AREA OVERVIEW—-- Agent & Data Mining Interaction (ADMI)

Longbing Cao
Faculty of Information Technology
University of Technology Sydney, Australia

Vladimir I. Gorodetski
St. Petersburg Institute for Informatics and Automation
the Russian Academy of Sciences
Content of area overview

- Evolution briefing
- Research topics
- Related publication
- Research groups
- Research projects
- Relevant activities
Evolution briefing

- Started from early 1990’s
- Pioneering papers in 1991
- Agent-based data mining & knowledge discovery by Davies, W., 1994
- Related topics in workshop since 2000
- Specific workshops started in 2005
- Special issue from 2006
- Currently, agent-mining symbionts
Research topics

- Agent driven data mining
- Data mining driven agents & multi-agent systems
- Mutual issues
- Applications and case study
Topic evolution

1991: Data Mining-Driven MAS
(Sian, S., Multi-Agent Machine Learning)

1994: Agent-Driven Data Mining
(Davies, W., Agent-driven knowledge discovery)

2005: Common Issues in Agent & Mining
(Zhang, C, Zhang, Z., Cao, L., Agents and data mining: Mutual enhancement by integration)

- Data mining enhancing agent intelligence
- Data mining-driven agent learning, adaptation and evolution
- Data mining-driven multiagent planning and dispatching
- Data mining-driven user modeling
- Data mining-driven user servicing
- Data mining-driven network servicing
- Data mining-driven agent recommender
- Data mining-driven trading agents
- Data mining agent assistant
- Distributed learning in multi-agent systems
- Collaborative learning in multiagents
- Information Gathering Agents
- Learning agents
- Agent-based Network Intrusion Detection
- Decentralized Clustering in Large Multi-Agent Systems
- Distributed learning in agent coordination
- Emergent agent organization and behavior
- Self-learning agents

- Activity modeling and mining
- Agent-based enterprise data mining
- Agent-based data mining infrastructure
- Agent-based mining process and project management
- Agent-based distributed data mining
- Agent-based distributed learning
- Agent-based grid computing
- Agent-based human mining cooperation
- Agent-based link mining
- Agent-based multi-data source mining
- Agent-based interactive data mining
- Agent-enriched ontology mining
- Agent-based parallel data mining
- Agent-based web mining
- Agent-based text mining
- Agent-based ubiquitous data mining
- Agent knowledge management in distributed data mining
- Agent for data mining data preparation
- Agent networks in distributed KDD and servicing
- Agent-service-based KDD infrastructure
- Agent-supported domain knowledge involvement in KDD
- Agent system providing data mining services
- Automated data mining learning
- Autonomous learning
- Agent-human-cooperated data mining
- Multiagent Reinforcement Learning
- Multiagent knowledge discovery
- Distributed agent-based data preprocessing
- Distributed learning
- Domain intelligence in agent-based data mining
- Mobile agent-based knowledge discovery
- Protocols for agent-based data mining
- Self-organizing data mining learning

18 December 2006
Agent & Mining Open Meeting on Area Position, Hongkong
Data mining driven AAMAS

- Data mining enhancing agent intelligence
- Data mining-driven agent learning, adaptation and evolution
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Mutual issues

- Human role and intelligence in agent & mining
- Human-system interaction
- Infrastructure and architecture problems
- Domain knowledge in agent & mining
- Ontology issues in agent & mining
- Constraints in agent & mining
- Intelligence metasynthesis in agent & mining
- Knowledge management in agent & mining
- Actionable capability
- Services
- Security, privacy, trust
- Nonfunctional issues
- ......
Applications and case study

- Auction
- Artificial Immune Systems
- Business intelligence
- Customer relationship management
- Distributed data extraction and preparation
- E-commerce
- Electronic and artificial markets
- Finance data mining
- Grid computing
- Healthcare
- Internet & social intelligence & social network analysis
- Knowledge management
- Market
- Network intrusion detection
- Network services, eg., recommendation, personal assistant, searching, retrieval, extraction
- Ontological engineering
- Parallel computing, eg., parallel GA
- Peer-to-peer
- Semantic web
- Supply chain management
- trading agents
- Web & text mining
Related publication

- **Pioneering work**
  - Davies, W., “Agent-Based Data-Mining”, 1994

- **Emerging work**
  - More publications emerged after 2000
  - Over 130 papers searchable
  - 6 books/proceedings
Publication evolution

- Yearly publication increase (to 2005)
- Engines: google, IEEEXplore, SpringerLink, ACM Portal, ISI, Science@Direct, InfoSci
Publication evolution

