EU-funded Marie Skłodowska - Curie ITN-EID training network "CISC-Collaborative Intelligence for Safety Critical systems"

The CISC Network MSCA-ITN-EID 955901

CISC is a Marie Curie Training Network funded by the European Commission to hire and train Early Stage Researchers (ESR) or PhD student as Collaborative Intelligence Scientists with the expertise and skillset necessary to carry-out the major tasks required to develop a Collaborative Intelligence system.

The training to be developed in the network will prepare the ESR for the following tasks:

1. Modelling the dynamics of system behaviors for the production processes, IoT systems, and critical infrastructures (System Safety Engineering);

2. Designing and implementing processes capable of monitoring interactions between automated systems and the humans destined to use them (Human Factors/ Neuroergonomics);

3. Using data analytics and AI to create novel human-in-the-loop automation paradigms to support decision making and/or anticipate critical scenarios.

4. Managing the Legal and Ethical implications in the use of physiology-recording wearable sensors and human performance data in AI algorithms.

The European Commission's guidelines on ethics in artificial intelligence (AI), published in April 2019, recognized the importance of a 'human-centric' approach to AI that is respectful of European values. Dedicated training schemes to prepare for the integration of "human-centric" AI into European innovation and industry are now needed. AIs should be able to collaborate with (rather than replace) humans. Safety critical applications of AI technology are "human- in-the-loop" scenarios, where AI and humans work together, as manufacturing processes, IoT systems, and critical infrastructures.

The CISC consortium comprises 13 world leading research groups from 7 European countries. The CISC consortium is offering 14 PhD positions for ESRs, of which 1 PhD for University of Milan. More information can be found at https://www.ciscproject.eu/.

ESR research project: Deep Learning for Human Performance Analysis and Prediction in Safety Critical systems

The use of Deep Learning in Human Computer Interaction and human performance is an emerging topic of research. The subject of this ESR will deal with the data analysis and the use of Deep learning approach in this field in order to detect and predict safety critical events in workplaces characterized by high complexity and automation. The research will use Big Data coming from body-signals, the human-machine interaction dynamics and the environmental settings (e.g. industrial processes). The main scope is to look for those signals that can represent reliable predictors of potential issues during the task execution. In fact, the factors that lead to a human error/failure are many (personal, organizational, contextual, etc.) and several are still unknown. In this context, applying Deep Learning algorithms to stream data, especially when dealing with several

heterogeneous interconnected data streams is an open challenge and for this training network the challenge is also to compare what results it can produce with the results coming from more white boxes approaches, such as a Bayesian Network models. This work will leverage recent work on explainable AI, and attention maps, to analyze the factors that the neural models attend to when predicting safety critical scenarios.

Expected Results:

- Investigate and test deep learning techniques for event detection and prediction in complex settings
- Use explainable AI techniques to understand the factors the models attend to during prediction and compare and contrast these results with the Bayesian models developed in ESR3
- A number of high-impact publications

Secondments:

The PhD student is going to be seconded on M12 for 6 months in ADIENT interiors (Serbia) to work on LIVE LAB 3 and on M12 to the Irish Manufacturing Research Company for 12 months to work on LIVE LAB 1 and support the data collection and analysis from the LIVE LAB1 case study.

Duration of the project and indicative starting date: 3 years starting from June 1, 2021

Research Group and General Conditions

The recruited PhD students will perform their activity under the supervision of prof. Ernesto Damiani, at the Department of Computer Science, University of Milan (Italy), within the SESAR Lab. More information at sesar.di.unimi.it. The recruited PhD students will be enrolled in the PhD

programme in “Computer Science”, and will be covered under the social security scheme. They will receive a Monthly Living Allowance plus a Mobility Allowance compliant with the applicable EU Marie Skłodowska-Curie Actions-ITN general conditions.

Admission criteria for doctoral education at University of Milan

In order to apply for a position in the PhD programme, students must have a second-level degree, an equivalent qualification, or an equivalent qualification by study level (Master of Science Degree) from a foreign University. The suitability of the foreign academic qualifications in terms of content is appraised by the Examining Board constituted for admission to each PhD programme, in compliance with the regulations in force in Italy and in the country in which the academic qualification was issued, and the international treaties or agreements pertaining to the conferment of qualifications for the continuation of studies.

ESRs shall, at the time of recruitment, be in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree. Full-time equivalent research experience is measured from the date when the researcher obtained the degree entitling him or her to embark on a doctorate, (either in the country in which the degree was obtained or in the country in which the researcher is recruited) even if a doctorate was never started or envisaged. Part-time research experience will be counted pro-rata.

Other project specific requirements

The Candidates must preferably hold a M.Sc. Degree in a relevant discipline or a MD degree by the starting date of the fellowship:

- The contract will last 36 months.

- Salary and additional benefits are according to EU-standards for Marie Curie ESRs. Additional benefits are foreseen for mobility and family allowance (if applicable).

- The ESR must be working exclusively for the action.

- Each ESR will have to complete at least 5 months of secondments to academic partners.

- Each ESR must actively participate in the events organized by Universities and Industrial partners, such as training/network events as well as in regular yearly Outreach Activities targeting different audiences.

- Recruitment, selection and appointment of the ESR follow the European Charter & Code of Conduct. All CISC partners commit themselves to provide equal opportunities male, female and disabled ESRs.

- ESRs' progress will be regularly monitored. Every year, the candidates and their work will be challenged and questioned. Failure in providing evidence of a regular and continuous commitment may result in the exclusion from the programme.

- Good collaborative and social skills and an open-minded attitude.

- Proficiency in the English language (minimum level: B2)

Mobility eligibility requirement

Eligible ESRs candidates may be of any nationality but must not, at the time of recruitment, have resided or carried out their main activity (work, studies, etc.) in Italy for more than 12 months in the last 3 years immediately prior to the recruitment date.

Application procedure

The application should be submitted electronically through the project website in the dedicated ESR 8 application page: https://www.ciscproject.eu/esr-8-project-title-deep-learning-for-human-performance-analysis-and-prediction-in-safety-critical-human-computer-interactions/

The dead line of Application

18/03/2021 23:00 - Europe/London

Recruitment strategy

A common scoring system and interviews of the candidates will be used, respecting privacy and protection of the Applicant's data. Female candidates and candidates with disabilities are encouraged to apply. For any further inquiry or information, please write to Prof. Gabriele Gianini (gabriele.gianini@unimi.it), specifying in the subject “CISC - ESR 8 Recruitment”.