# Protégé based Knowledge Services within the AKT Project

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6th Intl. Protégé Workshop
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Manchester, England

University of Southampton

# Advanced Knowledge Technologies

- AKT is an IRC project funded by EPSRC
- Started officially in 2000 for 6 years
- Concerned with the management of the knowledge life cycle
- Collaboration between the Universities of Aberdeen, Edinburgh, Sheffield, Southampton and the Open University

University of Southampton

UNIVERSITY OF ABERDEEN

THE UNIVERSITY OF EDINBURGH

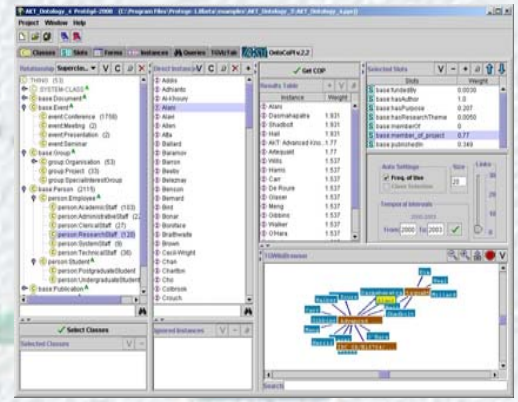
The Open University

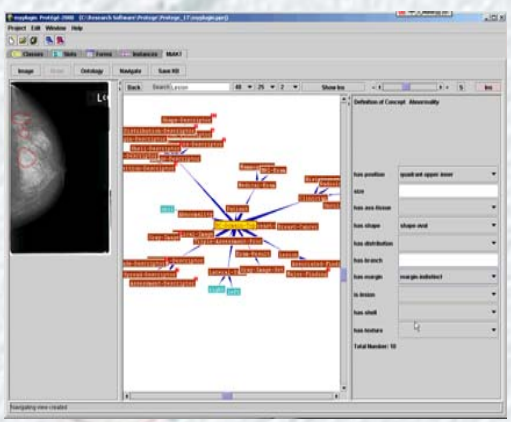
# Aim of presentation

- Introduce some of Protégé-based AKT technology
- Find which part of our technology is of interest to you
- Collect feedback and ideas
- Discuss further requirements and upgrades
- Establish contact with those who share some of our interests

# Protégé-based tools built by AKT Soton

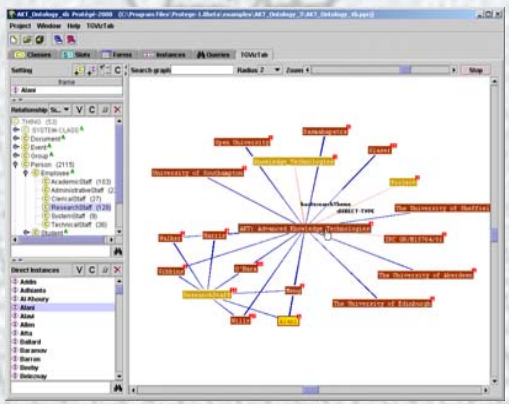
- Ontocopi: Support for community of practice identification using ontology network analysis





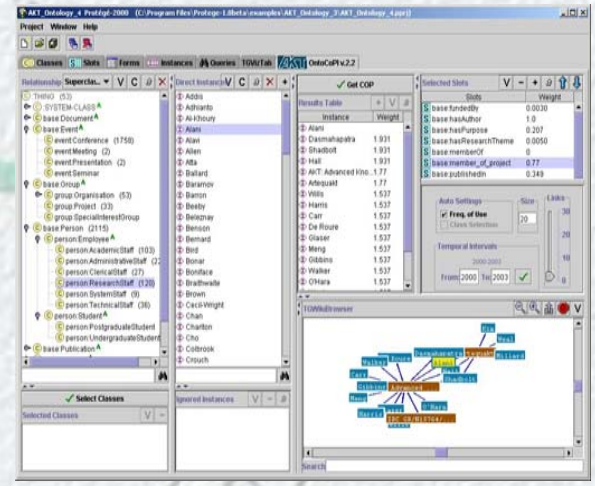
- MiAKTab: Management and annotation of medical images

