

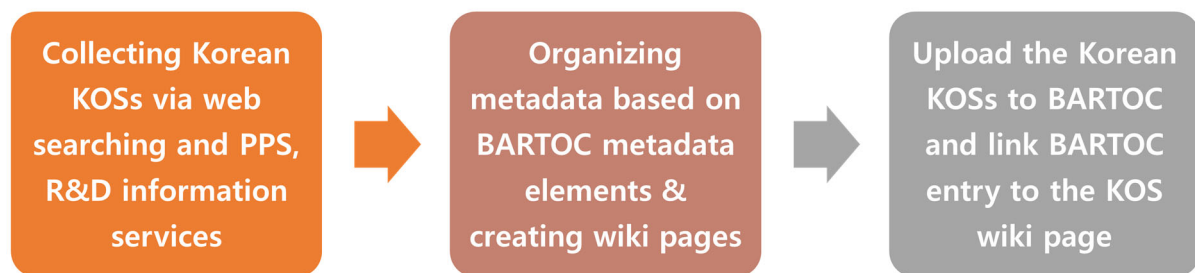
Collecting Distributed KOSs and Building Meta Information

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Overview

The purpose of this study is to collect Korean KOSs used in various fields, organize meta-information for individual KOS, and upload them to Basic Register of Thesauri, Ontologies & Classification (BARTOC) for integrated search with existing KOSs. The research was carried out with support from the National Research Foundation (NRF) of Korea from July 2019 to June 2022. This presentation mainly encapsulates the research results of the first and second years.



Introduction

The KOS is a generic term for tools such as classification systems, thesauri, and ontologies used to structure and utilize knowledge or product information in various fields. According to Dahlberg (1994), a pioneer in this field, knowledge organization (KO) has an interdisciplinary nature in that it organizes knowledge in each field. As for Broughton et al. (2005) and Hjørland (2008), KO is a concept that includes procedural aspects and tools for organizing knowledge. Therefore, various KOSs all have one thing in common: the support of the organization, management, and convenient retrieval of knowledge and information (Mazzocchi, 2018).

In other words, the KOS has been developed and utilized for various purposes across fields. In terms of analyzing domains and organizing and utilizing knowledge by field, the need for cross-references among KOSs is very high. However, the subjects that develop and utilize the KOS are different per field, and even in the same field, each country builds and uses the KOS separately. Thus, a KOS repository that systematically links distributed KOSs is required.

Therefore, this study aims to collect and systematize KOS information developed and utilized in each area of Korea. Currently, the author is working with fellow researchers as an editor of BARTOC, an international KOS repository. It was founded by Andreas Ledl and moved to the Verbundzentrale des GBV (VZG) in 2020. BARTOC editors can contribute to individual KOS registrations and various studies are being conducted based on the openness and cooperation system of the BARTOC database (VZG, [2022]).

Collection of Korean KOSs

At the beginning of the study, the researchers searched for keywords such as “KOS” (Korean Language), “Republic of Korea” (Location), and “Korea” (Korea) to investigate the number of Korean KOSs uploaded to BARTOC. In 2019, 36 domestic KOS searches were found, but only 4 Korean KOS cases were reported, and only 3 valid links were found. However, there were cases where the link was not valid, or the metadata of the KOS was insufficient.

Accordingly, to collect and systematically manage Korean KOSs, this study first investigated how KOSs are being developed and used in each field in Korea. In the case of domestic KOSs, there was no tool for comprehensive browsing, so it was necessary to collect KOSs used mainly for public or research institutes.

In continuously collecting KOSs, it was found that Korea primarily orders external projects to establish a classification system from a national institution called the Public Procurement Service (PPS). Several public institutions that use classification systems, such as Statistics Korea (KOSTAT) or Korean Intellectual Property Office (KIPO), are developing or updating classification schemes through projects to external companies or researchers. Therefore, in the case of public institutions, it was possible to comprehensively know what types of KOS were developed or maintained in one year through the *Korean ON-Line E-Procurement System*.

