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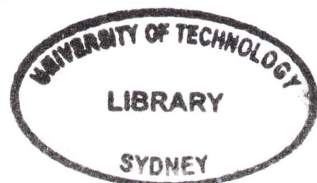
**Motivated Agents for
Informed Bilateral Negotiation**

A dissertation submitted for the degree of
Doctor of Philosophy in Computing Sciences

by

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Abstract

The automation of contract negotiation has the potential to change the way B2C and B2B trade takes place. For all its promise however, contract negotiation between businesses (for instance, e-Procurement) is still not conducted automatically. The automation of contract negotiation for e-commerce trade is complicated by three factors. Firstly, the majority of contract negotiation is multi-issue. Secondly, dynamic and uncertain contextual information is typically crucial for decision making in the negotiation. Finally, business relationships that evolve from negotiation need to be accounted for.

One observation made is that research in automating negotiation has not adequately addressed the role that uncertainty plays in decision making. Further more, understanding the importance of information for reducing this uncertainty is fundamental to designing software that is capable of modeling and valuing relationships that evolve from negotiation.

In light of this, this dissertation proposes an architecture design for an agent that makes negotiation decisions based on the value of information that it gives away and receives, where this value is derived from the amount of uncertainty the information reduces. It is argued that an agent that values information in this way delivers superior performance in B2B-style negotiations than an agent that is not able to do so.

The performance of an agent constructed with this architecture is evaluated with a series of bilateral negotiation simulations. An assessment is made on the behaviour of this agent, and a comparison is made between a strategy where decisions are made

based on information exchange, and a strategy where decisions are made based on a valuation on outcomes.

This architecture design is extended to a particular instance of B2B negotiation — integrative negotiation. In integrative negotiation, goals form part of the negotiation decision making apparatus. For the architecture design extension, this dissertation outlines integrative negotiation norms described by sociological research in real world negotiation. An agent constructed with this architecture is evaluated to assess its behaviour in real world B2B-style negotiations.

The dissertation concludes that, by modeling the uncertainty reduced by the communication of information, an agent is able to value the communicative interactions between itself and another agent. Business relationships are founded upon communication, and when an agent is capable of valuing its communicative interaction, then it is capable of modeling aspects of business relationships that evolve from negotiation.

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