- TGVizTab: Knowledge visualisation plugin using TouchGraph technology



# Ontocopi

- Ontocopi: Ontology-based Community Of Practice Identifier

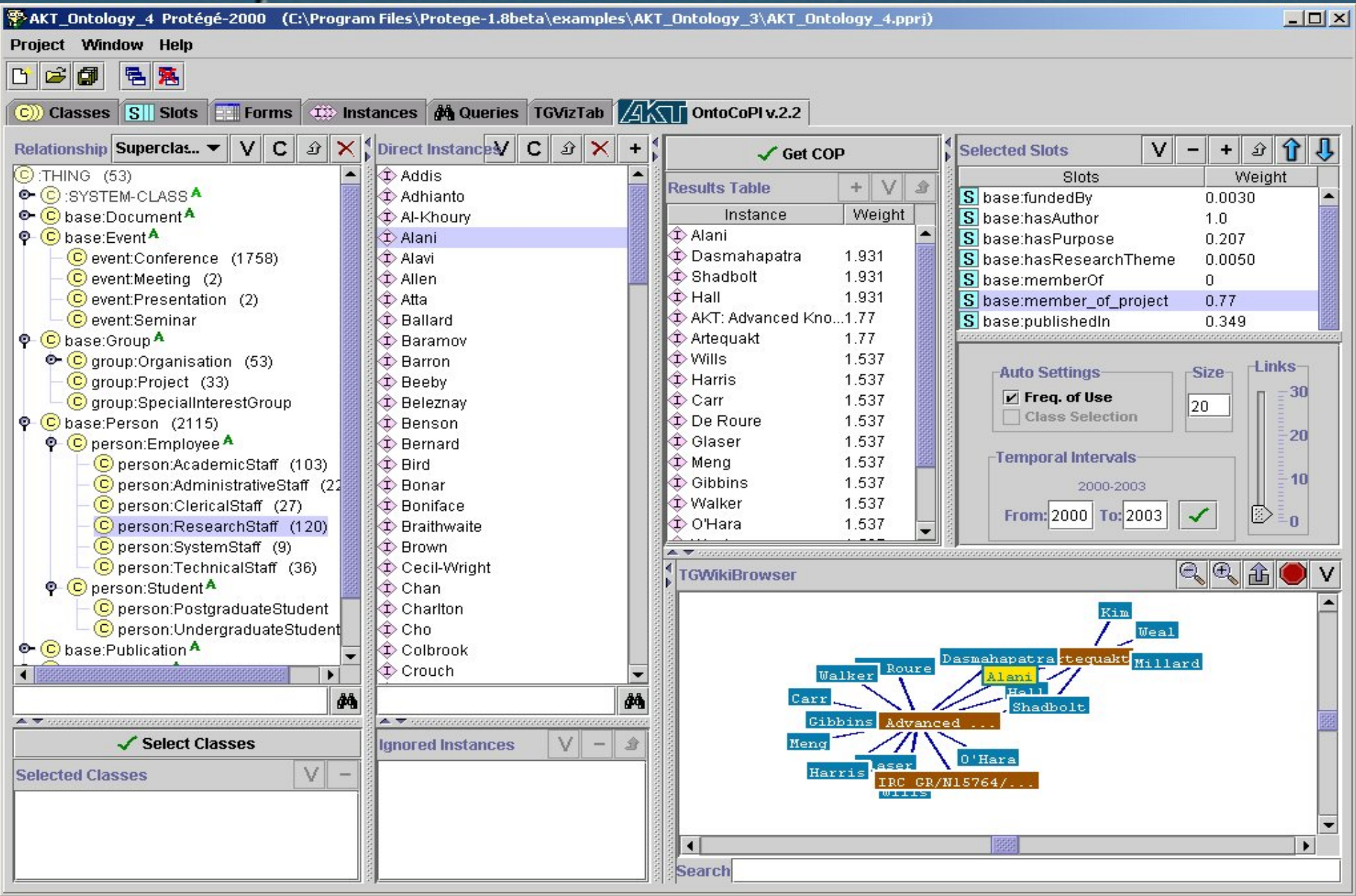


- Communities of practice (COPs) are:
  - Informal groups
  - Self-organising
  - Members share interest in practice

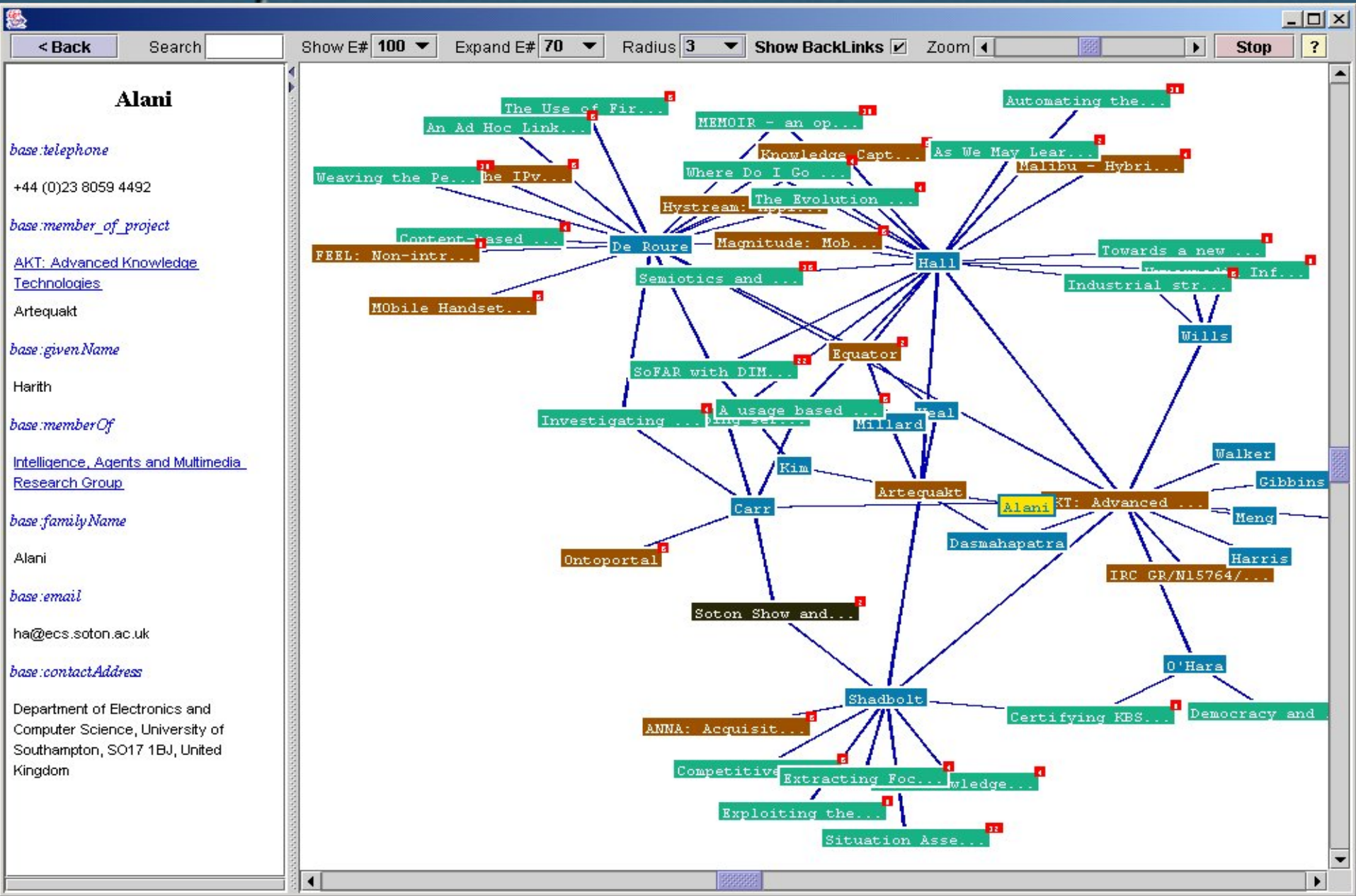
- Ontocopi uses a spreading activation algorithm to crawl the knowledge network and identify similar objects