The screenshot shows the '나라장터' (Korea ON-Line E-Procurement System) interface. The '입찰정보' (Bidding Information) section is active, displaying a list of procurement announcements. Three specific announcements are highlighted with red boxes, and arrows point from them to explanatory text on the right:

- Announcement 1:** A study on the classification system for surgical elective non-reimbursement of the National Health Insurance Service.
- Announcement 2:** A study on reevaluation of innovative medical device groups and revision of classification system of the Korea Health Industry Development Institute.
- Announcement 3:** Establishment of the classification system for the ultra-high performance computing industry of the Korea Institute of Science and Technology Information.

The table below shows the details of the highlighted announcements:

업무	공고번호·차수	분류	제출처	제출처명	제출일자	제출시간	제출상태
공역	20220636136-00	진급	의과 선택비급여 분류체계 연구	국민건강보험공단	2022/06/27 09:02	(2022/07/15 11:00)	제출
공역	20220604286-00	진급	혁신의료기기군 재평가 및 분류체계 개정 연구	조달청 총독	2022/06/07 10:03	(2022/06/08 10:30)	제출
공역	B2022-000434-00	일반	초고성능컴퓨팅산업 분류체계 정립	한국과학기술정보연구원	2022/06/03 09:00	(2022/06/17 11:00)	제출

Classification system development announcements on Public Procurement Service Website: Service Bid Information List Screen <<https://www.g2b.go.kr/index.jsp>>

In addition to the PPS website, it was also possible to find the announcement for the development of a classification scheme through the National R&D Information website run by the National Science & Technology Information Service (NTIS, [2022]).

The screenshot displays the '국가R&D통합공고' (National R&D Integrated Notification) interface. At the top, there's a search bar for '분류체계' (Classification System) and a navigation menu with options like '공고정보' (Notification Information), 'R&D사업일정' (R&D Project Schedule), 'MY공고' (My Notification), '알리미신청' (Alert Application), and 'RSS신청' (RSS Application).

A table lists various government agencies under the '부처명' (Ministry Name) column. A red box highlights the '부처명' column, and a blue box highlights the '공고명' (Notification Name) column. A red arrow points from the '부처명' column to a text box stating 'Information on the government agency that placed the project order'.

Below the agency list, there's a search bar with filters for '공고일' (Notification Date), '공고구분' (Notification Category), and '마감일' (Deadline). A red box highlights the '공고일' filter, and a blue box highlights the '공고구분' filter. A red arrow points from the '공고일' filter to a text box stating 'Government agency that placed the project order'.

The main content area shows a list of project announcements. A red box highlights the '부처명' column, and a blue box highlights the '공고명' column. A red arrow points from the '부처명' column to a text box stating 'Project name (KOS information to be developed)'. A blue box highlights the '공고명' column, and a red arrow points from the '공고명' column to a text box stating 'Establishment of a statistical survey system based on forest industry classification'.

The list of project announcements includes the following details:

순번	현황	부처명	공고명	D-day
103	마감	산림청	산림산업분류에 의한 통계조사 체계 구축 방안 연구	
102	마감	교육부	K-MOOC 강좌 분류체계 연구	
101	접수중	특허청	기국물 분류체계 개발 및 비전자기록물 정리 용역	D - 1
100	마감	보건복지부	치과 선택비급여 분류체계 연구_재공고	
99	마감	보건복지부	의과 선택비급여 분류체계 연구_재공고	
98	마감	기타	인천문화재단 기록물 분류체계 구축 연구용역	
97	마감	보건복지부	복지용구 품목 분류체계 개발 연구_재공고	
96	마감	보건복지부	혁신의료기기군 재평가 및 분류체계 개정 연구_재공고	
95	마감	기타	기록물 분류체계 개발 및 비전자기록물 전수조사 정리 용역	
94	마감	보건복지부	치과 선택비급여 분류체계 연구	

National R&D Integrated Notification Screen <<https://www.ntis.go.kr/rndgate/eg/un/ra/mng.do>>

Through this process, as the research progressed, it was possible to stably grasp the classification system of public institutions and effectively collect the KOS information constructed as a result.

