

The Knowledge Annotation Initiative of the Knowledge Acquisition Community (KA)²

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*"Ask not what the community can do for you.
Ask what you can do for the community!"*

1 Introduction

The *Knowledge Annotation Initiative of the Knowledge Acquisition Community (KA)²* is an initiative officially launched at [EKAW-97](#) to develop an ontology that models the knowledge acquisition community (its researchers, topics, products, etc.). This ontology will form the basis to annotate WWW documents of the knowledge acquisition community in order to enable intelligent access to these documents. (KA)² is an open joint-initiative where the participants are actively involved in (i) a distributive ontological engineering process to model the knowledge acquisition community (a domain ontology), and (ii) annotating webpages relevant for the KA community (the instances of the domain ontology).

(KA)² aims at "intelligent" knowledge retrieval from the Web and automatic derivation of "new" knowledge. In other words, it aims at knowledge-based reasoning on the Web, as opposed to the more usual information retrieval. Another objective of the initiative concerns a distributive ontological engineering process.

2 Research issues

There are three research topics involved in the initiative.

2.1 Ontological engineering

The knowledge acquisition community has to build its own ontology. This will be done in a distributive manner, using the Ontolingua environment. The current version of the ontology can be viewed at the [European mirror site](#) of the Ontolingua server of Stanford University. To view the ontology, login as "ontologias-ka2" with password "adieu007". The ontology for the KA community consists of seven related ontologies: an organisation ontology, a project ontology, a person ontology, a research-topic ontology, a publication ontology, an event ontology and a research-product ontology. At the moment (March 1998), we are organising the process how to establish a more definitive version of the ontology. The process will be collaborative and distributed.

2.2 Annotation of web pages

The instances of the ontology have to be provided by so-called "provider agents". Instances appear distributively at the relevant web pages of each provider agent. Web pages are annotated using a new HTML tag, called ONTO. Enclosing web information within this tag makes the information accessible for an ontology-based webcrawler (see below). [Examples](#) of annotated web pages can be found at all provider agents. [Instructions](#) on how to annotate web pages are also available. The process of how to annotate the web pages of the knowledge acquisition community is still an open issue. There are several possibilities, ranging from one responsible person offering an annotation service to each provider agent taking care of its own pages. Provider agents have to register at the Ontocrawler by sending it a URL of an index file listing the URLs of all annotated web pages.

2.3 Ontocrawler

Given a query, an ontology-based webcrawler (Ontocrawler) has to access the web pages and use the ontology to provide answers. Depending on how rich the ontology is (e.g. the amount of inferencing allowing axioms), Ontocrawler can also deduce "new" information, that is not explicitly stored on the Web. Notice that such inferencing is very common in knowledge-based systems, but not at all for web search engines. Ontocrawler can be accessed at the University of Karlsruhe, and is part of the [Ontobroker](#) project. At Ontobroker, provider agents can register and update their web pages so that these will be considered by Ontocrawler. Ontocrawler takes user queries and responds with answers. Ontocrawler reasons with FLogic (Frame Logic), a formal language to represent frames (classes, attributes, values). Because the ontology is built in Ontolingua, translators need to establish the relation between Ontolingua and FLogic. Ontolingua has been used for "visibility" reasons, and because it provides a hypertext environment enabling easy inspection.

3 Agents involved in (KA)²

There are several agent communities involved for getting the (KA)² initiative started, keeping it going, assuring its scientific content, making it a global collaborative effort and attracting industrial interest: coordinating agents, provider agents, ontopic agents, wise agents and business agents.

3.1 The coordinating agents

Coordinating agents are responsible for the daily matters of the initiative.

Name	Institution	Agent type	Email
Asuncion Gomez-Perez	Facultad de Informatica, Universidad Politecnica de Madrid	Ontology agent	asun@delicias.dia.fi.upm.es
Enrico Motta	KMI, Open University, United Kingdom	Webtool agent	E.Motta@open.ac.uk
Richard Benjamins	IIIA-CSIC, Spain and SWI-UvA, the Netherlands	Managing agent	richard@iiia.csic.es
Dieter Fensel	Institute AIFB, University of Karlsruhe, Germany	Recruiting agent	dfef@aifb.uni-karlsruhe.de
Michael Erdmann	Institute AIFB, University of Karlsruhe, Germany	Annotation agent	mer@aifb.uni-karlsruhe.de
Stefan Decker	Institute AIFB, University of Karlsruhe, Germany	Ontobroker agent	sde@aifb.uni-karlsruhe.de
Mark Musen	Stanford University, Section on Medical Informatics, USA	"Window on USA" agent	musen@smi.Stanford.edu

3.2 The wise agents

Wise agents are concerned with the scientific issues involved in the initiative.