- More info and demo at:
  - http://www.aktors.org/technologies/ontocopi/

# Ontocopi


AKT_Ontology_4 Protégé-2000 (C:\Program Files\Protege-1.8beta\examples\AKT_Ontology_3\AKT_Ontology_4.pprj)
Project Window Help
Classes Slots Forms Instances Queries TGVizTab OntoCoPI v.2.2
Relationship Superclas...
:THING (53)
:SYSTEM-CLASS
base:Document
base:Event
event:Conference (1758)
event:Meeting (2)
event:Presentation (2)
event:Seminar
base:Group
group:Organisation (53)
group:Project (33)
group:SpecialInterestGroup
base:Person (2115)
person:Employee
person:AcademicStaff (103)
person:AdministrativeStaff
person:ClericalStaff (27)
person:ResearchStaff (120)
person:SystemStaff (9)
person:TechnicalStaff (36)
person:Student
person:PostgraduateStudent
person:UndergraduateStudent
base:Publication
Direct Instances
Addis
Adhianto
Al-Khoury
Alani
Alavi
Allen
Atta
Ballard
Baramov
Barron
Beeby
Beleznay
Benson
Bernard
Bird
Bonar
Boniface
Braithwaite
Brown
Cecil-Wright
Chan
Charlton
Cho
Colbrook
Crouch
Get COP
Results Table
Instance
Weight
Alani
Dasmahapatra 1.931
Shadbolt 1.931
Hall 1.931
AKT: Advanced Kno... 1.77
Artequakt 1.77
Wills 1.537
Harris 1.537
Carr 1.537
De Roure 1.537
Glaser 1.537
Meng 1.537
Gibbins 1.537
Walker 1.537
O'Hara 1.537
Selected Slots
Slots
Weight
base:fundedBy 0.0030
base:hasAuthor 1.0
base:hasPurpose 0.207
base:hasResearchTheme 0.0050
base:memberOf 0
base:member_of_project 0.77
base:publishedIn 0.349
Auto Settings
Freq. of Use
Class Selection
Size
20
Links
30
20
10
0
Temporal Intervals
2000-2003
From: 2000
To: 2003
Select Classes
Selected Classes
Ignored Instances
TGWikiBrowser
Kim
Weal
Dasmahapatra
Artequakt
Millard
Walker
Roure
Alani
Hall
Carr
Shadbolt
Gibbins
Advanced ...
Meng
O'Hara
Harris
IRC GR/N15764/...
Search

# Ontocopi


< Back
Search
Show E# 100
Expand E# 70
Radius 3
Show BackLinks
Zoom
Stop
?
Alani
base:telephone
+44 (0)23 8059 4492
base:member_of_project
AKT: Advanced Knowledge Technologies
Artequakt
base:givenName
Harith
base:memberOf
Intelligence, Agents and Multimedia Research Group
base:familyName
Alani
base:email
ha@ecs.soton.ac.uk
base:contactAddress
Department of Electronics and Computer Science, University of Southampton, SO17 1BJ, United Kingdom
The Use of Fir...
An Ad Hoc Link...
MEMOIR - an op...
Automating the...
Knowledge Capt...
As We May Lear...
Malibu - Hybri...
Where Do I Go ...
Weaving the Pe...
The Evolution ...
Hystream:
Content-based ...
De Roure
Magnitude: Mob...
FEEL: Non-intr...
Towards a new ...
Hall
Semiotics and ...
Industrial str...
MObile Handset...
Wills
Equator
SoFAR with DIM...
A usage based ...
Investigating ...
Millard
Walker
Kim
Gibbins
Artequakt
Carr
Alani
Meng
Dasmahapatra
Ontoportal
Harris
IRC GR/N15764/...
Soton Show and...
O'Hara
Shadbolt
Certifying KBS...
ANNA: Acquisit...
Competitive
Extracting Foc...
Exploiting the...
Situation Asse...

# Medical Imaging & AKT

- MiAKT - Medical Imaging & AKT
- Project aims to provide assistance in the Multi-Disciplinary Meeting (Triple Assessment Meeting for Breast Cancer)
  - Medical Image annotation
    - Manually and/or with image analysis software
  - Semantic content-based image retrieval
  - Diagnosis and patient management recording
- Collaboration between 5 universities