Building a Wiki Page Containing the Collected KOS Meta Information

In finding a way to manage the collected KOS effectively, it was decided that metadata explaining the KOS should be separately established. This is because there are many KOSs which is lacking explanatory information on their usage method. Moreover, some KOS webpages hide the exact URL information for direct access. For example, the KOS named “New patent classification system,” issued by the Korean Intellectual Property Office (KIPO) is available online. However, it may be difficult to access internationally and intuitively understand because it is in the form of an attached file or a menu on the web.

4차 산업혁명 관련 16대 기술분야 특허

4차 산업혁명과 관련된 종전 7대 기술분야 일부 수정될 수 있습니다.

* 인공지능(AI), 빅데이터, 클라우드, 사물인터넷

** 인공지능(AI), 빅데이터, 클라우드컴퓨팅, 신재생에너지, 3D프린팅

특허분류체계 개요

4차 산업혁명 관련 기술 관계도

융합 서비스 분야

가상증강 현실, 스마트 시티, 맞춤형 헬스케어, 혁신신약, 3D프린팅, 신재생 에너지, 첨단소재, 지능형 반도체, 자율주행차, 드론 (무인기), 인공지능(AI), IoT, Cloud Computing, Big Data, 자율주행차, 드론 (무인기), 인공지능(AI), IoT, Cloud Computing, Big Data

특허분류 정보

인공지능	→	빅데이터	→	클라우드 컴퓨팅	→	차세대통신	→
사물인터넷	→	지능형 로봇	→	자율주행차	→	드론	→
가상증강현실	→	스마트시티	→	맞춤형 헬스케어	→	혁신신약	→
지능형반도체	→	첨단소재	→	신재생 에너지	→	3D프린팅	→

관련자료

기술설명 다운로드

Provided by attached file

Screenshot of the “New Patent Classification System Related to the Fourth Industrial Revolution” Provided by the Korean Intellectual Property Office <<https://www.kipo.go.kr/ko/kpoContentView.do?menuCd=SCD0200271>>

In particular, the collected Korean KOS was intended to be uploaded to BARTOC, the KOS repository, during which it was necessary to present rough information on the KOS. Therefore, the basic metadata based on the BARTOC meta elements are organized as below:

No	Title (Korean)	Title (English)	Scope	Description	KOS Type	DDC	EuroVoc	ILC
256	관광용어 외국어 용례사전	[Foreign Language Usage d	번역		Glossary	418 Standar	translation	
257	서울시 외국어 표기사전	[Dictionary of foreign lang	번역		Glossary	418 Standar	translation	
258	예술원 회원	[Academy of Art's Artist N	예술작가(문학, 미술, 음악, 연극, 영화,		Name authority list	709 History	artistic profession	
259	옛 문헌 한자어	[Terms of Sino-Korean wo	한자어, 고문헌		Dictionary ; Glossary			
260	국방전자조달 용어사전	[Terms of defence e-procu	군수품, 조달, 전자조달		Glossary		0821 def	t6c: contra
261	산림행정순화용어	[Refine Terms of Forest Ad	산림 행정	산림청에서는 그동안 1	List ; Terminology	634 Orchard	forest	
262	Tox-Info 용어사전	Toxicity information servic	식약품, 화학물	tox-info(toxicity information service)	Glossary	613 Person	drug addi	sh3p: drug
263	[원자력통제기술용어] 용어	[Nuclear Terminology]	원자력, 핵안보	초성검색으로 핵비확산	Glossary	539 Modern	nuclear safety	
264	해양수산과학기술 분류제	[Marine Science Technolog	해양수산과학기술		Classification Scheme	551 Geology	oceanography	
265	국방기술표준분류	[Standard Classification of	국방기술		Classification Scheme	355 Military	military science	
266	무기체계표준분류	[Standard Classification of	무기체계		Classification Scheme	355 Military	military science	
267	건설정보분류체계	[Construction Information	건설정보	건설사업 과정에서 발	Classification Scheme	600 Techno	technology ; building	
268	식품·의약품 등의 안전기	[Classification of Food and	식품의약품 안	식품의약품안전처의 안	Classification Scheme	610 Medicin	medical dv4: using t	
269	식품의약품용어집	[Terms of Food and Drug]	식품의약품		Glossary	610 Medicin	medical dv4: using t	
270	항공용어 사전	[Terms of Aviation]	항공		Glossary ; Terminology	387 Water,	civil aviation	
271	공직분류체계	[Classification of Public Of	행정, 공무원, 공직		Categorization Scheme ; Classification Scheme			

