SEMANTTINEN WEB ARKEOLOGISESSA TUTKIMUKSESSA

Tervetuloa mukaan!

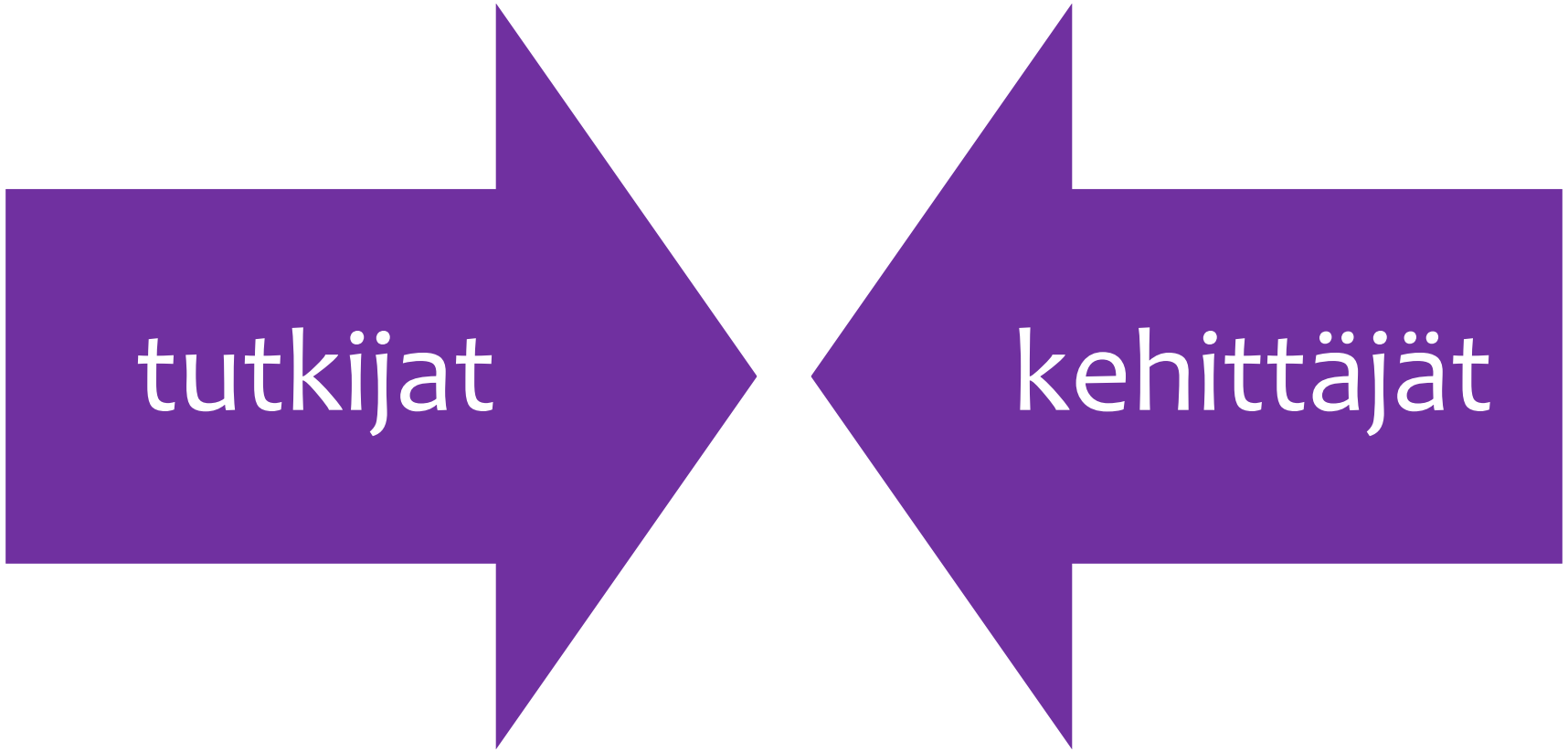
20.10.2020

Tiedeinstituuttien avoin tutkimusdata
irfrome.org/toiminta/tutkimus-2/tiedeinstituuttien-avoin-tutkimusdata

Tiedeinstituuttien avoin tutkimusdata -hanke

- Suomen ulkomailla toimivien tiedeinstituuttien projekti, joka keskittyy instituuttien tutkimusaineistojen digitaaliseen hallintaan ja avoimeen jakamiseen
- Alkanut joulukuussa 2017
- Seminaareja Suomessa ja Roomassa mm. Kick off -seminaari 4.4.2018
- **Aineistonhallinta-koulutuspäivä 24.11.20: avoin kaikille (Zoomin rajoissa)**
- irfrome.org/toiminta/tutkimus-2/tiedeinstituuttien-avoin-tutkimusdata
  - Tallennus (salasanan takana, saatavilla: *nissin@irfrome.org*)
- Käytännön asioita
  - mikrofonit ja videot hyvä pitää kiinni esitysten ajan
  - keskustelu joko chatin kautta tai mikrofonin kautta (avataan videot keskustelun ajaksi!)

SEMANTTINEN WEB = ?



OHJELMA

9.50 Laura Nissin (Tiedeinstituuttien avoin tutkimusdata): Alkusanat

10.00 Eero Hyvönen (keynote): *Digitaaliset ihmistieteet ja linkitetty avoin data: Sammon taontaa semanttisessa webissä*

10.45 Anna Wessman ja Ville Rohiola (SuAlt-projekti / LöytöSampo): *Arkeologiset löydöt, kansalaistiede ja semanttinen verkko*

11.15 Johanna Enqvist (Tieteen termipankki): *Arkeologian alan termityö Tieteen termipankissa*

11.45 – 12.15 tauko

12.15-12.45 Katri Seppälä ja Päivi Kouki (Sanastokeskus Tsk ry): *Käsiteanalyysiin pohjautuva ontologiatyö – esimerkkinä Museoalan ontologia*

12.45-13.15 Rick Bonnie (Ancient Near Eastern Empires, ANEE): *Open Archaeology in the Eastern Mediterranean: Between Dreams and Reality*

Keskustelu

Digitaaliset ihmistieteet ja linkitetty avoin data: Sammon taontaa semanttisessa webissä

Prof. Eero Hyvönen, Director
Helsinki Centre for Digital Humanities (HELDIG)
University of Helsinki and Aalto University
Semantic Computing Research Group (SeCo)
http://seco.cs.aalto.fi/u/eahyvone/

Contents

Overview of ca 20 years of work in Finland since 2001
at the Semantic Computing Research Group (SeCo) in Aalto and University of Helsinki

- **Semantic Web, Linked Open Data, and Digital Humanities (DH)?**
- **Vision:** Linked Data infrastructure for Cultural Heritage (CH) & DH
- **Realization:** Using the infrastructure in practice
  - National ontology services: from ONKI.fi to Finto .fi
  - Linked Data Finland service: LDF.fi
- **Applications:**
  - Semantic “Sampo” series of portals: video show
- **The Work Shows Paradigm Shift in CH Content Publishing**
  - From text publishing to knowledge discovery and Artificial Intelligence

Developing the Digital World Together

HELDIG

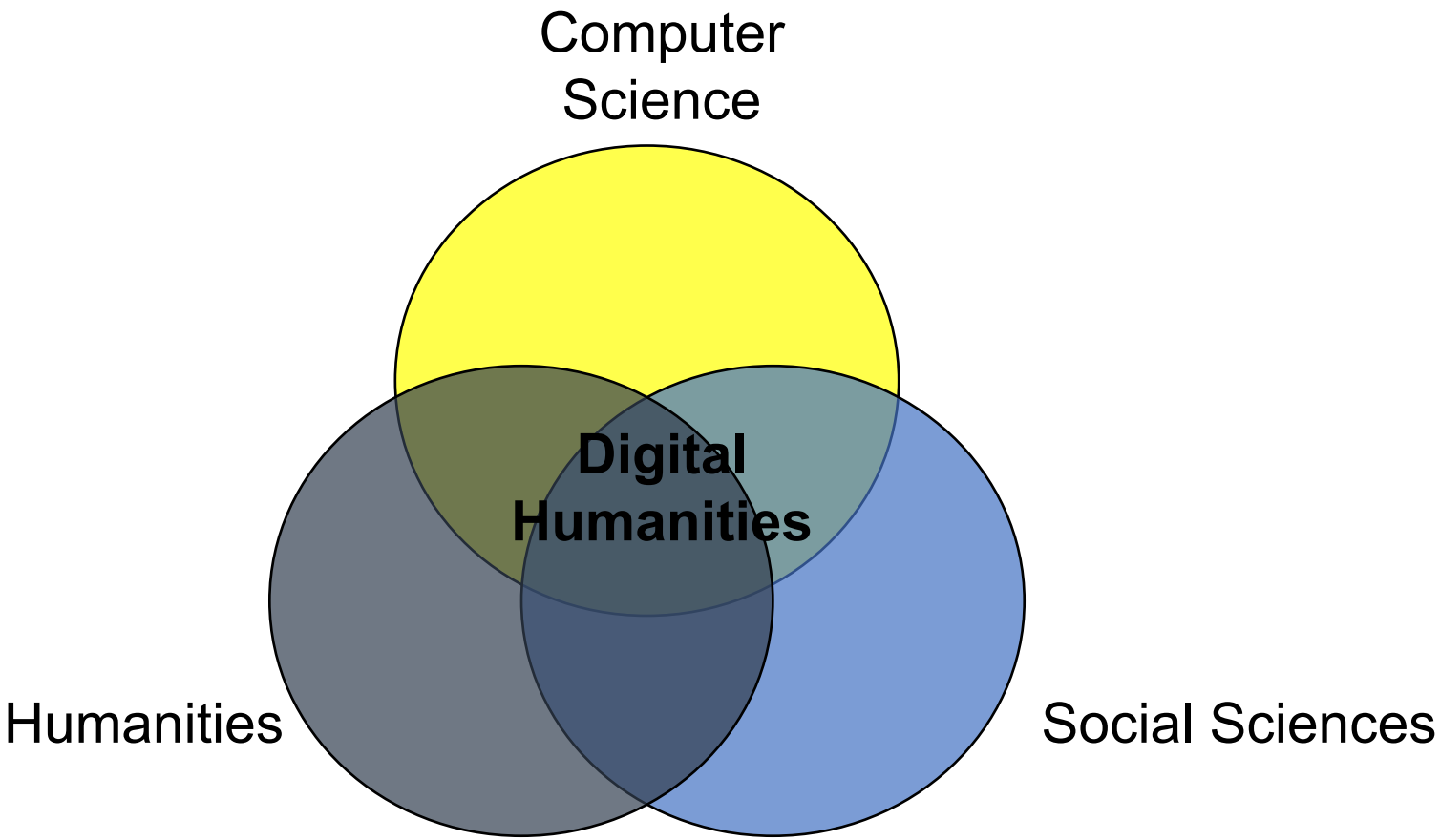
Helsinki Centre for Digital Humanities

UNIVERSITY OF HELSINKI

Aalto University

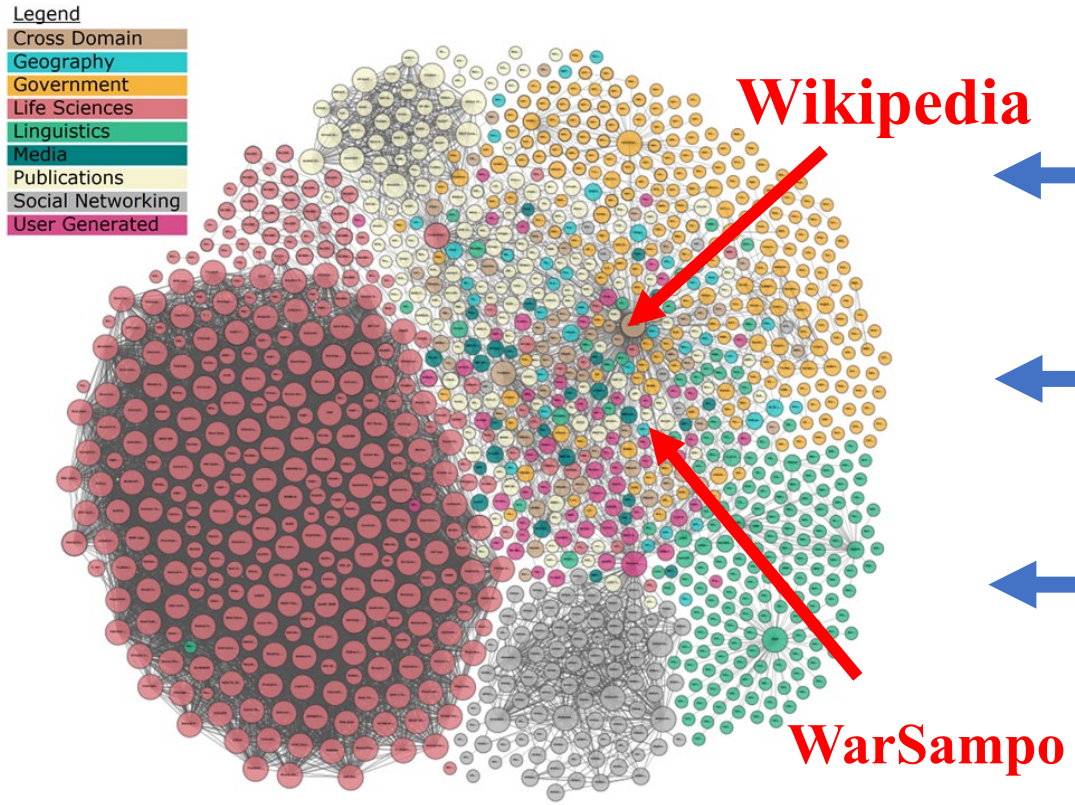
SeCo
semantic computing

What Is Digital Humanities?



Megatrend: Linked Open Data & Semantic Web?

Human Knowledge on the Web: ”Web of Data” for machines



Linked Open Data Stats 2018 (http://stats.lod2.eu/):
10 000 datasets,150 billion triples

Traditional Web ”Web of Pages” for humans

Google Index (2018):
50 billion pages (excluding hidden web)

Why Linked (Open) Data?

- Enriching everybody's data collaboratively from separate silos
  - Everybody wins by collaboration!

- Creating Findable, Accessible, Interoperable, Re-usable data
  - The value of data increases!

FAIR

https://www.go-fair.org/fair-principles/

- Creating more intelligent applications for the public, curators, and researchers
  - The machine "understands" linked data!

SEMANTIC WEB

On this page → technology topics • news • upcoming events and talks

In addition to the classic "Web of documents" W3C is helping to build a technology stack to support a "Web of data," the sort of data you find in databases. The ultimate goal of the Web of data is to enable computers to do more useful work and to develop systems that can support trusted interactions over the network. The term "Semantic Web" refers to W3C's vision of the Web of linked data. Semantic Web technologies enable people to create data stores on the Web, build vocabularies, and write rules for handling data. Linked data are empowered by technologies such as RDF, SPARQL, OWL, and SKOS.

Linked Data

The Semantic Web is a Web of data — of dates and titles and part numbers and chemical properties and any other data one might conceive of. RDF provides the foundation for publishing and linking your data. Various technologies allow you to embed data in documents (RDFa, GRDDL) or expose what you have in SQL databases, or make it available as RDF files.

Vocabularies

At times it may be important or valuable to organize data. Using OWL (to build vocabularies, or "ontologies") and SKOS (for designing knowledge organization systems) it is possible to enrich data with additional meaning, which allows more people (and more machines) to do more with the data.

Query

Query languages go hand-in-hand with databases. If the Semantic Web is viewed as a global database, then it is easy to understand why one would need a query language for that data. SPARQL is the query language for the Semantic Web.

Inference

Near the top of the Semantic Web stack one finds inference — reasoning over data through rules. W3C work on rules, primarily through RIF and OWL, is focused on translating between rule languages and exchanging rules among different systems.

Vertical Applications

W3C is working with different industries — for example in Health Care and Life Sciences, eGovernment, and Energy — to improve collaboration, research and development, and innovation adoption through Semantic Web technology. For instance, by aiding decision-making in clinical research, Semantic Web technologies will bridge many forms of biological and medical information across institutions.

https://www.w3.org/standards/semanticweb/

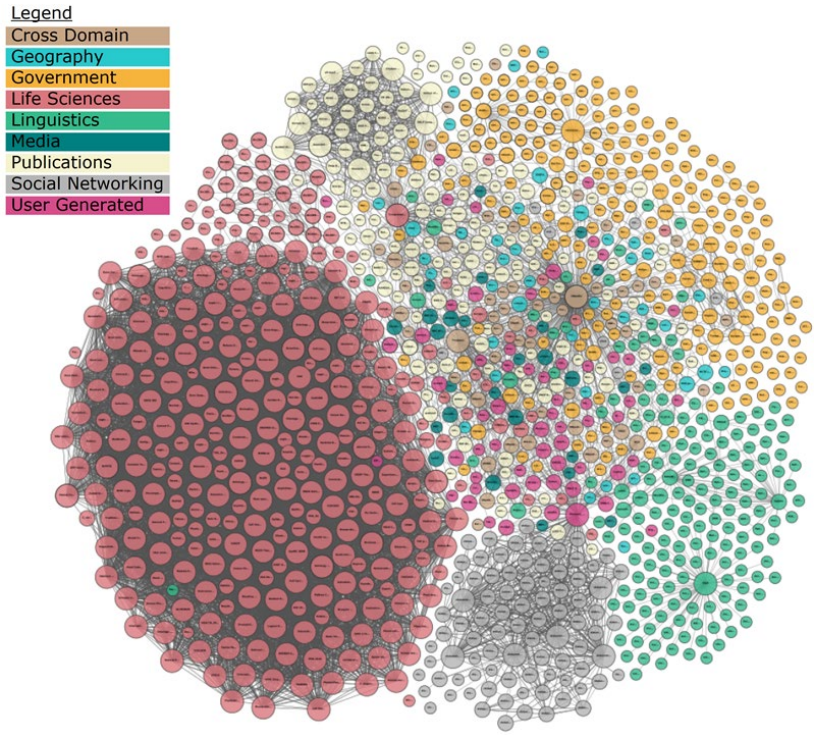
Vision:
National Linked Data Infrastructure for Cultural Heritage & Digital Humanities in Finland

Traditional Infras:

(rail)roads, electricity, …

Semantic Linked Data Infra:

Ontologies, data, metadata

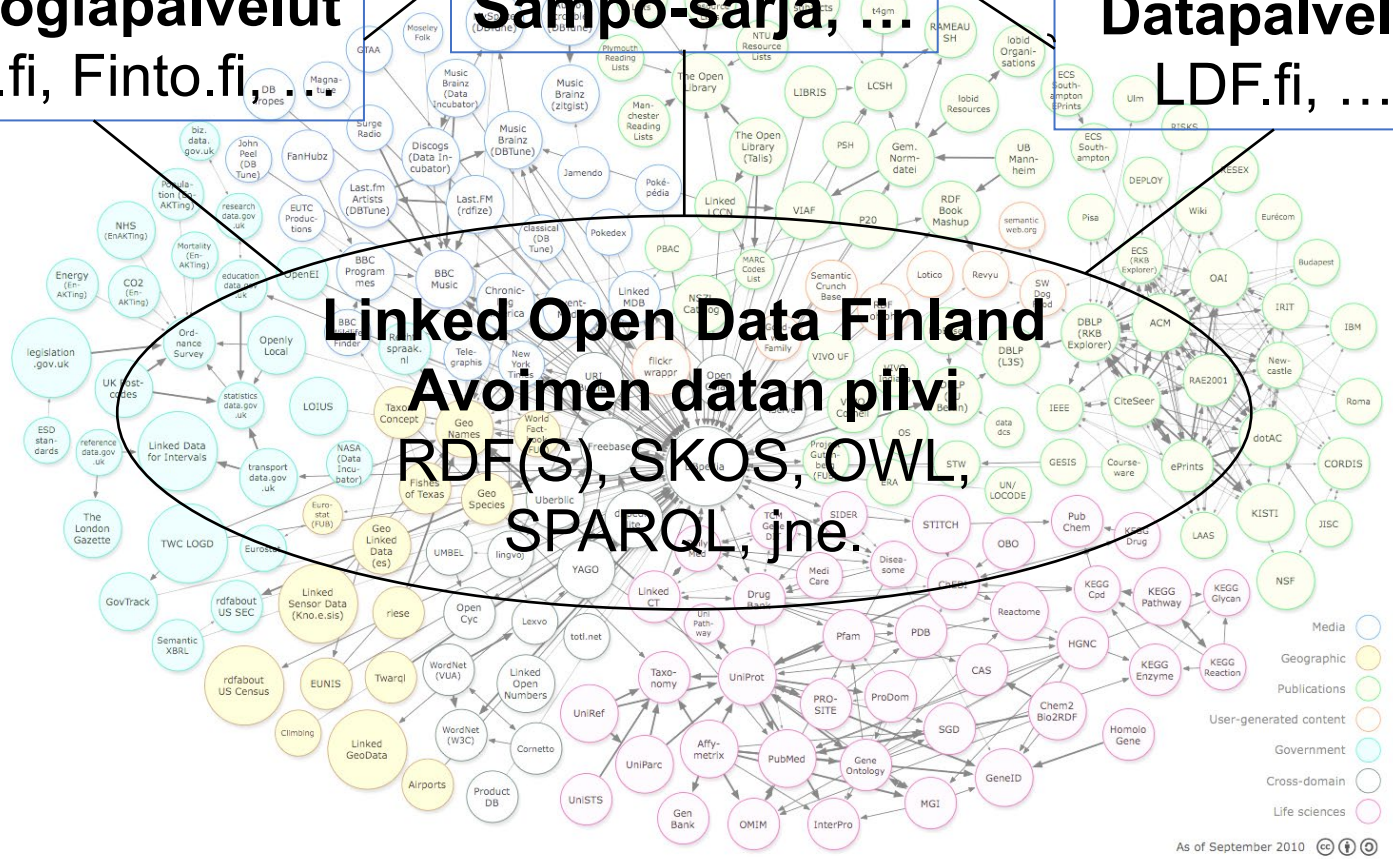


Linked Open Data Finland: Malli pähkinänkuoressa

Ontologiapalvelut
ONKI.fi, Finto.fi, …

Sovellukset:
Sampo-sarja, …

Datapalvelut
LDF.fi, …



Linked Open Data Finland
Avoimen datan pilvi
RDF(S), SKOS, OWL, SPARQL, jne.

Work in Progress in Finland

- 2001 Semantic Web Kick-Off in Finland seminar
- 2002-04 “MuseumFinland – Finnish Museums on the Semantic Web”
  - Need for an open national ontology infra was identified
- 2003-13 Finnish National Ontology Project FinnONTO
  - Transformed 15 national keyword thesauri into a LOD ontology cloud
  - Created living laboratory national ontology service ONKI.fi
    - Deployed by the National Library as FINTO.fi service in use since 2014
  - Created several application demonstrators
    - E.g. “CultureSampo – Finnish Culture on the Semantic Web” and “HealthFinland”
  - National effort with ca 50 funding participating organizations
- 2014-17 Linked Data (Science) Finland
  - Focus shift to Linked Open Data services & data analysis
  - Linked Data Finland service LDF.fi in use
- 2016- LODI4DH: Infrastructure for Digital Humanties in Finland
  - Ongoing joint work in HELDIG and Aalto University
- 2020- Several new research projects going on
  - HELDIG and Aalto

Welcome to joint collaborative work!
Universities & Cultural organizations & Companies

[Photo ©: Timo Väänänen]

Realization: Infrastructure in Practice

Sammon taonta, A. Gallen-Kallela, 1893, Ateneum

Data Models

The CIDOC CRM
Images, non-verbose…

Type:	Image
Title:	Allied Leaders at Yalta
Date:	1945
Publisher:	United Press International (UPI)
Source:	The Bettmann Archive
Copyright:	Corbis
References:	Churchill, Roosevelt, Stalin

Metadata

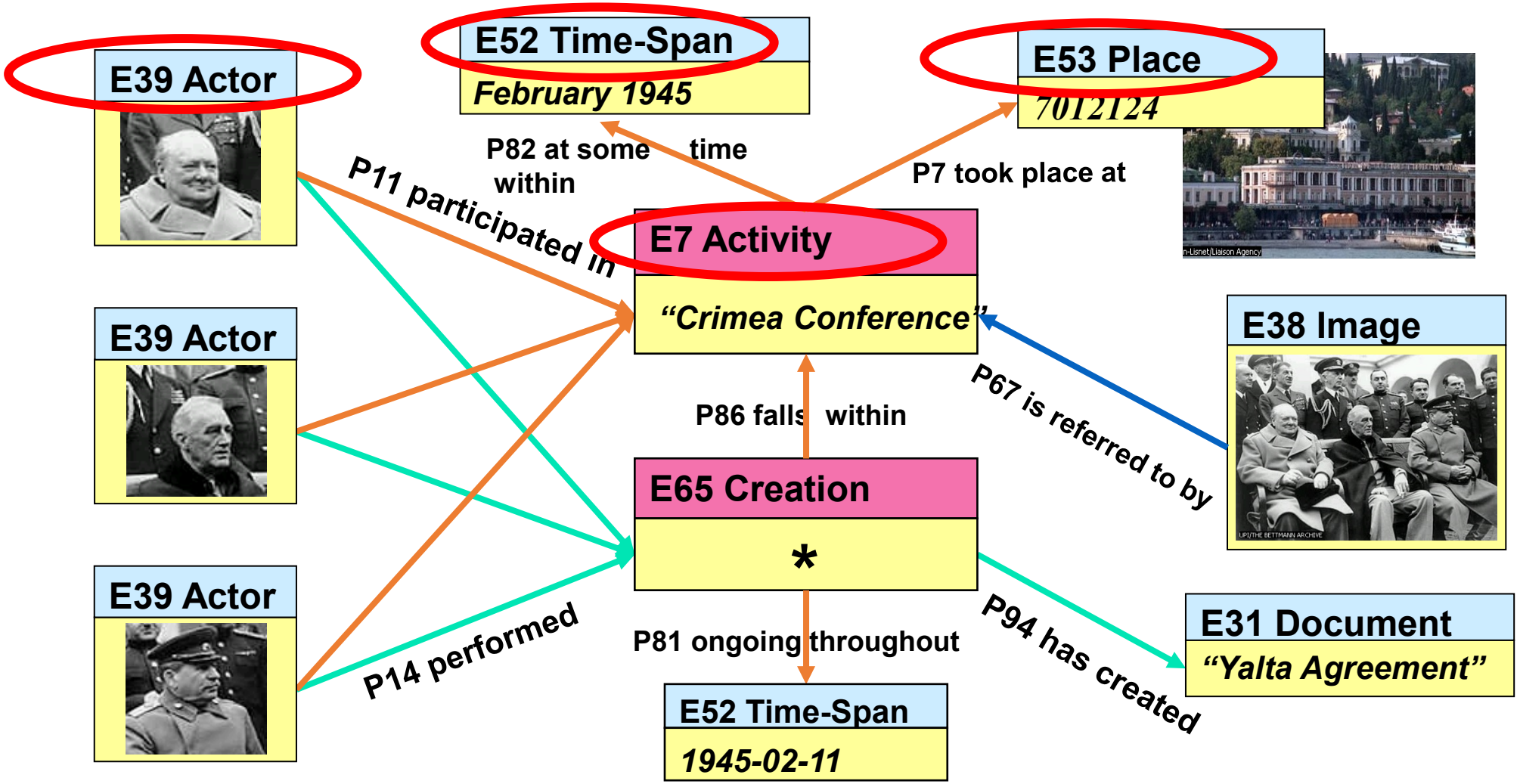
About…

Photos, Persons

[Slide by: Stephen Stead]

The CIDOC CRM

Explicit Events, Object Identity, Symmetry



[Slide by: Stephen Stead]

Search

CRMarchaeo
Excavation model

« Go to the CIDOC CRM website

Login for editing

Username *

Password *

Only administrators are allowed to edit the CIDOC-CRM website

Log in

Home

What is the CRMarchaeo?

