Collaboration and Knowledge Sharing in Grid Applications

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Overview

- Applications
- Motivation, history
- Experience Management Approach
- EMBET Architecture
- Ontology
- GUI
- Examples
Objectives, Application of the system

- Collaboration among users
- Knowledge Sharing
- Recommendation

- Representation of Experience or Knowledge
  - Text Notes
Motivation, problem area

- In Pellucid IST Project
  - Active Hint approach
  - \( AH = \text{action on resource(s) in context + explanation} \)
  - Many AHs in Pellucid:
    - See Text Note in this context because is useful

- In K-Wf Grid project
  - Need for sharing of expert knowledge

- Text Notes
  - Natural way for people
  - If we are able to detect context of note - note can help others better than other formalized knowledge
  - People like to enter notes or memos to remind something to themselves or others
Research Challenges

- Experience (Knowledge) Management
- Text Processing
- Knowledge, Semantic, Ontologies
- Semantic Annotation
- Domain Models (Flood Prediction, Traffic Simulation, ...)
- User Interaction
- Knowledge Relevance, Problem detection
Use In Grid Application

- Detection of Appropriate ...
  - WSRF Services from user text input
  - Expected Output data
- It returns ontology concepts (semantic info) for workflow construction

- Collaboration and Knowledge Sharing
  - Knowledge inserted by users about models, services, data, application ...
  - Active provision of knowledge when needed
Experience Management Approach

- Problem $p$
- Problem Space ($P$)
- In EMS Case-Lesson pairs ($c, l$)
  - Case Space ($C$)
  - lesson space ($L$).
- maps problem space to case space
  - $c = f(p)$
General vs. EMBET Approach

- **General EM Approach**
  - Characterize a problem
  - Transform the problem from the space P to the space C.
  - Choose from the cases the most "useful" lesson from the case-lesson pairs stored in the database
  - Apply that lesson.

- **EMBET EM Approach**
  - User context detection from environment which describes problem P
  - Our Model is described by ontology and Notes are stored with associated context, which describes space C
  - Notes represent learned lesson L which is associated with space C (note context). The note context is matched with a user problem described by the detected user context. The user context is wider than the note context and as a result all applicable notes are matched and returned.
  - Applying the lesson is left to the user be reading appropriate notes.
Knowledge Cycle

(4) Enter Note

(4) Pattern Detection Annotation Note with Context

(1, 4) Compare Current User Context And Note Context

(1, 4) Displaying context List

(4) User approve and submit context of note

(2) Notes are displayed to user in detected user context

(4) Vote on note, Updating relevance

1 Matching User Context or Problem

2 Displaying Relevant Notes

3 User take Decisions or Actions

4 Enter Note

4 Pattern Detection Annotation Note with Context

(1, 4) Compare Current User Context And Note Context

(1, 4) Displaying context List

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(4) Vote on note, Updating relevance
Architecture and GUI

GOM

EMBET Core

Knowledge Notes Detection
Context Detection
Store Knowledge

XML messages

EMBET GUI

JSP Pages
JSTL
HTML Output

XSLT Style Sheets
CSS

Knowledge Notes
Feedback On knowledge
Update Knowledge
Context Update

User Context

Zaahir Babghi
11/01/2005 11:35:26
Weather forecast - 11/03/2005
Choosing meteorological model
Area - Zilina(Lytska)
Priority: cost/availability

User Assistant

Weather failed
By: Michal Lasek (02/03/05)
Note: Aladin execution hangs up during processing dataset.12-05-04.dat.

Weather model suitability
By: Ondrej Babika (02/03/05)
Note: Aladin model isn't suitable for meteorological prediction in months with average temperature above 1.8C.

Degraded service
By: Zaahir Babghi (12/03/05)
Note: Service Aladin-0221 becomes deprecated due to new improved instance Aladin-0222.

Aladin model failed
By: Zaahir Babghi (02/03/05)
Model recommendations
(35%) 9 votes

Architecture and GUI

XML messages

Knowledge Notes
Detection
Context Detection
Store Knowledge

RDF
OWL

GOM

EMBET Core

XML messages

EMBET GUI

JSP Pages
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HTML Output

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Example of Use – Adding the Note

http://portal.ui.sav.sk:8080 - Add note for:

NoteID: note1124786121014

MM5 is not good model for Bratislava in September

http://portal.ui.sav.sk:8080 - Approve note:

Nitra(Stream)
Nitra(Settlement)
MM5 Meterology service (MeterologyService)
Location(Class)
Bratislava(Capital)
September(Month)
Bratislava(Location)
Bratislava(Settlement)
MeterologyService(Class)
MM5 Meterology service (MeterologyService)

Submit

Done
Example of Use – Definition of Problem

Michal Laclavík
September (Month)
Bratislava (Location)
MM5 Meterology service (MeterologyService)
DaveF Visualization Service (VisualizationService)
DaveF Hydraulics (HydraulicsService)

Notes
MM5 is not good service for Bratislava area in September
By: Michal Laclavík (23.08.2005 10:52:22)
DaveF calibration data for Bratislava need to be changed because result differ from reality 10-30% 
By: Emil Setiš (23.08.2005 11:02:07)
Ontology

- Text of note is matched by regular expressions.
- Domain (Application) elements described in ontology model are detected.
Major Outcomes/Results

- EMBET is system for:
  - User Problem Definition
  - Experience Management
  - Collaboration
  - Knowledge Sharing
Conclusion and outlook

- Tested and Evaluated on:
  - Pellucid IST Project
  - K-Wf Grid IST Project

- Can be used also in non Grid application
  - Intranet Systems
  - CRM, ERP
  - Systems which can communicate Context

- Customization
  - Domain Ontology Model (main resources in the domain)
  - Interface communicating context/problem of the user
Thank you!

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