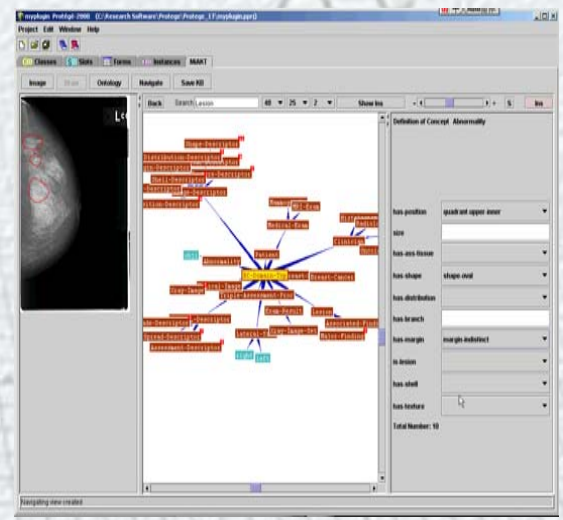
University of Southampton

KING'S College LONDON
University of London

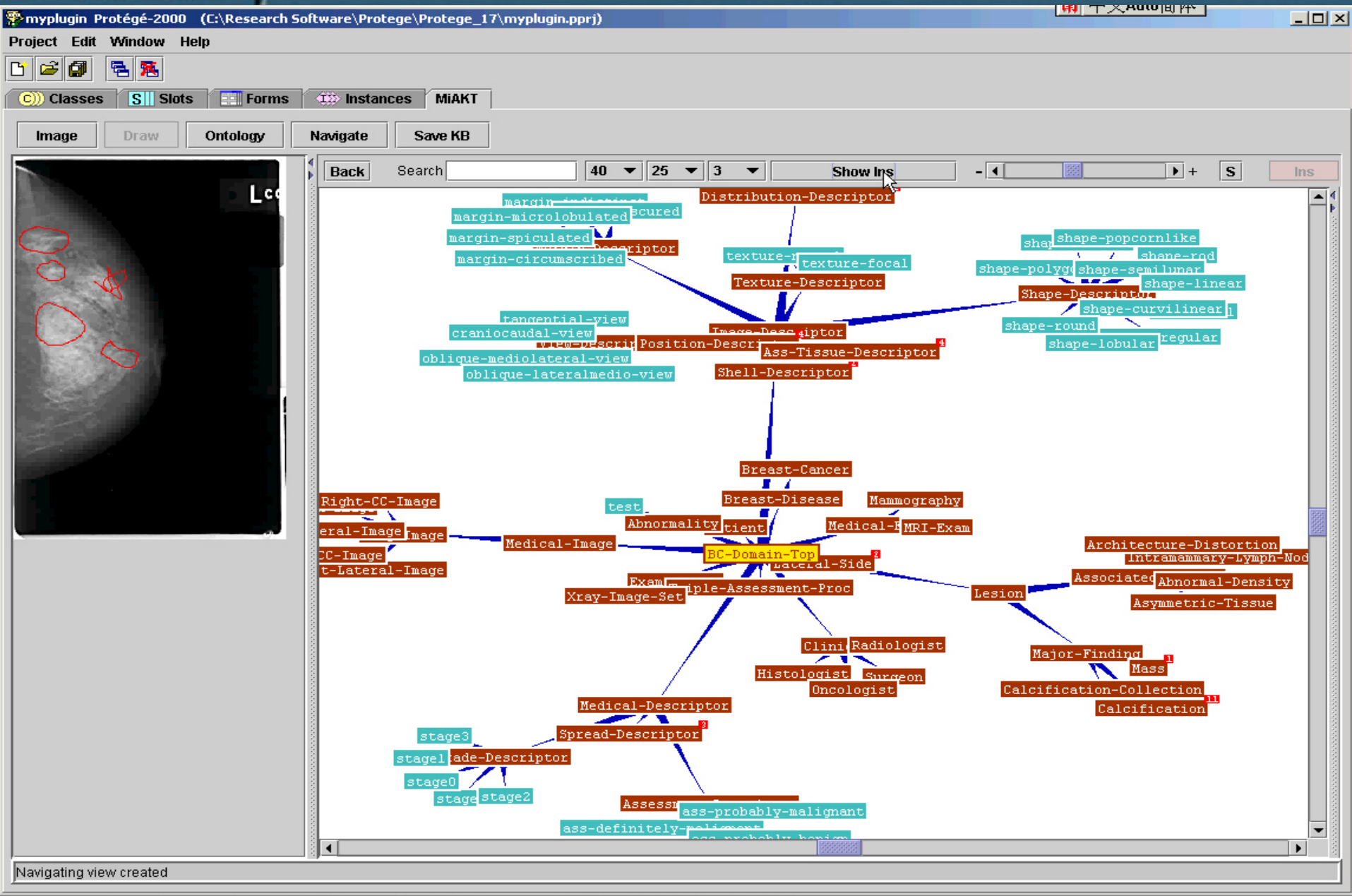
The Open University

# MiAKTab

- Manual annotation of medical images with respect to a given ontology
- Add/remove instances interactively from the graph
- Display the ontology with TouchGraph
- Currently available as a standalone applet with DAML-OIL support



# MiAKTab


myplugin Protégé-2000 (C:\Research Software\Protege\Protege_17\myplugin.pprj)
Project Edit Window Help
Classes Slots Forms Instances MiAKT
Image Draw Ontology Navigate Save KB
Back Search 40 25 3 Show Ins S Ins
Distribution-Descriptor
margin-microlobulated
margin-spiculated
margin-circumscribed
texture-focal
Texture-Descriptor
shape-popcornlike
shape-polyg
shape-semilunar
shape-linear
shape-curvilinear
shape-round
shape-lobular
regular
tangential-view
craniocaudal-view
oblique-mediolateral-view
oblique-lateralmedio-view
Position-Descri
Ass-Tissue-Descriptor
Shell-Descriptor
Breast-Cancer
Breast-Disease
Mammography
test
Abnormality
MRI-Exam
Right-CC-Image
Medical-Image
BC-Domain-Top
Xray-Image-Set
Architecture-Distortion
Abnormal-Density
Asymmetric-Tissue
Lesion
Radiologist
Histologist
Oncologist
Medical-Descriptor
Spread-Descriptor
stage3
stage2
stage0
Major-Finding
Mass
Calcification-Collection
Calcification
ass-probably-malignant
Navigating view created

