FU Stellenanzeiger vom 04.03.2014

Fachbereich Mathematik und Informatik
Institut für Informatik
AG Intelligente Systeme und Robotik

Wiss. Mitarbeiterin / Wiss. Mitarbeiter
limited to 36 months
Entgeltgruppe 13 TV-L FU

Job description:"Effective Higher-Order Automated Theorem Proving LEO-III" funded by the German Research Foundation (DFG)

Significant progress has recently been achieved in higher-order automated theorem proving. This includes the improvement of existing provers and the development of new provers and model finders. Moreover, many new application domains have been explored and a high number of experiments have been carried out. These experiments show that higher-order theorem proving systems can solve relevant problems in many application domains that cannot be solved effectively in less expressive logics. This progress has been fostered by the new international TPTP THF infrastructure.

The goals of the LEO-III project in research and technology are versatile, but strongly interrelated. One common pattern in several of our research tasks is the idea to exploit, transfer, and adapt selected theoretical and technological achievements in first-order automated theorem proving for the higher-order context. This way we want to improve overall automation and make it readily available to a range of scientists from other fields, including AI, mathematics, and philosophy.

The cooperative architecture of previous LEO provers has supported the mediation between expressive modeling languages and restricted, but computationally more tractable logics for proof automation. This mediation is an inherent principle of the LEO approach and will be further explored in the LEO-III project.

The list of objectives includes:

- Novel calculi and new design for LEO-III: the new system will be based on paramodulation/superposition; term-orderings, labeling techniques, and free-variable representations will be adapted and further developed for these purposes

- Flexible, concurrent collaboration with specialist reasoners for first-order logic and novel collaborations with specialist reasoners for other computationally interesting fragments of higher-order logic
- Provision of proof objects and support for the integration of LEO-III with proof assistants or other AI systems

- Application and evaluation of LEO-III

- Dissemination of LEO-III and contribution to the build-up resp. extension of an international infrastructure

The range of objectives is from technological challenges to foundational, theoretical issues. The research methods include theory, modeling, implementation, and evaluation.

The postdoctoral candidate is expected to support the principal investigator in the implementation of the project, to co-supervise a team of students working on project related topics, and to carry out major parts of the proposed research.

Requirements:

PhD respectively Doctorate in Computer Science, Mathematics, or Theoretical Philosophy
Desirable: We are seeking a postdoctoral candidate with exceptional research record in automated theorem proving, ideally in higher-order logics. Familiarity with LEO-II and/or Isabelle or Coq will be favorable.

Assets:

We are seeking a postdoctoral candidate with exceptional research record in automated theorem proving, ideally in higher-order logics. Familiarity with LEO-II and/or Isabelle or Coq will be favorable. Further requirements include experience in modern functional programming languages, preferably OCaml or Scala, and excellent writing and presentation skills.

Applications by March 17th, 2014 quoting the reference 721101-wiMi shall be addressed to

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