

The Interface Design for Dissemination of Science and Technology Information based on Semantic Web

25 October 2006

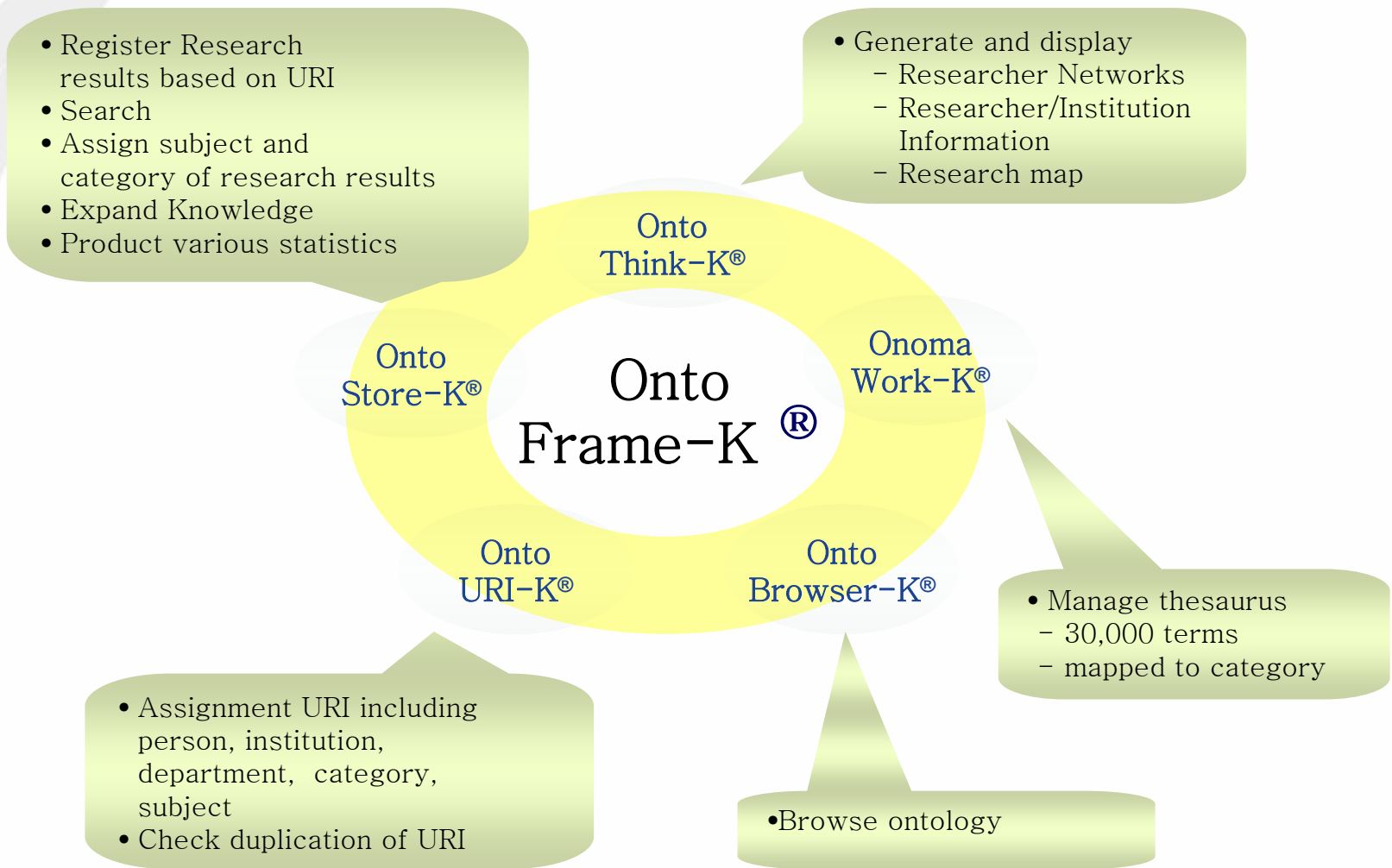
KISTI ISRL

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Insu Kang, Hanmin Jung, Wonkyung Sung

