

Personalization and User Modelling for Distributed Learning and Collaboration in Professional Context

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Outline

Motivation and Applications

Knowledge about Users and Learning Resources

Reasoning

Can that be followed also in more open collaborative context?

Conclusions

Adaptation and Learning Instruction

Learners differ (background, learning style, attention, interest, preference, ...)

Instruction should adapt to that as teachers adapt based on the feedback from the students in the class room

ELENA Personal Learning Assistant
for SMART SPACE FOR LEARNING Peter Dolog & Michael Steffens

Personalized Search Service

Select user: Type in concept name(s):

(default) Michael Peter

intelli

Select one or more concepts from the ontology:

- Computing Mileux
- COMPUTERS AND SOCIETY
- Electronic Commerce
 - Electronic data interchange (EDI)
 - Payment schemes
 - Intellectual property
 - Distributed commercial transactions
 - Security
 - Cybercash, digital cash
- Social issues
- Employment
- Handicapped persons and special needs
- Assistive technologies for persons with disabilities
- Abuse and crime involving computers
- Organizational Impacts
 - Reengineering
 - Automation
 - Employment
 - Computer-supported collaborative work
- General
- Miscellaneous
- Public Policy Issues
 - Use and abuse of power
 - Transborder data flow
 - Privacy

personal recommendation

Search Reset

ELENA Personal Learning Assistant
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Personalized Search Service

User: michael

Select one or more concepts:

- Distributed artificial intelligence [in: ARTIFICIAL INTELLIGENCE << Computing Methodologies]
- Intellectual property [in: Electronic Commerce << COMPUTERS AND SOCIETY << ...]
- Intellectual property rights [in: Public Policy Issues << COMPUTERS AND SOCIETY << ...]
- Intelligent Agents [in: Distributed artificial intelligence << ARTIFICIAL INTELLIGENCE << ...]
- ARTIFICIAL INTELLIGENCE [in: Computing Methodologies]

ELENA Personal Learning Assistant
for SMART SPACE FOR LEARNING Peter Dolog & Michael Steffens

Personalized Search Service

User: default

Selected concepts:
Intelligent Agents [in: Distributed artificial intelligence << ARTIFICIAL INTELLIGENCE << ...]

Query results:

PReco	Reco	Title	Description	Concepts
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Aufgaben zum Thema Intelligente Agenten	Aufgaben, um den Stoff des Moduls zu vertiefen	Intelligent Agents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Einige Fragen zum Thema Intelligente Agenten	Fragen, die Ihnen helfen sollen, den Stoff besser zu verstehen	Intelligent Agents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Vorlesung Künstliche Intelligenz WS 2002 - Stichworte zum Thema Umgebungen	Was stellen die verschiedenen Grundtypen Intelligenter Agenten vor und ihre prinzipielle Programmierung	Intelligent Agents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Weiterführende Materialien	Eine Sammlung von weiterführenden Links zum Thema Künstliche Intelligenz und Intelligente Agenten	Special-purpose; Intelligent Agents

The screenshot shows a Microsoft Internet Explorer browser window displaying the 'The Java Tutorial' page from developers.sun.com. An 'ELENA: PLA' window is overlaid on top, titled 'ELENA: PLA - Personalized Search Service - Microsoft Internet Explorer'. The ELENA window features a search bar and a 'Personalized Search Service' section. Below this, it shows 'User: default' and 'Query results:'.

Preco	Reco	Title	Description	Concepts
	●	JLayeredPane (Java 2 Platform SE v1.4.2)	?	http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#Container; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#JComponent; int; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#Integer; Numbers
	●	LongBuffer (Java 2 Platform SE v1.4.2)	?	http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#Array; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#Long; byte; if; new Operator; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#this; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#this;

Adresse <http://localhost:8080/uml/course.jsp> Wechseln zu Links

Navigation Map

- + Start
- + Language Basics
- + Object Basics and Simple Data Objects
- + Classes and Inheritance
- + Interfaces and Packages
- + Overview
- Object Oriented Programming Concepts
 - Language Basics
 - StartOO
 - What Is an Object
 - What Is a Message/next
 - What Is a Message
 - What Is a Class
 - Relations to Code
 - Questions
 - EndOO
- + Common Problems
- End

:.Overview :.Lecture Modules

Previous Next

LECTURE MODULE: What is an Object?

Objects are key to understanding object-oriented technology. Software objects are modeled according to a state and a behavior. A software object maintains its state in one or more variable.

A variable is an item of data named by an identifier. A software object implements its behavior with methods . A method is a function (subroutine) associated with an object.

