Faculty of Architecture and Design - Department of Design

PostDoc in the project "*Meaningful Human Control of digitalization in safety critical systems (MAS)*" Period: 2022 – 2025

The Department of Product Design in collaboration with SINTEF is offering a PostDoc in a project funded by the Norwegian Science Foundation (NFR). The project is "Meaningful Human Control of digitalization in safety critical systems (MAS)" and has been funded in the period 2022 to 2025. Key themes in digitalization covered in this project proposal are automation and remote operations. The project is based on research collaboration between NTNU, SINTEF, TØI (The Institute of Transport Economics) and Delft University of Technology (TU-Delft).

The PhD Scholarship is for a period of 3 years, with a planned startup early in 2022.

The Department of Design consists of two, about equally sized groups: one on Gløshaugen campus in Trondheim, and one at NTNU in Gjøvik. The department is engaged in research and education in the areas of industrial design, interaction design, strategic design, sustainable design, graphic design and media technology and management. One of the core strategic areas is interaction design and digital transformation, where control and monitoring of autonomous transport systems and corresponding control rooms is a central research area. In addition, we also study the intersection between autonomous transport systems and humans, such as operators, passengers and other parts of the environment. SINTEF Digita/SESS (Software Engineering, Safety and Security) - is a multi disciplinary unit guided by the SINTEF vision "Technology for a better society". SINTEF analyzes and develops new knowledge on the interaction between people, technology, organization and safety. Within the Human Factors area SINTEF have established the network Human Factors in Control (www.hfc.sintef.no) in addition to networks of safety and security such as PDS Forum.

The project will support a joint Norwegian-Canadian collaboration effort to improve methods addressing human factors, to provide a roadmap for a new wave of international collaborative, multidisciplinary research on risk, safety and human factors within major industrial operations undergoing digital transformation. Key industrial actors involved are Equinor, Vår Energi, Aker BP, ABB, DnV, Safetec, Lloyds, Kongsberg…

Key objectives in the project are to build knowledge of how to design and operate control systems to avoid accidents in automation and remote operations; how to utilize successful automation and remote operations in design; and how to build on this knowledge in guidelines and methods that are used in the industry. Key **research questions** (RQ) and activities (WP) in the project are:

What are the main safety challenges in design when implementing increased level of digitalization?

- WP1: Learning from accidents and incidents in automated and remote operated systems.
- WP2: Review of safety challenges and practices in design of safety critical control systems subject to automation/remote operations.

What are the main reasons for successful digitalization?

- WP3: Review of successful design, implementation and operation of automation and remote control, including successful recoveries. Explore suggestions in simulations.

What are the main design guidelines for meaningful human control and what are best practices to be used?

- WP4: Compile and analyse current practices, systematisation and structuring of design standards, guidelines and regulation related to automation, and remote operations.
- WP4b: Develop methodology to include sensemaking in safety critical task analysis
- WP5: Assess practice in use of CRIOP and improve the CRIOP method. Share relevant practices with the Canadian project – CRIOP-DO.
- WP6: Validate and improve the methods through use in relevant areas in Norway and Canada to broaden experiences.

The project has received strong support from authorities and industries in Norway. The common perception has been that automation and remote operations will be a key part of future industry. There is a strong need to establish a more systematic understanding of hazards and risks in order to establish design guidelines, testing regimes and regulations.

The candidate is expected to speak and write fluent Norwegian, and have the ability to build and sustain a network among the interested users, to further research, innovation, and the safe and resilient use of autonomy and remote operations in Norway.

We are planning to build and sustain an international research network within autonomy, remote operations safety and human factors/meaningful human control.

NTNU and SINTEF wishes to get in contact with qualified candidates for this PostDoc position. Applicants for this position must have PhD in a relevant fields, such as technology, automation and/or human factors. We are especially interested in applicants who has documented networking skills, and have a background combining technology and human factors.

The successful applicant will be based at the NTNU's Department of Design in Trondheim. Applicants must be fluent in Norwegian and English.

For further information please contact:
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