CRMarchaeo is an extension of CIDOC CRM created to support the archaeological excavation process and all the various entities and activities related to it. The model has been created starting from standards and models already in use by national and international cultural heritage institutions, and has evolved through deep analysis of existing metadata from real archaeological documentation. It has been enriched by continuous collaboration with various communities of archaeologists from different countries and schools. Furthermore, it takes advantage of the concepts provided by CRMsci, from which it inherits most of the geological and stratigraphic principles that govern archaeological stratigraphy, extending these principles.

CRMarchaeo is intended to provide all necessary tools to manage and integrate existing documentation in order to formalise knowledge extracted from observations made by archaeologists, recorded in various ways and adopting different standards. In this sense, its purpose is to facilitate the semantic encoding, exchange, interoperability and access of existing archaeological documentation

CRMatchaeo is a proposal for approval by CIDOC CRM SIG

What is the idea?

CRMarchaeo takes inspiration from the basic idea on which archaeology is based according to Harris Matrix, that the features of an archaeological site are to be found in the stratified context, which is investigated by an archaeological excavation. It takes into consideration the physical arrangement of archaeological stratification and the events that led to the formation of a particular stratigraphic situation. The model comprises entities and properties for describing stratigraphic genesis and modifications and the natural phenomena or human intervention that led to their creation, the nature and shape of existing stratifications and surfaces, and the analysis of the human remains or artefacts found within the strata. This will enable archaeologists to determine the relative chronological order in which stratification was formed. The interpretation of the chronological sequences, also based on the space-time analysis of a specific site, provides all the elements needed for the reconstruction of the identity, life, beliefs, behaviour and activities of a given group of people in the past in that specific place.

Text status: To be reviewed

Ontology Services

https://seco.cs.aalto.fi/projects/lodi4dh/

Linked Open Data Infrastructure for Digital Humanities in Finland: LODI4DH

- Domain ontologies
  - Historical Keyword Concepts
  - Historical Places and Maps
  - Historical Persons
  - Historical Times
  - Historical Events
- Harmonizing metadata models: extending CIDOC CRM
- Develop ontology and linked data services online
  - Publish core LOD datasets at ONKI.fi and LDF.fi services
- Develop re-usable data analysis & knowledge discovery tooling
- Develop language technology and tooling for data publishing
- Foster education in DH (text book, online courses, …)
- Evaluate ideas by applications in use: “Sampo” series of portals

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semantic computing

Aalto University

Keywords

Classes (not named entities)

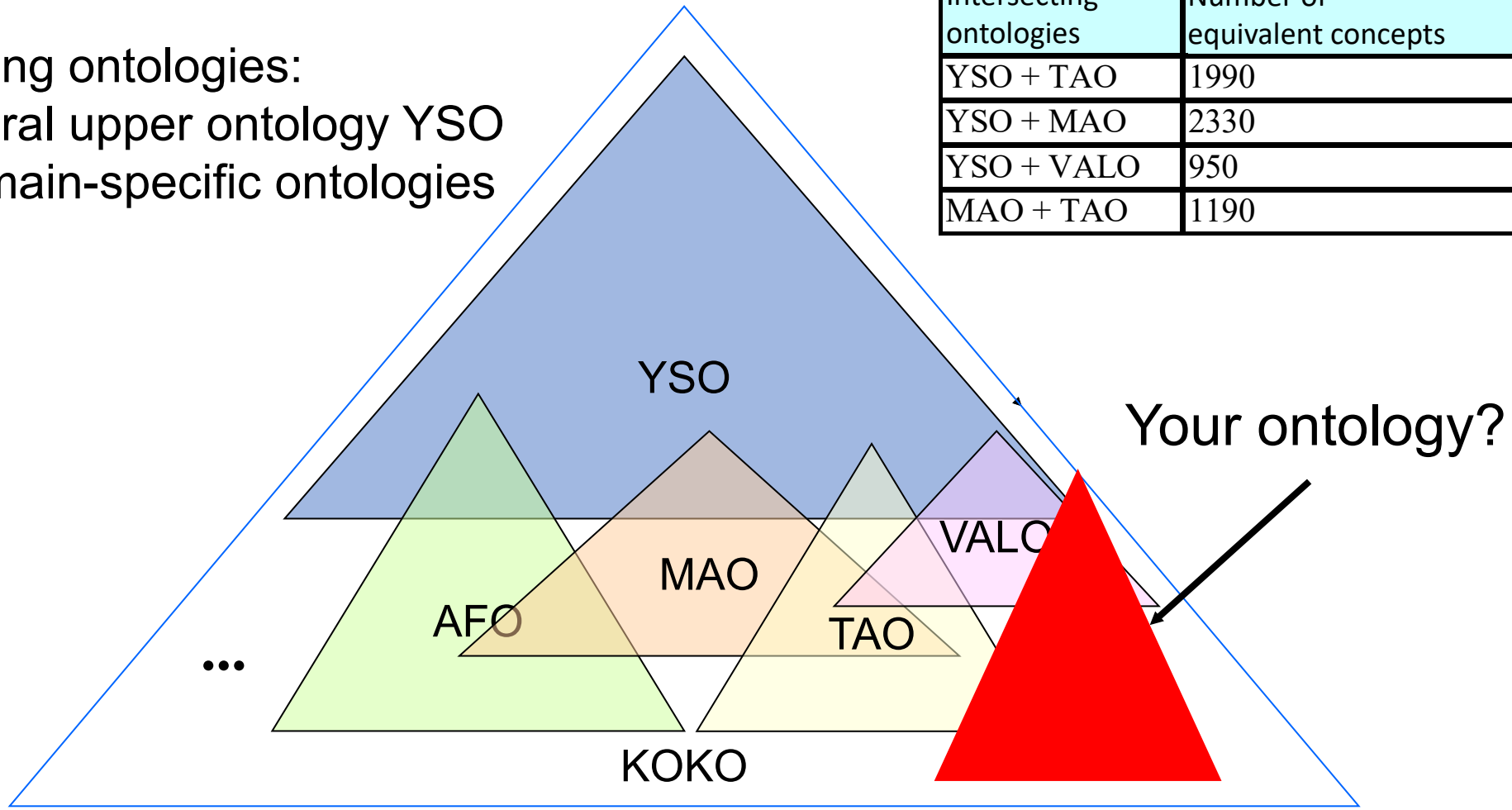
KOKO: Linked Open Ontology cloud

	Name	Ontology domain	Underlying thesaurus	Size	Maintaining Organization
1	YSO	General domain	General Finnish Thesaurus, YSA, Allärs	23700	National Library, Åbo Academy
2	MUSO	Music	Thesaurus of Music, MUSA/CILLA	1000	National Library
3	MAO	Museum domain	Thesaurus of Museum Domain, MASA	6800	National Board of Antiquities
4	AFO	Agriculture, foresty	Agriforest Thesaurus	5500	Viikki Science Library
5	TAO	Applied arts	Thesaurus of Applied Arts	2600	University of Eastern Finland and Library of Aalto University
6	VALO	Photography	Thesaurus of Photography Literature, Thesaurus of Photography Technology	1900	Finnish Museum of Photography
7	MERO	Seafaring, shipping	Thesaurus of Seafaring	1400	Finnish Transport Agency
8	KAUNO	Literature subjects	Thesaurus of Literature, Bella	4900	Finnish Public Libraries, Kirjastot.fi
9	JUHO	Public government	Thesaurus of Finnish Government, VNAS	6400	Ministry of Finance
10	TERO	Health promotion	YSA, TESA, MeSH, Stameta	22000	Various organizations
11	KITO	Literature research	Thesaurus of Literature Research	900	Finnish Literature Society
12	KULO	Culture research	Thesaurus for Folk Culture Studies	1600	Finnish Literature Society
13	KTO	Linguistics	Thesaurus of Linguistics	1000	Research Institute for the Languages in
14	PUHO	Defense	Thesaurus of Defence Administration	2000	Finnish Defence Forces
15	POIO	Points of interest	TGN, Geonames, LDG, SUO	4600	Various organizations
	TOTAL			**86300**	

Holistic Collaborative Finnish Ontology KOKO

Aligning ontologies:
General upper ontology YSO
+ domain-specific ontologies

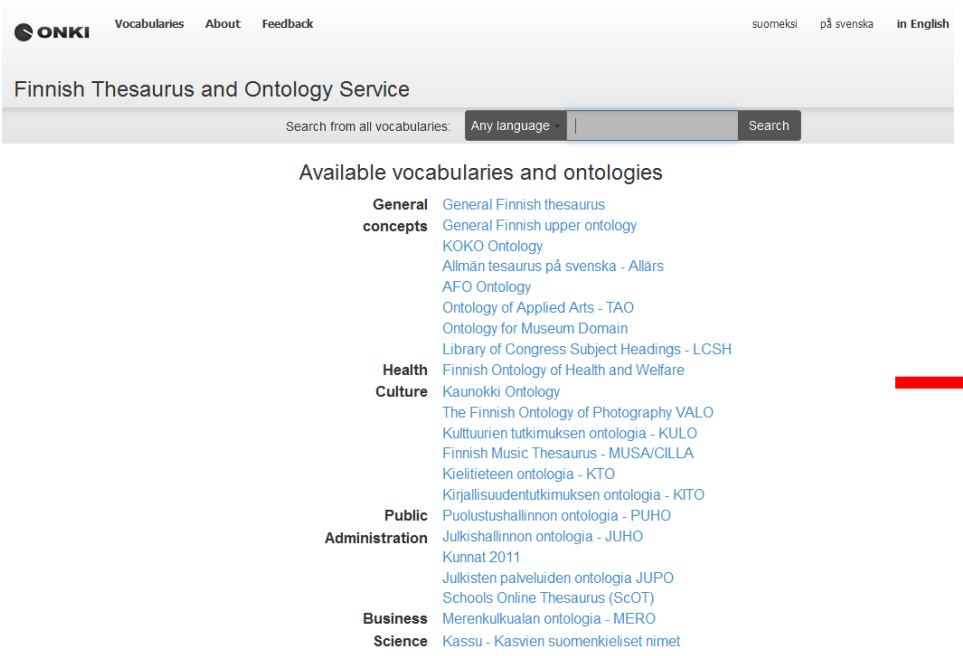
Intersecting ontologies	Number of equivalent concepts
YSO + TAO	1990
YSO + MAO	2330
YSO + VALO	950
MAO + TAO	1190

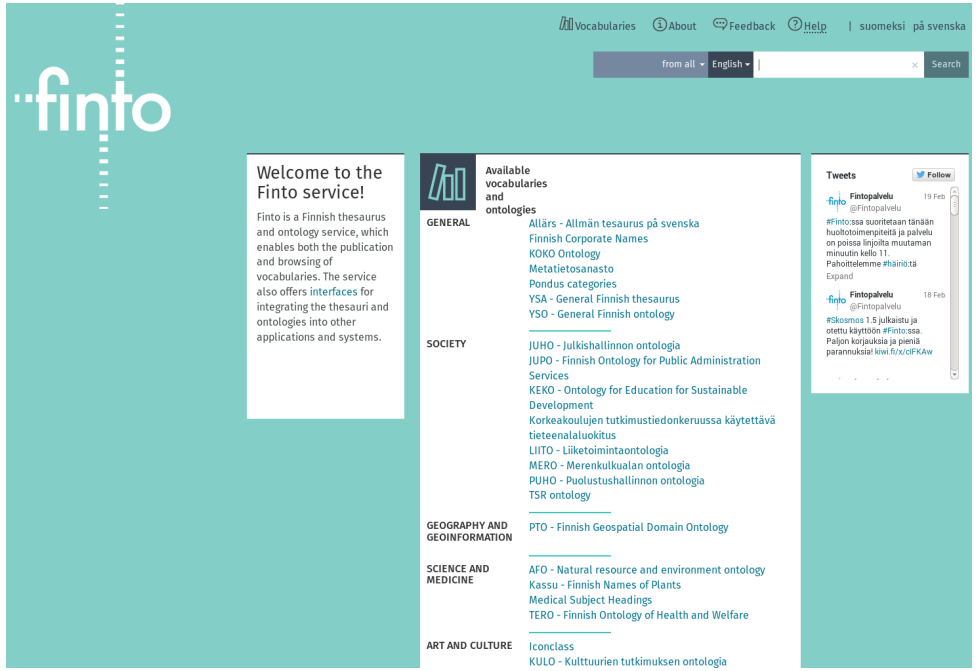


[Hyvönen et al., ESWC 2009]

KOKO ontologies and ONKI Light deployed January 2014 by the National Library as Finto

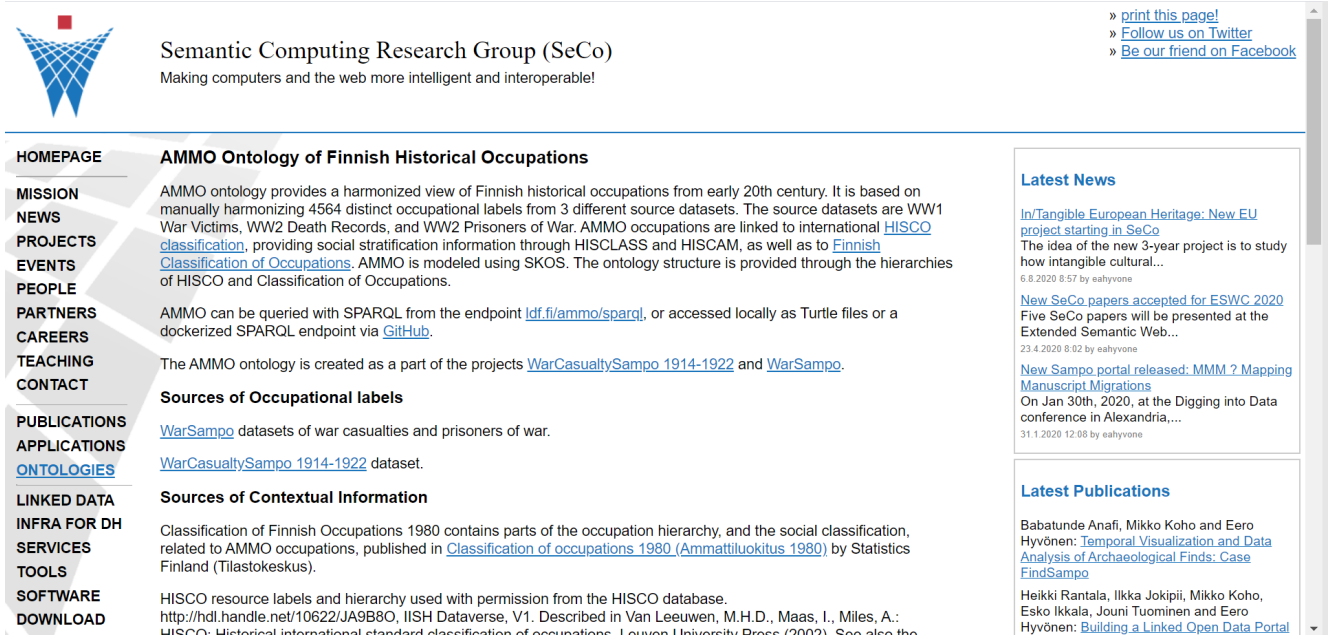
Permanent free national service funded by
Ministry of Education and Culture and Ministry of Finance
2019: 32 million API calls





New Keyword Ontologies 1: AMMO Ontology of Finnish Historical Occupatios

- Based on 4564 occupational labels from 3 source datasets
  - WarVictimSampo 1914-1922, WarSampo casualities. and Prisoners of War
- Linked to international HISCO classification
- https://seco.cs.aalto.fi/ontologies/ammo/



Semantic Computing Research Group (SeCo)

Making computers and the web more intelligent and interoperable!

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TEACHING
CONTACT
PUBLICATIONS
APPLICATIONS
ONTOLOGIES
LINKED DATA
INFRA FOR DH
SERVICES
TOOLS
SOFTWARE
DOWNLOAD

AMMO Ontology of Finnish Historical Occupations

AMMO ontology provides a harmonized view of Finnish historical occupations from early 20th century. It is based on manually harmonizing 4564 distinct occupational labels from 3 different source datasets. The source datasets are WW1 War Victims, WW2 Death Records, and WW2 Prisoners of War. AMMO occupations are linked to international HISCO classification, providing social stratification information through HISCLASS and HISCAM, as well as to Finnish Classification of Occupations. AMMO is modeled using SKOS. The ontology structure is provided through the hierarchies of HISCO and Classification of Occupations.

AMMO can be queried with SPARQL from the endpoint ldf.fi/ammo/sparql, or accessed locally as Turtle files or a dockerized SPARQL endpoint via GitHub.

The AMMO ontology is created as a part of the projects WarCasualtySampo 1914-1922 and WarSampo.

Sources of Occupational labels

WarSampo datasets of war casualties and prisoners of war.

WarCasualtySampo 1914-1922 dataset.

Sources of Contextual Information

Classification of Finnish Occupations 1980 contains parts of the occupation hierarchy, and the social classification, related to AMMO occupations, published in Classification of occupations 1980 (Ammattiluokitus 1980) by Statistics Finland (Tilastokeskus).

HISCO resource labels and hierarchy used with permission from the HISCO database.
http://hdl.handle.net/10622/JA9B8O, IISH Dataverse, V1. Described in Van Leeuwen, M.H.D., Maas, I., Miles, A.:

Latest News

In/Tangible European Heritage: New EU project starting in SeCo
The idea of the new 3-year project is to study how intangible cultural...
6.8.2020 8:57 by eahyvone

New SeCo papers accepted for ESWC 2020
Five SeCo papers will be presented at the Extended Semantic Web...
23.4.2020 8:02 by eahyvone

New Sampo portal released: MMM ? Mapping Manuscript Migrations
On Jan 30th, 2020, at the Digging into Data conference in Alexandria,...
31.1.2020 12:08 by eahyvone

Latest Publications

Babatunde Anafi, Mikko Koho and Eero Hyvönen: Temporal Visualization and Data Analysis of Archaeological Finds: Case FindSampo

Heikki Rantala, Ilkka Jokipii, Mikko Koho, Esko Ikkala, Jouni Tuominen and Eero Hyvönen: Building a Linked Open Data Portal

New Keyword Ontologies 1: Archaeological Object and Material Ontologies

- Based on MAO and archaeological databases of Finnish Heritage Agency
- Interlinked with international Art and Architechecture Thesaurus of Getty
- Related to FindSampo (SuALT) and AriadnePlus projects
- https://seco.cs.aalto.fi/projects/sualt/

	A	B	C	D	E	F
1	**Level 0**	**Level 1**	**Level 2**		**Mao1**	**Huomio**
2	ase				mao:aseet	
3		ammus			mao:ammukset	
4		aseen osa			mao:aseiden osat	
5		suojavaruste			mao:suojavarusteet	
6	astia				mao:astiat	
7	hela				mao:helat	sis. kaikki helat
8	idoli				mao:idolit	
9	jäte				mao:jätteet (jäännökset)	sis. työstöjäte + sulanut/palanut materia
10	kirves				mao:kirveet	sis. kaikki kirveet, myös sotakirveet. Kirveet myös työvälineissä
11	koru				mao:korut	Jako koruihin tulkinnallinen. Nyt koruja myös ne esineet, jotka asusteisiin tai pukeutumiseen liittyviä.
12		hela			mao:helat	sis. koruiksi määriteltävät helat,
13		helmi			mao:helmet	
14		hiuskoriste			mao:hiuskoristeet	
15		jakaja			mao:jakajat	
16		kantaja			mao:kantajat	
17		kaulakoru			mao:kaulakorut	
18		ketju (koru)			mao:ketjut (korut)	
19		kivikoru			mao:kivikorut	
20		koruneula			mao:koruneulat	sis.hiusneula
21		korvakoru			mao:korvakorut	
22		luukoru			mao:luukorut	
23		medaljonki			mao:medaljongit	
24		meripihkakoru			mao:meripihkakorut	
25		nappi			mao:napit	sis.korunapit
26		nilkkakoru			mao:nilkkakorut	
27		ohimokoru			mao:ohimokorut	
28		rannerengas			mao:rannerenkaat	
29		riipus			mao:riipukset	
30		solki			mao:soljet	sis. vain korusoljet (ml. vyönsolki)
31		sormus			mao:sormukset	
32	lasi				mao:lasi	rakennustarvike alla
33	luu				mao:luulöydöt	
34	maksuväline				mao:maksuvälineet	
35		grivna (metallitanko)			mao:grivnat (metallitangot)	
36		maksurannerengas			mao:maksurannerenkaat	
37		maksusormus			mao:maksusormukset	
38		raha			mao:rahat	
39	palanut materia				-	lisätty termi, ei MAO:ssa
40	pukine				mao:pukineet	
41		jalkine			mao:jalkineet	
42		vaate			mao:vaatteet	
43	raaka-aine				mao:raaka-aineet	sis.harkot (metalliset)
44	rakennustarvike				mao:rakennustarvikkeet	
45		lasi			mao:lasit	
46	solki				mao:soljet	sis. kaikki soljet
47	sulanut materia				-	lisätty termi, ei MAO:ssa

FindSampo: Archaeological Objects Facet

Collaborations with:
- MAO archaeology developers
- Termipankki archaeology developers

Actors

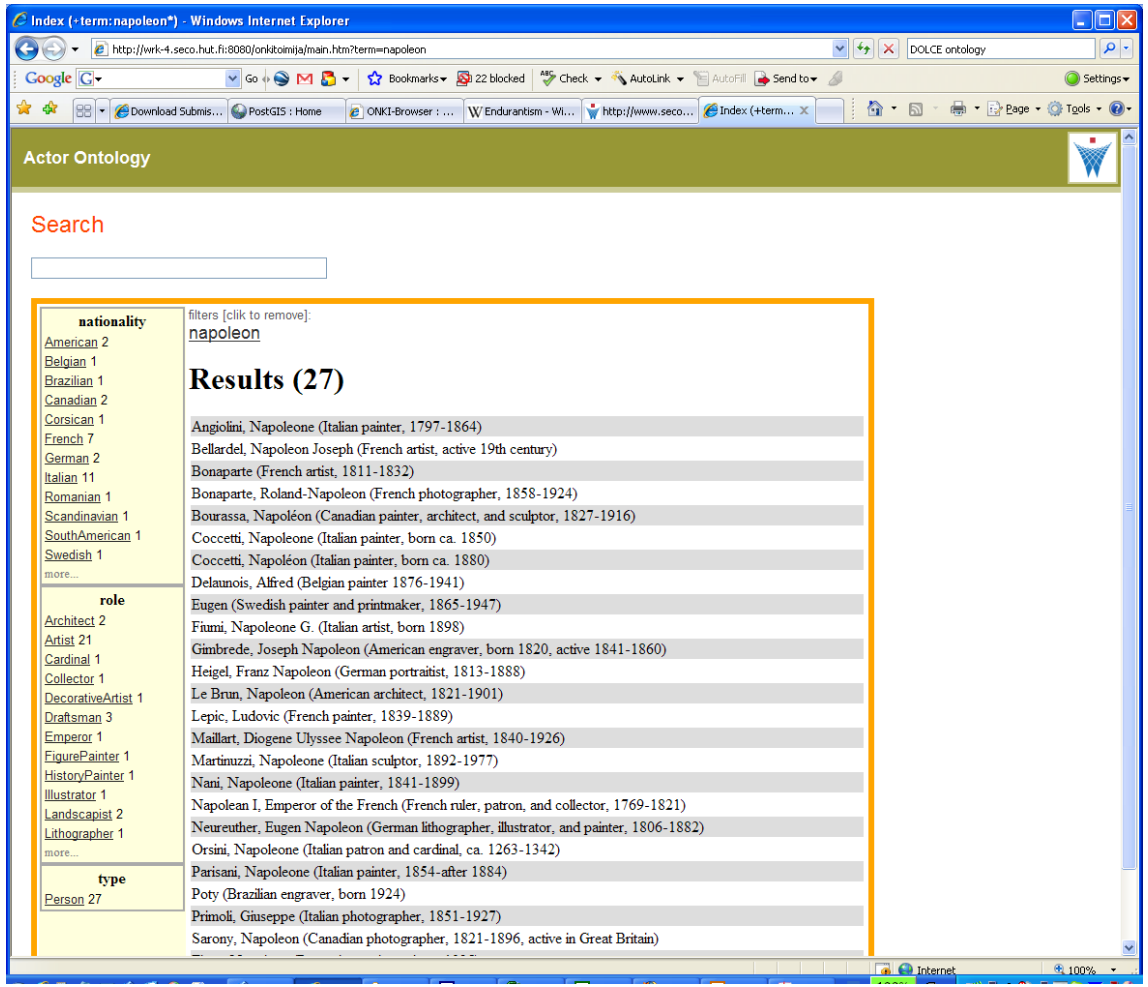
Persons, groups, organizartions

Actor ontologies: resolving identities

URI: http://dbpedia.org/resource/Pyotr_Ilyich_Tchaikovsky

Pjotr Tšaikovski (fi)
Пётр Ильи́ч Чайко́вский (ru)
Pyotr Ilyich Tchaikovsky (en)
Pjotr Tjajkovskij (sv)
Pjotr Tsjajkovskij (no)
Pjotr Iljitsch Tschaikowski (de)
Piotr Ilitch Tchaïkovski (fr)
Piotr Ilich Chaikovski (es)
Pëtr Il'ič Čajkovskij (it)
Pjotr Iljitsj Tsjaikovski (nl)
Piotr Ilitch Tchaikovsky (pt)
Piotr Czajkowski (pl)
Piotr Ilici Ceaikovski (ro)
Pjotr Iljics Csajkovszkij (hu)