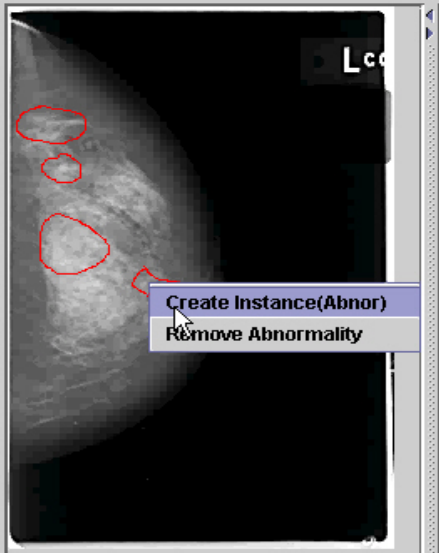
# MiAKTab

myplugin Protégé-2000 (C:\Research Software\Protege\Protege_17\myplugin.pprj)

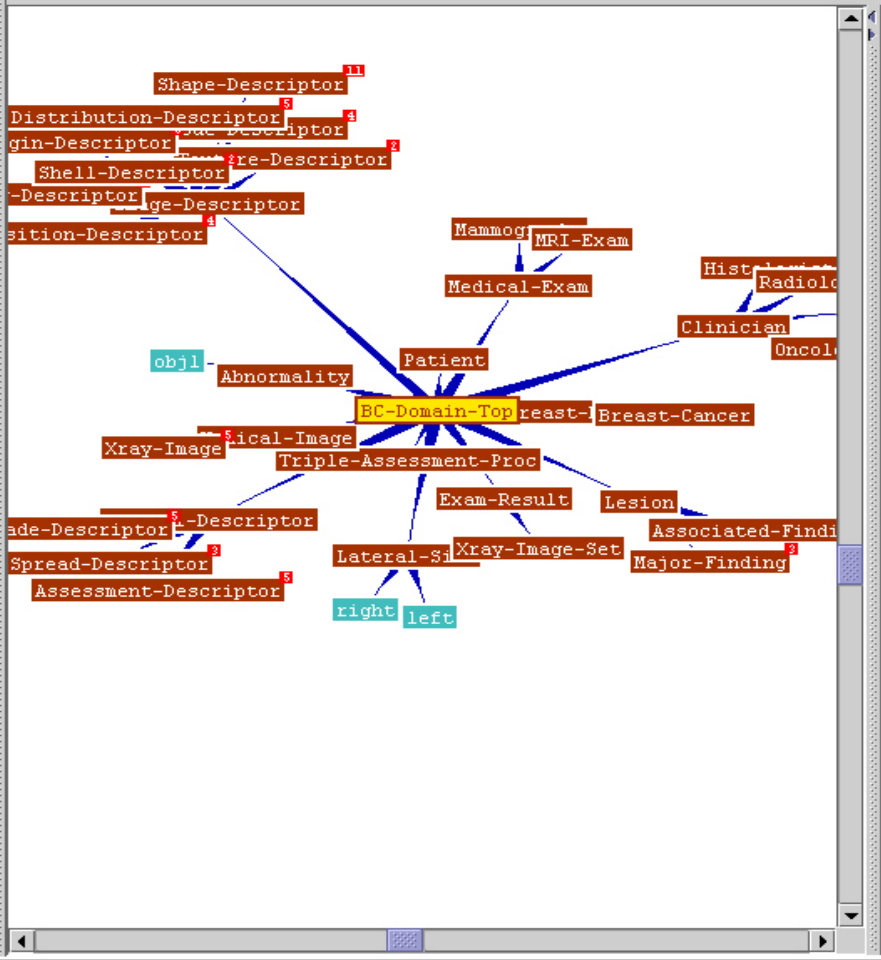
Project Edit Window Help

Classes | Slots | Forms | Instances | MiAKT

Image | Draw | Ontology | Navigate | Save KB




Back | Search Lesion | 40 | 25 | 2 | Show Ins | S | Ins




class BC-Domain-Top

namespace:
file:/C:/Research Software/OilEd/ontologies/bc-mammography.daml#

type:
primitive

known subclasses:
Abnormality
> Breast-Disease
> Clinician
> Exam-Result
> Image-Descriptor
> Lateral-Side
> Lesion
> Medical-Descriptor
> Medical-Exam
> Medical-Image
> Patient
> Triple-Assessment-Proc
>