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Overview of OntoFrame-K[®]



■ Goals

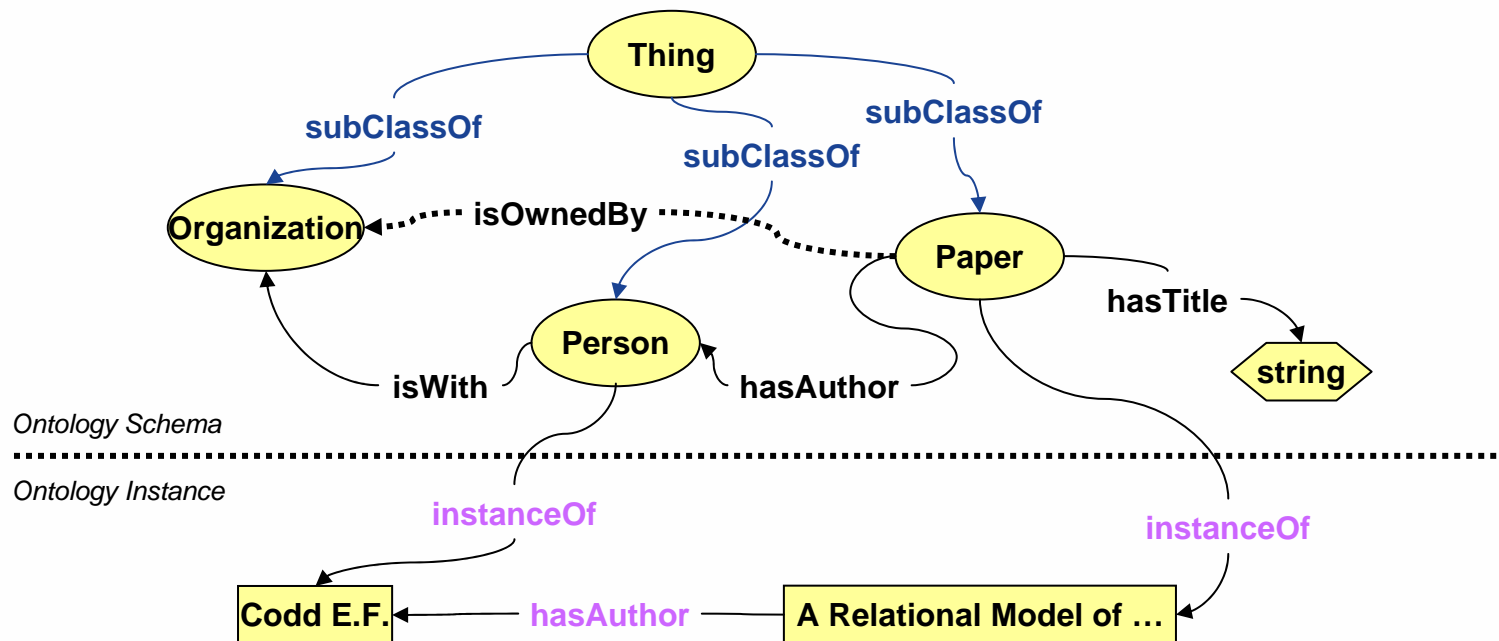
- Provide a infrastructure for science and technology information using ontology
- Make a valuable knowledge from research results
- Treat a mass knowledge information
- Develop useful scenarios and interfaces for researchers to effective use