ONKI People (2010): A demo with Getty Union List of Artist Names



120,000 Instances

[Kurki, Hyvönen, ICSD, 2010]

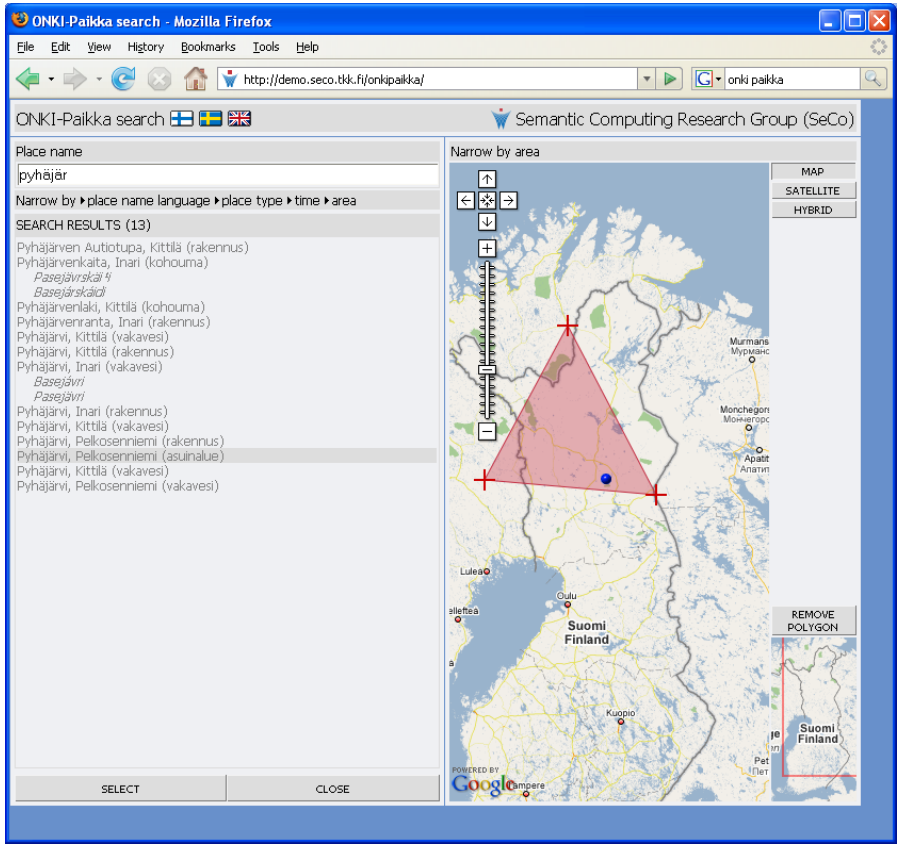
Historical Finnish Actors (in Sampo Systems)

- WarSampo (100 000 persons)
- Norssi Alumni (Vanhat Norssit) (21 000 persons)
- WarVictimSampo 1914-1922 (42 000 persons)
- BiographySampo (13 000 persons + 70 000 related ones)
- AcademySampo (28 000 persons + 54 000 related ones)

Historical Places

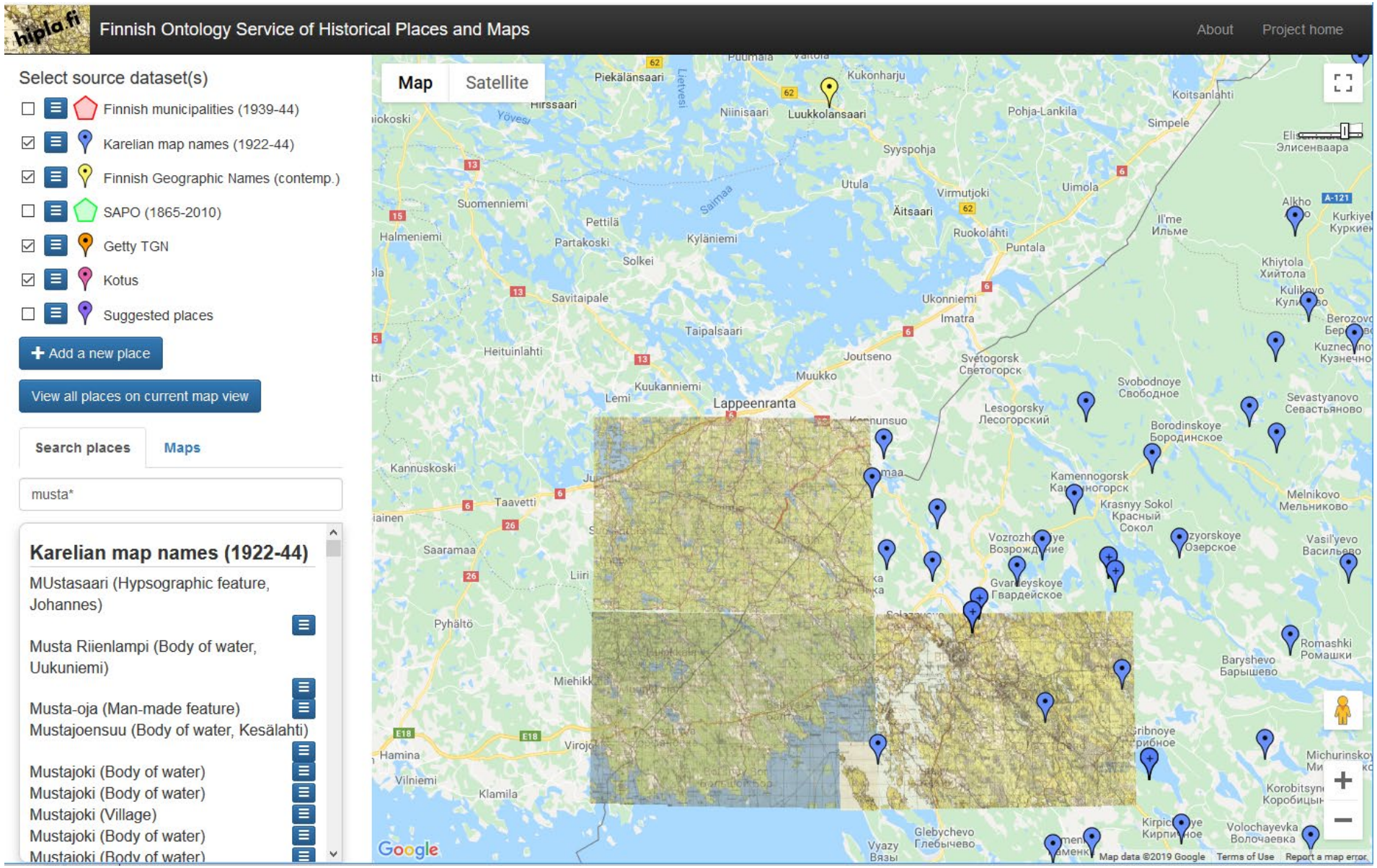
ONKI Geo for Geo-ontologies (2008)

http://demo.seco.tkk.fi/onkipaikka/



800,000
contempory
Finnish places
of National Survey

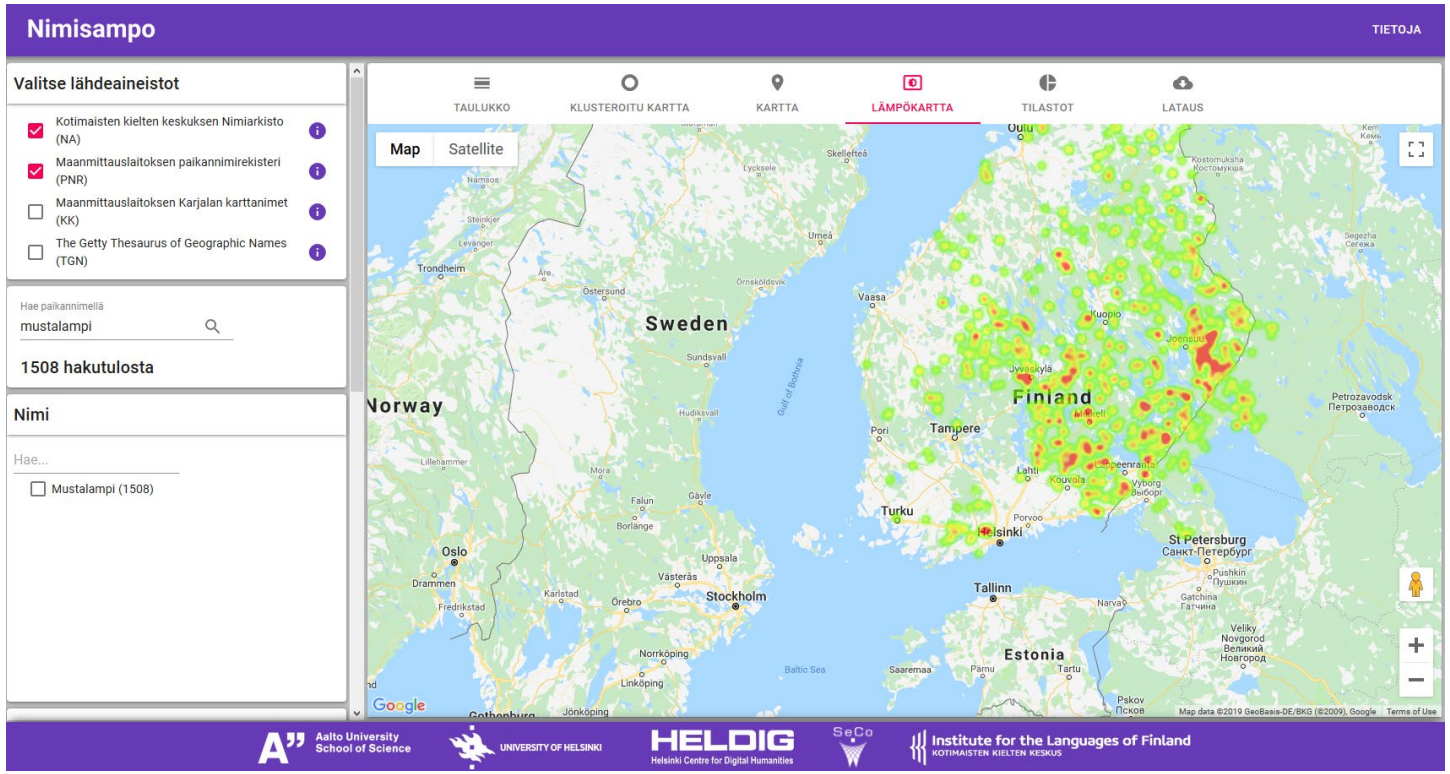
Finnish Ontology Service of Historical Places and Maps (2016): http://hipla.fi



[Hyvönen et al. 2016, Ikkala et al. 2016]

NameSampo (2019): http://nimisampo.fi

- 2 million place names (KOTUS Name Archive)
- 800 000 place names (National Survey)
- 1 100 000 place names (Getty Thesaurus of Geographical Names)



[Ikkala et al., 2019]

Pelagios network

The Pelagios Network connects researchers, scientists and curators to link and explore the history of places.

More about Pelagios | Become a Partner

Join the discussion

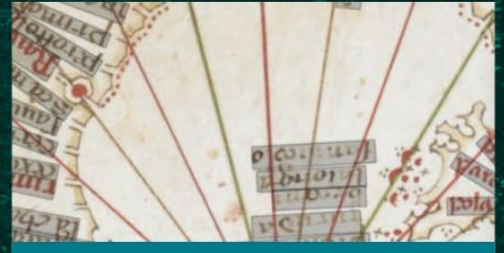
Read our blog

Discover Recogito

Find us on Github

https://pelagios.org/

Bringing damaged documents back to life



Medieval sea-charts: accurate before their time

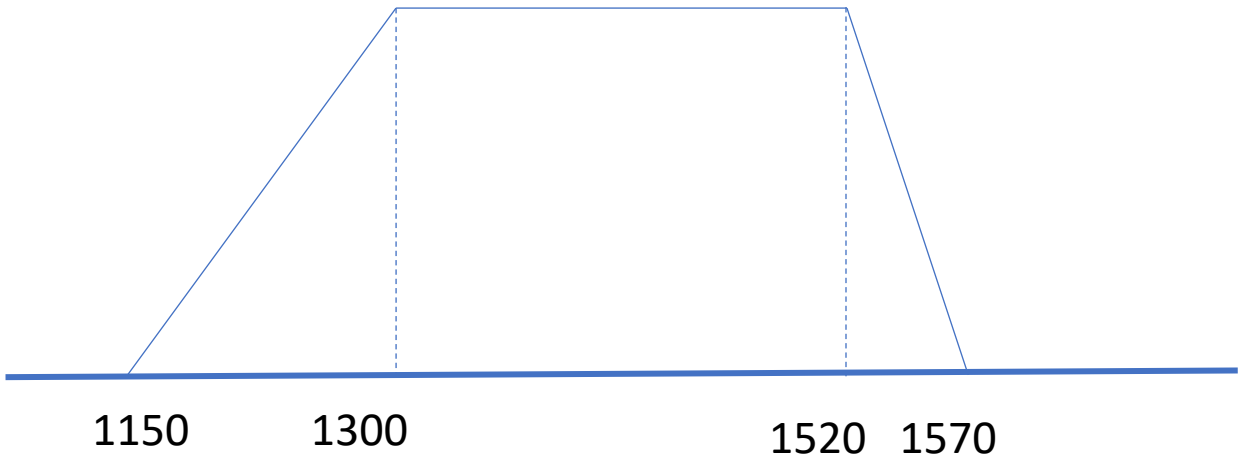
What are urban gazetteers?

Creating an Ottoman Gazetteer

Linked Data in the classroom

Historical Time Periods

Middle Age (Keskiaika) in Finland



FindSampo: Time Periods in Finland Facet

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Level 0	Level 1	Level 2	Level 3	Level 4	Level 5	begin of begin	end of begin	begin of end	end of end	MAO	Definition	Provenance link : TP	Notes	
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			varhaismesoliittinen kivikausi			−8850			−8000	http://www.yso.fi/onto/mao/p10592				
			keskimesoliittinen kivikausi			−8000			−6800	http://www.yso.fi/onto/mao/p10944				
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		vanhempi pronssikausi				−1700			−1100	http://www.yso.fi/onto/mao/p10319				
		nuorempi pronssikausi				−1100			−500	http://www.yso.fi/onto/mao/p10174				
	rautakausi					−500		1150	1300	http://www.yso.fi/onto/mao/p1006				
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			nuorempi roomalaisaika			150	200	375	400	http://www.yso.fi/onto/mao/p10195				
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			kansainvaellusaika			375	400	550	600	http://www.yso.fi/onto/mao/p3835				
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		varhaiskeskiaika				1150			1323	http://www.yso.fi/onto/mao/p8249				
		sydänkeskiaika				1323			1397	http://www.yso.fi/onto/mao/p9908				
		myöhäiskeskiaika				1397			1550	http://www.yso.fi/onto/mao/p8382				
	uusi aika					1550			2099	http://www.yso.fi/onto/mao/p2250				
		1500-luku				1500			1599	http://www.yso.fi/onto/mao/p8820				
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		1700-luku				1700			1799	http://www.yso.fi/onto/mao/p9418, http://www.yso.fi/onto/mao/p8076				
		1800-luku				1800			1899	http://www.yso.fi/onto/mao/p8284				
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		2000-luku				2000			2099					
Ajoittamaton														

Español

Download Guide Motivation Technical overview Publications Contact Thanks

PeriodO

A gazetteer of periods for linking and visualizing data.

Download the periods.

JSON Turtle CSV

Browse and edit periods.

PeriodO client

What is this?

PeriodO is a public domain gazetteer of scholarly definitions of historical, art-historical, and archaeological periods. It eases the task of linking among datasets that define periods differently. It also helps scholars and students see where period definitions overlap or diverge.

Who are you?

The PeriodO project is led by Adam Rabinowitz (University of Texas at Austin) and Ryan Shaw (University of North Carolina at Chapel Hill). Patrick Golden is the lead developer of the PeriodO software. The PeriodO dataset has been developed largely by our generous contributors. Our work has been funded

Tell me more.

Start by looking at the guide to using PeriodO.

You may also be interested in reading about the motivation for the project or getting a technical overview. Further information can be found in our publications. To keep up with PeriodO developments,

http://perio.do

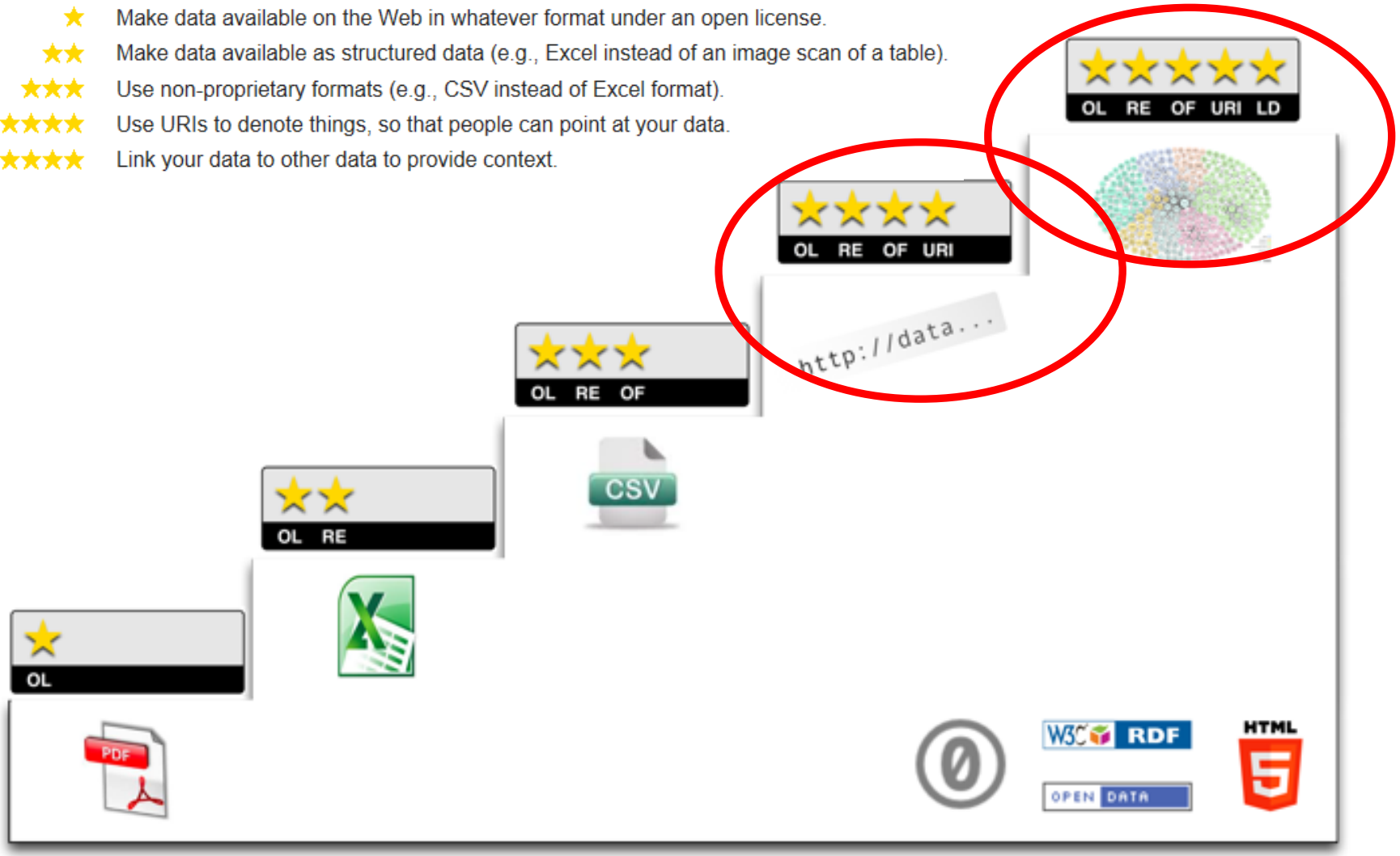
Data Services

Linked Data Finland Platform LDF.fi

The home of all Sampos and more

How to publish Linked Data?
5-star Linked Data model

- ★ Make data available on the Web in whatever format under an open license.
- ★★ Make data available as structured data (e.g., Excel instead of an image scan of a table).
- ★★★ Use non-proprietary formats (e.g., CSV instead of Excel format).
- ★★★★ Use URIs to denote things, so that people can point at your data.
- ★★★★★ Link your data to other data to provide context.



(Tim Berners-Lee)
http://5stardata.info

Our ”7-star” model and LDF.fi data hotel

Goals: enhance re-usability and data quality

7-star Linked Data Service

However, in our opinion, providing 5-star Linked Data is just the beginning. To actually make use of the datasets, consumers need more support in getting to know and access them, as well as a better grasp of their quality and provenance. To this end, we extend the model with two additional stars:

★★★★★★ Provide your data with a schema and documentation so that people can *understand and re-use* your data easily.

★★★★★★★ Validate your data and denote its provenance so that people can *trust the quality* of your data.

This added support should come with as little extra work as possible to the data publisher. Our hypothesis is that a lot of this can be done automatically, basing on the Linked Data core. A data publisher needs only to provide their data in the RDF format, and the LDF.fi portal will do the rest automatically. See the overview paper (in ESWC 2014 Proceedings, Springer-Verlag) for some more details about the underlying ideas.

Burj Al Arab

[Hyvönen et al., 2014]

Linked Data Finland Living Lab http://ldf.fi

- Home
- Project
- Datasets
- Schemas
- Services
- Policies
- Documentation
- Validation
- Applications
- Your Data?

Linked Data Finland

Living Laboratory Data Service for the Semantic Web

This site is the Living Laboratory of the Linked Data Finland research initiative, conducted by the Semantic Computing Research Group at Aalto University in collaboration with University of Helsinki and a large consortium of Finnish public organizations and companies.

Our goal is to make life easier for both publishers as well as consumers of structured data on the Web. We base our work on the Linked Data paradigm and stack of standards, which combines an expressive, semantic data model (RDF) with standardized access mechanisms (SPARQL and live HTTP URIs).

5-star Linked Data

The baseline of our work is the 5-star Linked Data model, proposed originally by Tim Berners-Lee.

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Example dataset homepage: Finnish Legislation and Case Law as Linked Data

Semantic Finlex

Linked Data Finland

★★★★★★

- Home
- Project
- Datasets
- Schemas
- Services
- Policies
- Documentation
- Validation
- Applications
- Your Data?

This dataset includes data regarding Finnish legislation and court decisions. The RDF data has been converted using data from the Finlex service; we call the new dataset Semantic Finlex. Special thanks to the Ministry of Justice, Edita Publishing Ltd. and Talentum Corp.

License

CC BY 4.0

See possible graph-specific licenses below.

Detailed Dataset Contents

Finnish Legislation (URI: http://ldf.fi/finlex/laki/)

(Browse data / Download)
Finnish acts and decrees.

Example resource URI: http://ldf.fi/finlex/laki/statute-sd18890039

Finnish Court Decisions (URI: http://ldf.fi/finlex/oikeus/)

(Browse data / Download)
Decisions of the Supreme Court and the Supreme Administrative Court.