The following illustration is a common visual representation of a software object:

Exercises

- [Exercercisel: Object definition](#)

Examples

- [Example1](#)
- [Example2](#)

Fertig Lokales Intranet

Personalization and Adaptation in Learning Instruction

The adaptivity => decisions among variable learning resources where decisions are driven by information about a user

Knowledge about:

- **Learning resources annotated with metadata interpreted as constraints on use**
- **Learner features used for comparing to the resource metadata**

Rules used to perform the match making and stating inferred personalization information

Motivation

Enormous amount of different learning resources on the Web

Different users using them

Two scenarios:

- Personalized link generation for navigation support
- Personalized queries

Problems:

To many links generated

To many results returned

Assumption:

- Ontologies -> shared agreed conceptual models
- Help to bias queries
- Help to generate links related for a domain of interest
- Additional information about user restricts the queries further

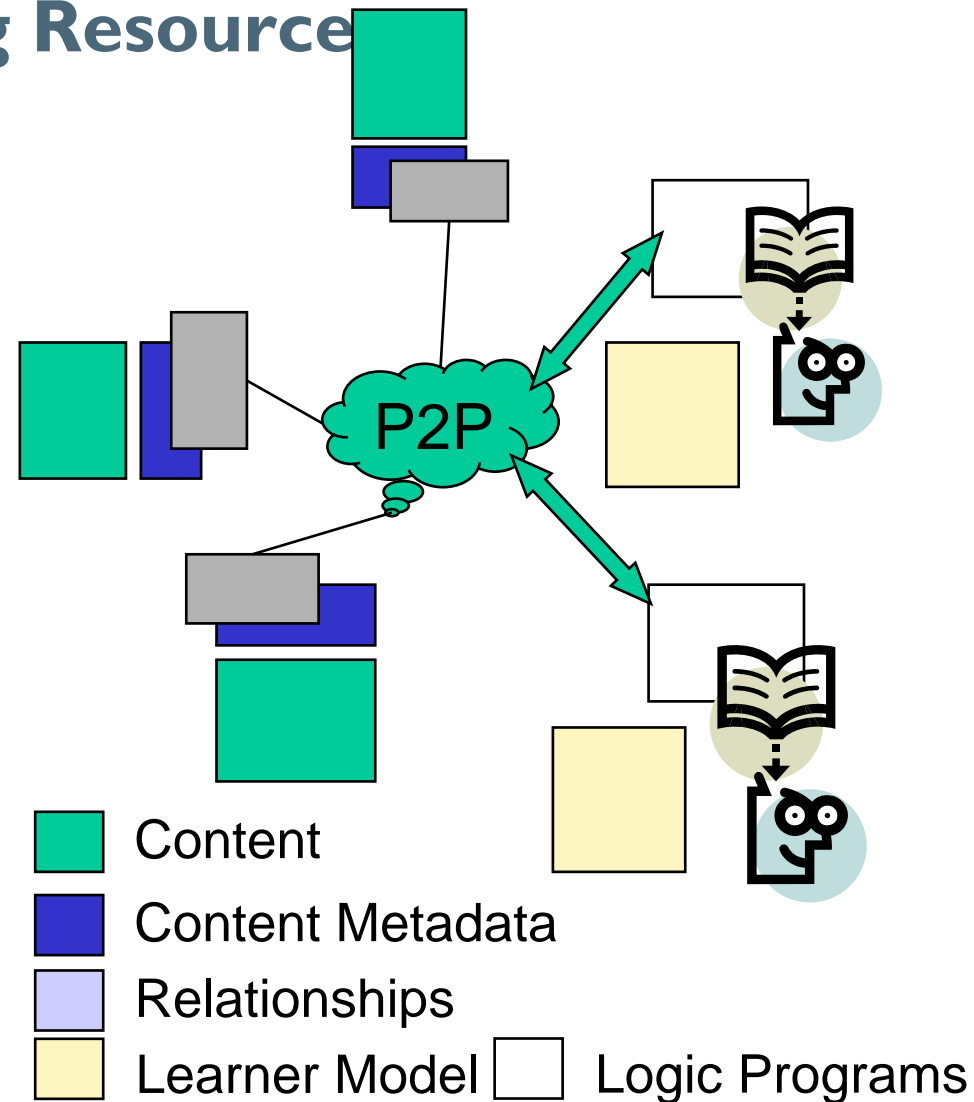
Retrieving the Learning Resource

Distributed content
 Distributed standard based
 metadata descriptions about:

- Content
- Relationships between the content
- Learner

Logic Programs

- Query and adapt content delivery and its links
- Visualize adaptive navigation support



eLearning Domain – Metadata Used

- Learning resource
 - Concepts/Competencies as learning outcomes
 - Prerequisites knowledge needed for understanding a resource
 - Prerequisites knowledge concepts/competencies to understand the concepts or to gain competencies
 - Language used in the resource
- Learner profile
 - Lerner performance, competencies/concepts previously acquired and compared to prerequisites of either resource/concept/competency
 - Language/Concept preferences

Knowledge Structure For Learner Features

Performance

Portfolios

Goals

Preferences

Personal Information

Identification

Test Performance

Adding Restriction on Language

```
<rdf:Description rdf:about="&n4;genid0">
  <n1:type
    rdf:resource="&n4:PDFReifiedStatement"/>
```