■ Approaches

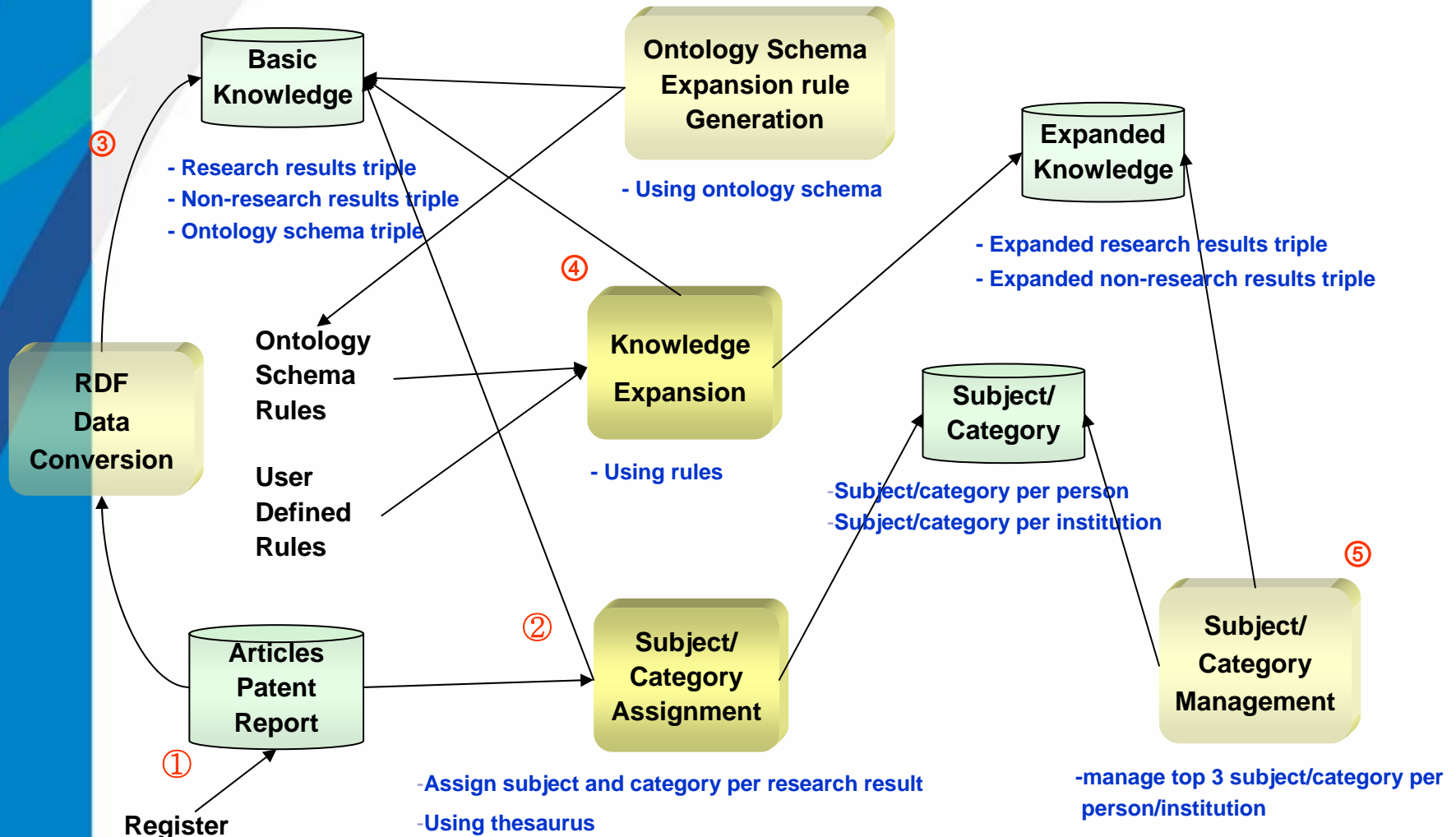
- Manage resources based on URI
- Expand knowledge using knowledge expansion rules
- Convert knowledge to RDF triples and manage RDF triples using DBMS
- Convert SPARQL query to SQL query

■ Ontology

- Core class: Person, Organization, Project, Outcomes (Paper, Patent, Report), Publication (Journal, Proceedings), Topic, CreatorsInformation, Location