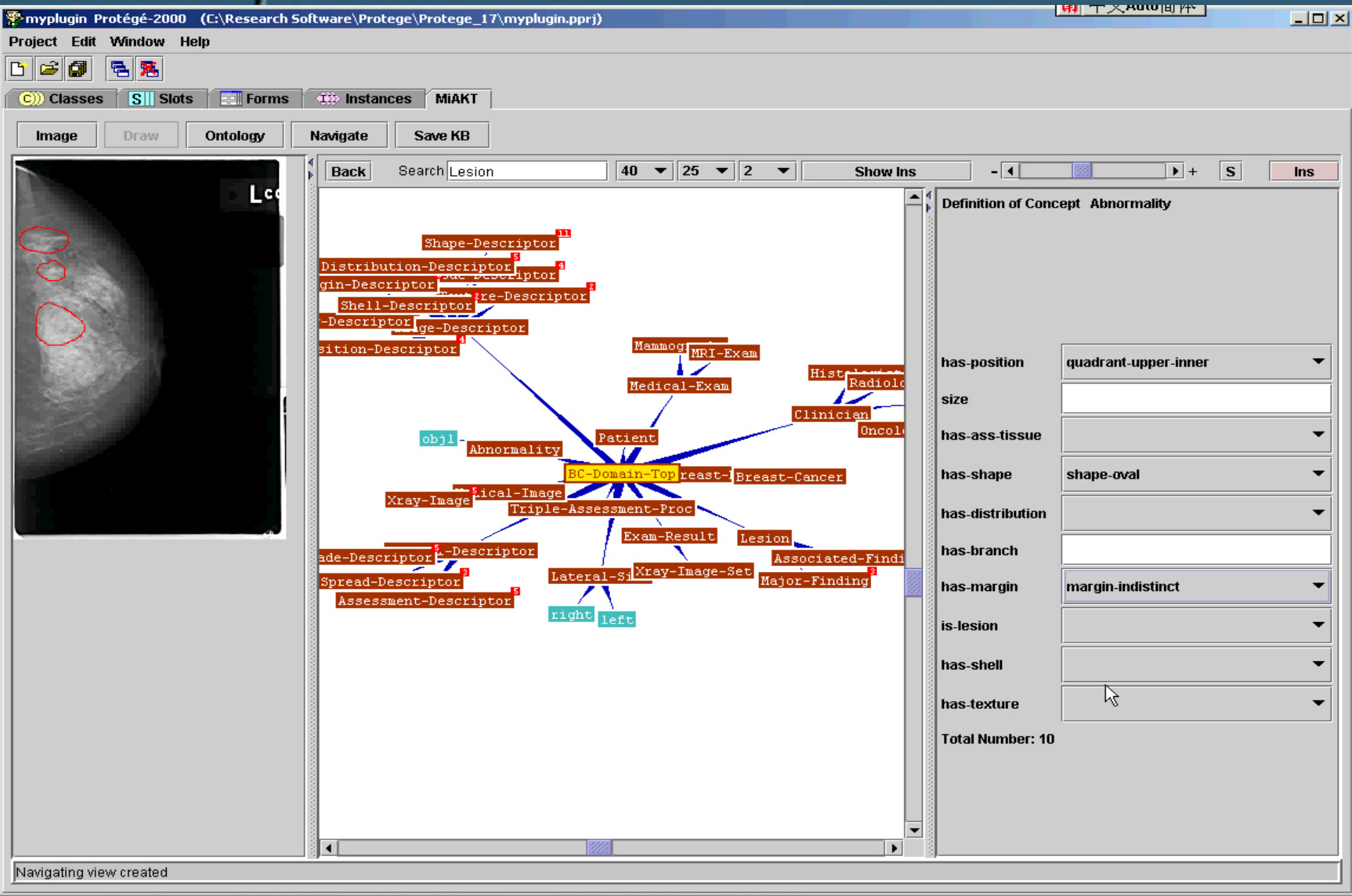
used in classes:
Abnormality
> Breast-Disease
> Clinician
> Exam-Result
> Image-Descriptor
> Lateral-Side
> Lesion
> Medical-Descriptor
> Medical-Exam
> Medical-Image
> Patient
> Triple-Assessment-Proc
>

>

class Breast-Cancer

Navigating view created

# MiAKTab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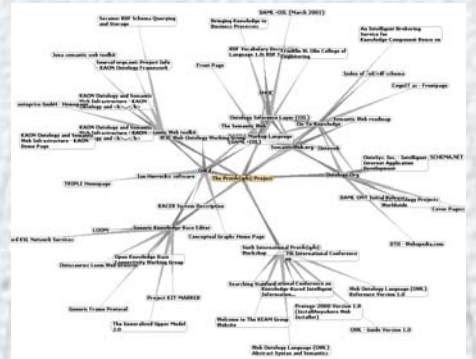
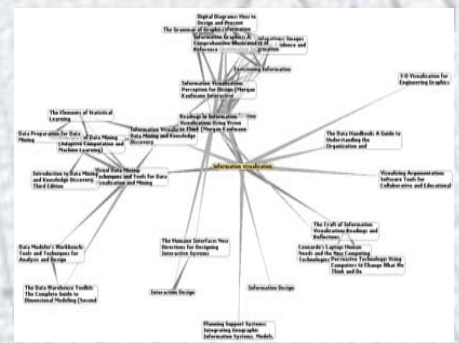
Back Search Lesion 40 25 2 Show Ins S Ins
Shape-Descriptor
Distribution-Descriptor
Shell-Descriptor
MRI-Exam
Medical-Exam
Clinician
Patient
objl
Abnormality
BC-Domain-Top
Breast-Cancer
Xray-Image
Triple-Assessment-Proc
Exam-Result
Lesion
Associated-Findi
Major-Finding
Xray-Image-Set
Spread-Descriptor
Assessment-Descriptor
right
left
Definition of Concept Abnormality
has-position quadrant-upper-inner
size
has-ass-tissue
has-shape shape-oval
has-distribution
has-branch
has-margin margin-indistinct
is-lesion
has-shell
has-texture
Total Number: 10
Navigating view created

# TGVizTab

- TGVizTab - TouchGraph Visualisation Tab
- *I needed a graph visualisation tool written in java, interactive, multi-dimensional, open source, and free! … 2 years later …. TouchGraph came out*
- TouchGraph
  - Uses a Spring layout algorithm
  - Fast real-time rendering
  - Extendable
  - Lightweight