Query: Give me learning resources on Java Variables

+

Preference: learning resource in german

```
  <n1:predicate rdf:resource="&n3;language"/>
</rdf:Description>
<rdf:Description rdf:about="&n4;genid0">
  <n1:object rdf:resource="&n7;de"/>
</rdf:Description>
```

A Rule to Generate Recommendation Annotation on Results

FORALL U, D recommended(U, D) <- user(U) AND

If learning resources are on Java Variables and
in german and
required knowledge level prerequisites are in learner
learner profile as a competence

=>

recommend

cy-

Recommendation in the Search Results

The screenshot shows the ELENA Personal Learning Assistant interface. The top part displays the logo and navigation options. Below, there's a 'Personalized Search' section with a 'Select user:' dropdown (showing 'Michael' and 'Peter') and a 'Select one or more concept:' list. The list includes categories like 'Computing Milieux', 'COMPUTERS AND SOCIETY', 'Electronic Commerce', 'Electronic data interchange (EDI)', 'Payment schemes', 'Intellectual property', 'Distributed commercial transactions', 'Security', 'Cybercash, digital cash', 'Social Issues', 'Employment', 'Handicapped persons and special needs', 'Assistive technologies for persons with disabilities', 'Abuse and crime involving computers', 'Organizational Impacts', 'Reengineering', 'Automation', 'Employment', 'Computer-supported collaborative work', 'General', 'Miscellaneous', 'Public Policy Issues', 'Use and abuse of power', 'Transborder data flow', and 'Privacy'. A 'personal recommendation' checkbox is checked. Below the list are 'Search' and 'Reset' buttons.

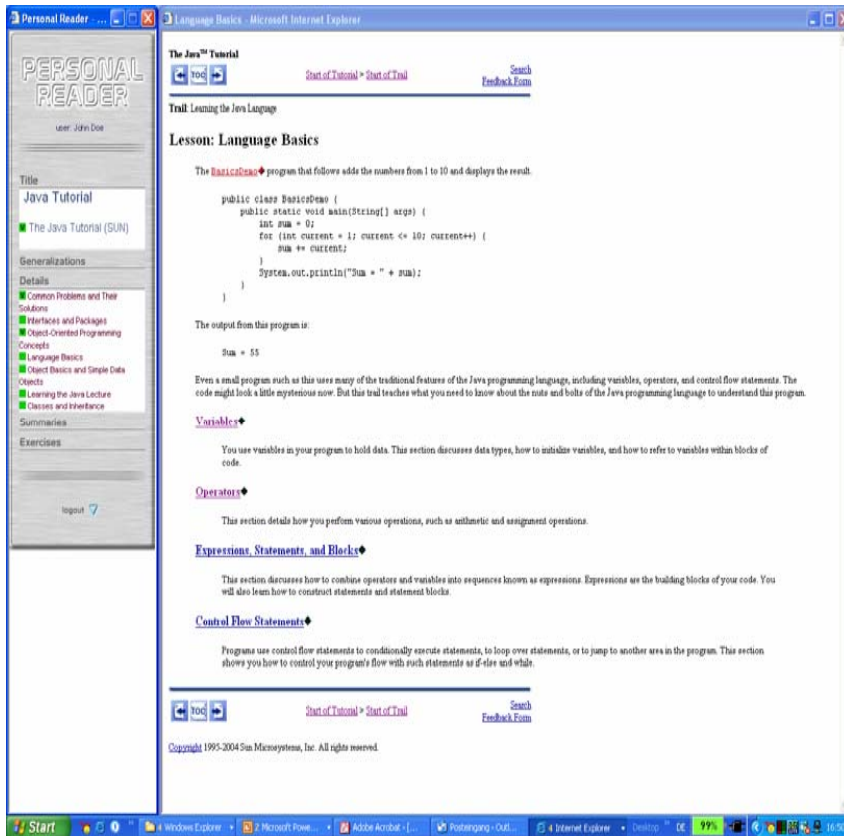
Mapping the value of the hasAnnotation attribute to a visual representation

hasAnnotation -> recommended => GreenBall

hasAnnotation -> not_recommended => RedBall

...

The Personal Reader



Similarly to the Example Rule, Summaries, Details, Generalizations, and Exercises are generated

Mapping to Visual Representation as Separate Boxes

www.personal-reader.de

Collaborative Problem Based Learning

Knowledge is created rather than acquired

It is created while solving problems

Adaptive support for

- Teachers to assess which problems to assign
- Learners to provide an advice (readings, peer experts, similar problems solved, ...)

How to get sufficient evidence to decide on both?

