

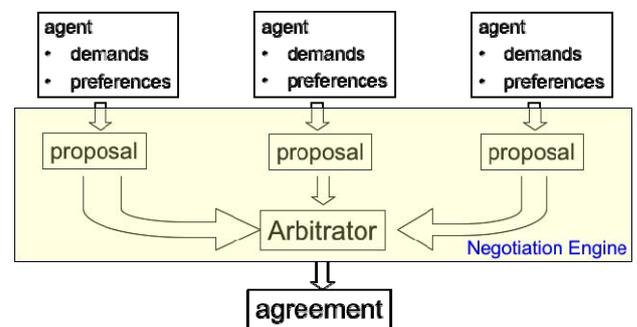
# RESEARCH DIRECTIONS

## How Can Machines Negotiate?

Dr Dongmo Zhang from the School of Computing and Mathematics in collaboration with researchers from the University of New South Wales and Dresden University of Technology, Germany is developing automated negotiation techniques for electronic trading systems. This research is funded by the Australia Research Council through its Discovery grants program.

'Many of us use eBay to buy and sell but behind its web interface, it is an electronic trading system based on classical game theory of mathematics', explains Dr Zhang. 'The current systems, such as eBay, are relatively limited, relying on models that are mostly single-issue, numerically based and simplistic. Electronic trading systems used in automated negotiation or bargaining need to use models dealing with bargaining situations with multiple issues and massive information. This project will establish a comprehensive bargaining model and develop automated negotiation technologies to support complex trading negotiations, qualitative decision-making and logic-based strategic reasoning. Multiple factors such as negotiable demands, conflicting claims and disputes will be considered in the new model (these factors are usually ignored in current models). This allows us to separate a bargaining situation into basic components and to leave the reasoning task to a computer system. So the negotiation can become automated and effectively implemented by Artificial Intelligence technologies.'

A logical theory of bargaining will be developed using cooperative and non-cooperative models. These deal with bargaining solutions and strategies respectively. A market specification language will be introduced to describe complex trading structures in electronic markets.



The new theoretical approach developed in this project may be used for analysis in a variety of areas such as economics, politics and sociology.

The project will bring about a set of new techniques and algorithms to the area of automated negotiation, including a mediation-based negotiation engine (as shown in the above picture) and a generic market testing system equipped with a market specification language interpreter. The techniques and algorithms can be used by the IT industry to develop efficient e-trading systems and allow Australian business to take advantage of emerging e-market opportunities.

**Project Title:** Logical Foundation and Implementation Technology for Automated Negotiation.

**Funding has been set at:** \$225,000

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