Name	Institution	Email
Bob Wielinga	SWI-UvA , the Netherlands	wielinga@swi.psy.uva.nl
Rudi Studer	Institute AIFB , University of Karlsruhe, Germany	studer@aifb.uni-karlsruhe.de
Bill Swartout	ISI, University of Southern California	swartout@isi.edu
B. Chandrasekaran	Ohio State University	chandra@cis.ohio-state.edu
James Hendler	University of Maryland, USA	hendler@cs.umd.edu
Brian Gaines	University of Calgary, Canada	gaines@cpsc.ucalgary.ca

3.3 The provider agents

Provider agents provide the initiative with instances of the ontology. In other words, they have to annotate their web pages, using the KA ontology. At the kick-off meeting during EKAW'97, the following groups and people committed themselves to be a provider agent. The recruiting agent is responsible for attracting more researchers and groups.

Name	Institution
Andreas Abecker	DFKI, Germany
Nathalie Aussenac	IRIT, Univ. Paul Sabatier, France
Maillet-Contoz	LIRMM, France
Hans Akkermans	University Twente, the Netherlands
Sean Wallis	Univ. College, London, United Kingdom
Robin Boswell, Susan Craw	Robert Gordon Univ., United Kingdom
Enrico Motta	KMI, Open Univ., United Kingdom
Enric Plaza, Richard Benjamins	IIIA-CSIC, Spain
Christine Pierret	Univ. Rennes, France
Karlsruhe gang	AIFB, Univ. Karlsruhe, Germany
B. Chandrasekaran	Ohio State University, USA
Asuncion Gomez	Technical University of Madrid, Spain
Bob Wielinga, Richard Benjamins	SWI, Univ. of Amsterdam, the Netherlands
Nigel Shadbolt	Univ. of Nottingham, United Kingdom
Paul Compton, Tim Menzies	University of New South Wales, Australia
Derek Sleeman	University of Aberdeen, United Kingdom
Jan Treur, Frances Brazier, Niek Wijngaards, Frank van Harmelen, Annette ten Teije	Free Univ. Amsterdam, the Netherlands

How to become a provider agent

Clearly, this initiative can only succeed through active participation of the community. So we welcome each member of the KA community to join (KA)². Please send an email to the [recruiting agent](#) in case you want to join our

initiative.

3.4 The ontopic agents

Ontopic agents (from ontology topic) are researchers that contribute to the ontological engineering process to establish a consensual ontology of the KA community. This process is a collaborative effort of the KA community. There are about 15 groups of ontopic agents, each group being responsible for a particular research topic of KA. The following researchers form the ontopic agents group, along with the respective research topics.

Name	Institution	Ontology topic interest
Andreas Abecker Rose Dieng	DFKI, Germany INRIA-Sophia, France AIFB, Univ. of Karlsruhe Germany	Knowledge Management, Corporate Memories, Enterprise modeling
Stefan Decker		
Enrico Motta Mark Musen	KMI, Open Univ., UK SMI, Stanford Univ.	Problem-Solving Methods
Hans Akkermans Asuncion Gomez Perez	Univ. Twente, the Netherlands UPM, Univ. Madrid, Spain	Ontologies
Jan Treur, Catholijn Jonker, Frances Brazier	AI Group, Free Univ., The Netherlands	Agent-Oriented Approaches
Frank van Harmelen, Annette ten Teije	AI Group, Free Univ., The Netherlands	Validation and Verification
Frank van Harmelen, Annette ten Teije	AI Group, Free Univ., The Netherlands	Specification languages
Dieter Fensel Richard Benjamins	AIFB, Univ. Karlsruhe, Germany SWI, Univ of Amsterdam	Reuse
Guus Schreiber	SWI, Univ. of Amsterdam, the Netherlands	Sisyphus-II
Nigel Shadbolt	Univ. of Nottingham, UK	Sisyphus-III
Rob Kremer, Brian Gaimes	Univ. of Calgary, Canada	Sisyphus-IV
Paul Compton, Tim Menzies	University of New South Wales, Australia	Ripple-down rules
Derek Sleeman Maarten van Someren Enric Plaza Robin Boswell, Susan Craw	University of Aberdeen, UK SWI, Univ. of Amsterdam, the Netherlands IIIA-CSIC, Spain Robert Gordon Univ., UK	Knowlegde Acquisition through Machine Learning
Udo Hahn Fernando Gomez	Univ. of Freiburg, Germany Univ. of Central Florida	Knowledge Acquisition from Natural Language
Henrik Eriksson Frank Maurer	Linkoping Univ., Sweden Univ. of Kaiserslautern	Distributed Modeling over the Internet
Dickson Lukose	Univ. of Calgary	KA through Conceptual Graphs