Knowledge Structure For Learner Features

Performance

Portfolios

Goals

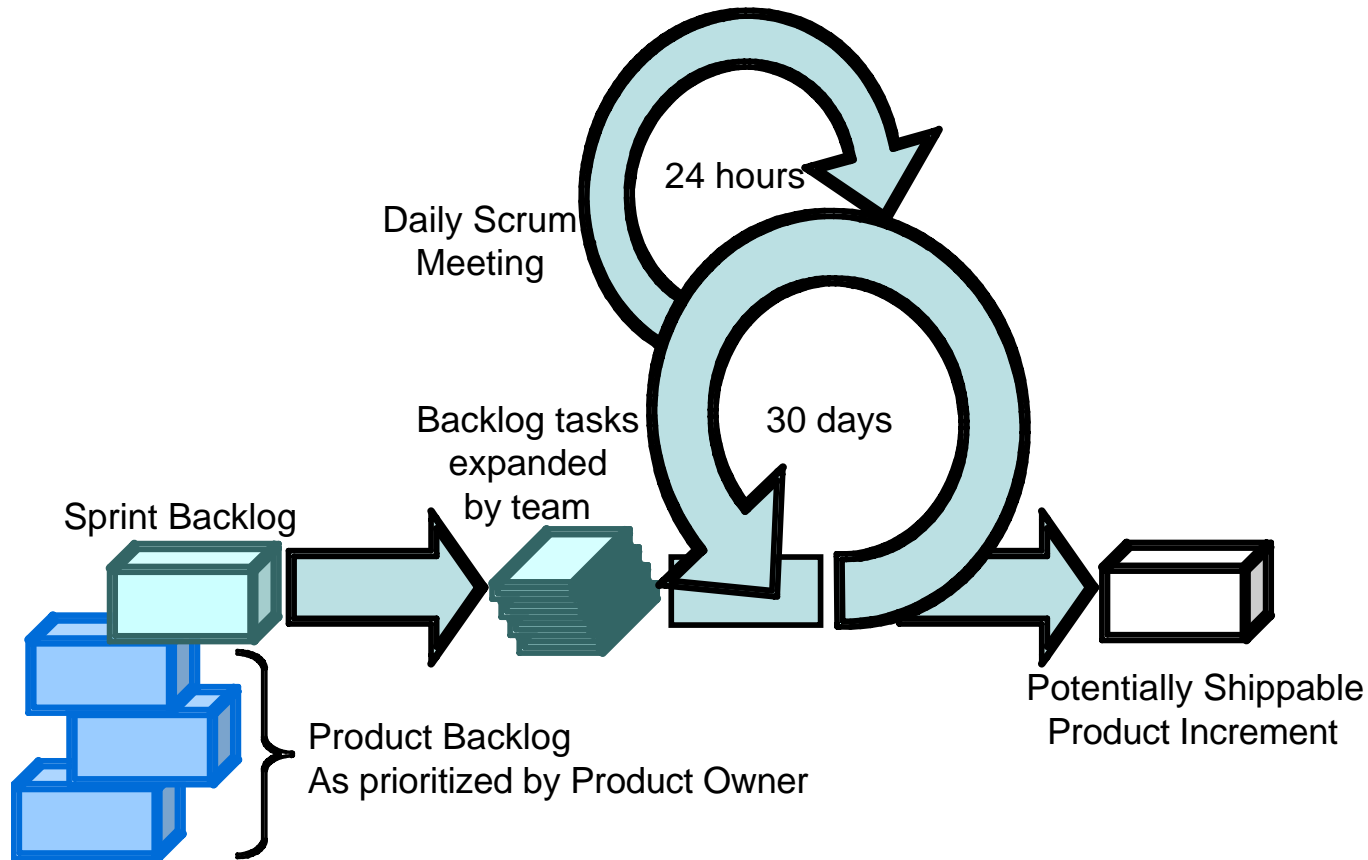
Preferences

Personal Information

Identification

Test Performance

Software Engineering – SCRUM Method



Scrum Lifecycle
from Larman: Agile and Iterative Development. Addison-Wesley

What could be learned

Personalities which fit together

Recommendation and learning about similar projects and how they solved particular task decomposition and planning problem

Recommendation and scheduling a timeslot for a brainstorm with those guys who solved similar problems before if there are any outstanding issues not clear from the learning resource (product backlog for example)

KIWI: Knowledge in a Wiki



UI @ Netbeans

This is the home page for anything related to design of netbeans UI. Here, you can find all user interface specifications, usability studies and other resources related to UI.

Don't forget to visit blog of Sun-UI-KitAppearance Developer team

Graphics Repository
The NetBeans Graphics Repository contains all the graphics related to NetBeans GUI. It contains icons, skins and artwork of all elements.

netbeans 6.0
netbeans 6.0 comes with a lot of new features and a whole new look! Many former tasks have been integrated to give unified look and feel and provide the best overall experience. It is now more easy and easier to use than ever before!