Example resource URI: http://ldf.fi/finlex/oikeus/courtKKO

Schemas Used

Following schemas (vocabularies) are used in the datasets above:

- Schema: http://purl.org/finlex/schema/laki/
- Schema: http://purl.org/finlex/schema/oikeus/

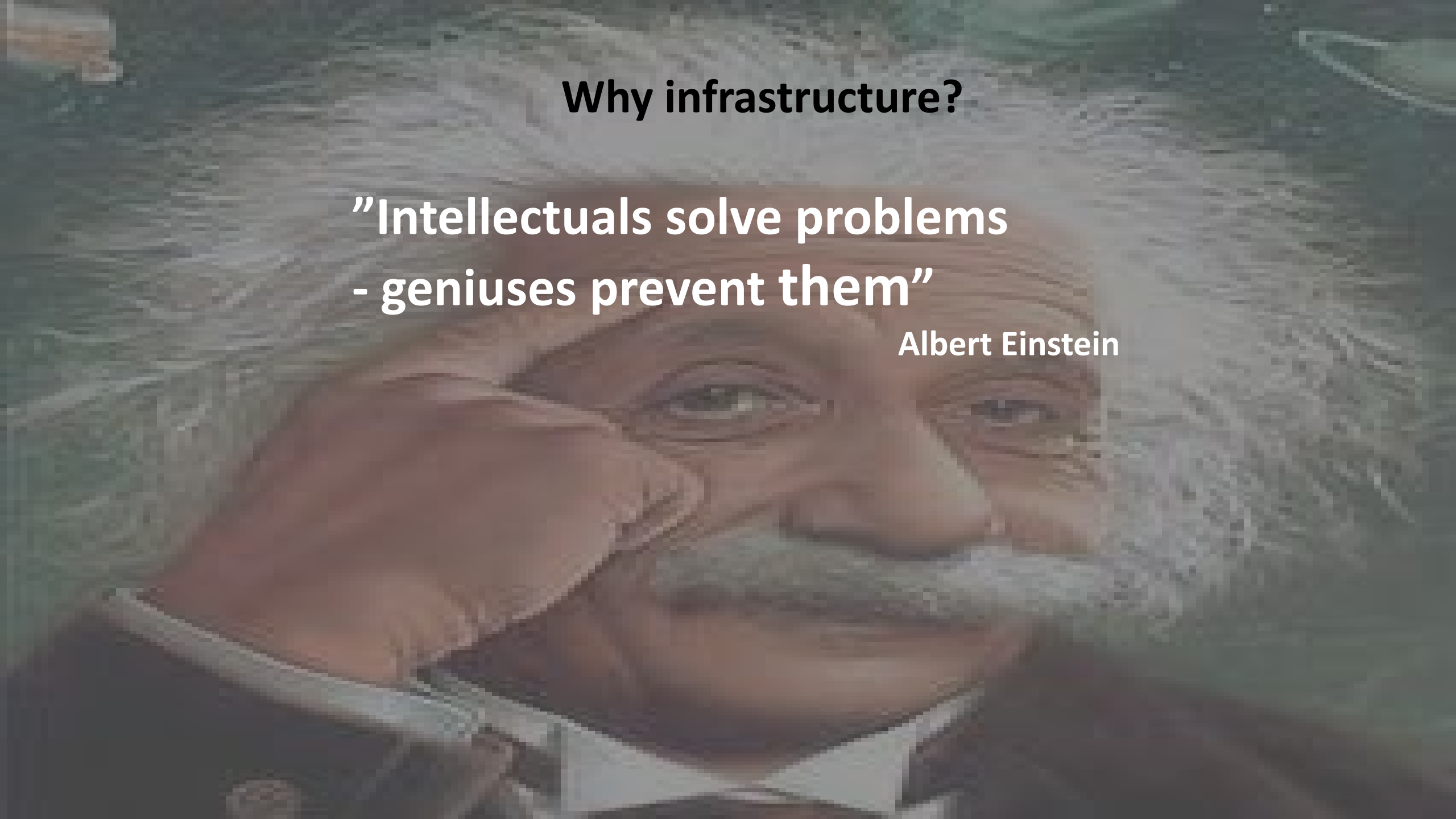
Vocabulary Usage Analysis and Quality Issues

Following analyses tell what schemas (vocabularies) are used in the dataset graphs and how they have been used. Issues on data quality are pointed out.

Need for Language Technology: http://nlp.ldf.fi (tulossa)

- The source data is typically text with little structure
- In DH research and applications semantic data (= machine "understandable") needed!
  - Speech / Image -> text (OCR)
  - Text -> entities/concepts (e.g. NER/NEL)
  - Entities/concepts-> relations
  - Relations -> events
  - Events -> language understanding
  - Language understanding -> knowledge discovery
  - Knowledge discovery -> computational creativity

Why infrastructure?



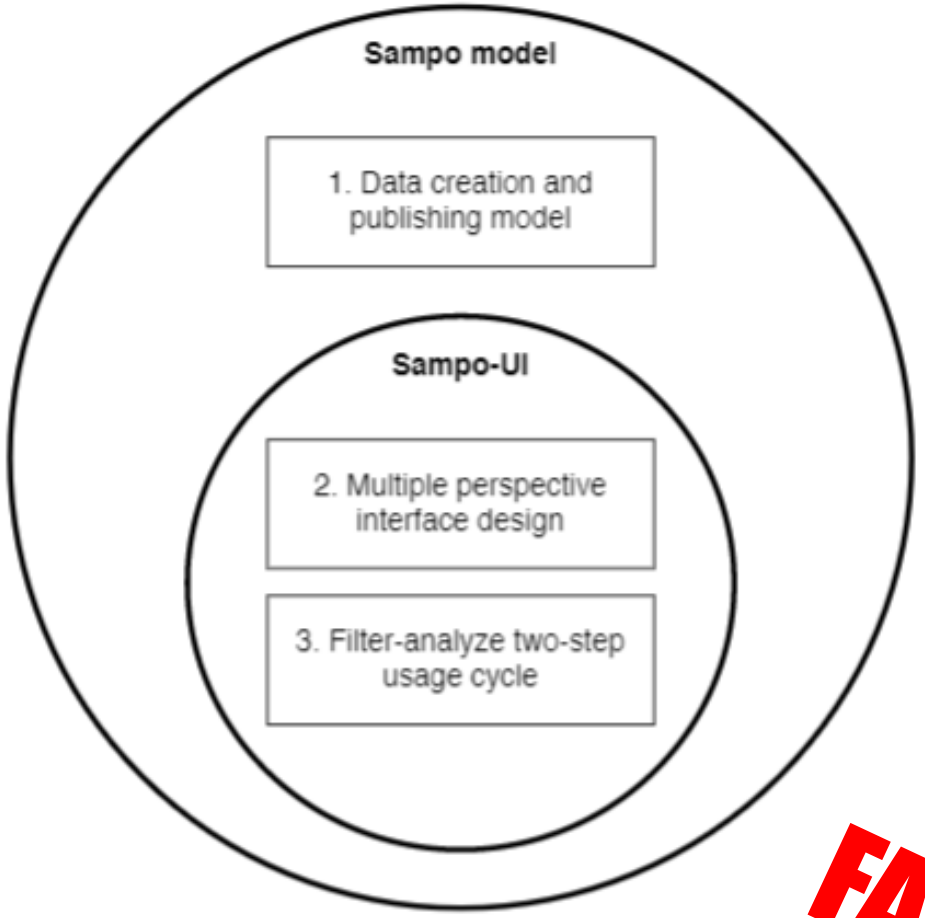
”Intellectuals solve problems
- geniuses prevent them”

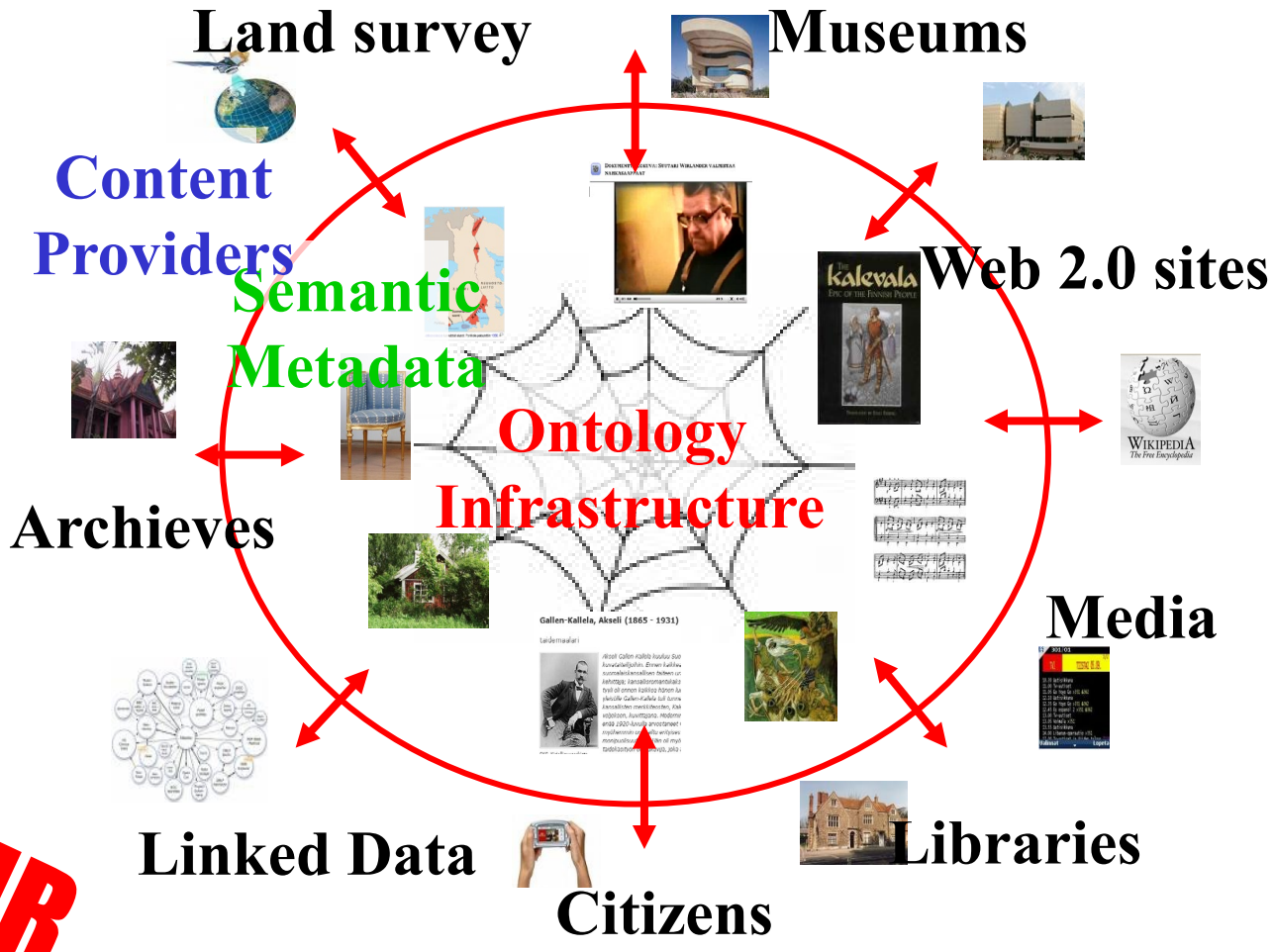
Albert Einstein

Applications

Sampo Model and Sampo Portals

”Sampo” Model and Sampo-UI Framework





FAIR

Fig. 1. Sampo model and Sampo-UI framework

Sampo = Mythical artifact of the Finnish Epic Kalevala that gives to its owner riches and good fortune.
A metaphore of amazing technology.

Defense of Sampo,
National Gallery, Ateneum,
A. Gallen-Kallela, 1896

Cultural Heritage ”Sampos” on the Semantic Web 2004-

Defense of Sampo, Ateneum,
A. Gallen-Kallela, 1896

1. **MuseumFinland** – Finnish Museums on the Semantic Web (2004)
2. **CultureSampo** – Finnish Culture on the Semantic Web (2008)
3. **TravelSampo -** Mobile Contextualized Services of Cultural Tourism (2011)
4. **BookSampo** – Finnish Fiction Literature on the Semantic Web (2011) **[2 million users in 2019]**
5. **WW1LOD** – World War I Linked Open Data (2014)
6. **WarSampo –** Finnish World War 2 on the Semantic Web (2015-19) **[742 000 users]**
7. **Norssi Alumni on the Semantic Web** – Historical person registry using LOD (2017)
8. **U.S. Congress Prosopographer** – U.S. Congress Legislators 1789-2018
9. **BiographySampo** - Finnish Biographies on the Semantic Web (2018-20) **[39 000 users]**
10. **NameSampo –** Linked Data Workbench for Toponomastic Research (2019) **[37 000 users]**
11. **WarVictimSampo 1914-1922** – National War History **[23 000 users]**
12. **Mapping Manuscript Migrations (MMM)** – medieval and Renaissance manuscripts (2020)

https://seco.cs.aalto.fi/applications/sampo/

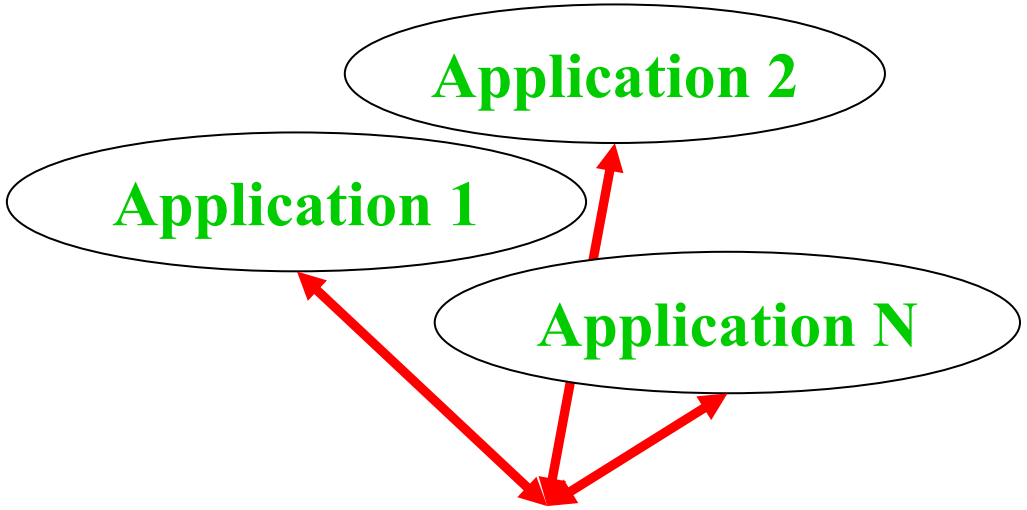
https://seco.cs.aalto.fi/applications/sampo/

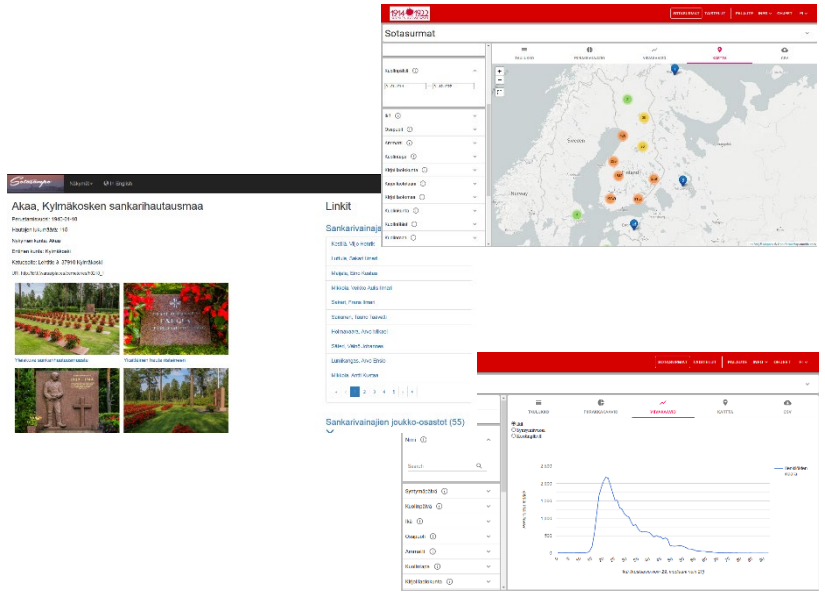
New Sampos Underway: Towards SampoSampo Network!

- **FindSampo**
  - Archaeology & Citizen Science of metal detectorists, with Finnish Heritage Agency (2017-2021)
- **LawSampo**
  - Finnish Legislation and Case Law, with Ministry of Justice of Finland (2019-)
- **AcademySampo**
  - Historical Finnish Academic People in 1640–1899 (2019-)
- **ParliamentSampo**
  - Parliament of Finland data 1907-2020, (2020-2022)
- **HistorySampo**
  - A time machine of Finland (2020-)
- **LetterSampo**
  - Republic of Letters 1400-1800 data (2020-)

How to Forge Sampos on the Semantic Web?

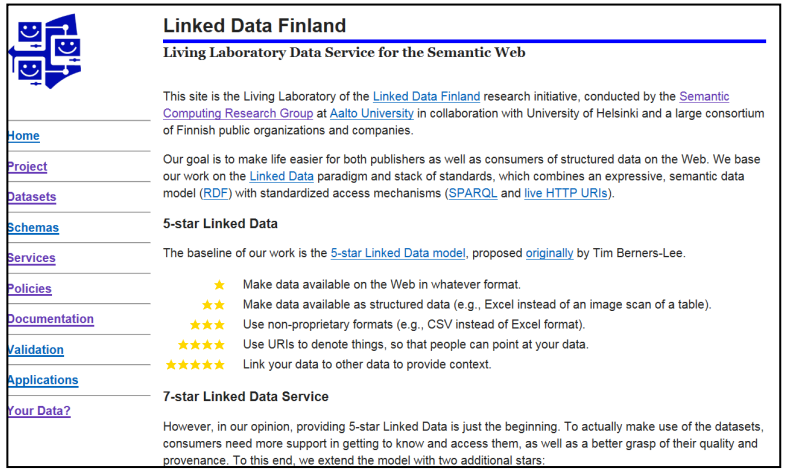
Client Side (Browser)





SPARQL End Point

Linked Data Finland Service
WWW Standard Model



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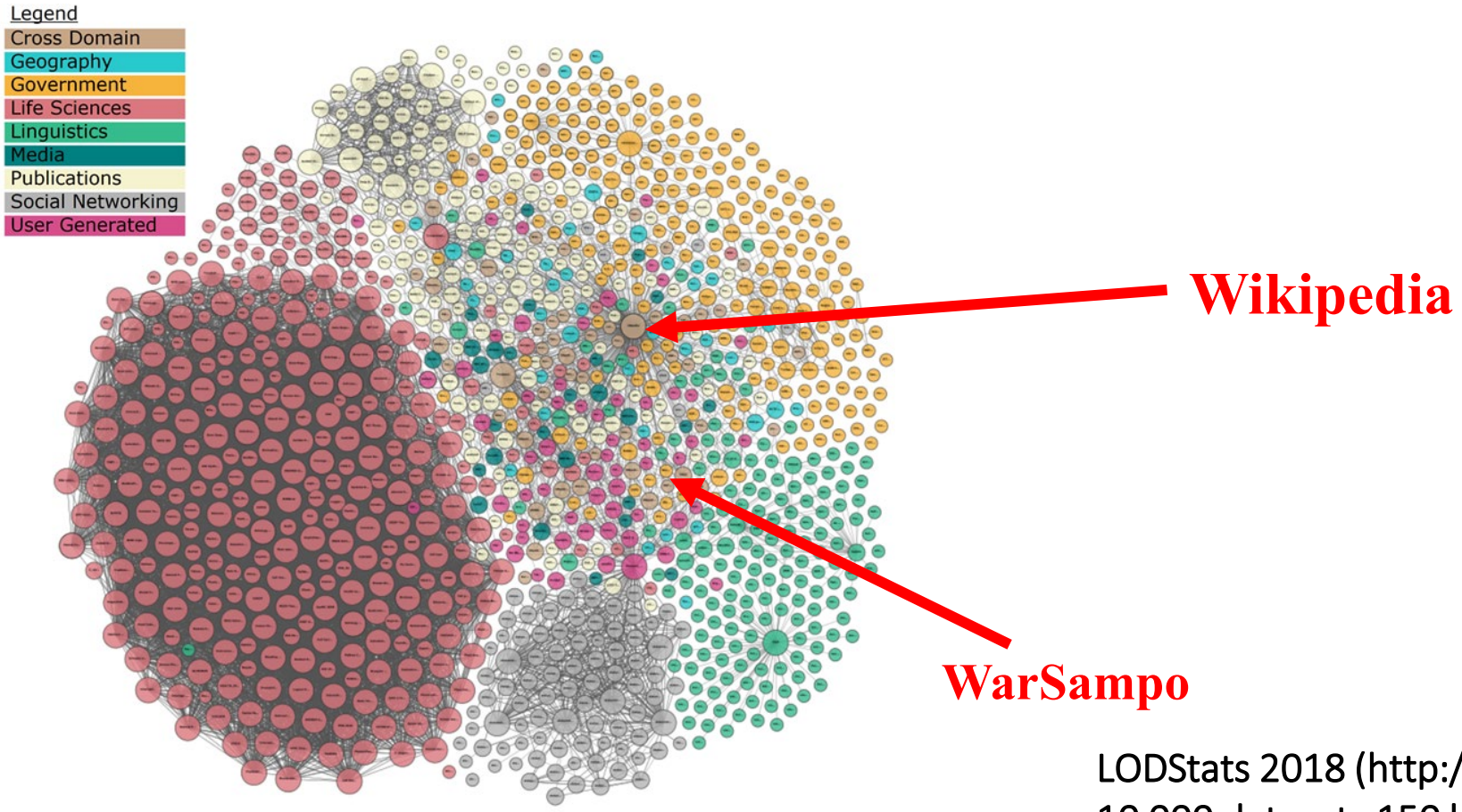
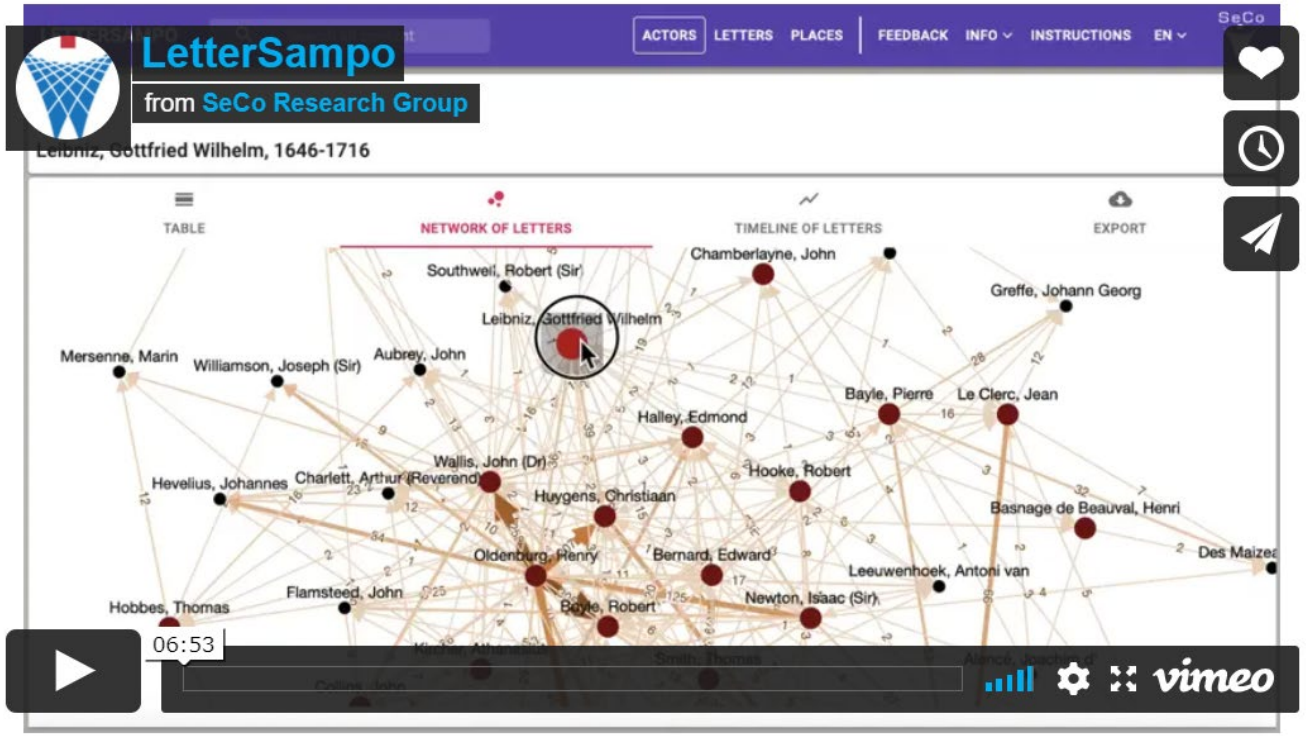
Server Side
http://ldf.fi

The Big Picture: Web of Data: Linked Open Data Cloud



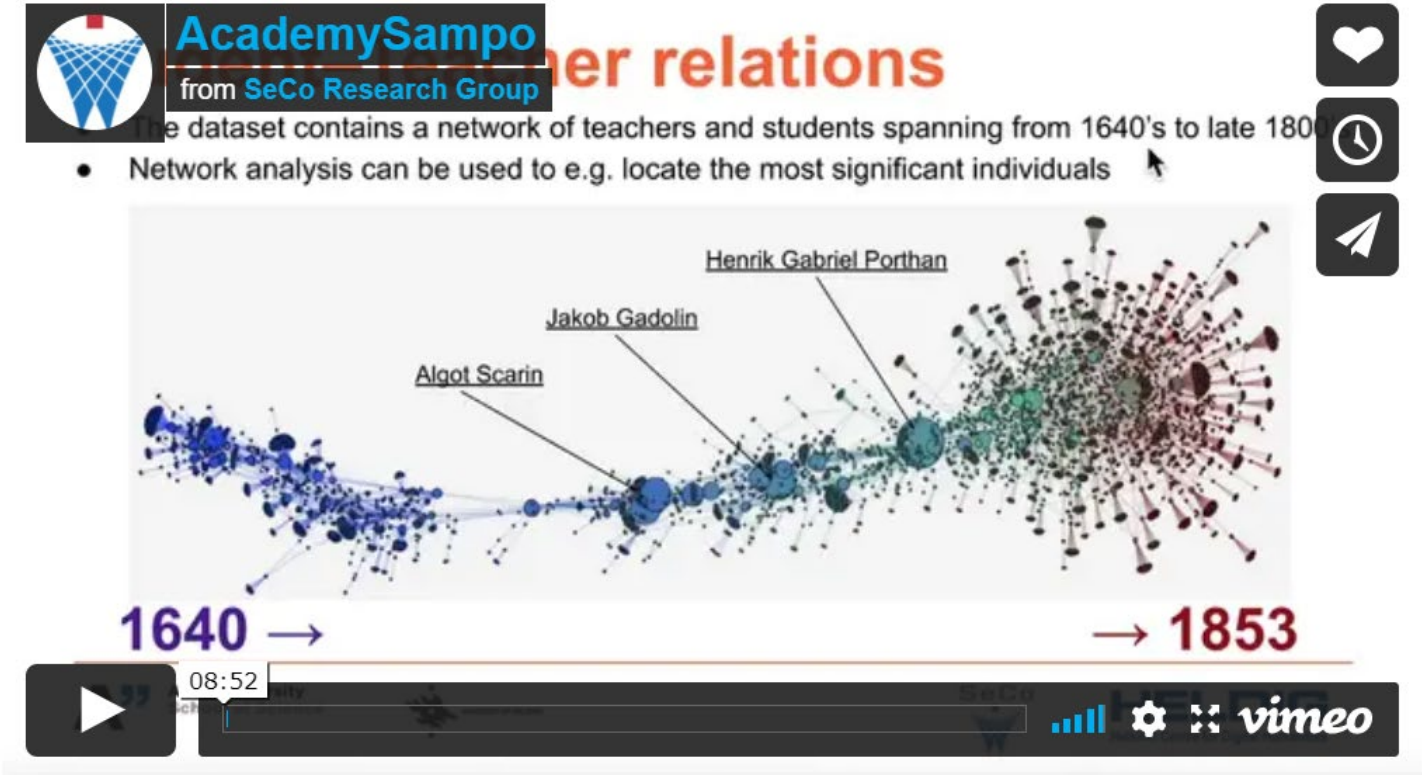
LODStats 2018 (http://stats.lod2.eu/):
10 000 datasets,150 billion triples

