

RESEARCH DIRECTIONS

Advanced Model Updates for Systems Verifications and Modifications

Professor Yan Zhang from the School of Computing and Mathematics has been awarded an Australian Research Council Discovery Projects Grant to develop a new system prototype for advanced computer aided system modification.

'With the significant increase in the complexity of various hardware and software systems, computer aided system modification has become crucial to ensure precision in complex system development', says Professor Zhang. 'This project will utilise the principles of computer aided analysis of complex systems, based on the innovative concept of model update, to develop an improved system of model checking.'

Model checking has been in use for about 20 years and is one of the most promising technologies for computer aided verification. It is applied in the development of various hardware and software systems and applications. In the model checking approach, the specification properties that a system is required to meet are expressed as formulae and the model checker reports errors and can provide useful information on counter-examples. A major limitation of the model checking systems, however, is that they can only verify the correctness or otherwise of a system specification. The task of correcting the system is left to the system designers.

This project will integrate advanced Artificial Intelligence techniques, such as belief revision and system update, to develop new methodology and technology for automatically repairing faulty specifications when errors are reported during model checking. This will significantly enhance the precision and effectiveness of complex hardware and software development systems.



By applying these new techniques, the Australian IT industry will significantly improve its capacity for developing highly complex hardware and software systems for various applications. With a strong research program across different areas such as knowledge system update, model checking in software development, and a collaborative research training environment, this project will strengthen Australia's international reputation in computing and IT research.

Project Title: Model Update with Localization, Constraints and Abstraction

Funding has been set at: \$225,000 over 3 years

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