The Fifth International Conference on Autonomous Agents: An E-commerce Perspective

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The fifth international conference on autonomous agents took place in Montreal, Canada from May 28th to June 1st, 2001. The technical program was rich with 13 tutorials, 12 workshops, 42 software demos, 57 papers, and 78 posters. In addition, the conference covered four invited talks, a panel on agents in e-commerce and robotics events. This report summarizes the parts of the technical program related to e-commerce.

Categories and Subject Descriptors: A.1 [**General Literature**]: Introductory and Survey; I.2 [**Artificial Intelligence**]: Distributed Artificial Intelligence; J.4 [**Computer Applications**]: Social and Behavioral Sciences—*Economics*

General Terms: Autonomous agents, E-commerce, Artificial markets

Additional Key Words and Phrases: Economics, Design, Auctions

1. OVERVIEW

The fifth international conference on Autonomous Agents was held in Montreal, Canada on May 28 - June 1, 2001, with over 450 participants. The conference chair was Jörg P. Müller from Siemens, Germany and the program co-chairs were Elisabeth Andre from DFKI, Germany and Sandip Sen from University of Tulsa, USA. The local organization chair was Claude Frasson from University of Montreal, Canada. The submissions to the conference were peer-reviewed and approximately 27% of the submissions were accepted as full papers [Müller et al. 2001].

The comprehensive technical program covered numerous aspects of agent technology. The first two days were allocated for the 13 tutorials and 12 workshops. The remaining three days hosted the software demos, the robotics events, and the paper sessions. The papers and posters were presented in three parallel sessions. Each session was associated with one of the following tracks: action selection and planning, artificial market systems and e-commerce, software prototypes, coordinating multiple agents, collaboration between humans and agents, adaptation and learning, models of emotion and personality, multiagent teams, agent architectures, human-

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like qualities of agents, agent communication languages, agent societies, multiagent communication and collaboration, and agent-based software engineering. Here, we report parts of the program that are related to e-commerce.

2. PAPER SESSIONS

Two sessions were designated for the papers and posters on artificial markets and e-commerce. The first session started with the presentation of an interesting auction application by Parkes and Ungar. The authors have developed a method for decentralized train scheduling using an auction. The second paper in the session was by Reeves *et al.* who constructed a framework for automating negotiation using declarative contract descriptions. The contracting language developed expressed the necessary information in the discovery of the contractors, the negotiation of the contract terms, and the execution of the transactions.

In addition to these two papers, the session hosted thirteen posters. Both Dutta *et al.* and Yang *et al.* have developed shopping agents, the former concentrating on query reformulation to increase accuracy and the latter concentrating on scalability. Four posters studied resource allocation problem from various angles. Veit *et al.* built a configurable matchmaking framework to mediate demand and supply based on profiles of the users. Wang *et al.* used market-based methods for agent allocation, whereas Easwaran and Pitt used genetic algorithms for service allocation. Collins and Gini analyzed automated contracting and a built a prototype for automating negotiation in multiagent systems.

Two posters emphasized efficient coordination mechanisms. Gerber *et al.* designed a coordination infrastructure to enable efficient and flexible interactions for supply web agents. Following a similar motivation, Economou *et al.* developed a generic interaction framework based on implicit commitments.

Finally, two posters analyzed different properties of a market-based multiagent system. Schillo *et al.* investigated robustness and Robles *et al.* explored the requirements for establishing a trust model in such a system. Three posters were on distinct aspects of auctions. He and Leung presented an agent bidding strategy based on fuzzy logic. Brandt and Weiß showed how antisocial agents can affect the outcome of a Vickrey auction. Hattori *et al.* developed a method for obtaining bidding strategies under budget constraints.

The second session of the artificial markets and e-commerce track contained five papers; most of them focused on auctions. Preist *et al.* presented an agent that can bid for the same item in multiple auctions simultaneously, resulting in better profit than just bidding in one auction. With a similar intuition, Matsumoto and Fujita also developed an agent that can bid at multiple auctions but this time for a combination of items, obtaining sub-optimal profits for complementary, substitutive and independent combinations of goods. Greenwald and Kephart explored probabilistic pricing algorithms, which are used to assign prices to goods on the Internet. Choi and Liu designed a new market mechanism where buyers and sellers use probability distributions of possible new offers when making decisions. Yamamoto and Sycara examined the requirements for efficient coalition among buyers to exploit the benefits of volume discounts and developed a configurable coalition formation scheme that accommodates surplus sharing among participants.

In addition to the designated artificial markets and e-commerce tracks, several

papers in other tracks were related to e-commerce. In the adaptation and learning track, Stone *et al.* presented their bidding agent, ATTack-2000, which finished first in the Trading Agent Competition, which was held last year. The presentation explained the bidding and allocation strategy of the agent as well as its adaptive behavior.

In the software prototype session, Ono *et al.* presented a facilitator to find trustworthy partners to form e-partnerships. Again in the same track, Gil and Ramachandran presented a matchmaking service that can reason about agent capabilities and requests.

In the multiagent communication and collaboration track, Karacapilidis and Moraïtis described an artificial market system in which the users can delegate tasks to long-lived artificial agents that keep track of users profiles to improve service quality.

3. OTHER HIGHLIGHTS

One of the many highlights of the conference was the panel on agents in e-commerce panel, led by Nick Jennings from University of Southampton. The panelists included Mike Yearworth from Hewlett Packard, Steve Osborn from Lost Wax, Jeff Kephart from IBM, Tuomas Sandholm from Carnegie Mellon University, Jim Hendler from DAPRA and Carles Sierra from IIIA-CSIC. The panelists discussed good examples of agents for e-commerce, benefits of agent-based approaches, challenges for business-to-business e-commerce, and the need for standards. The panel stimulated discussion on the current as well as future landscape of the e-commerce agents.

Tuomas Sandholm was this year's recipient of the Autonomous Agents Research Award. Following his acceptance of the award, he delivered a talk titled "Agents in Combinatorial Markets", where he discussed the challenges that underlie the interactions between incentives and computing in combinatorial markets.

4. CONCLUSION

The fifth international conference on autonomous agents had a broad technical program with a considerable emphasis on e-commerce. There was a notable increase in the number of software prototype papers and demos, which is a promising sign toward filling the gap between theory and practice.

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