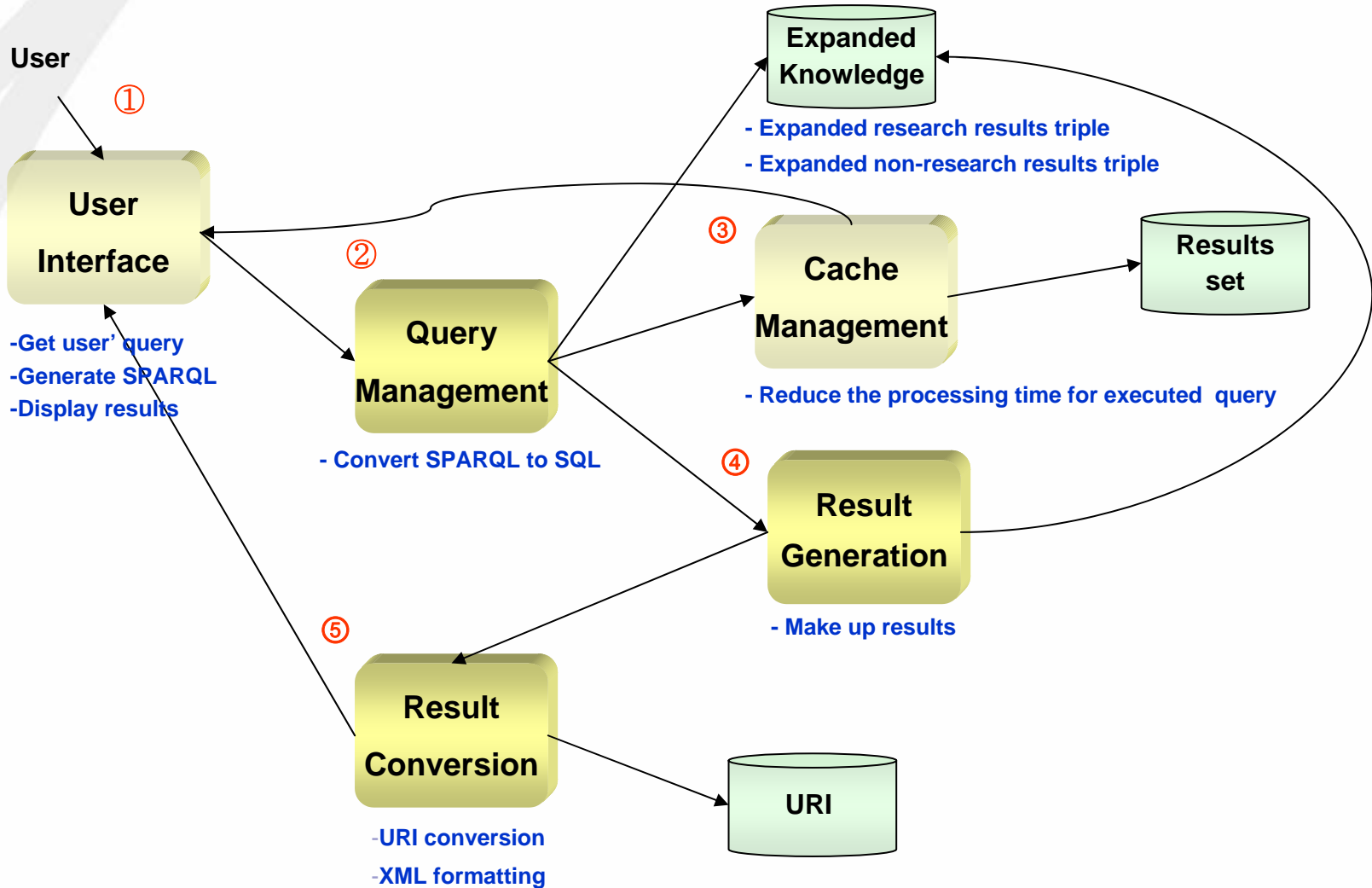


Knowledge management 1/2



- Knowledge expansion
 - Using 22 expansion rules
 - Ontology schema rules and user defined rules
 - $x \text{ hasCreationInformation } y, y \text{ hasCreator } z \rightarrow x \text{ createdByPerson } z$
 - $x \text{ hasInstitutionOfPerson } y, y \text{ hasLocationOfInstitution } z \rightarrow x \text{ locatedIn } z$
 - $x \text{ createdByPerson } y \rightarrow y \text{ creatorOf } x$
 - RDF triples: 1.6 million
- Manage RDF triples using DBMS
 - To handle a mass of RDF triples