- A sampling result

<table>
<thead>
<tr>
<th>Year</th>
<th>Conf/wk papers</th>
<th>Journal papers</th>
<th>Books</th>
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<th>Workshops</th>
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<th>Tutorial</th>
<th>Panel discussions</th>
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### Research groups

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<th>Andrew G. Barto, USA</th>
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<tr>
<td>Elizabeth Chang, Australia</td>
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<td>Winton Davies, Australia</td>
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<td>John Debenham and Simeon Simoff, Australia</td>
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<td>Vladimir Gorodetski, Russia</td>
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<td>Stephen Haag,</td>
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<td>Hillol Kargupta, USA</td>
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<td>Daniel Kudenko, UK</td>
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<td>Jiming Liu, Canada</td>
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<td>Sridhar Mahadevan, USA</td>
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<td>Vladimír Mařík, Czech</td>
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<td>Pericles A. Mitkas, Greece</td>
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<tr>
<td>Joerg Mueller, Germany</td>
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<td>Eugenio Oliveira, Portugal</td>
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<td>Zbigniew Ras, USA</td>
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<td>Sandip Sen, USA</td>
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<td>Zhong Zhi Shi, China</td>
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<td>Katia Sycara, USA</td>
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<td>Chengqi Zhang and Longbing Cao, Australia</td>
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**Loosely, separately:** Over 30 groups involving research on both agents and mining

**Tightly, interactively:** Only a few of groups study agent & mining interaction and integration
Research projects

- ILS [Silver:90]
- GOLEM and INTEG.3 [Brazdil and Muggleton, 1991]
- ANIMALS [Davies:93, Edwards:93]
- MALE [Sian, 1991]
- Carnot [Woelk et al., 1992]

- PADMA (Parallel Data Mining Agents) [Kargupta, 1997]
- JAM (Java Agents for Metalearning) [Stolfo, et al, 1997]
- Papyrus [Bailey, 1999]
- BODHI [Kargupta, 2000]
- OPS [Gorodetski, 2000-05]
- AA-2.0 (Agent Academy) [Mitkas, 2002-06]
- F-Trade (Autonomous financial data mining) [Cao and Zhang, 2003-06]
- Agent-based data mining and warehousing (US Patent) [Weiss, Michael; Mankovskii, Sergueii, 2005]
- OWLS-MX (Hybrid Semantic Web Service Retrieval) [Klusch, 2005]

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Relevant activities

- **Workshops**
  - **MADW-MADM2005** (*Multiagent Data Warehousing and Multiagent Data Mining*, Wen-Ran Zhang, Yan-Qing Zhang, Xiaohua Tony Hu)
  - **IADM2006** (*Interaction between Agents and Data Mining*, Longbing Cao, Zili Zhang, Vladimir I. Gorodetski)
  - **AISADM2007** (Vladimir I. Gorodetski, Chengqi Zhang, Victor Skormin, Longbing Cao)

- **Special issue**
  - Interaction between Agents and Data Mining (Guest editors: Longbing Cao, Zili Zhang, Vladimir I. Gorodetski, Chengqi Zhang)
Resources

- Agent & Mining Interaction and Integration
  - Area evolution
  - Research topics
  - Research groups
  - Publications
  - Professional activities
  - Projects

- Upload your work!!!
Agent & Mining Interaction and Integration

This website summarizes, to our limited knowledge, all relevant resources about a newly emerging area — AGENT & MINING (Data Mining or Knowledge Discovery) INTERACTION and INTEGRATION.

Area Overview

In the last decade, two of most prominent research areas —— multiagent system and data mining, have attracted substantially increasing attention from diverse disciplines. In recent several years, an emerging trend has come up, that is the interaction and integration between these two areas. This is embodied in terms of the occurrence of particular workshops and decent quantity of research papers. In this website, we present a survey of interaction and integration between agents and mining. The systematic survey of this new area indicates that this is a very interesting and promising challenge. The interaction and integration between agent and mining has potential to not only strengthen either side, but generate new techniques for developing more powerful intelligence and intelligent information processing systems.

We present an instant survey of this exciting and promising area in terms of the following aspects:

- Research Topics
- Research Groups
- Research Activities
- Publications
- Research Projects
- Open Issues

www-staff.it.uts.edu.au/~lbcao/amii

Comments, Feedbacks and Uploading Your Work Now!

Your comments and feedbacks are more than welcome. In particular, I apologize if your work has not been included into this survey. If this is the case, please send your work including research topics, groups, activities, publications, projects, as well as your vision on this new area to:

- Dr Louching Cao: lbcao[at]it.uts.edu.au
Agent & Mining Interaction and Integration

Formal Publications

In the last decade, there are a decent number of publications on Agent & Mining Interaction and Integration. In the following, we list around 100 papers published on related issues.


