TRACK: Formal Reasoning with Artificial Intelligence

SYNOPSIS:

In this track, which combines formal methods and artificial intelligence, we are looking forward to presentations which either use rigorous formal techniques (model checking or theorem proving) in support of deductive artificial reasoning (for example: reasoning about artificial agents and their possible actions, about time, about knowledge representation and belief systems, and the like), or which use various heuristic techniques from artificial intelligence in order to accelerate the run-time performance of the various model checking or theorem proving tools that are used as correctness deciders in the field of formal methods. Though many formal verification problems (e.g., the SAT problem) are NP-complete (if decidable at all) in their worst cases, their average cases might still get improved by means of "intelligent" choices of the clauses or proof-sub-paths that a verification tool can attempt in its next steps. Moreover, this track shall also be open for "intelligent" solutions of problems of software testing and abstract program interpretation: for example the rapid search for a minimal input value set that yields maximal path coverage, and the like. As far as the old "symbols versus neurons" dispute in the field of artificial intelligence is concerned we would like to emphasise that this track supports a very broad understanding of the term "artificial intelligence" itself, which shall not only include the latest number-based search heuristics and techniques (like particle swarm optimisation, neural networks, and the like), but also the older or more classical concepts of artificial reasoning (i.e.: rule-based symbol manipulation). All papers submitted to this track must be novel and original, and may not have already been submitted for publication elsewhere. Related work must be sufficiently captured in a section of its own under the section heading "Related Work". Practical software tool demonstrations are highly welcome, too, even if they are not accompanied by the presentation of a publishable theoretical paper. For a submission's page-layout and page-limit please see the instructions provided on the web-site of the main conference.

TOPICS INCLUDE:
* Intelligent (AI-supported) generation of test case inputs for automated software engineering,
* Intelligent (AI-supported) optimisation/acceleration of model checking algorithms,
* Intelligent (AI-supported) optimisation/acceleration of theorem proving tools,
* Intelligent (AI-supported) optimisation/acceleration of SAT solving tools,
* Intelligent (AI-supported) detection of potential program invariants (e.g. loop invariants),
* Intelligent (AI-supported) detection of promising abstraction-choices for state-space-reduction,
* Intelligent (AI-supported) program transformation (software refactoring) techniques,
* and similar areas of research.

TRACK CO-CHAIRS:
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