How to become an ontopic agent

If you are interested in becoming an ontopic agent, send an email to the [managing agent](#), indicating to what the part

of the ontology you want to contribute.

3.5 The business Agents

Business agents are responsible for exploring the possibility of external funding of the initiative and raising the interest of possible interested industries.

Name	Institution	Email
Annejet Meijler	Intelligent Systems Lab Amsterdam-UvA , the Netherlands	meijler@swi.psy.uva.nl

4. Agenda of the initiative

In order to get the initiative started, an agenda has been setup with the most urgent things to be done.

Activity	Responsible Agent	Deadline
Establish a mailing list including all agents. Maintain mail archive	Webtool agent	Done at Nov. 25, 1997. ka2-coordinators-list@open.ac.uk ka2-participants-list@open.ac.uk ka2-mailing-list@open.ac.uk
Provide ontopic agents with useful webtools	Webtool agent	as soon as groups are organised
Get minimal amount of research groups (provider agents) involved.	Recruiting agent	done
Annotate web pages	Annotation agent, provider agents	two weeks after having registered as provider agent
Improving Ontobroker developed at Institute AIFB , University of Karlsruhe	Ontobroker agent	open
Look for interested industries, companies	Business agents	open
Suggest international project proposal for the initiative (Esprit, DARPA, etc.)	Wise agents	open

4.1 Ongoing activities

To keep the initiative going, several ongoing activities have to be taken care of.

Activity	Responsible Agent
Maintain mail archive	Webtool agent
Keep KA ontology up-to-date	Ontology agent
Get more provider agents involved	Recruiting agent

5 Additional information

Pointers that add more background on these ideas are:

- The general idea:
[Dieter Fensel](#), Michael Erdmann, and Rudi Studer: Ontology Groups: Semantically Enriched Subnets of the WWW. In *Proceedings of the International Workshop Intelligent Information Integration during the 21st German Annual Conference on Artificial Intelligence*, Freiburg, Germany, September 9-12, 1997.

(<ftp://ftp.aifb.uni-karlsruhe.de/pub/mike/dfe/paper/www.ps>)

- A more detailed overview of the (KA)² initiative:
[Richard Benjamins](#) and [Dieter Fensel](#) "Community is Knowledge in (KA)²" ([postscript HTML](#)).
- The tools and techniques in more detail:
[Dieter Fensel](#), Stefan Decker, Michael Erdmann, and Rudi Studer: Ontobroker: Transforming the WWW into a Knowledge Base (Draft only). ([postscript.Z](#), [postscript](#))
- The FLogic version of the Ontology for the Knowledge Acquisition Community:
[Richard Benjamins](#) and Dieter Fensel: A Draft Ontology for Knowledge Acquisition (Draft only)
(<http://www.aifb.uni-karlsruhe.de/WBS/broker/ka-onto.onto>)
- A paper submitted to KAW'98, Banff with a detailed explanation of the KA2 initiative.

Pointers to related work include:

- A related initiative for the logic programming community is proposed by Harld Boley ([paper.ps](#)).
- The [SHOE](#) approach (Luke, Spector, Rager, Hendler of the University of Maryland).
- [XML](#).
- An overview of other related projects can be found at <http://www.aifb.uni-karlsruhe.de/WBS/broker/inhalt-wp.html>

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