Basic metadata for the Korean KOSs are organized based on the BARTOC metadata elements

In addition to the basic metadata, basic descriptive information on the KOS was built on the MediaWiki platform before uploading to BARTOC. This is not only to upload Korean KOS itself to the BARTOC but also to support global researchers in understanding Korean KOS in detail. Although built around Hangul as a Wiki page, it is composed of text, so one can use the browser's translation function. One may also check the contents in a unified manner because it provides various KOS information through the same interface. Moreover, it provides links to the source and other similar KOS information.

4차산업혁명 관련 新특허분류 체계

KOS, 우리 모두의 메타 지식

4차산업혁명 관련 新특허분류 체계(New patent classification system) 4차 산업혁명과 관련된 종전 7대 기술분야**를 16대 기술분야**로 확대 및 개선하여 선진특허분류(CPC) 체계에 추가하여 수립하였습니다. 세부 내용은 국제표준화 과정 및 개정 과정에서 일부 수정될 수 있습니다.

* 인공지능(AI), 빅데이터, 클라우드, 사물인터넷(IoT), 지능형로봇, 자율주행차, 3D프린팅

** 인공지능(AI), 빅데이터, 클라우드컴퓨팅, 차세대 자율주행차, 드론, 가상증강현실, 스마트시티, 맞춤형 제조, 청다소재, 신재생에너지, 3D프린팅[1]

Explanatory information for the KOS in textual form

4차산업혁명 관련 新특허분류 체계

저자 특허청

발행처 특허청

발행년 확인불가

KOS유형 분류체계

제공형 온라인 및 PDF

식

파일 4차산업혁명관련新특허분류체계

BARTOC <https://bartoc.org/en/node/20240>

Summarized information including KOS file and BARTOC URL

같이보기 [편집 | 원본 편집]

- 디자인분류코드
- 상품분류코드

외부링크 [편집 | 원본 편집]

- BARTOC URL <http://bartoc.org/en/node/20240>

각주 및 출처 [편집 | 원본 편집]

- [↑ https://www.kipo.go.kr/kpo/HtmlApp?c=33001&catmenu=m06_07_06](https://www.kipo.go.kr/kpo/HtmlApp?c=33001&catmenu=m06_07_06) 특허청

분류: 지식구조체계

Link information (related KOS, external URL, source URL)

"New Patent Classification System for the Fourth Industrial Revolution" Wiki Page

<http://openarchives.net/kos/4%EC%B0%A8%EC%82%B0%EC%97%85%ED%98%81%EB%AA%85_%EA%B4%80%EB%A0%A8_%E6%96%B0%ED%8A%B9%ED%97%88%EB%B6%84%EB%A5%98_%EC%B2%B4%EA%B3%84>

BARTOC Upload of Korean KOS along with Wiki Page Information

After structuring the collected KOS information and building a Wiki page, basic metadata was added, and a part of Korea's KOS was entered into BARTOC.

