Overview

1. ITTALKS web application.
2. Some advanced capabilities.
3. How did DAML help?
4. Future work.

Joint work with JHU/APL and MIT/Sloan.
See [http://umbc.edu/~finin/papers/swss01/](http://umbc.edu/~finin/papers/swss01/) for slides

UMBC/JHU/MIT DAML Project

UMBC, JHU, and MIT are working together on a set of issues under funding from the DARPA DAML program.

**UMBC** (Finin, et. al.) is focused on integrating communicating agents, DAML and the Web.

**JHU APL** (Mayfield, et. al.) is building information indexing and retrieval systems that work with documents and queries that contain a mixture of free text, XML and DAML.

**MIT Sloan School** (Grosof et. al.) is developing techniques for integrating rule based technology and distributed belief into DAML.

To be integrated in agent-based applications involving search and using rule-based reasoning.

ITTALKS

• **ITTALKS** is a database driven web site of IT related talks at UMBC and other institutions. The database contains information on
  – Seminar events
  – People (speakers, hosts, users,…)
  – Places (rooms, institutions,…)

• This database is used to dynamically generate web pages and DAML descriptions for the talks and related information.

• Notifications are sent to registered users and/or their agents via email, SMS, WAP, and/or KQML for talks matching their interests, location and schedule.

[http://ittalks.org/](http://ittalks.org/)
Registered users create a profile (encoded in DAML) to describe their preferences and attributes.

After logging in, ITTALKS can filter the talks shown based on my interests, schedule and location.

Talks are published in HTML.
ITTALKS Ontologies

- We’ve defined and use the following ontologies, all at http://daml.umbc.edu/ontologies/
  - calendar-ont.daml – calendar and schedule info
  - classification.daml – ACM CCS topics
  - dist-trust.daml – distributed trust concepts
  - person-ont.daml – people and their attributes
  - place-ont.daml – talk locations
  - profile-ont.daml – user modeling info
  - talk-ont.daml – talks info
  - topic-ont.daml – topics and interests

Advanced Capabilities and features

- Topic ontologies
  - Automatic classification of talks and users w.r.t. DAML topic ontologies.
  - Support for multiple topic ontologies, with manual and automatic mapping between pairs of topic ontologies.

- Agents
  - Using DAML as a FIPA compliant ACL
  - DAML reasoning engine (XSB, YAJXB, RDF API)
  - Intelligent agents that accept DAML talk notifications and make entries on a user’s calendar if it matches the user’s interests, location and schedule.

- Distributed trust
  - A DAML distributed trust model for ITTALKS security and authorization.
What are talks about?

- Topic hierarchies provide indexing terms
  - ACM CCS topic hierarchy
  - Open Directory
- Encoded as DAML ontologies
- These allow users to specify interests as well as browse the database of talks by topic
- Automatic classification of talks (based on title and abstract) and users (based on his web pages, CV, papers, etc.)
- Discovery of mapping rules between CCS to OD ontologies using IR techniques

Classifying Talks

CMU Bow statistical text analysis tools
e.g.: ACM CCS

ACM CCS classifier

topics

e.g.: 5K ACM abstracts

Topics Ontology Mapper

Mapping between topic ontologies

T1

CMU Bow statistical text analysis tools

T1 ↔ T2 mapper

T2

{(t2:bar, 0.8), (t2:qux, 0.7), ...}
**Topic Mapping**

- Topic ontology includes relationships between terms in two different topic ontologies
  - Similar, broader, narrower
- User can link some “landmark” topics
- Classification system generates similarity scores
- Induced relationships must be consistent with user’s links and constraints
- Induced relationships further weighted by hierarchical information

**DAML and Agents**

- Much multi-agent systems work is grounded in ACLs (e.g., KQML, FIPA) and associated software infrastructure (e.g., DARPA Grid)
  - The paradigm has been peer-to-peer, message oriented communication mediated by brokers and facilitators.
- The SW invites different paradigms which will require some changes in ACLs and their associated software systems.
  - Agents “publish” beliefs, requests, delegations, and other “speech acts” on SW.
  - Agents search for & “discover” what peers have published.
  - Some agents “speak for” a set of SW pages, answering queries about their content
- The software agent research community is very interested in the semantic web and DAML

**ITTALKS Agent**

- ITTALKS offers a web interface for its human users and can send notifications to humans via email, WAP and SMS.
- We are also developing an agent API so that software agents can interact with ITTALKS.
- Currently, the ITTALKS agent can send notifications to agents via KQML using DAML as the “content language”.
  - We will support richer, mixed initiative dialogs between ITTALKS and agents in the future
How Does DAML Help?

- Does it Help? Yes
  - We’ve identified five general areas in which DAML added value or facilitated building or maintaining our application
- Is DAML needed? No
  - Not strictly (yet), although the alternative technologies are not designed for the web and thus suffer from deficiencies.
- What’s missing?
  - DAML isn’t the ultimate semantic web language and there’s still a serious lack of SW tools

DAML as an Interop Language

- Information in ITTALKS is exposed or published in DAML on the web.
- Future versions of ITTALKS will import information from other event sites via DAML (e.g., UMBC’s campus calendar).
- DAML’s descendant will become the “semantic interlingua” for applications and systems.
DAML as an Ontology Language

We used DAML as
• As a DB conceptual schema language
• To help specify APIs
• To aid human understanding
• A way to allow the user to view talks via their own model of the domain

DAML as a User Modeling Language

DAML is used to encode common user models that
• Are stored in the user’s file space giving the user complete access and control
• Contain information which can be shared by many applications
• Can contain information specific to certain applications

DAML as an ACL

• DAML is used to support agent communication as a “content language” used to encode the content of a KQML message
• Future: as an encoding for an entire FIPA ACL message and as a way of publishing speech acts on web pages

What We Missed

• Lack of rules
  – Needed to describe security policies for distributed trust
• Description logic is a new formalism to most.
  – The learning curve is steep and some fall off.
• Lack of development tools
  – We used/adapted XML and RDF tools
4 Future work

• More work on agents, distributed trust, user modeling and ontology mapping
• ITTALKS is a useful, fairly sophisticated web application that used DAML in an integral way
• We can generalize this to Xtalks, an application to manage announcements of talks and other, similar kinds of events in any subject area.
• This can be simplified and packaged (and open sourced) to make it easy to install and maintain.

Just add water…

(1) Unpack Xtalks and place in a medium sized Linux box
(2) Sift the DAML config file
(3) Stir in one DAML topic ontology
(4) Optionally mix in additional DAML event ontology subclasses to taste
(5) Optionally top with DAML distributed trust policy information
(6) Sprinkle with custom HTML templates, GIFs, and CSS files as desired

And Xtalks becomes…

• bioTalks or
• lingTalks or
• historyTalks or
• yogaLectures or
• pentagonSeminars or
• bostonRaves or
• mitLcsEvents or
• …

Conclusion

• ITTALKS is a useful, fairly sophisticated web application
• The semantic web concepts and DAML in particular
  – Make it easier to develop and maintain ITTALKS
  – Support some features of ITTALKS
• Visit http://ittalks.org/
  – To use ITTALKS
  – For more information, including a paper, a demo “movie”, and these slides
• mailto:info@ittalks.org to request a domain for your organization.