LetterSampo (2020): Historical Letters on the Semantic Web



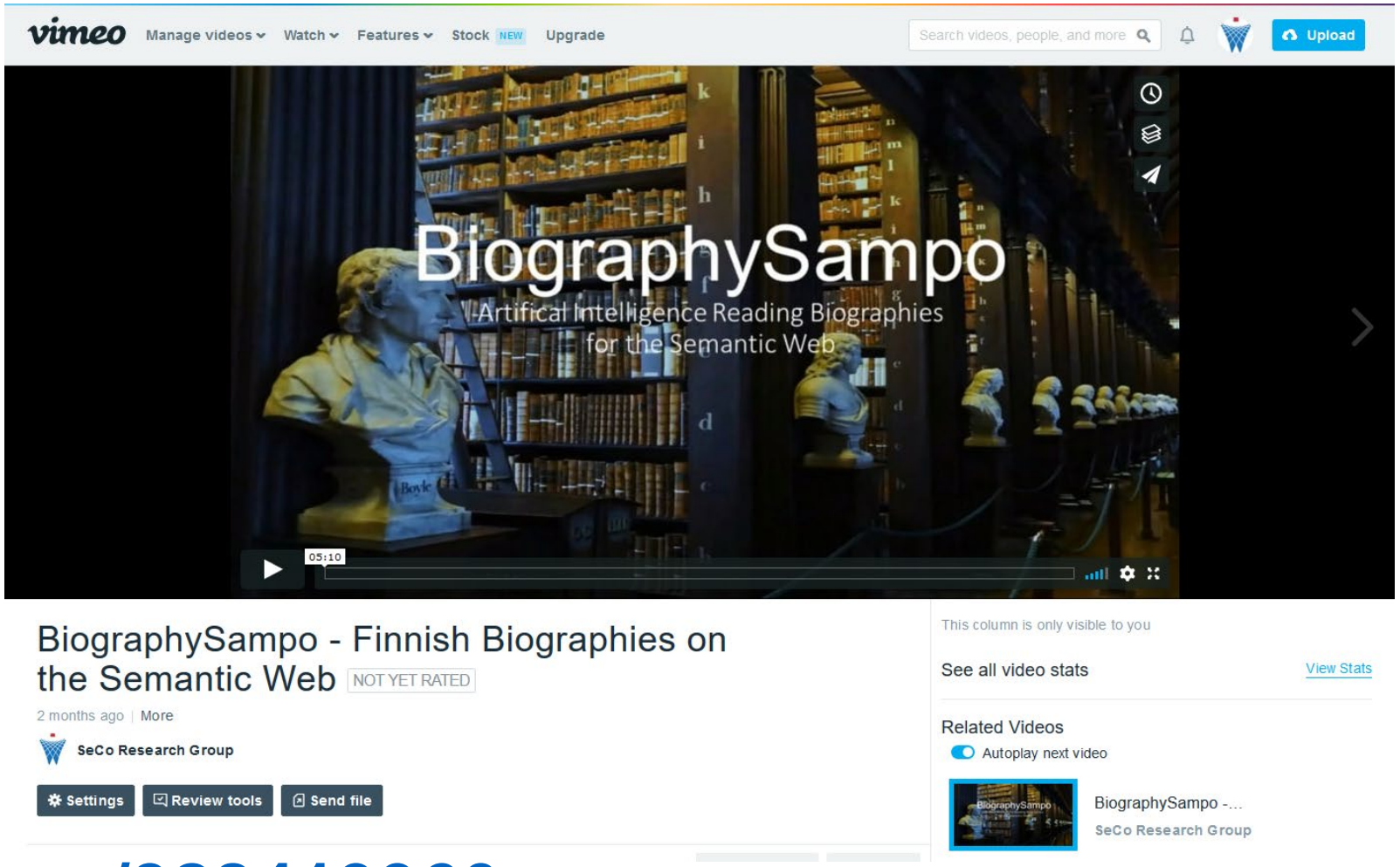
https://vimeo.com/461293952

AcademySampo (2020):
Finnish Academic People 1640-1899



https://vimeo.com/462993654

BiographySampo (2018):
AI Reading Biographies for the Semantic Web



https://vimeo.com/328419960

Löytösampo HOME MYFINDS SEARCH REPORT MORE EN LOG IN

FINDSAMPO

THE FINNISH ARCHAEOLOGICAL FINDS DATA AND REPORTING PLATFORM

RECENT FINDS

FindSampo Overview

Data & photos:
At site or later

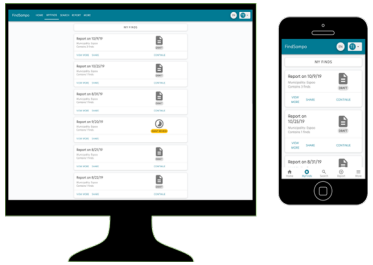
Support & info
about archaeology

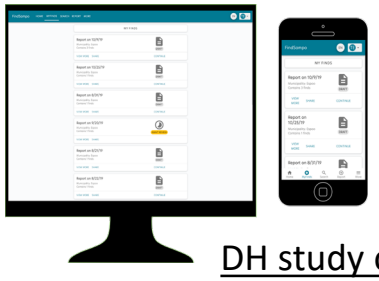
FHA Legacy Systems:
Databases, GIS

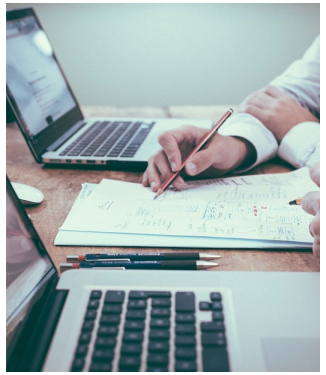
FindSampo
Reporter

FindSampo
TripleStore

FindSampo
Portal







DH study of
archaeological
finds

Data Infra: Ontologies, Datamodels,
Datasets
Human Infrastructure: Expert
Community

Museovirasto
Finnish Heritage Agency

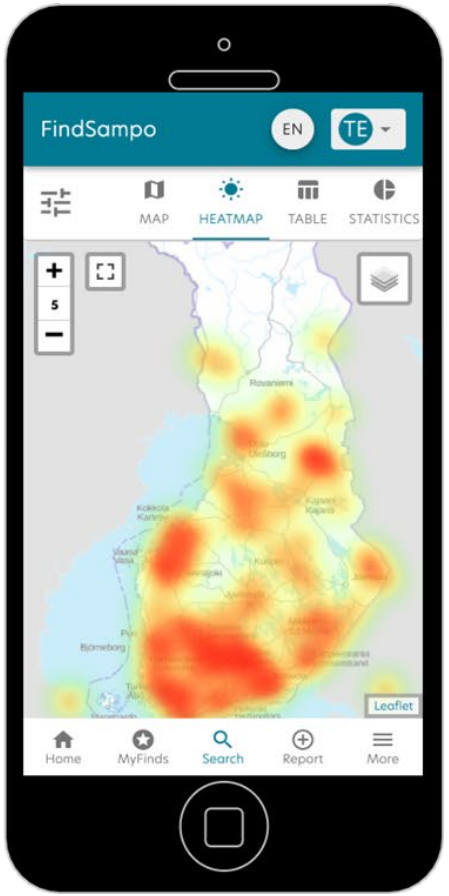
W3C
Semantic
Web

ARIADNE plus

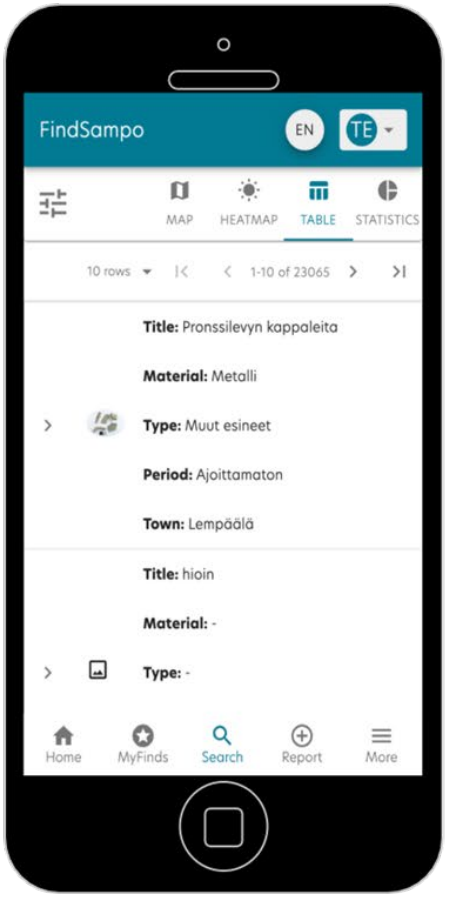
Data Visualisation (1/2)

Clustered Map

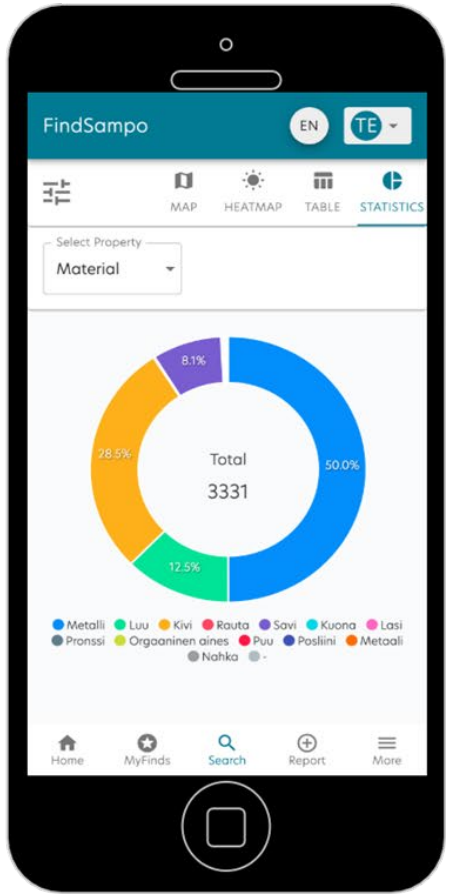
HeatMap



Table



Statistics



To study finds:

Exact places

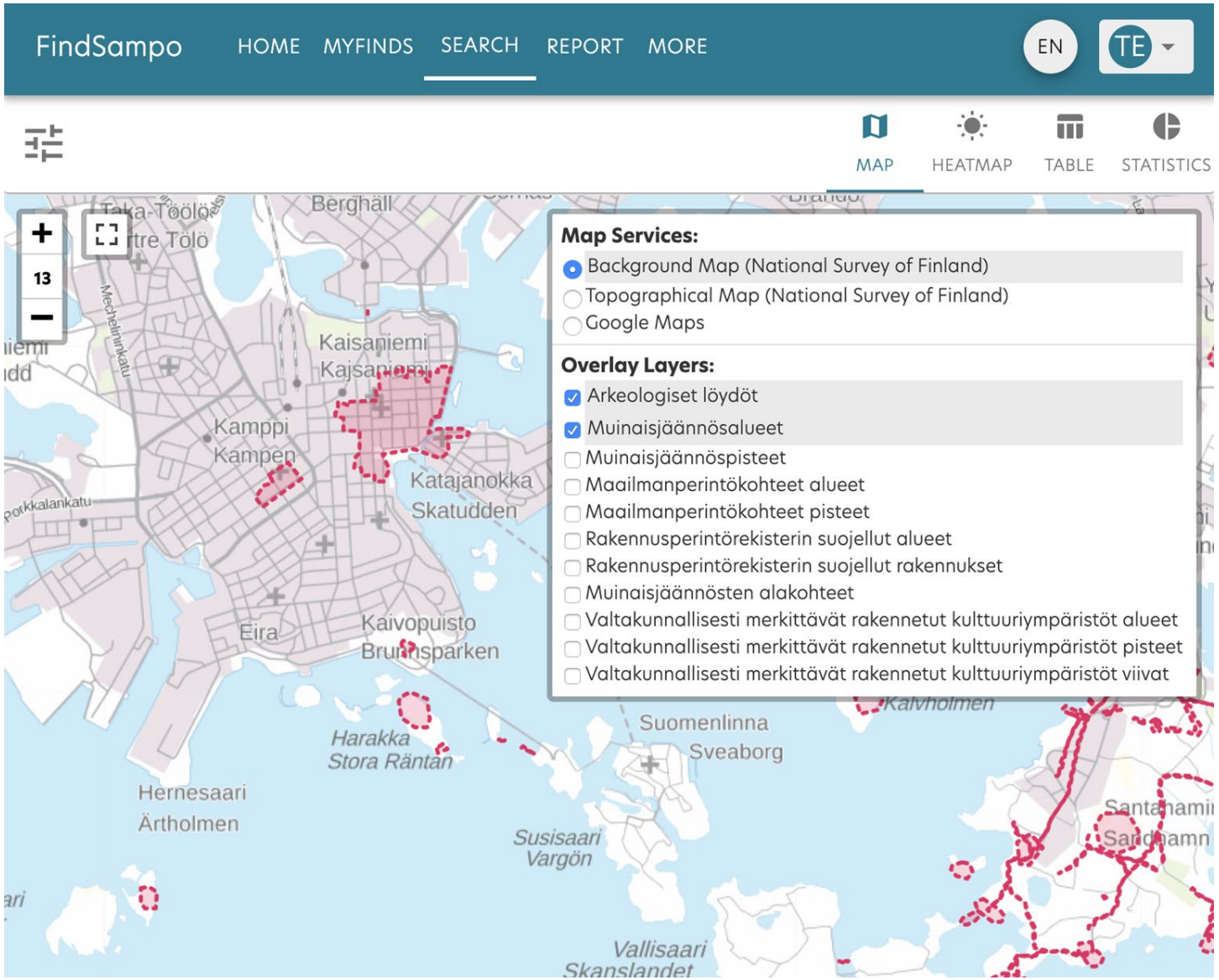
Delayed disclosure

For planning

detecting

For analyzing finds

Data Visualisation (2/2)



FHA GIS data:

- Find CH areas of interest
- Show forbidden areas
- Different maps used

Applying FindSampo "Sampo Model" Internationally
Portable Antiquities Scheme at the British Museum

- 700 000+ finds of metal detectorists
- Semantic enriching & interoperability test
- Data analyses on a larger dataset

The British Museum

Portable Antiquities Scheme

www.finds.org.uk

ARIADNE plus

”Sampo Series” Demonstrates a Paradigm Shift: 4 Generations of Publishing Data for Humanities

1. Printed Texts
2. Online Systems for Searching and Exploring
3. Publishing Content as Linked Data with Tools for DH
4. Automatic Knowledge Discovery and Artificial Intelligence

Semantic Computing Research Group (SeCo)

Making computers and the web more intelligent and interoperable!

INVITATION TO OPEN AND FREE WEBINAR

Semantic Computing Research Group (SeCo) at Aalto University and University of Helsinki (HELDIG) invites you to join the webinar:

Digital Humanities in Action: Sampo Model and Portals for Cultural Heritage

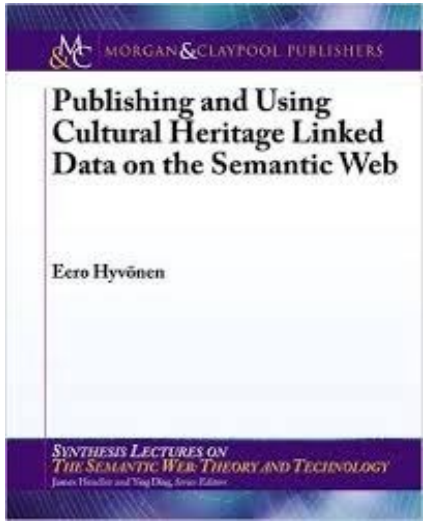
Thursday 29.10.2020, 13:00–17:00 (12:00-16:00 CET)
Online webinar (register below to get the Zoom link)

Abstract
This open and free webinar presents results of joint research at Aalto University and University of Helsinki (HELDIG), Semantic Computing Research Group (SeCo), on building an open national Semantic Web infrastructure with applications for Digital Humanities. In particular, the Sampo model and series of Sampo portals have been created that have had millions of users on the Web. The seminar presents key elements of the infrastructure and tools, and ten latest Sampo portals, five of which are already online, and five under development in ongoing research projects

https://seco.cs.aalto.fi/events/2020/2020-10-29-sampo-portals/

More Information – Questions?

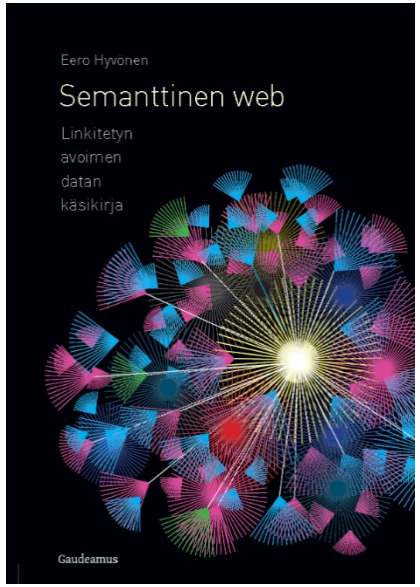
Linked Open Infra for Digital Humanities in Finland: LODI4DH
https://seco.cs.aalto.fi/projects/lodi4dh/
Sampo Model & Portal Series:
https://seco.cs.aalto.fi/applications/sampo/
Semantic Web & Linked Data Standards
http://www.w3.org/standards/semanticweb/



In English

2012

https://www.amazon.com/Publishing-Cultural-Heritage-Synthesis-Technology/dp/1608459977



In Finnish

2018

https://www.gaudeamus.fi/semanttinen-web/

Löytösampo
Arkeologiset löydöt, kansalaistiede ja semanttinen verkko

Anna Wessman, Helsingin yliopisto
Ville Rohiola, Museovirasto

SUOMEN AKATEMIA
FINLANDS AKADEMI
ACADEMY OF FINLAND

HELDIG
Helsinki Centre for Digital Humanities

Museovirasto
Finnish Heritage Agency

UNIVERSITY OF HELSINKI

Aalto University
School of Science

Taustaa:

Kuva: Anna Wessman/HY

- Metallinestinharrastus kasvoi 2010-luvulla
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  - Suunniteltu viranomaisnäkökulmasta

Wessman & Rohiola 2020

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    - Samassa palvelussa myös ohjeita ja tietoa harrastajille

→ *työkalu, joka auttaa ja tukee viranomaisia*

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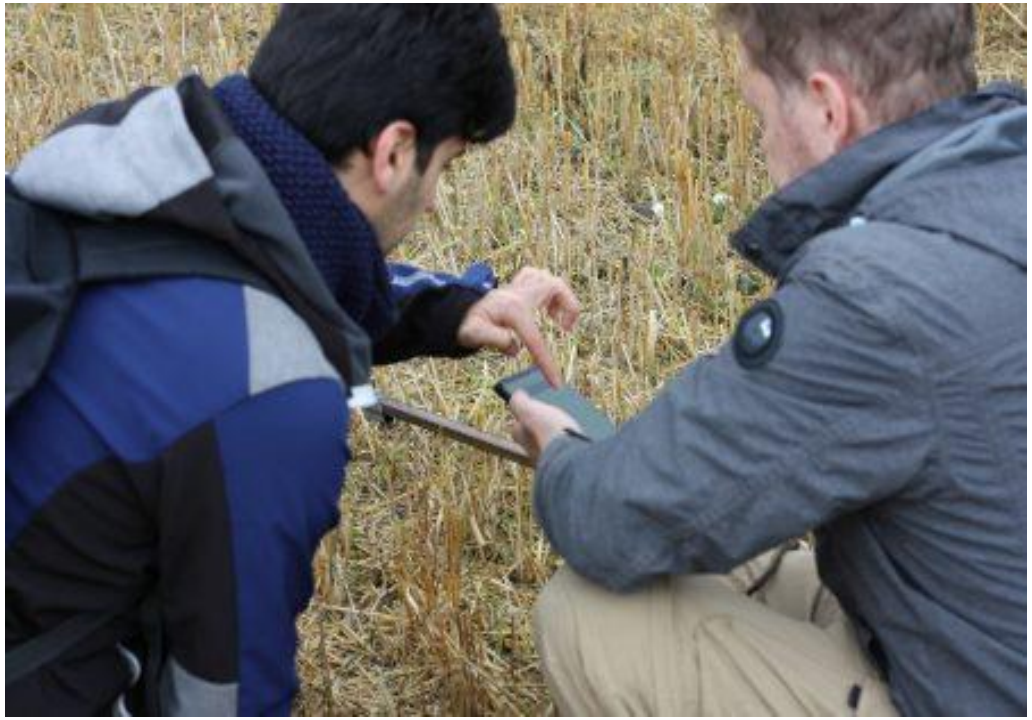
Miten työskentelemme?