UI Specifications
Development of Specifications (2007-09-27)
Editor Guide and Editor Issues (2007-09-27)
A thorough review of netbeans editor font, font and syntax highlighting (2007-09-24)
About Swing Review (2007-09-24)
NetBeans and Font for Windows System (2007-09-24)
NetBeans Foundation UI specification (2007-09-21)

Usability Reports
Editor Usability Study (2007-09-26)
ShellDialog Page Usability Study (2007-09-12)
Debugger Usability Study (2007-09-12)

Styleguides

Front Page
User FAQ
Developer FAQ
Community Doc
Popular Projects
Development
Quality
Bug Dashboard
Hudson
Source
Night
Wiki Etiquet
Formatting Rule
Terms Of Use

Done

Wiki @ Netbeans

Getting Mercurial push access

While the netbeans.org Mercurial repositories allow anonymous read access, an account must be specifically granted permissions to write ("push") to the repository. This page outlines the process for requesting such permission.

Requesting commit access for the NetBeans sources

If you would like to work on a piece of existing NetBeans code, you will need to request commit access to the NetBeans sources. This page outlines the process for requesting such permission.

1. Make sure you are subscribed to (and read!) the relevant mailing lists so that you know what is going on in that area of development. It is also necessary to subscribe to the [broken builds notification mailing list](#).
2. Make sure you have looked through the existing source code and

Releases & Planning

NetBeans Release Map
= 6.1 = 6.0
= 5.5.1 = Archive

Mailing Lists

Done

Source Code @ Netbeans

Issues @ Netbeans

Query

Issue type: DEFECT, ENHANCEMENT, FEATURE, TASK, PATCH

Component: **UNCATEGORIZED**, 3rd-party, a11y, accelerators, antlr, apisupport

Subcomponent: *ALL*, *NEW*, -- Other --, 3rd-party, a11y, accessibility, actions

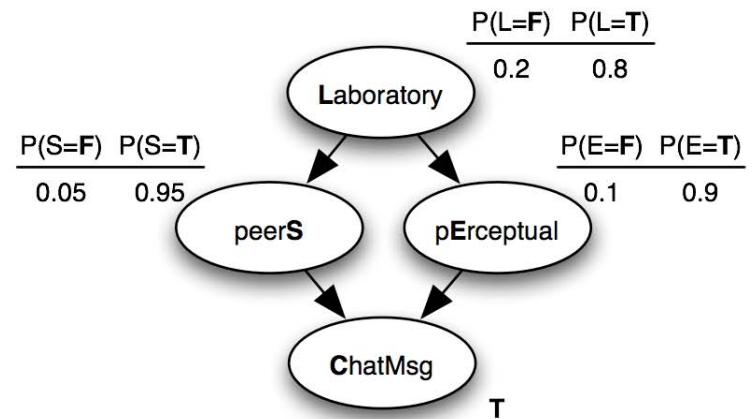
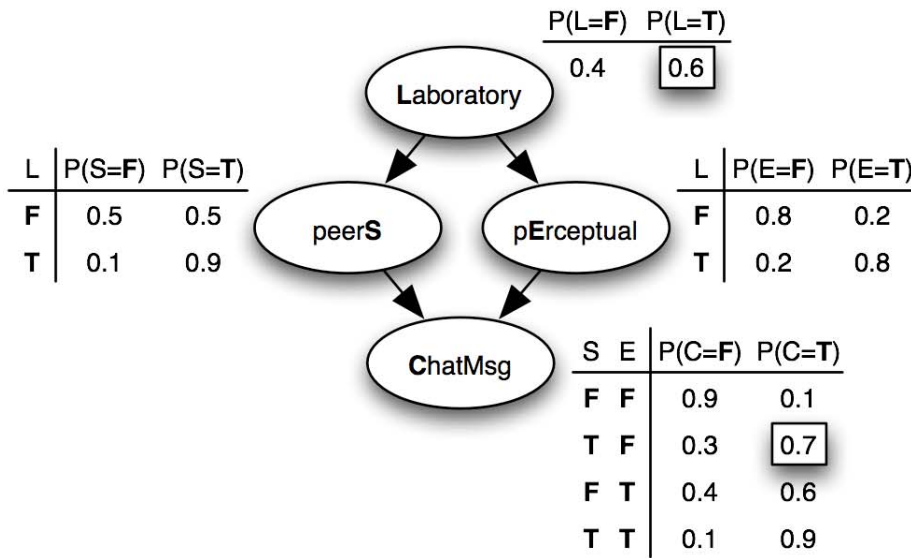
Status: UNCONFIRMED, NEW, STARTED, REOPENED, VERIFIED, CLOSED