New patent classification system

About Access Content Identifiers

The previous seven technology areas related to the Fourth Industrial Revolution* were expanded and improved to 16 technology sectors**, and the Advanced Patent Classification (CPC) system was added to the system. The details may be partially modified in the course of international standardization and revision.^{en}

* Artificial intelligence (AI), big data, cloud, Internet of Things (IoT), intelligent robots, self-driving cars, 3D printing

** Artificial intelligence (AI), big data, cloud computing, next-generation communications, Internet of Things (IoT), intelligent robots, drones, virtual augmented reality, smart cities, customized healthcare, innovative new drugs, advanced materials, renewable energy, 3D printing

4차 산업혁명과 관련된 종전 7대 기술분야*를 16대 기술분야**로 확대 및 개선하여 선진특허분류(CPC) 체계에 추가하여 수립하였습니다. 세부 내용은 국제표준화 과정 및 개정 과정에서 일부 수정될 수 있습니다.^{und}

* 인공지능(AI), 빅데이터, 클라우드, 사물인터넷(IoT), 지능형로봇, 자율주행차, 3D프린팅

** 인공지능(AI), 빅데이터, 클라우드컴퓨팅, 차세대통신, 사물인터넷(IoT), 지능형로봇, 자율주행차, 드론, 가상증강현실, 스마트 시티, 맞춤형헬스케어, 혁신신약, 지능형반도체, 첨단소재, 신재생에너지, 3D프린팅

Titles New patent classification system
4차 산업혁명 관련 新특허분류 체계

KOS Type Classification schema | List

Links http://openarchives.net/kos/4%EC%B0%A8%EC%82%B0%EC%97%85%ED%98%81%EB%AA%85_%EA%B4%80%EB

Subject Technology (600) | <http://eurovoc.europa.eu/5042> (5042) | <http://eurovoc.europa.eu/3707> (3707) | <http://eurovoc.europa.eu/4415> (4415)

ko

Languages

URI <http://bartoc.org/en/node/20240>

Homepage https://www.kipo.go.kr/kpo/HtmlApp?c=33001&catmenu=m06_07_06

Basic description of the KOS (English & Korean version)

MediaWiki KOS page URL

DDC	600 Technology
EUROVOC	5042 patent
EUROVOC	3707 industrial revolution
EUROVOC	4415 technology
ILC	tayne patents

Knowledge and Organization System Screen Uploaded to Basic Register of Thesauri, Ontologies & Classification
<<https://bartoc.org/en/node/20240>>

By repeating this process, Korea's KOS maintained the meta information and created a continuous upload cycle to BARTOC. The procedure is as follows.

- Collect Korean KOSs.
- Identify the KOS information and construct the Wiki page.
- Upload the KOS information along with the Wiki page to BARTOC.
- Link the corresponding KOS URL of BARTOC on the Wiki page.

Currently, about 200 Wiki pages have been built, and about 200 Korean KOSs have been uploaded to BARTOC.

Future Works

The collection of Korean KOSs, the construction of meta information, and the uploading thereof to BARTOC were repeated for about three years. In the process, it was possible to analyze in detail the development and management system of Korea's KOS, and externally, there were changes and improvements in BARTOC itself.

As the research support from the NRF will end in June 2022, there is a task to stabilize the process of continuously monitoring and systematizing Korea's KOS. It is also necessary to add information that can link Korea's KOS with other KOSs in similar fields through the BARTOC integrated platform because the previously developed KOS is the main reference for developing a single KOS. In addition, the internationally linked KOS, such as the industry-standard classification, forms a network by itself.

Furthermore, all KOSs should be classified and indexed. In addition to the Dewey Decimal Classification, there is a plan to use the second edition of the Integrative Levels Classification more actively for KOS classification. If applicable, Korean Decimal Classification number can be added.

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