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Wessman & Rohiola 2020

Löytösampo

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Wessman & Rohiola 2020

Museoviraston ontologinen työ

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FASETTIONTOLOGIA (SuALT - Löytösampo)
Esineen nimi, materiaali ja ajoitus + kunta

Ontologiatyö

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(a) Termistön mappaus ja annotointi Finto MAO/TAO –ontologian kanssa
(b) Termien kääntäminen englanniksi
(c) Termien mappaus Getty Art and Architecture Thesaurus (AAT) –ontologian kanssa

Wessman & Rohiola 2020

Löytösammon toimintoja

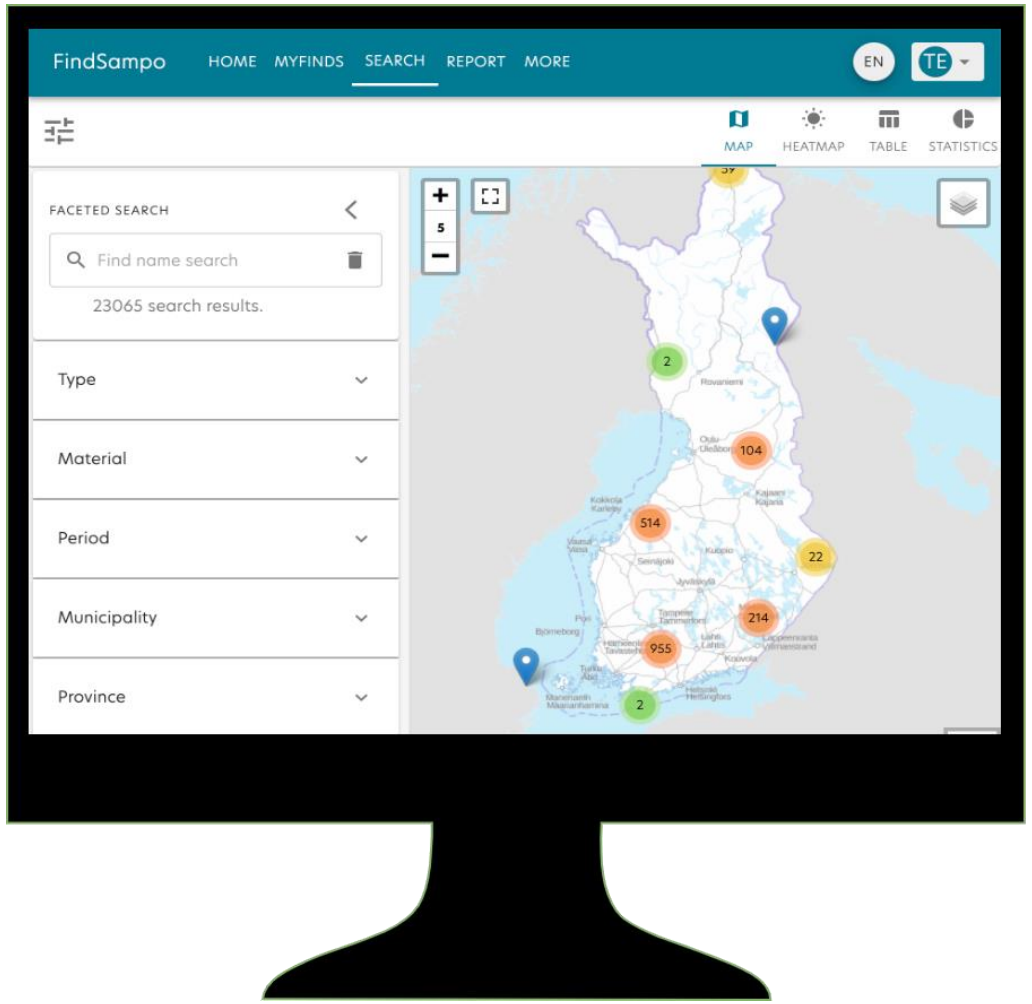
Fasettihaku

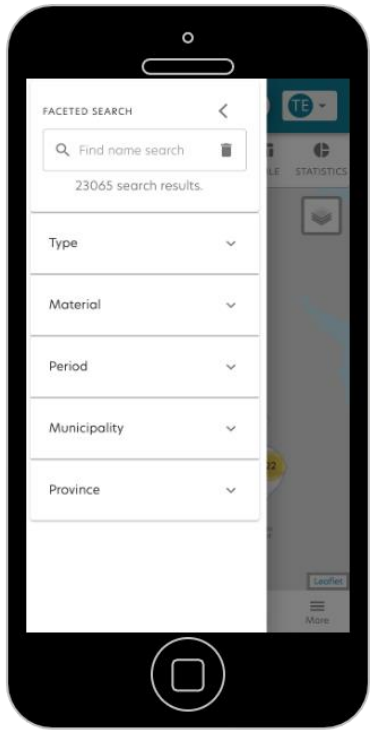
Esinenimi

Materiaali

Ajoitus

Paikkatieto



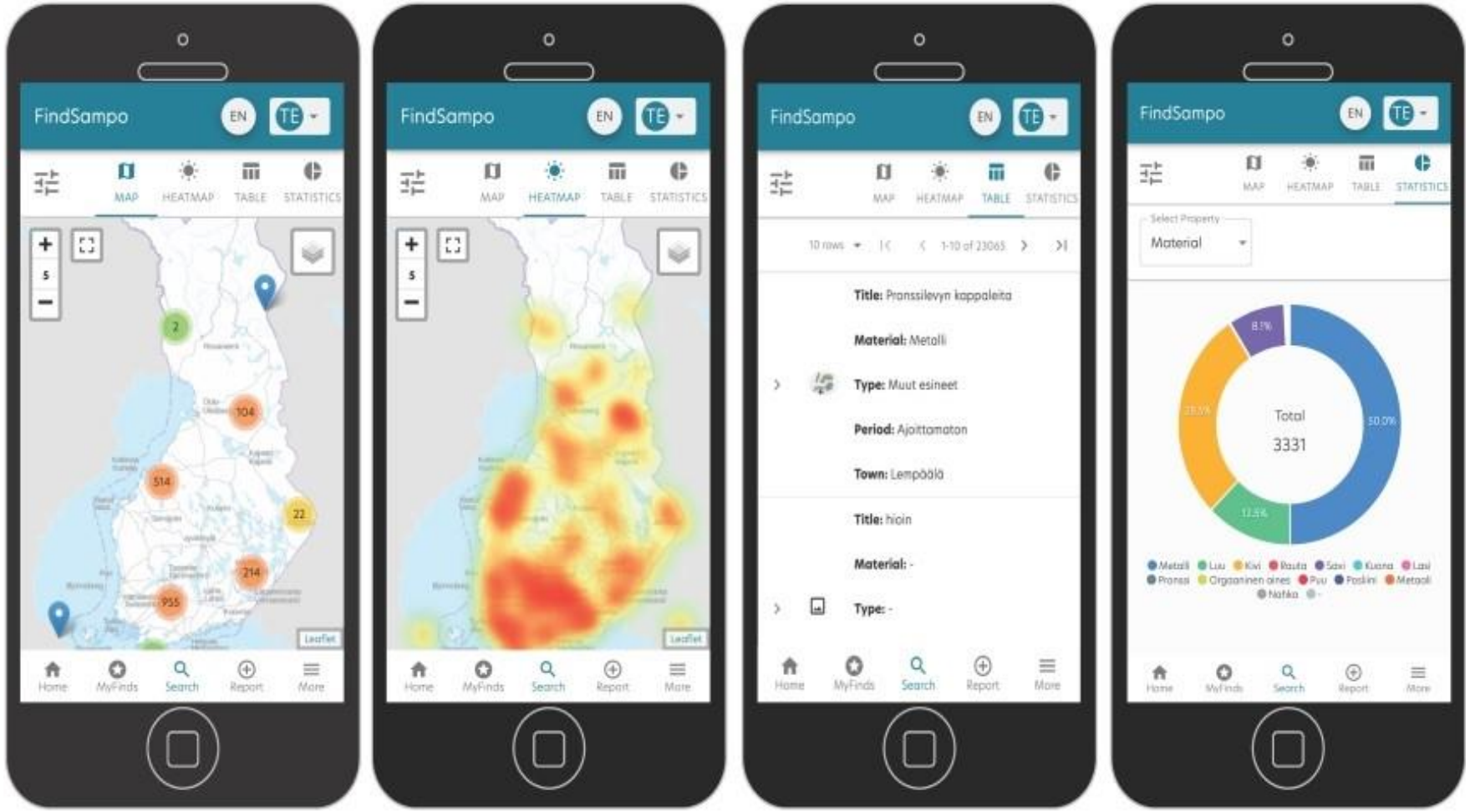


Käyttötapa:

Mobiilikäyttö

Wessman & Rohiola 2020

Löytösammon toimintoja



- Useita karttatasoja
- Heatmap-kartat
- Taulukoita
- Tilastoja
- Useita hakutoimintoja
- Linkitetty data
- Kulttuuriperintökohteet
- Infotekstit
- Automaattinen täyttö
- Oppimistyökalu

Wessman & Rohiola 2020

Kiitos!

sualt-project@helsinki.fi
https://blogs.helsinki.fi/sualt-project/

Save the Date:
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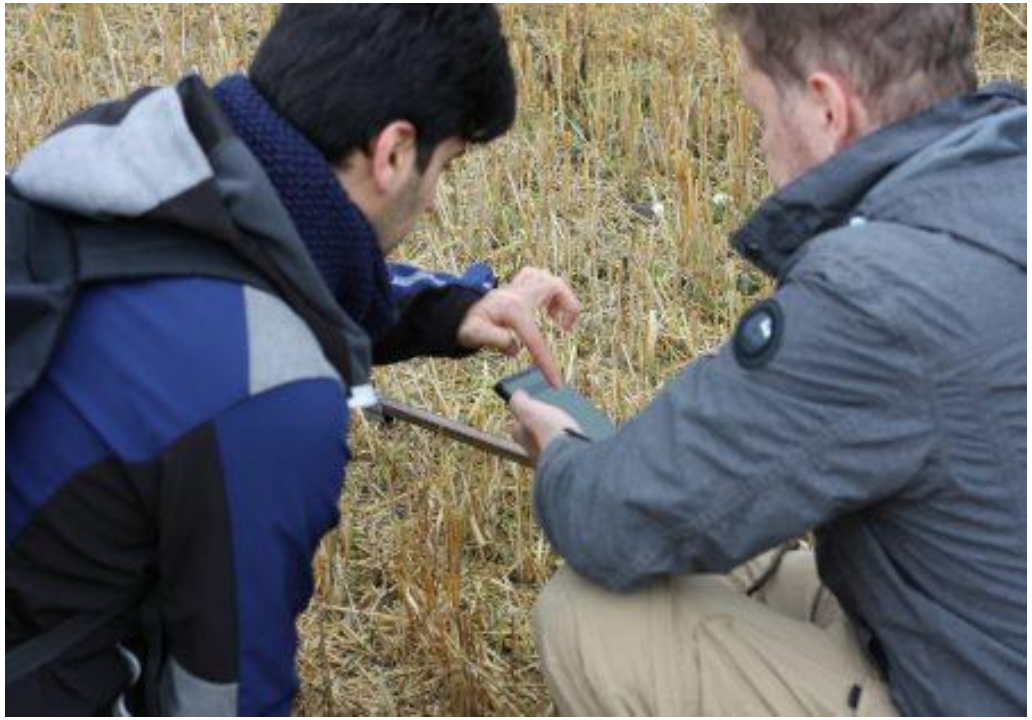

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Wessman & Rohiola 2020

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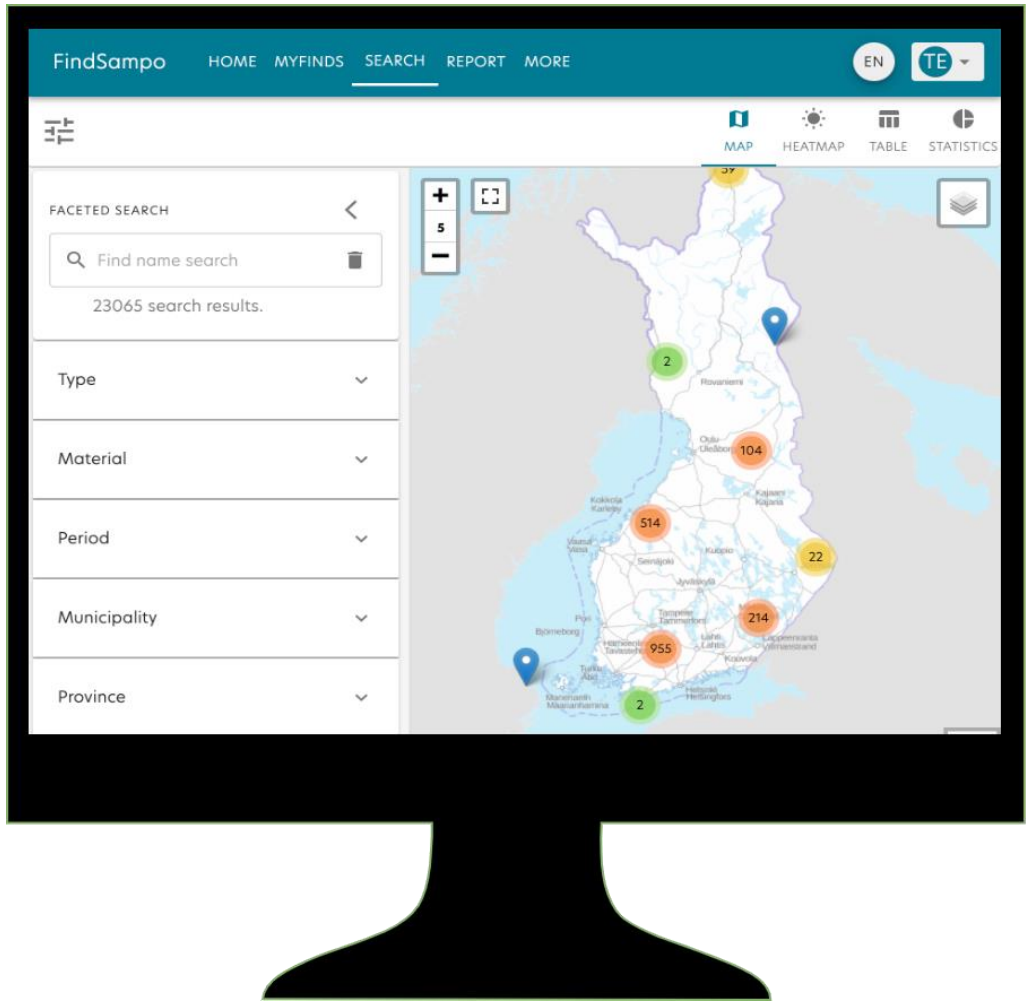

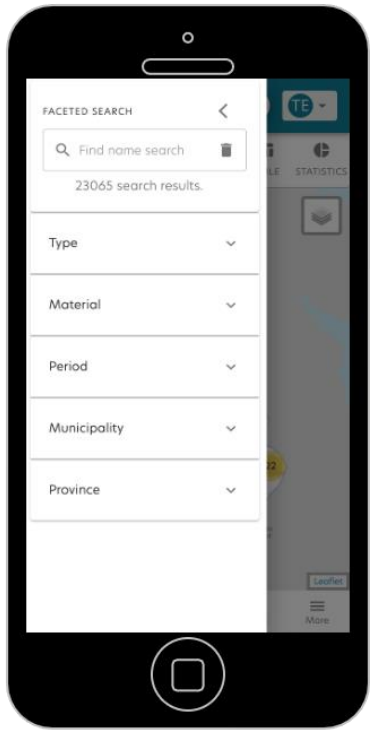

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Mobiilikäyttö

Wessman & Rohiola 2020

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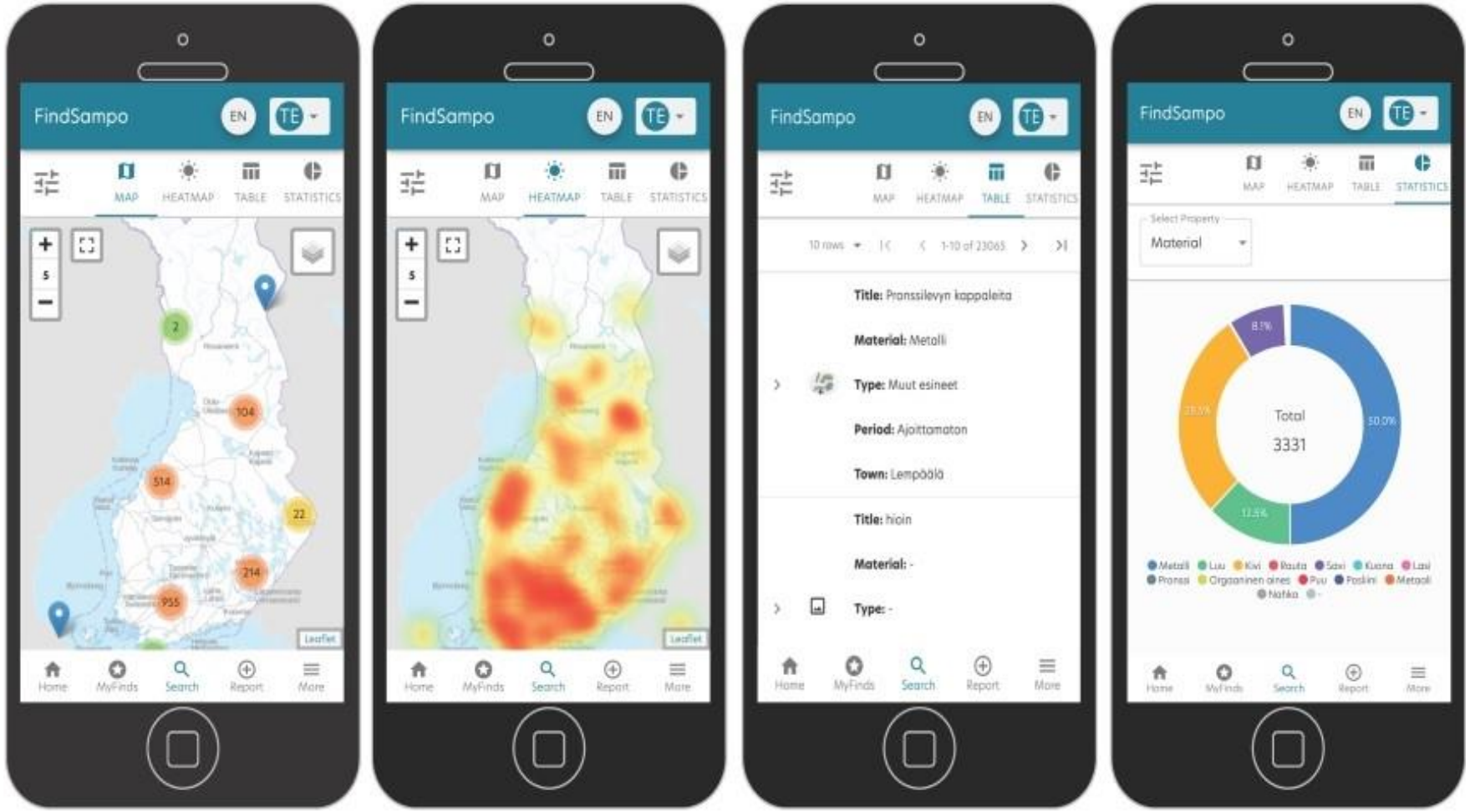

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Wessman & Rohiola 2020

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sualt-project@helsinki.fi
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Löytösampo-konferenssi 18.5.2021 Kansallismuseon auditoriossa

Sanastokeskus

Käsiteanalyysiin pohjautuva ontologiatyö – esimerkkinä Museoalan ontologia

Semanttinen web arkeologisessa tutkimuksessa
20.10.2020

Päivi Kouki ja Katri Seppälä, Sanastokeskus TSK

Sanastokeskus TSK (1/2)

- käsiteanalyysiin erikoistunut asiantuntijaorganisaatio
- tarjoaa palveluja sekä julkiselle että yksityiselle sektorille
- voittoa tavoittelematon yhdistys
  - perustettu vuonna 1974, alkuperäinen nimi Tekniikan Sanastokeskus
- jäseninä sekä organisaatioita että henkilöitä
- 8 työntekijää (7 terminologia ja 1 IT-suunnittelija)
- http://www.tsk.fi/tsk/

Sanastokeskus TSK (2/2)

- tarkoitus: saada aikaan sanastoja ja ontologioita sekä kehittää sanasto- ja ontologiatyön metodiikkaa ja työkaluja
  - viestinnän selkeyttäminen ja tietojärjestelmien semanttisen yhteentoimivuuden tukeminen organisaatioiden toiminnan tehostamiseksi
  - suomen kielen käyttöalan kaventumisen ehkäiseminen
- toiminta: yleishyödyllisiä palveluja sekä toimeksiantoihin perustuvia projekteja, tilanteen mukaan kehityshankkeita
  - ns. suurelle yleisölle saatavilla: TEPA-termipankki, Terminfo-tiedotuslehti, tiedotus ja aineistot verkkosivuston kautta

Sanastokeskus

Terminologisen sanastotyön ja ontologiatyön yhtenevyydet ja erot (1/3)

- sanastotyö: terminologinen sanastotyö = määrittelevä sanastotyö= systemaattinen sanastotyö = käsiteanalyysiin perustuva sanastotyö = käsitetyö
  - kansainvälisesti standardoituun käsiteanalyysimenetelmään perustuva sanastotyö (vrt. ISO 704 Terminology work – Principles and methods)
- ontologiatyö = asiasanastopohjaisten ontologioiden rakentaminen (käsiteanalyysiä hyödyntäen)
- Sanastokeskus tekee sekä sanasto- että ontologiatyötä yhdessä kohdealan asiantuntijoiden kanssa

Sanastokeskus

Terminologisen sanastotyön ja ontologiatyön yhtenevyydet ja erot (2/3)

- yhteistä: käsitteiden kuvailu
  - menetelmänä voidaan käyttää käsiteanalyysiä eli käsitepiirteiden ja käsitteiden välisten suhteiden analysointia
- eroja:
  - käyttötarkoitus
    - terminologinen sanasto: viestintä, tiedonsiirto
    - asiasanastopohjainen ontologia: kuvailu, tiedonhaku

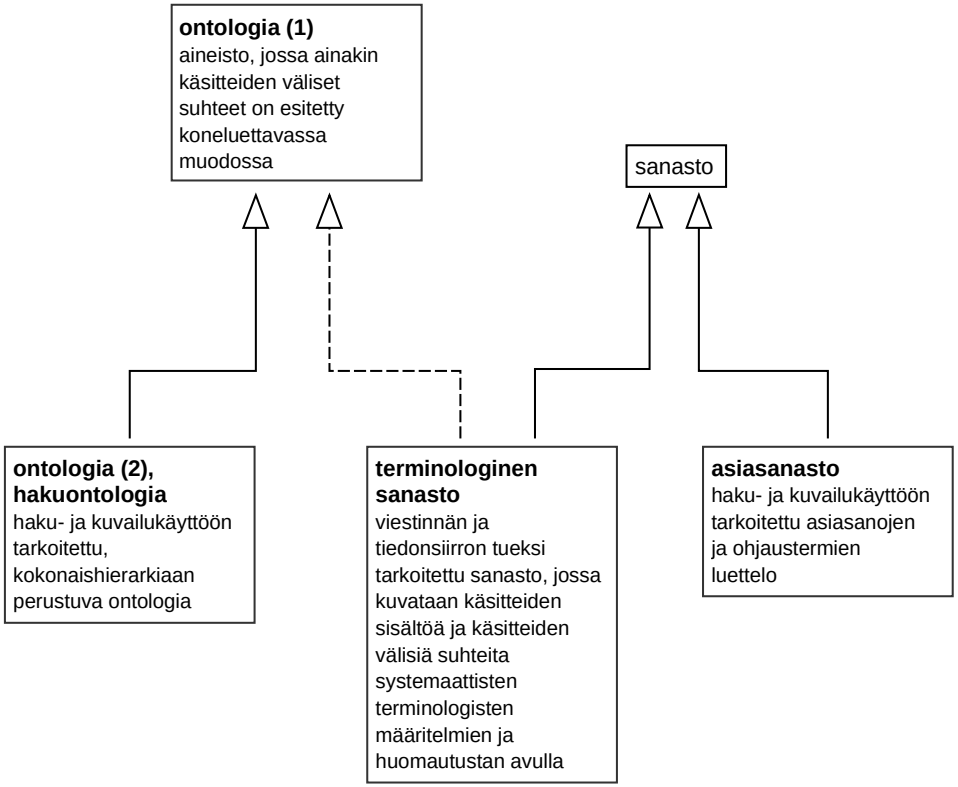
Sanastokeskus

Terminologisen sanastotyön ja ontologiatyön yhtenevyydet ja erot (3/3)

- tiedon kuvailutapa:
  - terminologisessa sanastotyössä käsitteiden kuvailussa painopisteenä on käsitteiden määrittely
  - asiasanastopohjaisessa ontologiatyössä painopisteenä on käsitteiden välisten suhteiden, erityisesti hierarkian kuvaaminen
- tarkkuustaso: käyttötarkoituksen mukaan
- tiedon esitystapa:
  - terminologiset sanastot: ensisijaisesti ihmisluettavia (sis. sähköisessä muodossa koneluettavia linkkejä)
  - ontologiat: kone- ja ihmisluettavia

Sanastokeskus

Sanastot ja ontologiat



AAKKOSELLINEN HIERARKKINEN KÄSITEVALIKOIMA

historiallinen todistusvoimaisuus

historiallinen todistusvoimaisuus

historiallinen todistusvoimaisuus

Luonnos

Suositettava termi

FI historiallinen todistusvoimaisuus

Määritelmä

FI ominaisuus, joka kohteella on silloin, kun sitä voidaan pitää jonkin historiallisen tapahtuman tai ilmiön todisteena tai siitä kertovana ja tietoa lisäävänä esimerkkinä

Huomautus

FI Historiallista todistusvoimaisuutta käytetään eräänä kriteerinä rakennusten, rakennelmien ja rakennettujen alueiden kulttuurihistoriallista merkittävyyttä arvioitaessa (laki rakennusperinnön suojelemisesta498/2010).

FI Käsitekaavio:Kulttuurihistoriallinen arvo ja merkittävyys

Käyttöala

rakennettu kulttuuriympäristö

Käsitteen tila

Luonnos

Liittyvä käsite

- kulttuurihistoriallinen merkittävyys

Luotu	Muokattu
19.12.2019 11:03	19.12.2019 11:03

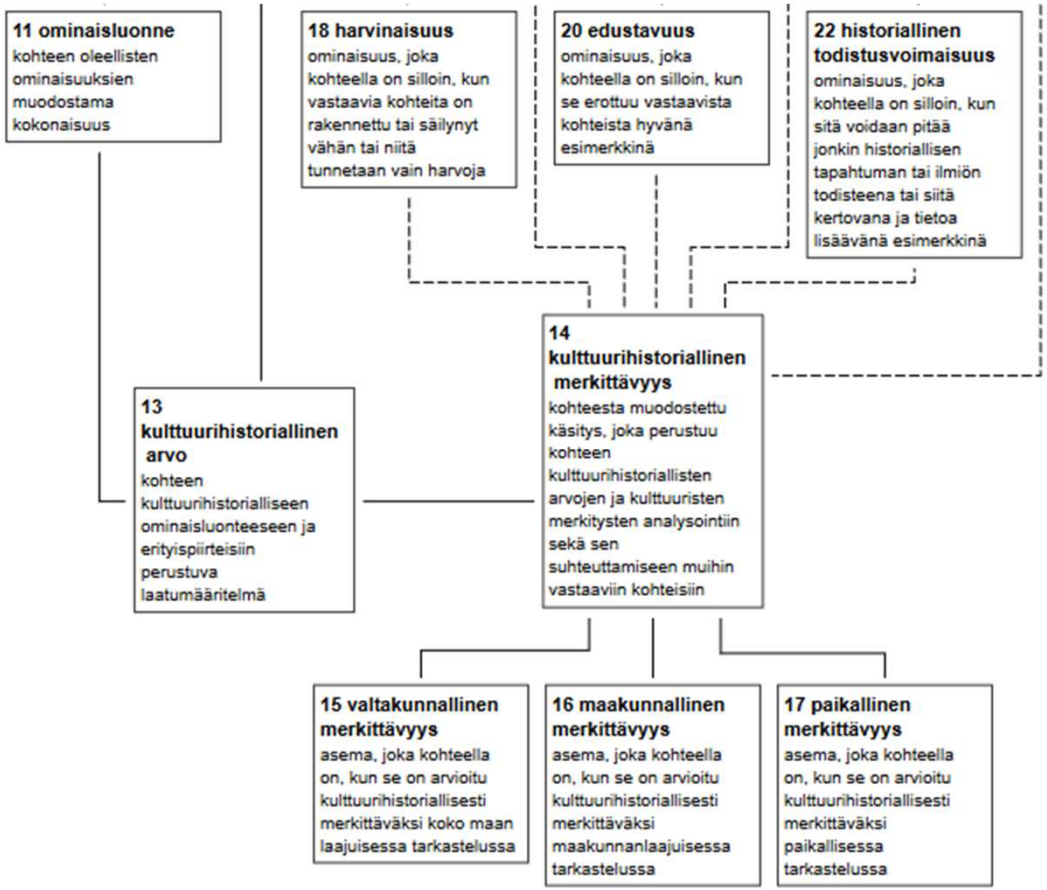
URI

http://uri.suomi.fi/terminology/rakkultymp/c23

Rakennusperinnön suojelun käsitteitä
https://sanastot.suomi.fi

Sanastokeskus

Esimerkki käsitejärjestelmäkaaviosta



finto Suomalainen asiasanasto- ja ontologiapalvelu

Sanastot | Tietoja | Palaute | Ohje | på svenska | in English

MAO/TAO - Museoalan ja taideteollisuusalan ontologia

Sisällön kieli suomi Hae

Aakkosellinen | Hierarkia

- oliot
- ominaisuudet
- tapahtumat ja toiminta
  - ajanjaksot
    - haudan hallinta-aika
    - kalenteriin liittyvät ajanjaksot
    - luonnontieteelliset ajanjaksot
    - menneisyys
    - tauot
    - tulevaisuus
    - vaikutusaika
    - vasteaika
    - viive (tekniikka)
    - yhteiskunnalliset ajanjaksot
      - aikakaudet
      - aikakaudet
      - antiikki
      - arabikevät
      - aselepo
      - autonomian aika
      - belle époque
      - elinkaari
      - elinkaari
      - fin de siècle
      - **historiallinen aika**

tapahtumat ja toiminta > ajanjaksot > yhteiskunnalliset ajanjaksot > historiallinen aika

KÄYTETTÄVÄ TERMI **historiallinen aika**

TYYPPI	YSO-käsite	
YLÄKÄSITE	yhteiskunnalliset ajanjaksot	
ASSOSIATIIVISET KÄSITTEET	esihistoria historia historiantutkimus	
KUULUU RYHMÄÄN	52 Historia	
MUUNKIELISET TERMIT	historical time historisk tid	englanti ruotsi
URI	http://www.yso.fi/onto/yso/p28301	
Lataa tämä käsite:	RDF/XML TURTLE JSON-LD	Luotu 9.4.2015, viimeksi muokattu 19.12.2019
LÄHES VASTAAVA KÄSITE	historiallinen aika historisk tid (sv)	YSA - Yleinen suomalainen asiasanasto Allärs - Allmän tesaurus på svenska

Sanastokeskus

Museoalan ja taideteollisuusalan ontologia MAO/TAO

2003–2012 **2015** **2016** **2017** **2018** **2019** **2020**

MAO/TAO laaditaan osana FinnONTO-projektia

YSOn hierarkian päälle rakennettu yhdistelmäontologia

Perustuu Museoalan asiasanastoon ja Muotoilun ja viestinnän asiasanastoon

1. päivitys-projekti: Ontologiaan lisätään Museo2015-hankkeessa kerättyjä käsitteitä

2. päivitys-projekti: Ontologian päähierarkia päivitetään; korjauksia ja lisäyksiä

Ontologia täysin Museoviraston hallintaan

Kulttuuri-ympäristön kuvailuun liittyvä ontologia- ja sanastotyö

Arkeologisiin esineisiin liittyvä työ (helmikuu 2019 ->)

Rautakausi ja kivikausi

Julkaisut 9/2019, 12/2019

MAO-käsitteitä n. 10 970 kpl

Historiallinen aika ja pronssikausi

Julkaisu 12/2020?