Resolution: FIXED, INVALID, WON'T DO, DEFERRED, DUBIOUS, DUPLICATE, WORKSFORME

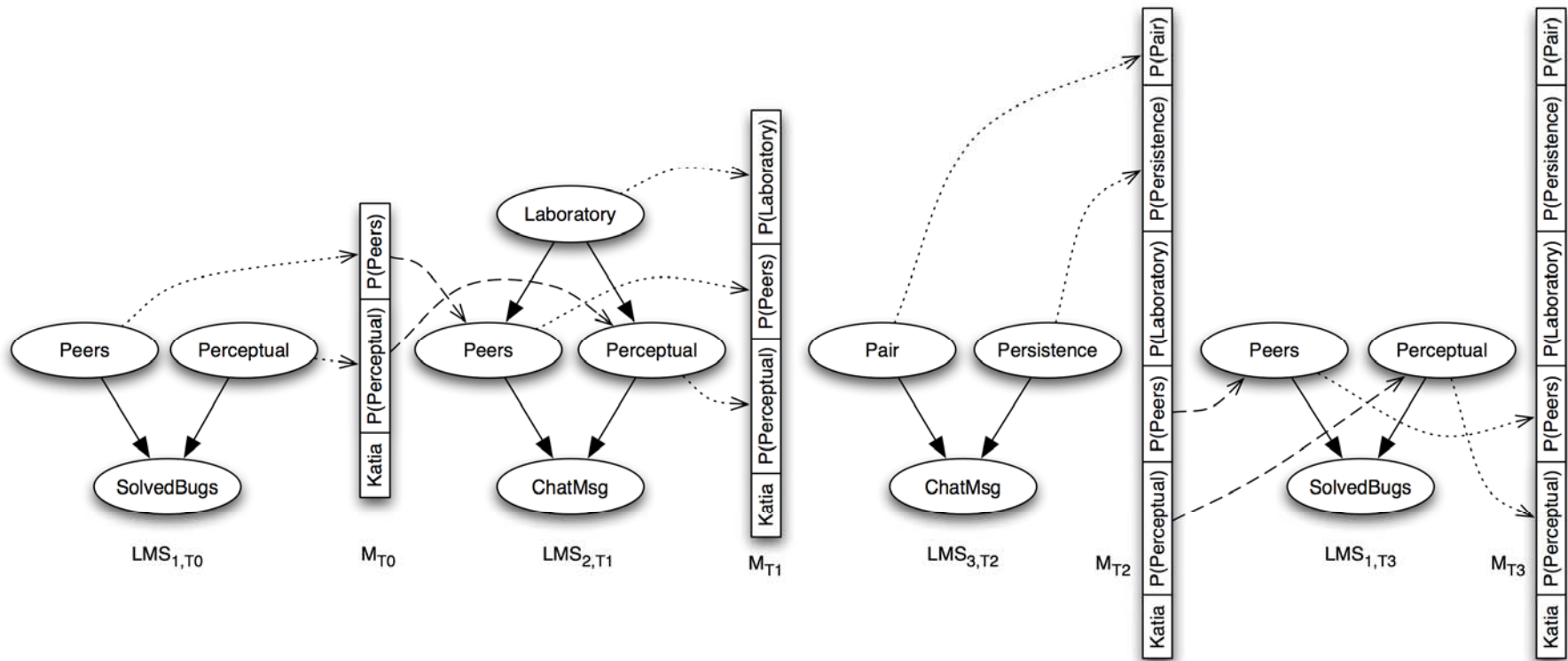
Priority: P1, P2, P3, P4

Platform:	OS:	Version:	Target milestone:
All	All	1.0	---
DEC	Windows 3.1	1.1 for Java EE SDK U3	3.0
HP	Windows 95	2.0	3.1
Macintosh	Windows 98	3.1	3.2
Palm PDA	Windows ME	3.2	3.2.1
PC	Windows 2000	3.2.1	3.3
SGI	Windows NT	3.3	3.3.1

Collaborative Learner Models



Distributed Nature



Issues

- Why certain knowledge sources have been recommended
- Why something changed
- Who is the right expert
- How to derive context for the whole team

Reason Maintenance

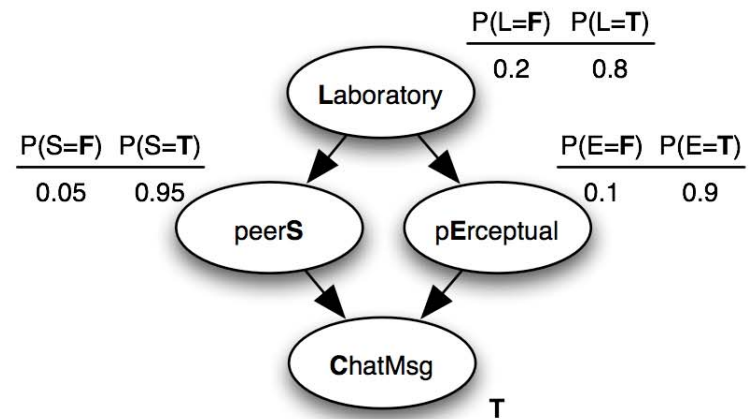
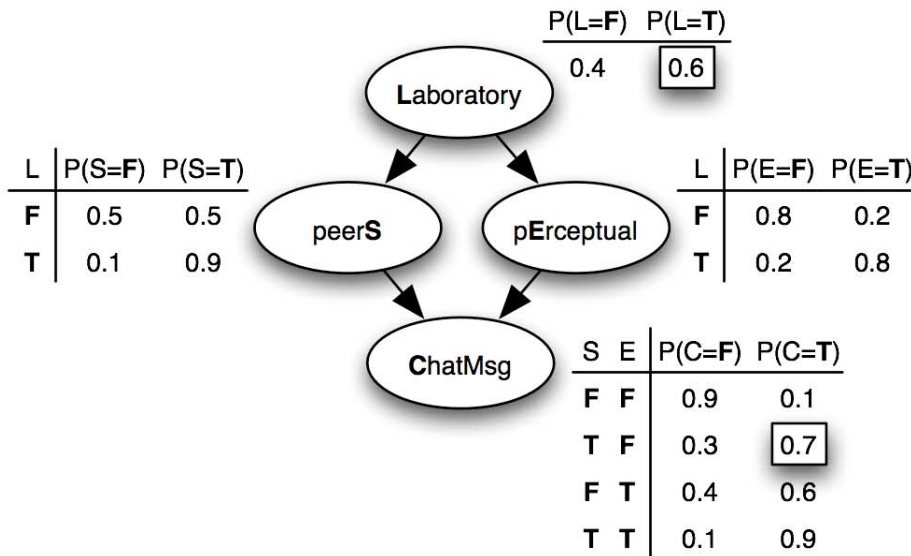
Records and maintains reasons why changes have been made in reasoning assumptions and as a follow up in the inferred knowledge

