Rule Responder: An Intelligent Multi-Agent System for Collaborative Teams and Virtual Communities

Benjamin Craig
Harold Boley

Institute for Information Technology
National Research Council, Canada
Fredericton, NB, Canada

New Brunswick Innovation Forum
St. John New Brunswick
October 28-29, 2008
Star-Like Rule Responder Architecture

Hub — OA: Organizational Agent
Spoke — PA: Personal Agent

EA: External Agent

Virtual Organization

Expert_1

Expert_2

Expert_3

Expert_4

Expert_5

PA_1

PA_2

PA_3

PA_4

PA_5
Existing Auto-Responders

- Mail Clients can act as auto-responders when people are unreachable, as illustrated by “Vacation Programs”
- Other auto-responders engage users in interaction sequences, e.g. to check user identity when subscribing/unsubscribing to/from a mailing list
- Rule Responder extends such auto-responders to intelligent, distributed rule systems such as for symposium planning
Overview of Rule Responder

- Rule Responder is a prototypical multi-agent system for virtual communities.
- Supports rule-based collaboration between the distributed members of community.
- Members are assisted by semi-automated rule-based agents, which use rules to describe the decision and behavioral logic.
Deployed Use Case: Symposium Planner

- **RuleML-20xy Symposia**
  - An organizational agent acts as the single point of entry to **assist** with symposium planning:
    - Currently, query answering about the symposium
    - Ultimately, preparing and running the symposium
  - Personal agents have supported symposium chairs since 2007 (deployed as **Q&A** in 2008)
    - General Chair, Program Chair, Panel Chair, Publicity Chair, etc.
Personal Agents

- Each PA acts as a Personal Assistant to a human in the organization
- These agents are softbots that help you in working and networking
- You define the rules how your agent shall assist you
- In our deployed use case, symposium chairs are assisted by PAs
Organizational Agent

- The Organizational Agent interconnects all the Personal Agents in our Star-Like Rule Responder Architecture
- The OA channels the right *information* to the right *agent* at the right *time*
- The OA acts as a Mediator, Middleman, or Facilitator
- In our deployed use case, the OA contains general policies & regulations of the RuleML-2008 Symposium
External Agents

- External agents supports clients outside your organization who want to interact with the organization
- An External Agent links clients with the OA of your organization
- The OA will find for them the right PA and Expert for each problem at hand
- Mediated by the OA, the Expert, their PA, or both together will solve your problem
Competing/Complementary Work

Intelligent Agents:
- ISI’s Electric Elves (e-Elves)
- SRI’s Open Agent Architecture™ (OAA)
- FIPA’s Agent Communication Language (ACL)
- JADE-Board’s Java Agent Development Framework (JADE)

Web Services:
- Publish: W3C’s Web Services Description Language (WSDL)
- Find: OASIS’ Universal Description Discovery & Integration (UDDI)
RuleML-2008 Organizational Agent:

```xml
<Atom>
  <Rel>sponsor</Rel>
  <Expr>
    <Fun>contact</Fun>
    <Ind>Mark</Ind>
    <Ind>JBoss</Ind>
  </Expr>
  <Ind type="integer">500</Ind>
</Atom>
```

Query Selection

The drop-down boxes show sample queries you -- as an External Agent -- can send to the RuleML-2008 Organizational Agent. These examples can also act as initial templates that you can edit to create your own queries. Further kinds of queries can be sent as described in papers contained here.
Conclusion

- Created *Star-Like Rule Responder Architecture*
- Deployed *Symposium Planning Use Case*
can be adapted to organizing other meetings and assisting other virtual communities
- Further deployed use cases include the *Health Care and Life Science Rule Responder (HCLS)*
- Thanks to RuleML’s int’l *Rule Responder*
  Technical Group with Adrian Paschke, Alexander Kozlenkov, and Nick Bassiliades
Rule Responder Opportunities

- Status of the Business Idea:
  - Open Source Prototype with Deployed Use Cases:
    - http://ibis.in.tum.de/projects/paw/hcls/

- Desired Cooperations
  - Partnership for Your Intelligent Agents
  - Partnership for Your Use Cases

→ COME TO OUR BOOTH!