Intern (m/f) Formal Verification Human-Vehicle Interaction Job No. 2418696 (Garching)

About us

GE Global Research - Europe employs approximately 200 engineers and scientists from more than 40 different countries. Our scientists and technologists come from a variety of disciplines and backgrounds, including chemistry, physics, mathematics, engineering, sciences and materials research.

Located in the heart of southern Germany, Global Research - Europe sits on the Garching campus of the Technical University of Munich. This creates a unique blend for our scientists to be in a university setting, while performing research in a world-class industrial lab that is dedicated to bringing new technologies to market. The facility also operates closely with technology teams at GE businesses across the globe, ensuring effective transition of breakthrough innovations from the lab into advanced products and services. Within the R&D community, the center maintains close partnerships with numerous universities, research institutions and technology companies in Germany and abroad.

Current research at the facility focuses on automated manufacturing of composite parts, waste heat recovery for industrial and power applications, grid integration of renewable energies, molecular imaging for cancer diagnostics, high power electronics for stationary and mobile applications and advanced compressor technologies.

GE is committed to taking on the world's toughest challenges. In order to fulfill that promise we rely on a culture of leadership, diversity and inclusiveness. We aim to employ the world's brightest minds to help us create a limitless source of ideas and opportunities. We believe in hiring talented people of varied backgrounds, experiences and styles... people like you.

The Controls and Embedded Systems (CES) Laboratory in Munich - where you will work - provides technology innovation in the areas of control systems for a wide range of applications as well as embedded systems development. CES is involved with worldwide customers in GE's Oil & Gas, Power & Water, Transportation and Energy Management businesses. The team focuses on control algorithm development - in particular fault accommodating control and nonlinear controls -, physics-based prognostics and health management (PHM) algorithms, high-integrity embedded systems, model-drivel development and V&V. The rapidly growing customer demands for dependable and resilient control systems, performance optimization, and Industrial Internet solutions open up new research and development opportunities for controls systems and embedded systems scientists and engineers.

Responsibilities

You will work in the context of the EU Horizon2020 project UnCoVerCPS (http://cps-vo.org/group/UnCoVerCPS) on control and verification of cyber-physical systems. In particular you will be studying the applicability of formal methods such as model checking for proving safety properties of human-vehicle systems, e.g. pilot-aircraft or driver-car systems.

- Model certain aspects and limitations of human capabilities, integrate these with the vehicle models and apply a tool chain developed in the UnCoVerCPS to this class of systems.
- Perform literature survey on modeling of human operators (pilots, drivers) in collaboration with our project partners
- Develop models of aspects of human operator behavior using GE-internal tools as well as tools developed in the EU project
- Integrate pilot / driver models with existing vehicle models
- Apply existing hybrid model checking tools to the integrated model
- Suggest and implement improvements of the tool chain
- Document and present your results

Qualifications

- Student of Computer Science or a related discipline
- Knowledge of automata theory for discrete systems
- Knowledge of model checking / theorem proving
- Working knowledge of modeling in Matlab/Simulink, Stateflow or similar
- Knowledge of temporal logics (LTL, CTL*)
- Excellent communication skills
- Fluency in English
- Currently enrolled at a university

Desired Qualifications

- Knowledge of tools for model checking and/or theorem proving, e.g. NuSMV, SPIN, Isabelle or ACL2s
- Knowledge of hybrid dynamic systems and their automata representation
- Knowledge of reachability analysis
- Knowledge of temporal logics for continuous systems

We look forward to receiving your online application.