Sanastokeskus

MAOn laajentaminen arkeologisiin esineisiin liittyvillä käsitteillä

- tavoitteet
  - SuAlt-projektin tukeminen
  - arkeologisiin esineisiin liittyvien käsitteiden lisääminen MAOon

- lähteitä
  - Museoviraston luettelointitietokanta
  - HY:n opetusmateriaali
  - museoiden tietokannat (mm. Helsingin kaupunginmuseo, Vantaan kaupunginmuseo, Aboa Vetus)
  - lisäksi käsitteitä lisättiin myös työn aikana

Ontologiatyön organisointi

- osaprojektit
  - rautakausi (kevät 2019)
  - kivikausi (syksy 2019)
  - historiallinen aika (kevät 2020)
  - lisäksi pienempiä kokonaisuuksia: pronssikausi, rahat, aseet

- mukana asiantuntijoita myös Museoviraston ulkopuolelta

Sanastokeskus

Ontologiaprojektin vaiheet

- terminologi käsittelee Museoviraston toimittamaa aineistoa ja sijoittaa käsitteet ontologiaan alustavasti

- asiantuntijat tarkastavat terminologin työn työpajoissa
  - käsitteiden sijainti hierarkiassa
  - termit
  - mahdolliset lisättävät käsitteet

- terminologi viimeistelee ontologian julkaisua varten
  - ontologia julkaistaan Finto-ontologiapalvelussa

Sanastokeskus

raid - maotao/maotao.ttl - TopBraid Composer FE

dit Navigate Project Model System Inference Resource Window Help

mao:p10614

ses

- tulilapiot
- tupekset
- tuurat
- työkalut [mao:p2492]
  - hakut
  - hiomakivet
  - holliraudat
  - höylät [mao:p2422]
  - iskukivet
  - jakoavaimet
  - kairat
  - kirveet [mao:p636]
    - hakokirveet
    - havukirveet
    - kivikirveet
      - alkeelliset kirveet
      - Ilomantsin kirveet
      - Jäkärlän kirveet
      - kaksoiskirveet
      - kapeateräiset kirveet
      - Kaukolan kirveet
      - kehdonjalaksen muotoiset kirveet
      - Kiukaisten kirveet
      - oikokirveet
      - olkakirveet (kivikirveet)
      - piikirveet
      - pohjalaiset kirveet

maotao.ttl

Class Form

Name: mao:p10614

Annotations

alternative label
- kehdonjalaksen muotoiset hakut {@fi}
- kehdonjalaskirveet {@fi}

preferred label
- kehdonjalaksen muotoiset kirveet {@fi}

Class Axioms

subClassOf
- KIVI-VALMIIT
- kivikirveet

equivalentClass

disjointWith

hasKey

Other Properties

type
- mao-meta:Concept

mao-meta:associativeRelation

mao-meta:broader_term

mao-meta:creator

Properties

- definedConcept
- edeltäjä
- has member
- has member list
- has top concept
- is in scheme
- is in semantic relation with
- kuuluu temaattiseen ryhmää
- mao:p5620
- mao-meta:associativeRelatic
- mao-meta:broader_term
- mao-meta:deprecatedHasPa
- mao-meta:deprecatedPartOf
- mao-meta:deprecatedReplac
- mao-meta:deprecatedSubCl
- mao-meta:deprecatedSuper
- mao-meta:narrower_term
- mao-meta:partOf
- partOf
- seuraaja
- tao-meta:deprecatedHasPart
- tao-meta:deprecatedPartOf
- tao-meta:deprecatedReplace
- tao-meta:deprecatedSubCla
- tao-meta:deprecatedSuperC
- tao-meta:LT
- tao-meta:partOf

Sanastokeskus

MAO/TAO - Museoalan ja taideteollisuusalan ontologia

Sisällön kieli suomi Hae

Aakkosellinen Hierarkia

- tupekset
- tuurat
- työkalut
  - hakut
  - hiomakivet
  - höylät
  - iskukivet
  - jakoavaimet
  - kairat
  - kirveet
    - hakokirveet
    - havukirveet
    - kiinnittimet
    - kivikirveet
      - alkeelliset kirveet
      - Ilomantsin kirveet
      - Jäkärlän kirveet
      - kaksoiskirveet
      - kapeateräiset kirveet
      - Kaukolan kirveet
      - **kehdonjalaksen muotoiset kirveet**
      - Kiukaisten kirveet
      - oikokirveet
      - olkakirveet
      - piikirveet

... > välineet > työvälineet > kirveet > kivikirveet > kehdonjalaksen muotoiset kirveet [näytä kaikki 5 polkua]
... > työvälineet > käsityökalut > kirveet > kivikirveet > kehdonjalaksen muotoiset kirveet
... > työvälineet > työkalut > kirveet > kivikirveet > kehdonjalaksen muotoiset kirveet
... > työvälineet > työkalut > kirveet > kivikirveet > kehdonjalaksen muotoiset kirveet

KÄYTETTÄVÄ TERMI	**kehdonjalaksen muotoiset kirveet**
TYYPPI	MAO-käsite
YLÄKÄSITE	kivikirveet
OHJAUSTERMIT	*kehdonjalaksen muotoiset hakut* *kehdonjalaskirveet*
URI	http://www.yso.fi/onto/mao/p10614
Lataa tämä käsite:	RDF/XML TURTLE JSON-LD

Viimeksi muokattu 19.12.2019

- löydöt –> alakäsitevalikoima on puutteellinen
  - aarrelöydöt
  - arkeologiset löydöt -> hierarkia antaa väärän kuvan arkeologisista löydöistä
    - laivalöydöt
    - luulöydöt
  - asuinpaikkalöydöt
  - hajalöydöt
  - hautalöydöt
    - muumiot -> käsite on väärässä hierarkiassa
  - irtolöydöt
  - kaivauslöydöt
  - kätköt
  - maalöydöt
  - pintalöydöt
  - rahalöydöt
  - ruuhilöydöt -> epäolennainen käsite
  - vesilöydöt
  - sukelluslöydöt -> löytyy tarkempi yläkäsite vesilöydöt

Haasteita

- kuinka varmistetaan, että kaikki tarvittavat käsitteet löytyvät ontologiasta?
- termivalinnat
- hierarkkinen rakenne vs. asiasanaluetteloiden assosiatiivisiin suhteisiin perustuvat ratkaisut
- näkökulmaerot

Tulevaisuudessa?

- ontologian hyödyntäminen Museoviraston omissa järjestelmissä
  - huomioidaan järjestelmäkehityksessä
  - ontologia auttaa yhtenäistämään luettelointia

- ylläpito ja edelleen kehittäminen
  - osa puutteista paljastunee vasta käytön myötä -> palaute käyttäjiltä
  - säännöllinen ylläpito takaa sen, että ontologia pysyy käytettävänä

OPEN ARCHAEOLOGY IN THE EASTERN MEDITERRANEAN: BETWEEN DREAMS AND REALITY

Rick Bonnie, University of Helsinki
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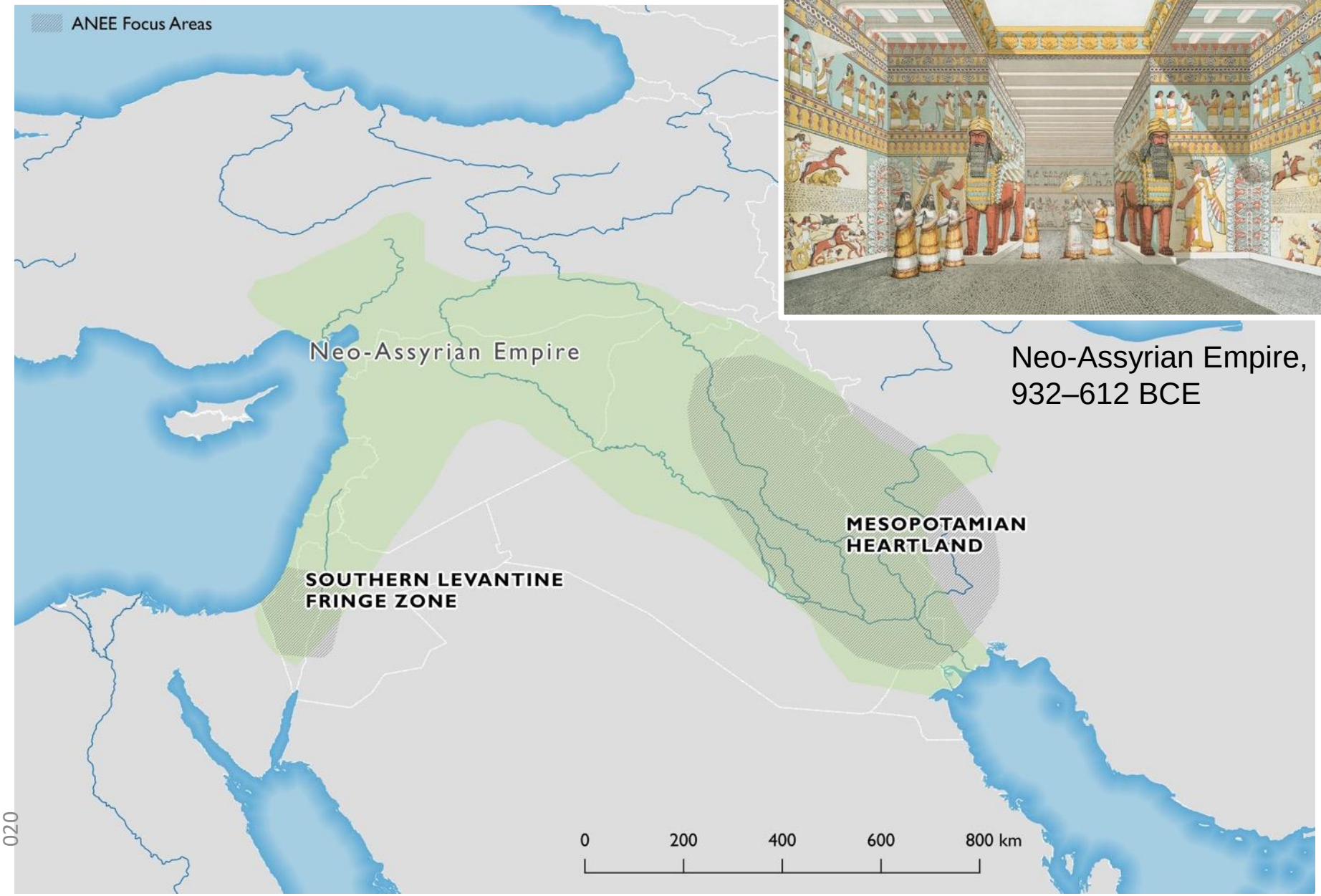
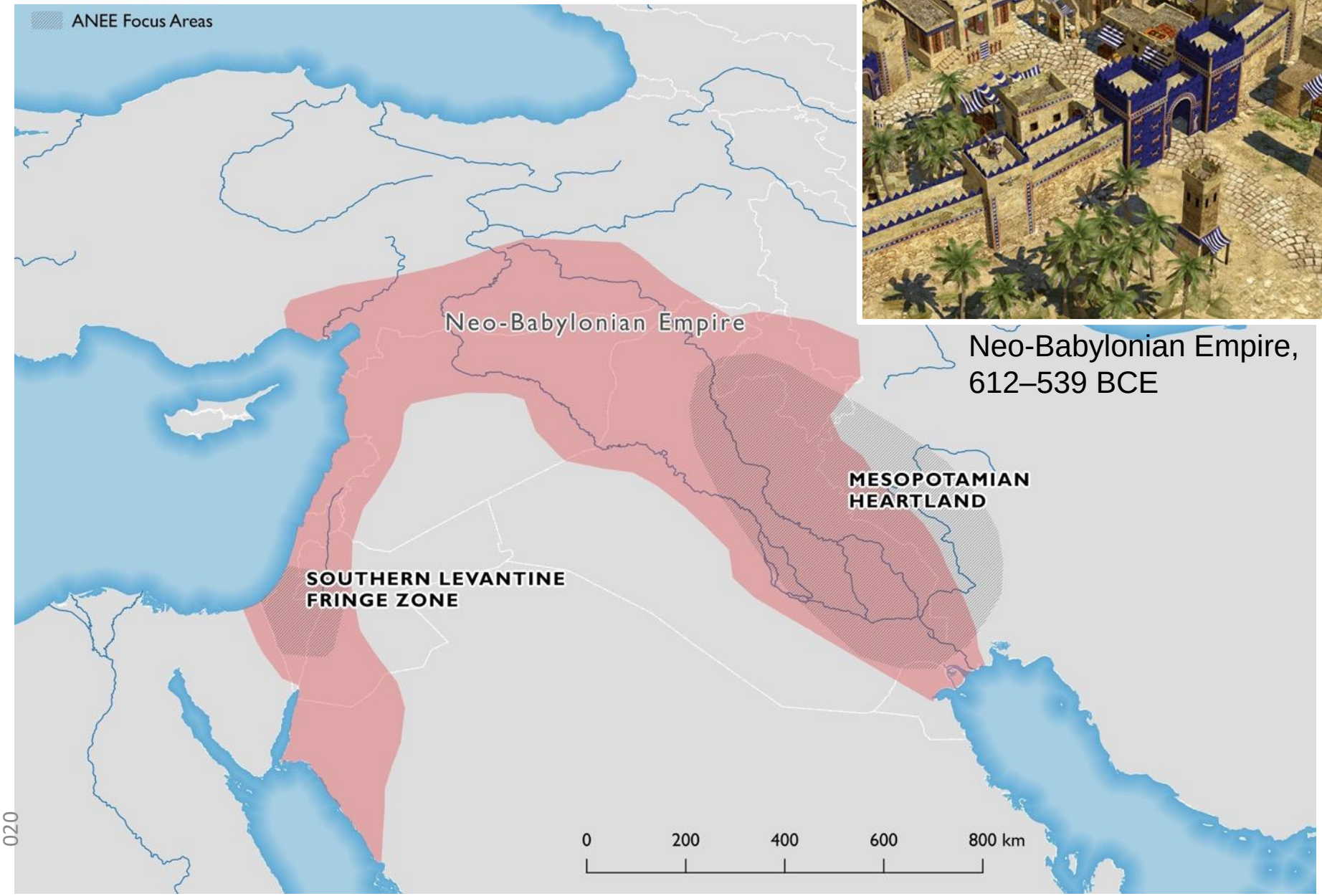
HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

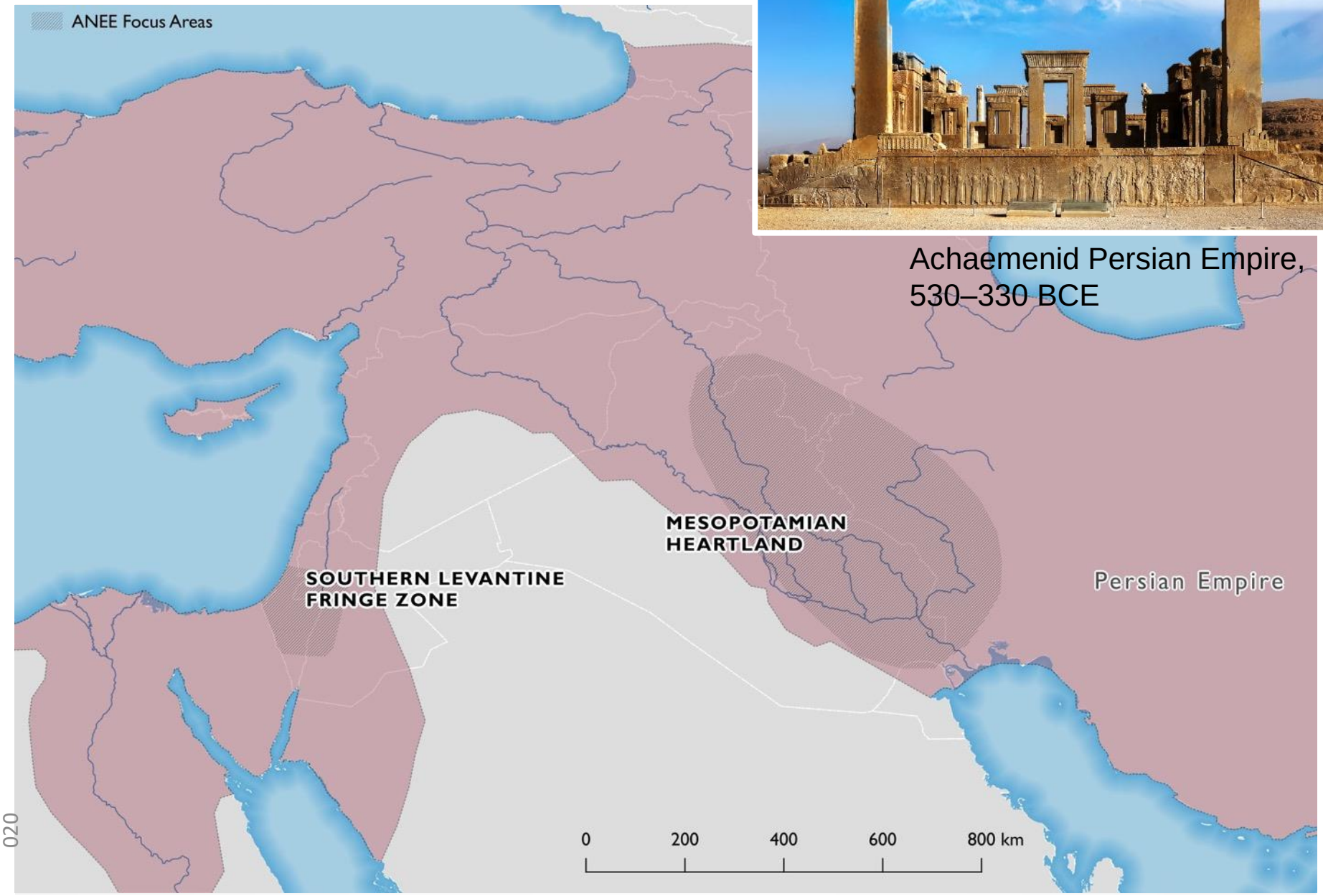
Academy of Finland Centre of Excellence
ANCIENT NEAR EASTERN EMPIRES
ANEE



Neo-Assyrian Empire, 932–612 BCE



Neo-Babylonian Empire, 612–539 BCE



Achaemenid Persian Empire, 530–330 BCE

Hellenistic “Successor States”, c. 323–30 BCE

ANEE Focus Areas

MESOPOTAMIAN HEARTLAND

Seleucid Kingdom

SOUTHERN LEVANTINE FRINGE ZONE

Ptolemaic Kingdom

0 200 400 600 800 km

ANEE Focus Areas

Roman Empire,
27 BCE–636 CE

Parthian Empire,
240 BCE–224 CE

Roman Empire

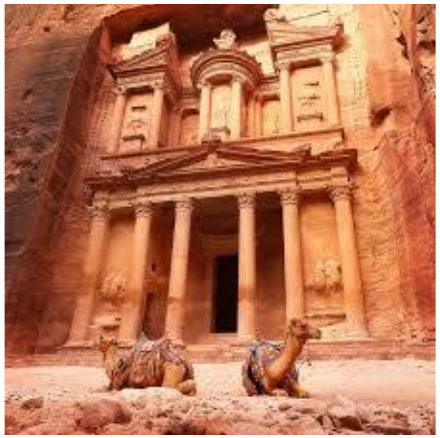
MESOPOTAMIAN HEARTLAND

Parthian Empire

SOUTHERN LEVANTINE FRINGE ZONE

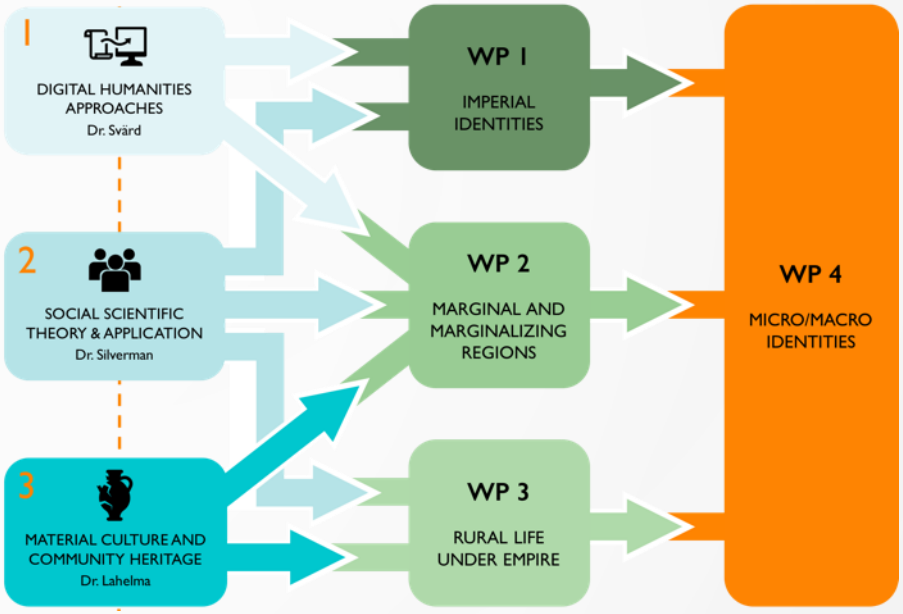
Nabataean Kingdom

600 800 km



COE IN ANCIENT NEAR EASTERN EMPIRES (ANEE)

- How do changing empires impact social group identities and lifeways during the first millennium BCE
- Longue-durée perspective: Neo-Assyrian, Neo-Babylonian, Persian, Hellenistic, Roman/Parthian
- Textual, Social-scientific, and Archaeological scholarship

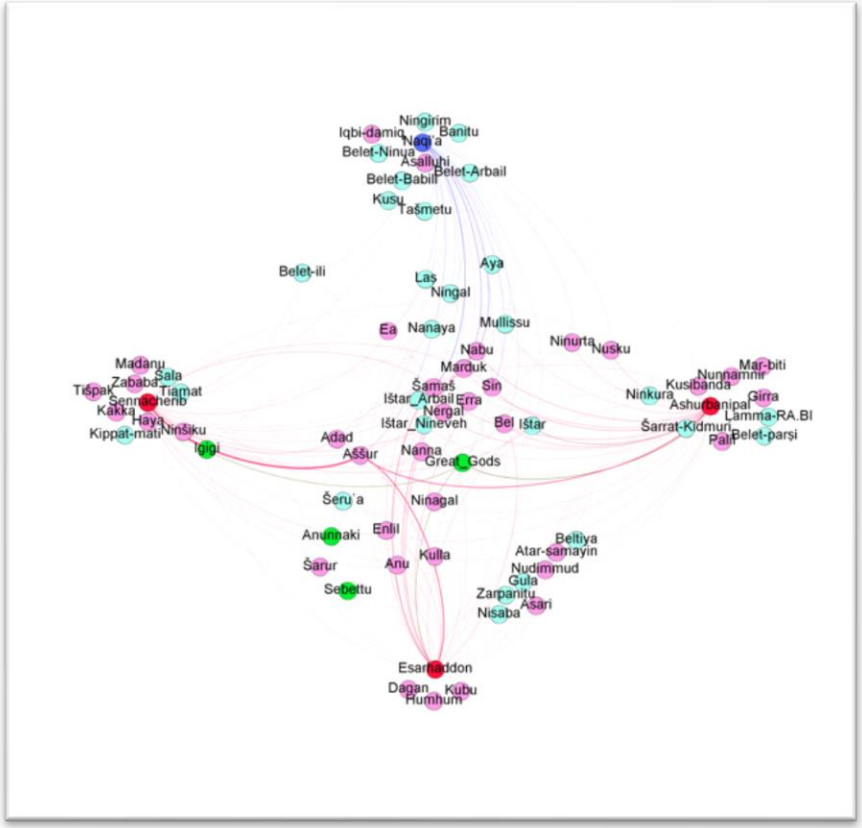


www.helsinki.fi/anee

TEAM 1
DIGITAL HUMANITIES APPROACHES

Utilizes recent advances in the digital humanities to examine multiple social group identities present in the empires. It concentrates on the emic point of view and engages with:

1. **language technology:** building contextual semantic models from primary sources regarding lexemes
2. **social network analysis:** Tracing social networks through prosopographic data enables the team to delineate social groups among the elite of the empires under study.
3. **traditional archival work:** philological and historical work on the texts is needed as well, especially where data is too thin for Digital Approaches



TEAM 2
SOCIAL SCIENTIFIC APPROACHES

Tests and refines theoretical models from the social sciences for ancient evidence, integrating anthropological approaches to archaeology with sociological readings of textual and archaeological evidence.