Query Processing



User interfaces 1/5

출처 지식기반정보유통플랫폼개발연구
한글보고서명 지식기반 정보유통 플랫폼 개발 연구
영문보고서명 Development of a Knowledge-driven Platform for the Information Dissemination

순위	이름	소속기관	기여도
1	<input type="checkbox"/> 성원경	<input type="checkbox"/> 한국과학기술정보연구원	8.4
2	<input type="checkbox"/> 최성영	<input type="checkbox"/> 한국과학기술정보연구원	2.4
3	<input type="checkbox"/> 이형진	<input type="checkbox"/> 한국과학기술정보연구원	2.4
4	<input type="checkbox"/> 이병희	<input type="checkbox"/> 한국과학기술정보연구원	2.4
5	<input type="checkbox"/> 미확인	<input type="checkbox"/> 미확인	2.4
6	<input type="checkbox"/> 정한민	<input type="checkbox"/> 한국과학기술정보연구원	2.4
7	<input type="checkbox"/> 박동인	<input type="checkbox"/> 한국과학기술정보연구원	2.4
8	<input type="checkbox"/> 구남양	<input type="checkbox"/> 한국과학기술정보연구원	2.4
9	<input type="checkbox"/> 구희관	<input type="checkbox"/> 한국과학기술정보연구원	2.4
10	<input type="checkbox"/> 이미경	<input type="checkbox"/> 한국과학기술정보연구원	2.4

주제 지식데이터(37.89%); 메타데이터(37.5%); 공유(24.61%)
분야 응용소프트웨어(65.46%); 데이터베이스(17.84%); 컴퓨터네트워크및인터넷(16.68%)

지식데이터; 메타데이터; 공유; 웹; 지식정보; 출력데이터; 입력데이터; 데이터베이스; 생명주기; 디스; 웹기술; 관리데이터베이스; 말뭉치; 검색엔진; 형식; 개인용컴퓨터; 제한; 후론엔진; 데이터생성; PC; C언어; 키워드검색; 서비스시나리오; 검색어; 정보서비스; 지식검색; 개인PC; 콘텐츠; 편집기; 출; 통합검색; 인프라; 분리; 관계정보; 전자상거래; 업로드; 브라우저; 분포; 에이전트; 포털; XML; 터; 인터넷; 인공지능; 복원; 클러스터; 인터넷; 정보추론; 사용자정보; IP주소; 스키마정보; 로그

- CRUD meta data of research results based on URI
- Assign subject and category
- Expand knowledge using inference rules

- Register URI and search URI
- URI including person, institution, department, source, subject, category
- Check duplication

전체 검색

총 : 11435 건

인력 URI*	한글이름(+)	영문이름(+)	소속기관*	소속기관*
0000000000	Unknown	Unknown	Unknown	000000
0000000001	최진영		고려대학교	131720
0000000002	최진영		고려대학교	131720
0000000003	최진영		한양대학교	133800
0000000004	최진영		경북대학교	111200
0000000005	최진영		서울대학교	114900
0000000006	최진영		서울대학교	114800
0000000007	조성배		순천향대학교	132120
0000000008	김상욱		송실대학교	133520
0000000009	김상욱		한양대학교	133800

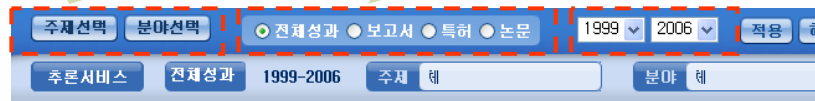
1 [2] [3] [4] [5] [6] [7] [8] [9] [10] .. [1144] [다음10개]