Can be used for explanations of how personalization did something

Can be used to explain why certain features about user have been inferred

Can indicate for a user which assumptions to change

Collaborative Learner Models



More Generic Strategies

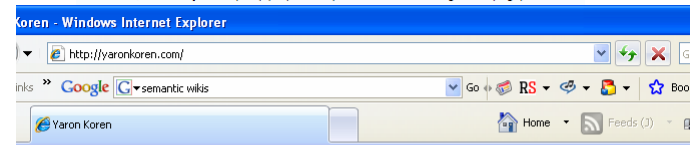
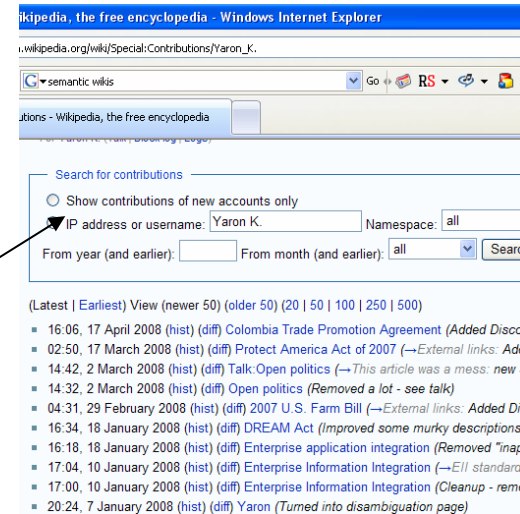
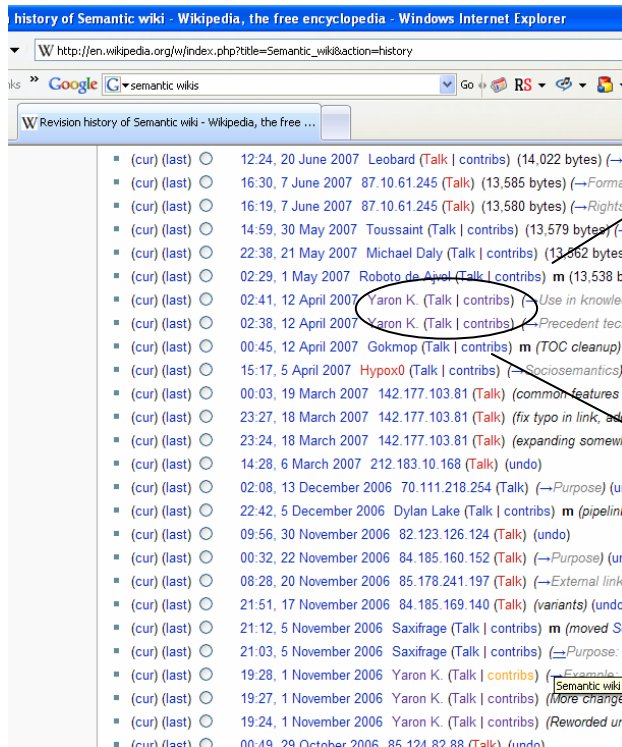
- Prerequisite relation is encoded as:
 - Link to a competence (1)
 - Link to another resource (2)
 - Literal value (3)

- Domain knowledge: $I \leftarrow 2; I \leftarrow 3$

- I trust/prefer more 2 than 3 (user preference)

- Conditions implemented over preferences:
 - `domain_prefered_over(X, Y)` and
 - `user_prefered_over(X,Y,U)`