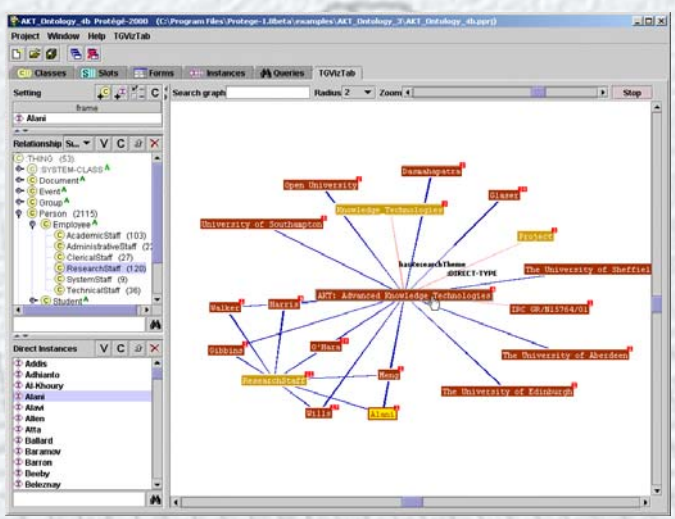
GoogleBrowser



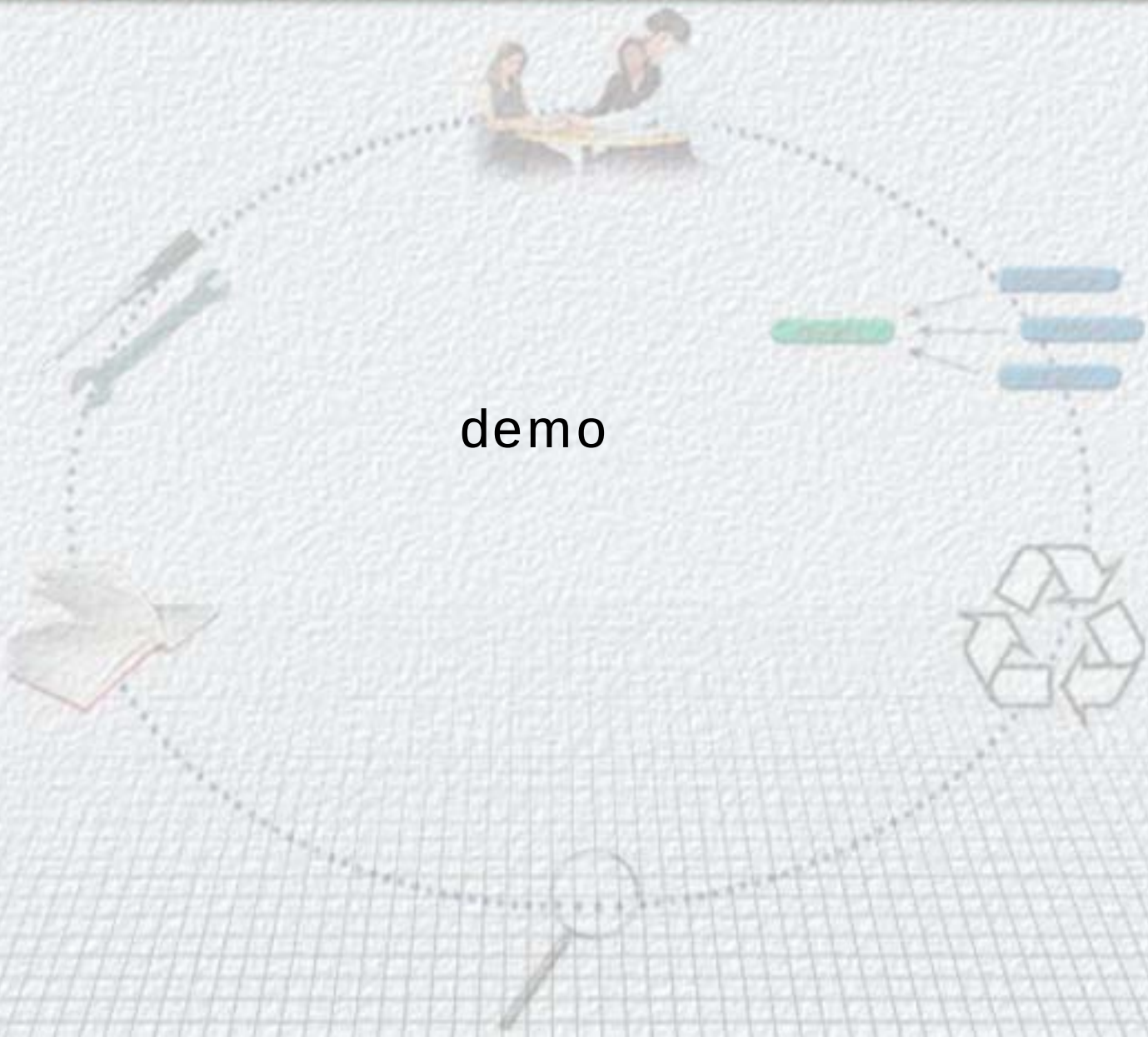
Amazon.com

# TGVizTab

- Visualises Protégé‘s ontologies and knowledge bases (classes, instances, and slots)
- Incremental graph navigation
- Neighbourhood size control
- Save/Load graph and settings in XML
- Interactive graph
- Hide/show individual slots and nodes
- Fast and dynamic pan and zoom
- Colour control



