Postdoctoral Research Position in Ergonomics and Human-Computer Interaction

Topic: Supervision of Autonomous Robot Tractors in Warehouses and Logistics Platforms

Introduction / Context:

Warehouses and logistics platforms (WLPs) play a critical role in economic growth and business competitiveness, connecting national industries to the global supply chain. Currently, they face significant pressures on multiple fronts, including the shortage of logistics platform operators and the sector's overall lack of attractiveness, dock saturation caused by increasing volumes and the rise of e-commerce, safety risks for on-site operators, environmental concerns (CO_2 emissions, noise pollution), and the societal commitment to reduce greenhouse gas emissions to nearly zero by 2030.

In this context, the ANR xHUB project "Autonomous Logistics Platforms" aims to address these challenges WLPs face by developing and testing eco-friendly autonomous robot tractors for handling on-site operations. These autonomous robot tractors will be supervised by operators and will "cohabit" with the workers employed at WLPs. The project raises important questions regarding the design of the supervision system and the role of operators: What will their tasks be? What functionalities will the system require? What information will they need? What should be designed in terms of user interfaces and human-computer interaction? Given the system's reliance on artificial intelligence (AI), what user needs will emerge regarding explainability—the ability of an AI system to produce explanations for its "predictions"? Finally, what will be the implications for WLP operators in terms of job transformation and work organization?

We are therefore seeking a postdoctoral researcher whose role will be to contribute to this part of the project (Work Package 4) in the following tasks, using a participatory and **user-centered design approach**:

- Conduct an ergonomic analysis of current activities in WLPs through interviews and on-site observations.
- Develop the functional specifications of the supervision system to be designed, including work on the explainability of AI-based system behaviors.
- Develop supervision work scenarios for autonomous tractors.
- Prototype the user interface (Human-Computer Interaction, HCI).

- Explore innovative interaction technologies (e.g., augmented reality, wearable interfaces) for supervising autonomous tractors.
- Design and evaluate user-centered interaction modalities adapted to collaborative environments and diverse operator profiles.
- Identify potential biases or usability challenges in the outputs of AI systems.
- Conduct an ergonomic evaluation of the supervision system.
- Analyze the transformations in work organization and operator activities within warehouses and logistics platforms.

Skills and Qualifications for the Position:

- Knowledge and experience in data collection methods for activity analysis: interviews, observations, etc.
- Knowledge and experience in activity analysis.
- Experience or strong familiarity with user-centered design.
- Knowledge of HCI prototyping.
- Understanding of AI.
- Skills in the ergonomic evaluation of interactive systems.
- Sensitivity to challenges related to the appropriation and adoption of technological innovations by end users.
- Ability to work in a collaborative research environment.
- Advanced proficiency in French.
- Good proficiency in English.

Qualifications:

PhD in ergonomics, work/occupational psychology, or computer science (specialization in HCI).

Contract Details:

- Start Date: As soon as possible (Around 1 May 2025).
- End of Contract: 01 March 2027.
- Work Location: Orange (Paris/Paris region), in collaboration with the Distributed Knowledge and Artificial Intelligence Laboratory (CIAD), University of Technology of Belfort-Montbéliard (UTBM).
- Supervisors: Dr. Yazan Mualla (UTBM), Dr. Moustafa Zouinar (Orange).

Application Process:

Applications must be sent via email to Dr. Yazan Mualla (yazan.mualla@utbm.fr) and Dr. Moustafa Zouinar (moustafa.zouinar@orange.com). The application must include:

- A detailed CV,
- A copy of the doctoral degree or any document certifying the doctoral level (proof of completion),
- References and/or one to two letters of recommendation.