1. Analyse group formation and authority negotiation among local elites in Mesopotamia and the southwestern imperial fringe zone (modern Israel/Palestine and Jordan).

2. Assess the impact of large imperial networks on local social group identities and lifeways.

3. Compare the phenomena of forced migration and labour in each of the first millennium empires, through both textual and archaeological data.

TEAM 3

MATERIAL CULTURE AND COMMUNITY HERITAGE

Investigates interactions between ancient empires and local communities inhabiting the imperial fringes; and provide a sustainable future for this heritage.

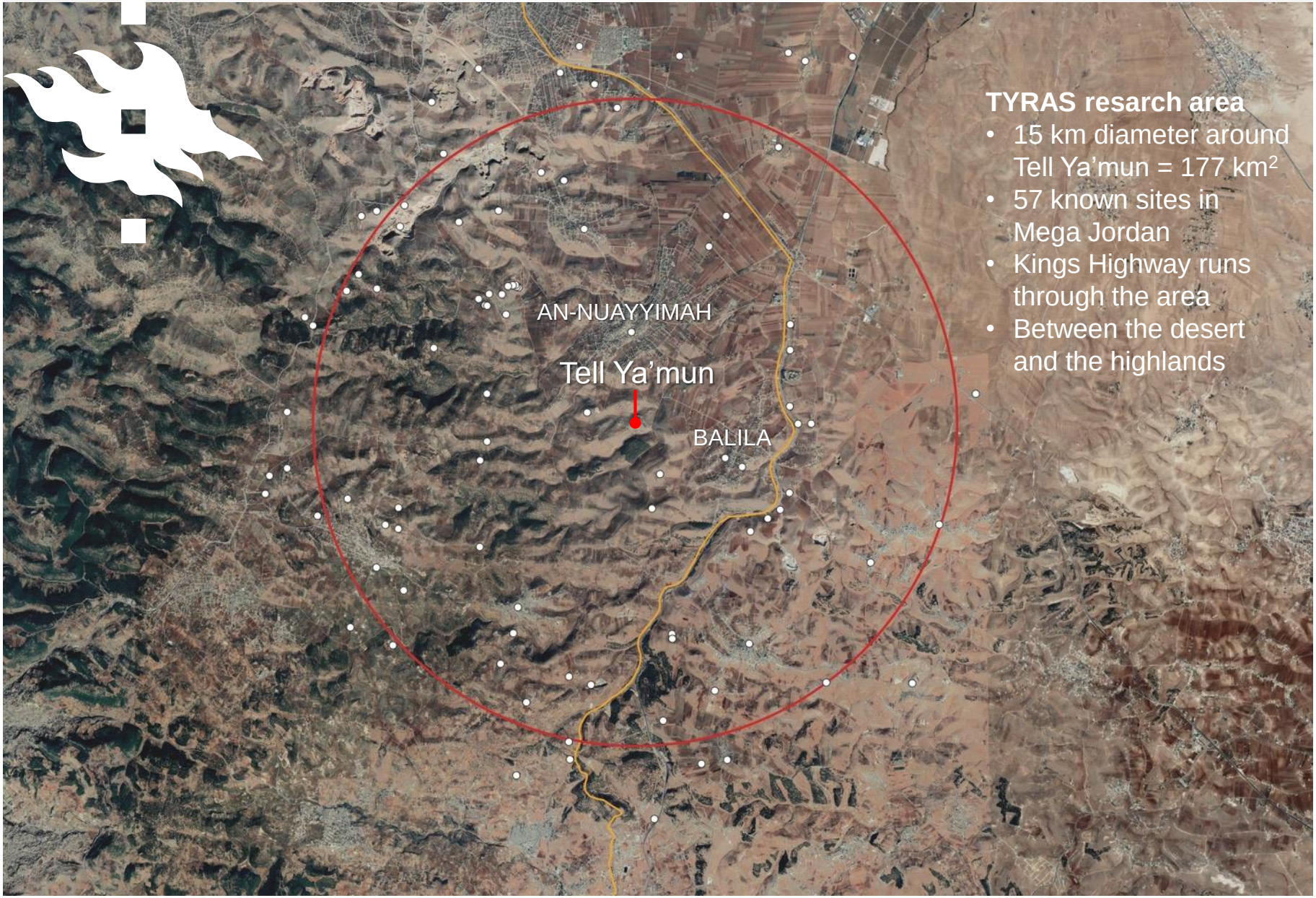
- Developing an archaeological survey (with Yarmouk University, Jordan)
- A community archaeology project in Jordan together with Jordanian archaeologists
- Organising a museum exhibition in Finland with partners
- Developing policies to combat antiquities trafficking

- Building sustainability: investigating earthen architecture and social practices in the Ancient Near East (Lorenzon; UH3y project)
- Religious Responses to Climate Change in the Southern Levant (Bonnie; UH3y project)
- Making Home Abroad: Understanding Migrant Experiences and Heritage Implementation in Finland (Bonnie; Finnish Cultural Foundation)

TELL YA'MUN REGIONAL ARCHAEOLOGICAL SURVEY

HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

Academy of Finland Centre of Excellence
ANCIENT NEAR EASTERN EMPIRES



TYRAS resarch area

- 15 km diameter around Tell Ya'mun = 177 km^2
- 57 known sites in Mega Jordan
- Kings Highway runs through the area
- Between the desert and the highlands

TELL YA’MUN

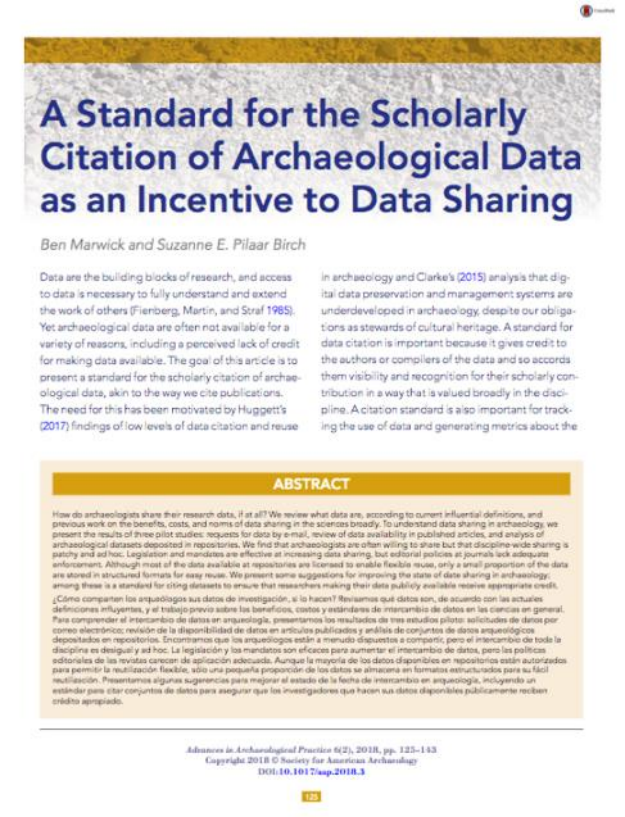
Excavations 1999–2004 by Jerome Rose, University of Arkansas and Mahmoud Najjar, Yarmouk University


COVID-19 SITUATION

PROBLEMS OF ARCHAEOLOGICAL DATA PUBLISHING

- Post-fieldwork is a slow process (lack of funding, lack of time, data is assigned to original excavator)
- Due to the above, decades of unpublished archaeological legacy data
- Static physical reports
  - with emphasis on interpretation
  - often only a selection of data per site

DATA CITATION IN ARCHAEOLOGY



A Standard for the Scholarly Citation of Archaeological Data as an Incentive to Data Sharing

Ben Marwick and Suzanne E. Pilaar Birch

Data are the building blocks of research, and access to data is necessary to fully understand and extend the work of others (Fienberg, Martin, and Straf 1985). Yet archaeological data are often not available for a variety of reasons, including a perceived lack of credit for making data available. The goal of this article is to present a standard for the scholarly citation of archaeological data, akin to the way we cite publications. The need for this has been motivated by Huggett's (2017) findings of low levels of data citation and reuse in archaeology and Clarke's (2015) analysis that digital data preservation and management systems are underdeveloped in archaeology, despite our obligations as stewards of cultural heritage. A standard for data citation is important because it gives credit to the authors or compilers of the data and so accords them visibility and recognition for their scholarly contribution in a way that is valued broadly in the discipline. A citation standard is also important for tracking the use of data and generating metrics about the

ABSTRACT

How do archaeologists share their research data, if at all? We review what data are, according to current influential definitions, and previous work on the benefits, costs, and norms of data sharing in the sciences broadly. To understand data sharing in archaeology, we present the results of three pilot studies: requests for data by e-mail, review of data availability in published articles, and analysis of archaeological datasets deposited in repositories. We find that archaeologists are often willing to share but that discipline-wide sharing is patchy and ad hoc. Legislation and mandates are effective at increasing data sharing, but editorial policies at journals lack adequate enforcement. Although most of the data available at repositories are licensed to enable flexible reuse, only a small proportion of the data are stored in structured formats for easy reuse. We present some suggestions for improving the state of data sharing in archaeology; among these is a standard for citing datasets to ensure that researchers making their data publicly available receive appropriate credit.

¿Cómo comparten los arqueólogos sus datos de investigación, si lo hacen? Revisamos qué datos son, de acuerdo con las actuales definiciones influyentes, y el trabajo previo sobre los beneficios, costos y estándares de intercambio de datos en las ciencias en general. Para comprender el intercambio de datos en arqueología, presentamos los resultados de tres estudios pilotos: solicitudes de datos por correo electrónico; revisión de la disponibilidad de datos en artículos publicados y análisis de conjuntos de datos arqueológicos depositados en repositorios. Encontramos que los arqueólogos están a menudo dispuestos a compartir, pero el intercambio de todo la disciplina es desigual y ad hoc. La legislación y los mandatos son eficaces para aumentar el intercambio de datos, pero las políticas editoriales de las revistas carecen de aplicación adecuada. Aunque la mayoría de los datos disponibles en repositorios están autorizados para permitir la reutilización flexible, sólo una pequeña proporción de los datos se almacena en formatos estructurados para su fácil reutilización. Presentamos algunas sugerencias para mejorar el estado de la fecha de intercambio en arqueología, incluyendo un estándar para citar conjuntos de datos para asegurar que los investigadores que hacen sus datos disponibles públicamente reciben crédito apropiado.

Advances in Archaeological Practice 6(2), 2018, pp. 125–143
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DOI:10.1017/aap.2018.3

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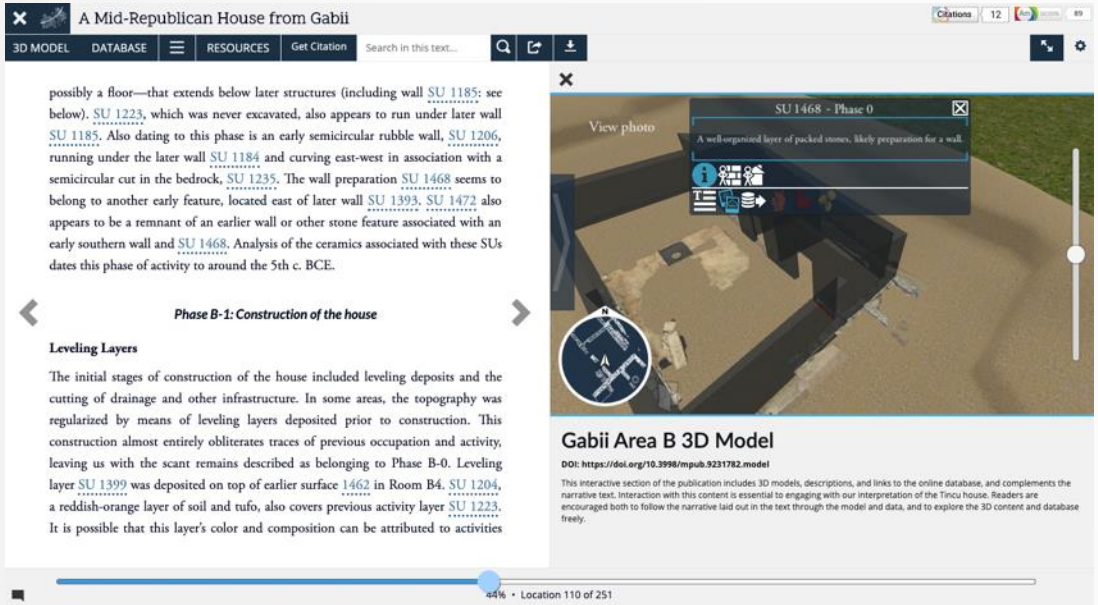
When citing data in the text of a manuscript or report, the ideal practice is to cite the dataset and the traditional publication that first described it, like so (Penev et al. 2017): "This paper uses data from the [name] data repository at http://doi.org/xxx/xxx (Author YYYY), first described in Author YYYY." For example: "This paper uses data from the Open Science Framework data repository at http://doi.org/10.17605/OSF.IO/32A87 (Marwick 2017), first described in Marwick et al. 2017." Citing both the dataset and the publication helps to resolve ambiguity about the source of the data and gives context to the data. Furthermore, the author-

Marwick, Ben, and Suzanne E. Pilaar Birch. "A Standard for the Scholarly Citation of Archaeological Data as an Incentive to Data Sharing." *Advances in Archaeological Practice* 6.2 (2018): 125–43.

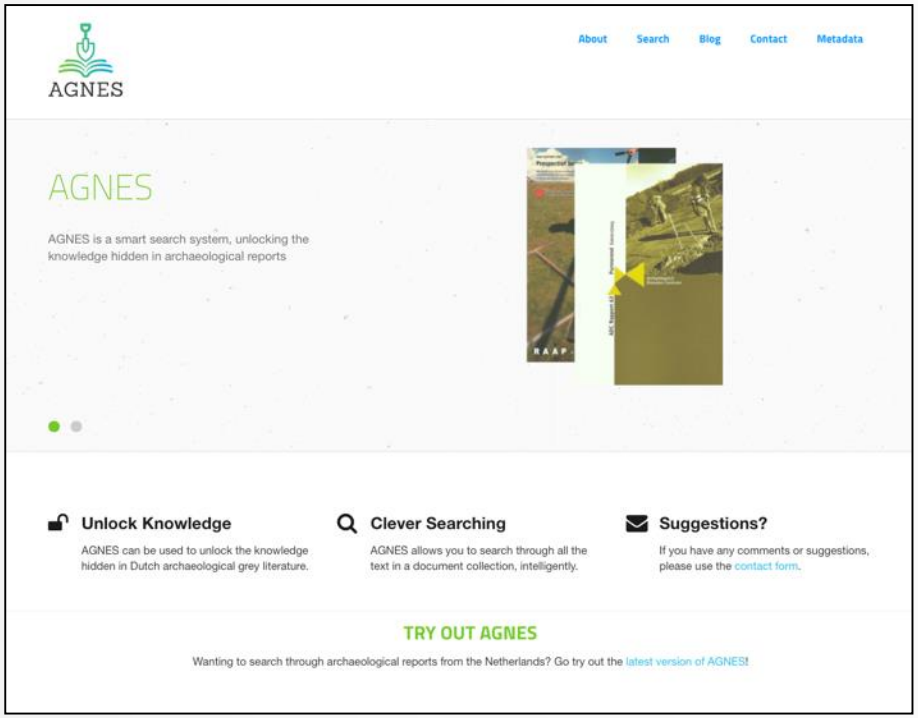
RE-IMAGINING ”THE EXCAVATION REPORT”

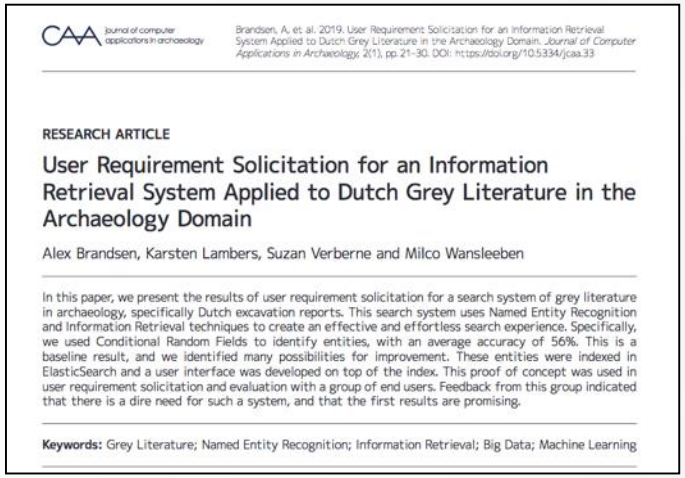


https://www.fulcrum.org/concern/monographs/n009w229r#webgl

Opitz, Rachel. “Publishing Archaeological Excavations at the Digital Turn.” *J. Field Archaeol.* 43.sup1 (2018): S68–82.

DATA SEARCH PORTAL





CAA journal of computer applications in archaeology

Brandsen, A, et al. 2019. User Requirement Solicitation for an Information Retrieval System Applied to Dutch Grey Literature in the Archaeology Domain. *Journal of Computer Applications in Archaeology* 2(1), pp. 21–30. DOI: https://doi.org/10.5334/jcaa.33

RESEARCH ARTICLE

User Requirement Solicitation for an Information Retrieval System Applied to Dutch Grey Literature in the Archaeology Domain

Alex Brandsen, Karsten Lambers, Suzan Verberne and Milco Wansleeben

In this paper, we present the results of user requirement solicitation for a search system of grey literature in archaeology, specifically Dutch excavation reports. This search system uses Named Entity Recognition and Information Retrieval techniques to create an effective and effortless search experience. Specifically, we used Conditional Random Fields to identify entities, with an average accuracy of 56%. This is a baseline result, and we identified many possibilities for improvement. These entities were indexed in ElasticSearch and a user interface was developed on top of the index. This proof of concept was used in user requirement solicitation and evaluation with a group of end users. Feedback from this group indicated that there is a dire need for such a system, and that the first results are promising.

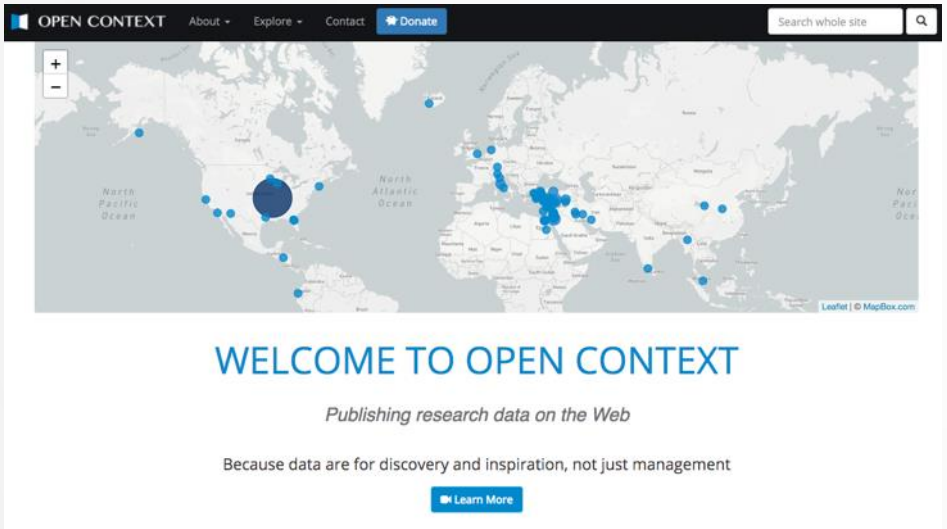
Keywords: Grey Literature; Named Entity Recognition; Information Retrieval; Big Data; Machine Learning

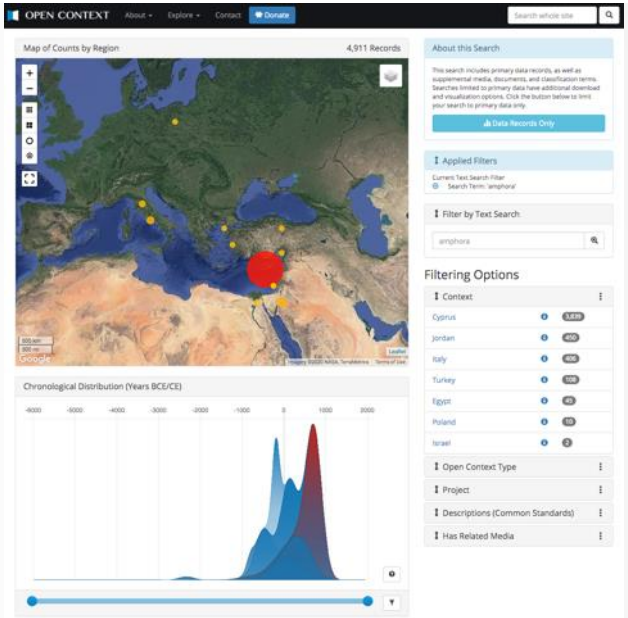
Brandsen, Alex, Karsten Lambers, Suzan Verberne, and Milco Wansleeben. “User Requirement Solicitation for an Information Retrieval System Applied to Dutch Grey Literature in the Archaeology Domain.” *Journal of Computer Applications in Archaeology* 2.1 (2019): 21–30.

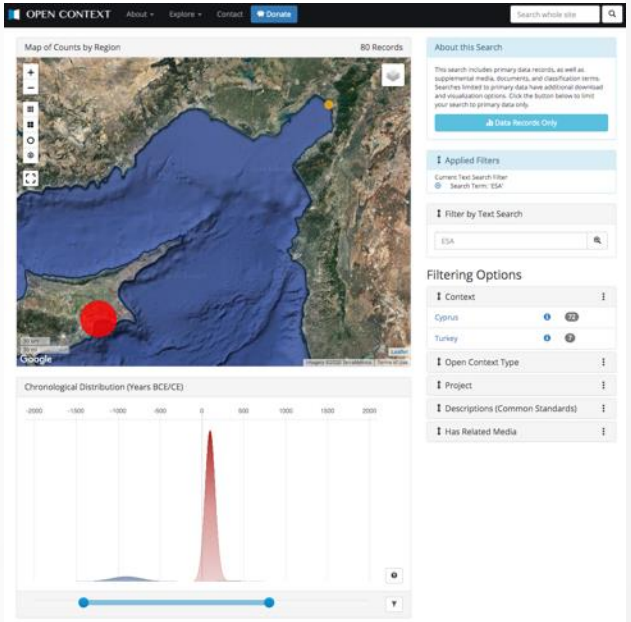
IDEAS ON OPENNESS

- focus on **born**-open data, including all field and laboratory finds
  - Rouder, J. N. “The What, Why, and How of Born-Open Data.” *Behav. Res. Methods* 48.3 (2016): 1062–69.
- Collaboration → makes our research available quickly
- New voices → stimulates immediate collaboration and discussion with researchers and students
- Information available to involved communities

NOT TRYING TO REINVENT THE WHEEL







ETHICAL CHALLENGES

- forms Open Data a risk of exposing archaeological sites to a greater likelihood of looting
  - Looting of arch. sites a big problem accross the Mediterranean
  - ”monetary” vs ”cultural” value
  - Centuries of colonialism have impacted communities understanding of ”heritage” (e.g., in Jordan Iron Age is very much connected to ”Biblical Archaeology”)

- Potential culturally sensitive restrictions around who can view or experience certain objects

PRACTICAL CHALLENGES

- Different government agencies, different ideas of the role of archaeology
  - DoA prefers information first in its own annual reporting (ADAJ), which is slow process (~~born~~ open data)
- Archaeological data is created through many specialists (intellectual property rights)
- Adopting new ideas in new fieldwork projects is slow process
- Assigning enough resources (people, time, budget)

DATA CHALLENGES

- Collaboration between different heritage authorities complicated
- Much fieldwork done by academic institutions (different data structuring process)
  - Different academic backgrounds (archaeology, anthropology, Classics, Near Eastern studies, biblical studies)
- Many different open datasets and platforms created, not clear how these all (can) link to one another (e.g., ADS, OpenContext, Levantine Ceramics Project, Coins DBs)
- Teaching future archaeologists how to make use of LOD
  - Cook, Katherine, Canan Çakirlar, Timothy Goddard, Robert Carl DeMuth, and Joshua Wells. “Teaching Open Science: Published Data and Digital Literacy in Archaeology Classrooms.” *Advances in Archaeological Practice* 6.2 (2018): 144–56.