User interfaces 2/5

- limit on subject and category

- limit on type of research result

- limit on year of research result



- Display the information of researchers

- Display the expert lists and researcher networks



- Display the research map by location

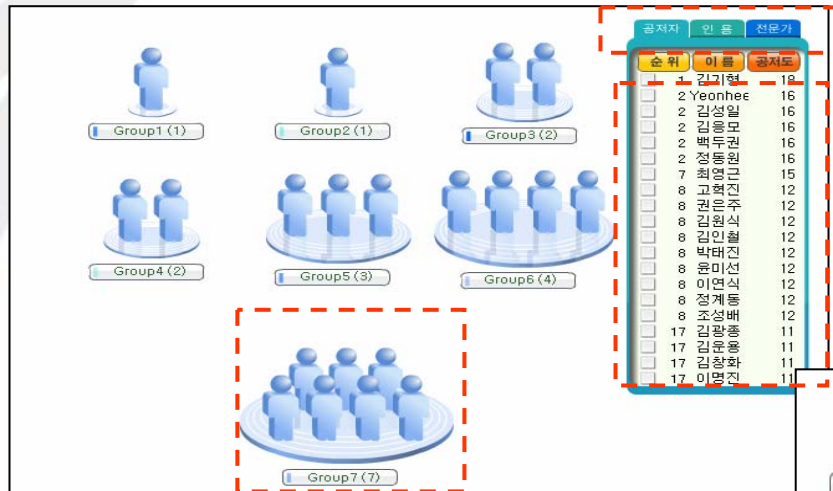
- Display the statistics of research results by year

- Display the information of institutions

- Display the list of research results

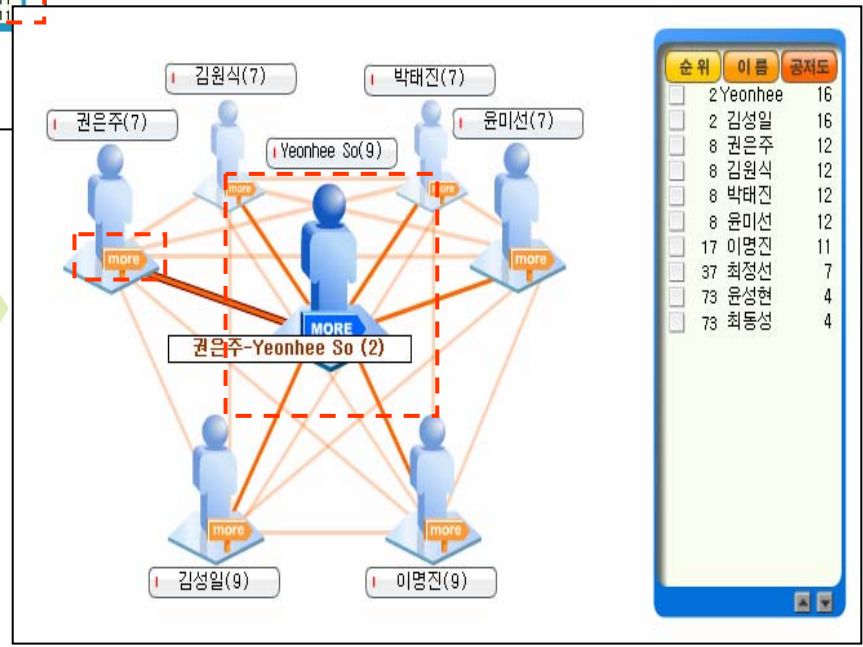
User interfaces 3/5

Researcher Networks



- Group the researchers that took part in research results together
- Display the groups with the number of researchers
- Display Expert list, coauthor network and citation network

- Display the connection and degree of connectivity between researchers
- Limit the number of researcher to 7 and click 'more' to select other researcher
- The thickness of line represents degree of connectivity between two researchers



User interfaces 4/5

Researcher Information

번호	이름	소속기관	소속부서
7	김원식	PEB_0000002165 고려대학교	교육학
6	이명진	광운대학교	산업심리학
5	권은주	고려대학교	교육학
4	윤미선	고려대학교	교육학
3	박태진	전남대학교	심리학
2	김성일	고려대학교	교육학
1	Yeonhee So	고려대학교	교육학