# TGVizTab

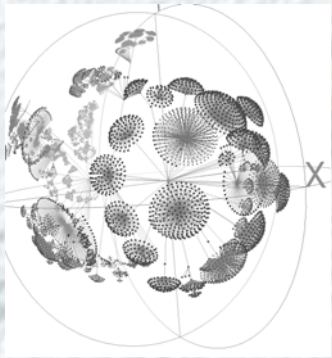


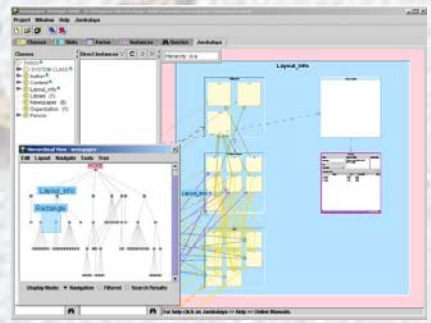
demo

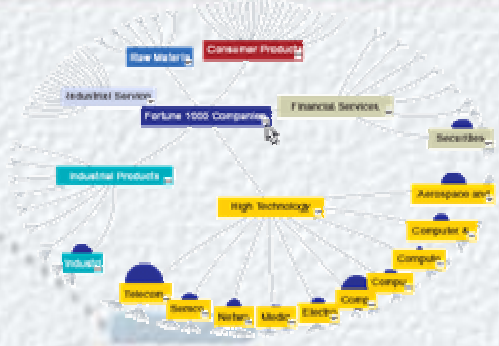
# TGVizTab future development

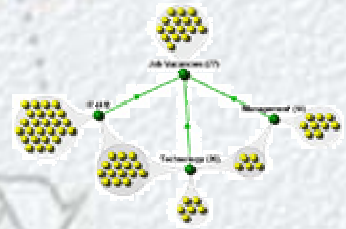
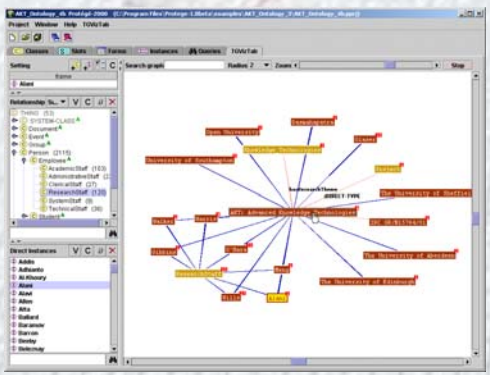
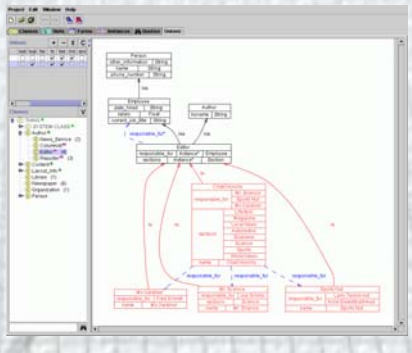
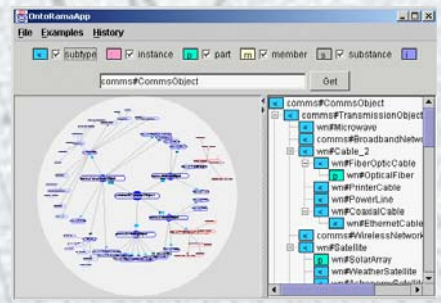
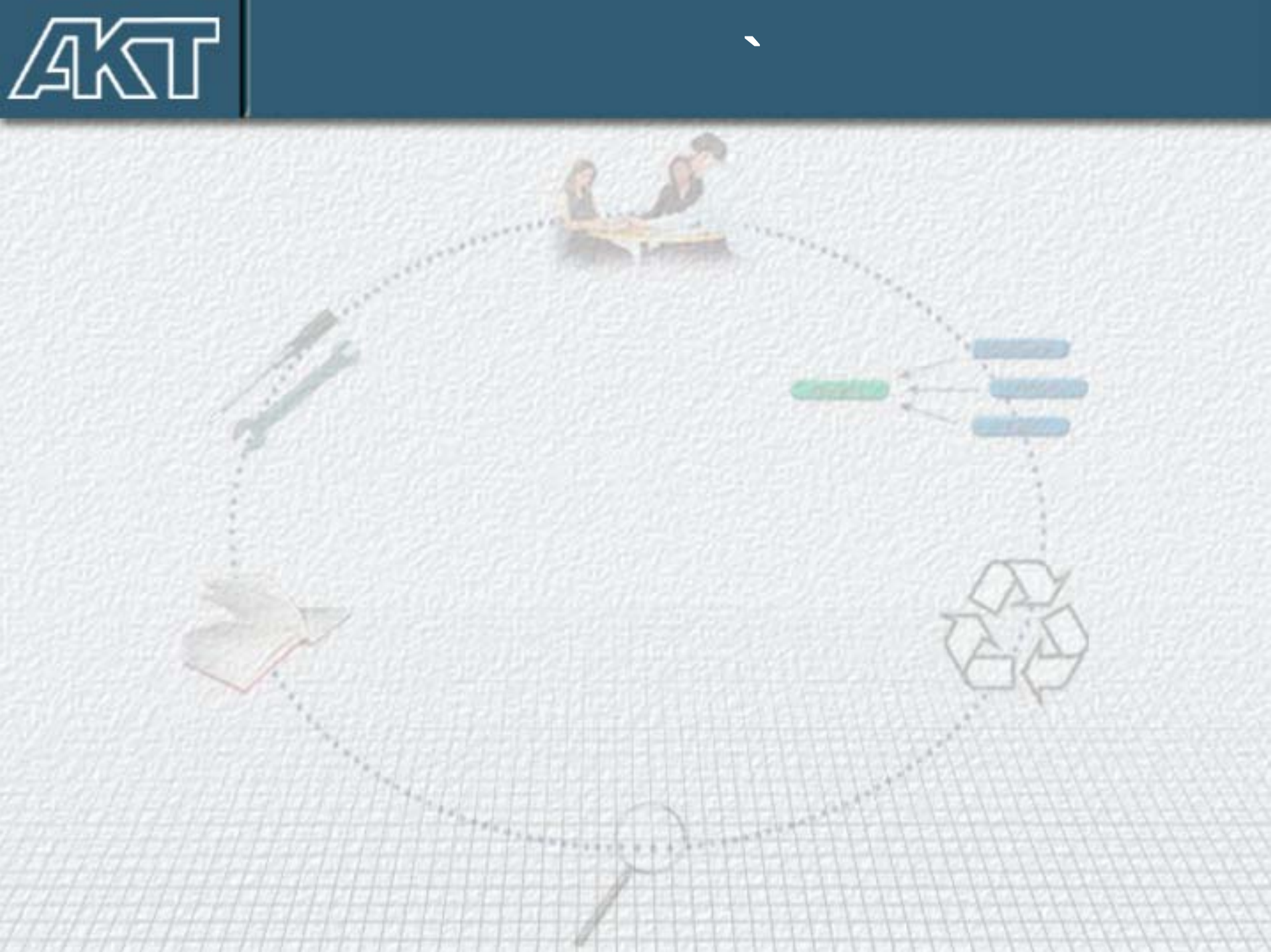
- Soon
  - Hyperbolic effect
  - Semantic zooming
  - Source release
  - Back/Forward
- Later?
  - KB editing via graph
  - Handling of reified relations
  - Node icons and hints

# Ontology Visualisation








- *Are there any specific requirements for ontology visualisation?*