

Preface

Electronic Commerce—a gamut of activities involving economic transactions performed through software that may be more or less autonomous over a network (mostly an open network like the Internet)—is an emerging reality. It is, undoubtedly, a reality that has been coming into being for some time, perhaps since the old teleprocessing days of the late sixties, and certainly inherits many traits from soundly established practices in banking and business. However, what we currently identify as Electronic Commerce (EC) is a brand new phenomenon mainly because of the sociological impact of personal computing and the Internet. For example, we might have glimpsed at new forms of “immediacy” or at a different notion of “proximity” thanks to teleprocessing, but the size and diversity of a truly world-wide *digital village* is only recently becoming apparent. Consequently, notions that were fundamental in traditional commercial activity, such as territoriality (e.g. national borders) and timing (e.g. opening hours), are undergoing a profound revision because of this form of globalization, with the result that new business practices (and liabilities) are quickly becoming available. However, even if “accessibility” is at the core of the Electronic Commerce eclosion, it is not the only relevant innovative feature in Electronic Commerce. EC is also spawning new technologies and innovative uses of older technologies which in turn question in radical ways many traditional concepts and practices. Notably, as may be grasped in this volume, agent-based technologies and their potential effect on the standard views of “presence”, “accountability” or “trust”.

A number of strategic studies claim that Electronic Commerce is a major growing business, and it is not surprising that both governments and business have shown serious concern about its potential opportunities and risks. It is, likewise, because of its inherent complexity and value, a wonderfully rich environment for theoretical and practical innovation; and, also quite naturally, a field for testing old technologies as well. Such a burgeoning reality could hardly be free of opportunism, but serious technical literature has obviously also been published. Although a sound and thorough classification of this technology may be premature, there seems to be a clear preference for what may be seen as “enabling” concerns, such as:

- The role of EDI and similar standards.
- Identity of participants and transaction security.
- Taxation.

We thought it was time to look into other aspects of Electronic Commerce. As its name indicates, the AMET-98 workshop aimed at a more focused approach: Firstly, we were interested in those challenges and opportunities that Electronic Commerce opens for a particular technology: software agents. And secondly, we were interested in exploring interactions among agents, thus the choice of “trading” over a more generic “commerce”. Agent-based technologies thrive on

the metaphor of an “autonomous” software agent: a program that shows some sort of purposeful behaviour, reacting to a changing environment and persisting over time or locations. The metaphor is suggestive and has seen its share of incarnations and associated developments, and the Internet offers a digital reality where these incarnations can accomplish useful tasks, taking advantage of many Artificial Intelligence tools and techniques. Electronic Commerce, in particular, has strongly attracted the attention of agent-makers; and agent technologies in turn seem quite likely to contribute decisively to this field. As one of the workshop participants (N.R. Jennings) put it, “EC is the most important application for Agent Technologies, because it is reality-based and constitutes a massive market”. It may also be worth mentioning that we are now witnessing a second generation of agent technologies where agents are not limited to simple information gathering tasks, but are increasingly becoming involved in the more complex (and consequential) process of actual trading: making purchases and negotiating deals.

A quick list of current theoretical challenges and practical concerns associated with the use of agent technologies in electronic trading is not difficult to produce:

- ideal and actual agent behavior such as rationality, autonomy, situatedness, optimality and trust-building features;
- roles of agents and their inherent qualities: identity, delegability, liability, and reliability of participants (be they software representatives or mediators);
- ontologies, interaction standards and social conventions: market institutions; insurance, financial and certification instruments; acceptable interactions; trading conventions;
- new products, services and practices: market-specific agent shells vs. more generic trading tools; payment and contracting methods; risk-assessment and coverage; quality, prestige and performance certification, . . .

These were the type of topics mentioned in the workshop invitation and we are happy to report that these topics and many more were raised and debated at AMET-98. They are now here made available to the reader through a revised version of the accepted workshop papers.

The AMET-98 workshop took place on the 10th of May, as one of the workshops that preceded the Agents-98 Conference in Minneapolis (USA). After a thorough evaluation process, 11 papers were accepted for publication, 10 out of these were presented at the workshop, which included also two round tables where theoretical and practical issues of agent-mediated trading were debated. This volume contains the 11 accepted papers that have been revised to incorporate the workshop discussions and the comments of the reviewers. These contributions reflect the variety of interests present in that part of the agents community working in Electronic Commerce, and as such, the collection can be seen as a guide to the state of the art in agent-mediated electronic trading from the agents community perspective.

Maes and Gutman’s paper serves as good introductory reading for the basic concepts and areas of activity in the field, in addition to giving a detailed account of one type of agent-mediated trading that the MIT group has been developing

for the past few years. The reader will find that there is a well-defined interest on foundational issues in some of the AMET-98 papers; it is most apparent in, for example, Andersson and Sandholm's work in which a Game Theoretic approach provides a formal framework to model agents as optimal decision makers; Matos and Sierra study the benefits of using evolutionary computing in the process of finding good negotiation strategies; other theoretical approaches are also present, that is the case of the paper by Garcia *et al.* which uses possibility theory to model individual decision-making; based on the same Fishmarket auction example as Garcia's *et al.*, the paper by Padget and Bradford discusses the advantages and limitations of a Π -calculus formalism to produce a formal specification of a trading convention. The workshop also attracted presentations that dealt with more empirical concerns. For example the paper by Parkes *et al.* looks into auctioning conventions and examines some classical protocols (and their inherent issues such as trust, cost and fairness) under the new light of an agent-biased perspective. In a similar pragmatic vein, a group of papers look into the problem of establishing and sharing ontological or deontological standards, the paper by Collis and Lee, for instance, presents an agent toolkit prototype that can produce "utility agents" to be tailored by users to trade according to standardized trading conventions; similarly, the paper by Steinmetz *et al.* advocates the establishment of standard trading practices that allow software trading agents and agent-based arbitration, and discusses one potentially attractive example. Eriksson *et al.* complement these papers advocating for a uniform communication framework for agent-based markets. In this same line of thought, Ghidini and Serafini discuss the problem of information integration and its central importance for Electronic Commerce. A large-scale application is discussed in the paper by Goldsmith *et al.*; here, an agent-based system is used to deal with the intricate process of in-bond manufacturing, and constitutes an excellent example of how agent-based technologies may profit from EDI standards and Object Oriented methodologies when deploying real-world systems.

We would like to take this opportunity to acknowledge the participation of round-table speakers. Katia Sycara, Yao-Hua Tan, Hans Voss, Robert Guttman and Nick Jennings debated on practical issues related to agent-mediated electronic trading. Likewise, Frank Dignum, Michael Wellman, Thuomas Sandholm, Chiara Guidini, Julian Padget and Cristiano Castelfranchi did the same on theoretical issues.

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Program Chairs AMET'98

Organization

This workshop took place on the 10th of May 1998, as one of the workshops of the Second International Conference on Autonomous Agents held in Minneapolis, USA.

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