주제 에이전트 컴퍼넌트 제한

분야 데이터베이스 가상현실관련시뮬레이션포함 알고리즘

- Search researcher
- Display the information of researchers
- Suggest top 3 subjects and categories per researcher

- Search institution
- Display the information of institutions
- Suggest top 3 subjects and categories per institution

Institution Information

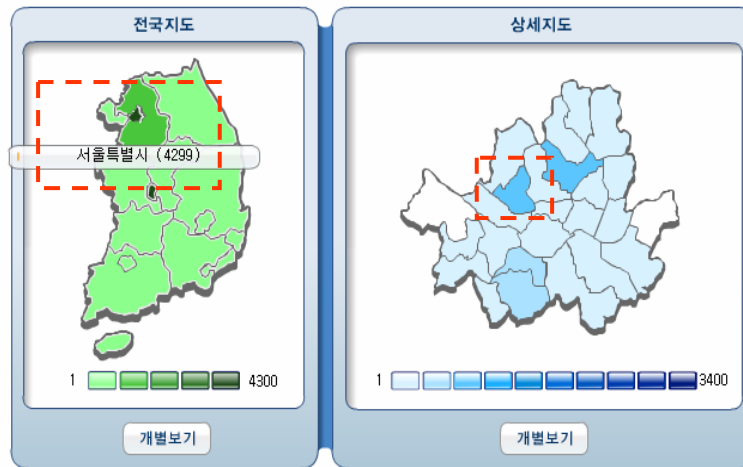
번호	기관명	위치
4	고려대학교	서울 성북구 안암동5가 고려대학교
3	동덕여자대학교	서울 성북구 하월곡2동 동덕여자대학교
2	서경대학교	서울 성북구 정릉4동 서경대학교
1	한성대학교	서울 성북구 삼선동3가 한성대학교

주제 알고리즘 패킷 PROTOCOL

분야 컴퓨터네트워크및인터넷 컴퓨터하드웨어 응용소프트웨어

User interfaces 5/5

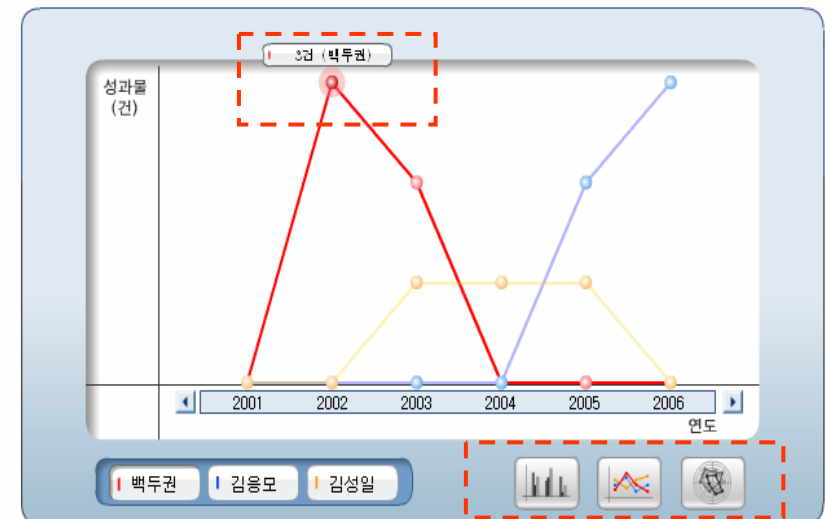
Research map



- Separated by two level map
- Display the research results by location
- The depth of color represents the main area that generated research results

- Display the statistics of researcher' works by year
- Limit the number of researcher to 3
- Select one of 3 types of chart
- every points represent the number of research results

Statistics Information



Conclusions

■ Conclusions

- Provide a infrastructure for science and technology information using ontology
- Provide easier, more effective services
- Generate knowledge from a different standpoint

■ Future works

- Enhance the accuracy and speed on performance
- Create more robust, more effective services
- Apply to foreign languages
- Cover a mass of research results