How to Initialize User Profiles from Wiki Resources



Yaron Koren

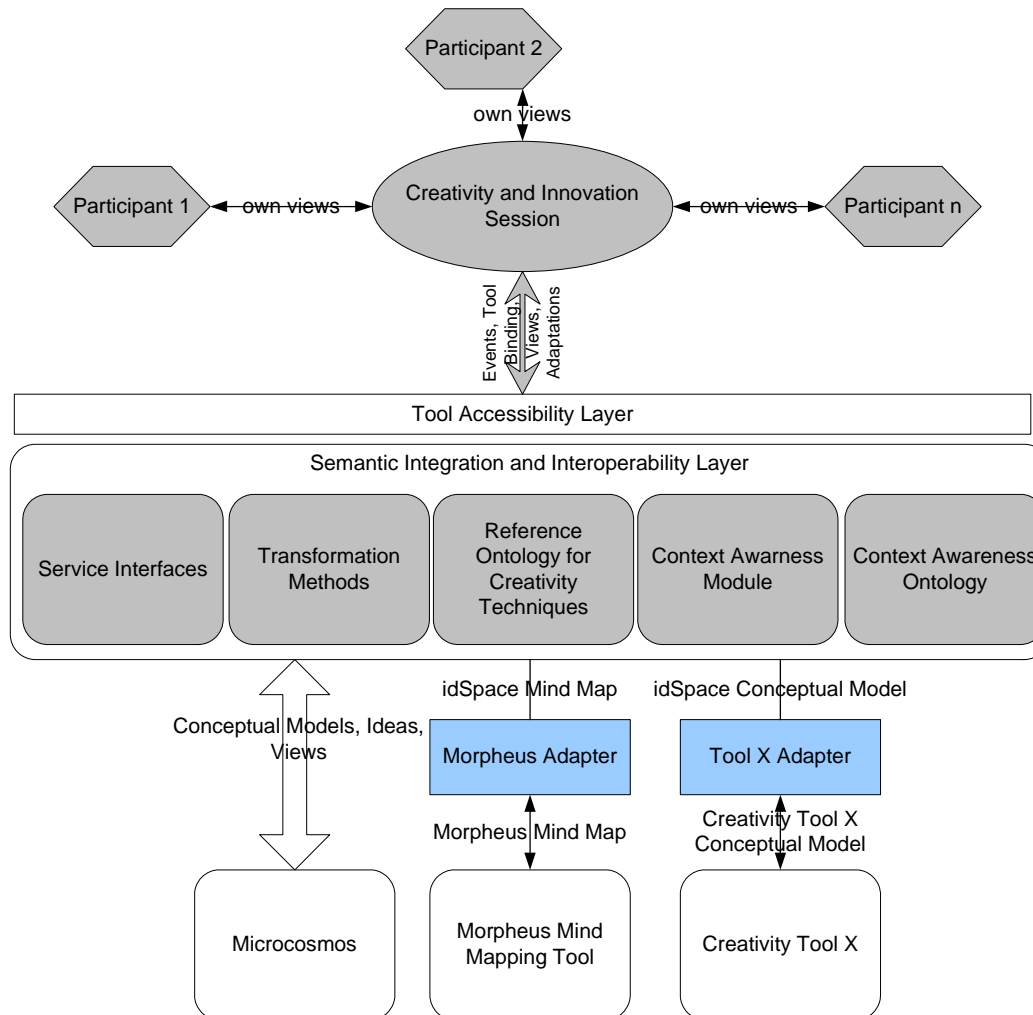
Currently a freelance web programmer, living in [Park Slope, Brooklyn](#). Before that I lived in Manhattan, I grew up in [Haifa, Israel](#), and then [Amherst, MA](#).

weblog

Current interests

[Semantic wikis](#) - These days I do almost exclusively [MediaWiki](#) development, based around the [Semi](#) which I think is world-changing. I've created five extensions around it, among them [Semantic Forms](#) which allows for the creation of collaborative, form-based structured data; [Semantic Drilldown](#), which browsing that data; [Semantic Calendar](#), which enables calendars for viewing semantic date data; an

idSpace project: distributed collaborative creativity



Conclusions

Reasoning and Inference can be of help in collaborative settings
for personalization

Uncertainty of inferred knowledge is higher

Different kinds of reasoning needs to be trialed:

- Probabilistic
- Reason Maintenance
- Changes allowed for a user (open user model)

Integration of evidence from different sources is an issue

How to benefit from social network analysis?

Questions?

References:

Peter Dolog et. al: Personalizing Access to Learning Networks. ACM TOIT, Feb. 2008

Peter Dolog et. al: Relaxing RDF Queries with Domain and User Preferences. To appear in Springer Journal of Intel. Inf. Syst.

Peter Dolog et. al: Personalization in Distributed e-Learning Environments. In Proc. WWW2004. New York.

Peter Dolog et. al: The Personal Reader: Personalizing and Enriching Learning Resources using Semantic Web Technologies. In Proc. AH2004. Eindhoven

Stefano Ceri et al: Adding Client-Side Adaptation to the Conceptual Design of e-Learning Web Applications. JWE, 2005.

KIWI project: <http://www.kiwi-project.eu>

idSpace project: <http://www.idspace-project.org>