

Describing and Searching Food Content in Historical Images with the ChIA Vocabulary

Gerda Koch¹, Amelie Dorn², Renato Rocha Souza²

Yalemisew Abgaz³, Ramiro Ortiz¹,

¹AIT Angewandte Informationstechnik - Europeana Local - AT, ²ACDH-CH OeAW,

³Dublin City University,

Background



Project details

- Funded in 2018 by the go!digital Next Generation call of the Austrian Academy of Sciences (GDNG 2018-051)
- Project duration: 27 months (06/2019 - 08/2021);

Involved expertise

- Digital Humanities, AI & NLP (ACDH-CH OeAW, AT)
- Semantic technologies (Dublin City University, IE)
- Cultural Image aggregation & vocabulary management (AIT - Europeana Local - Österreich, AT)



The Problem



AIM of ChIA

- Increase access to cultural images depicting **food**

In current image collection:

- The collection focuses on bibliographic metadata
- Wide range of cultural information does not get sufficient coverage.

Background



Problem

- art images are often subject to a wide range of interpretations
- textual descriptions can only partially capture the richness and complexity of the semantic content of a visual image
- human indexing of images is very labor intensive and hardly feasible in detail for large databases
- Image databases for experts



Image source: Europeana

Title: Banquet Still Life (Adriaen Van Utrecht); CC-BY-PD

Description: The Fleming Adriaen van Utrecht here demonstrated that he could paint virtually anything, from costly tableware to glass, fruit, an enormous lobster on a Chinese plate, a cut-open pasty, and much more. Given its striking low vantage point, this large painting was most likely meant to hang above a chimneypiece.

The Problem



Metadata

- In most cases content descriptions use iconographic phrases like “fruits”, “flowers”, “still life”.



about:	/proxy/provider/2059517 /data_foodanddrink_WAGMU_op725	
dcCreator:	def:	STEELE, E
dcDate:	def:	1889
dcDescription:	def:	Oil painting showing a vase of flowers and a bowl of fruit on a table, more fruit lies on the table.
dcFormat:	def:	image/jpeg

Europeana data set

Total: ~53 Mio digital objects

Includes: ~30 Mio digital images

from: 3.500 institutions in 42 countries



<https://www.europeana.eu>

The Problem



Networks/Joint databases

- Irregularity in the use of semantics across the datasets.

Vocabularies

- No specific food or drink related vocabularies are used for describing art images

Food Vocabularies



Goal:

The ChIA project investigates the use of

- existing art and food related vocabularies and mappings
- in order to establish a tagging baseline and
- integrated resource to describe food and drink items depicted in images.

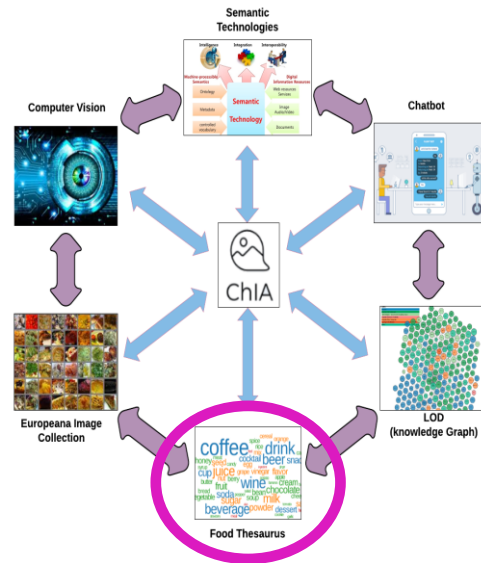


Image: CC-BY-4.0 Yalemisew Abgaz

The Approach



Vocabularies:

- Getty Arts and Architecture Thesaurus
- Iconclass
- CONA - Getty Cultural Objects Name Authority
- IA - Getty Cultural Objects Name Authority - Iconography Hierarchy
- TGM - Library of Congress Thesaurus For Graphic Materials
- FoodOn
- AGROVOC
- OntoFood
- Food Product Ontology

The Approach



Art Vocabularies:

- **Getty Arts and Architecture Thesaurus**
- **Iconclass**
- CONA - Getty Cultural Objects Name Authority
- IA - Getty Cultural Objects Name Authority - Iconography Hierarchy
- FoodOn
- AGROVOC
- OntoFood
- Food Product Ontology
- TGM - Library of Congress Thesaurus For Graphic Materials

The Approach



Food Vocabularies:

- Getty Arts and Architecture Thesaurus

- FoodOntoMap:

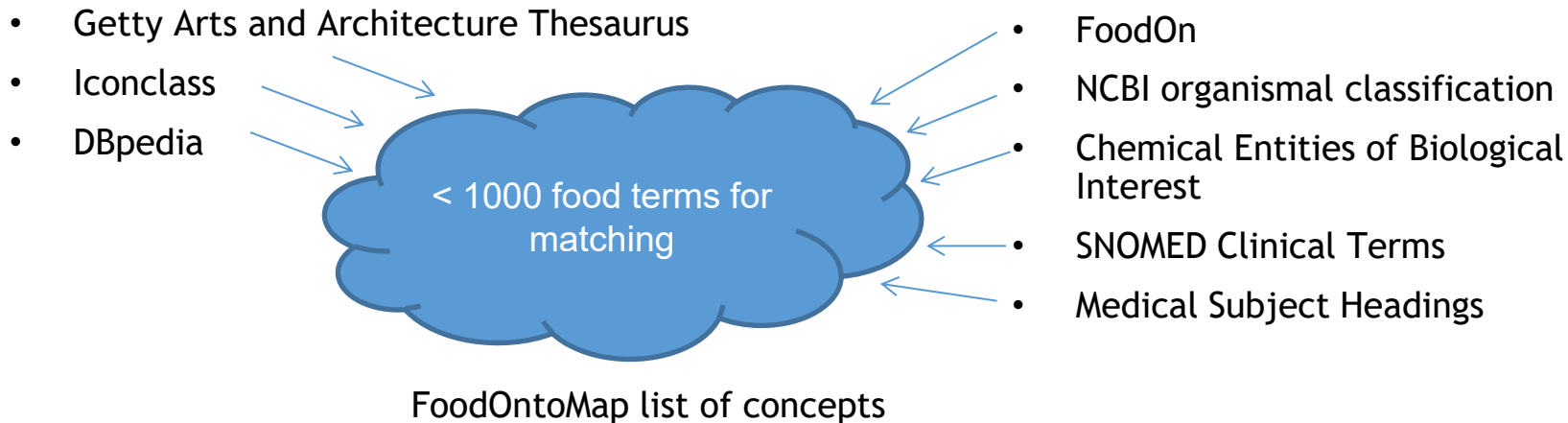
- Hansard Corpus
- FOODON
- SNOMEDCT
- OF OntoFood
- RCD Clinical Terms Version 3
- MESH Medical Subject Headings
- SNMI Systematized Nomenclature of Human and Veterinary Medicine
- NDDF National Drug Data File

<https://zenodo.org/record/3600619#.YUL0RX1CQ95>

The Matching



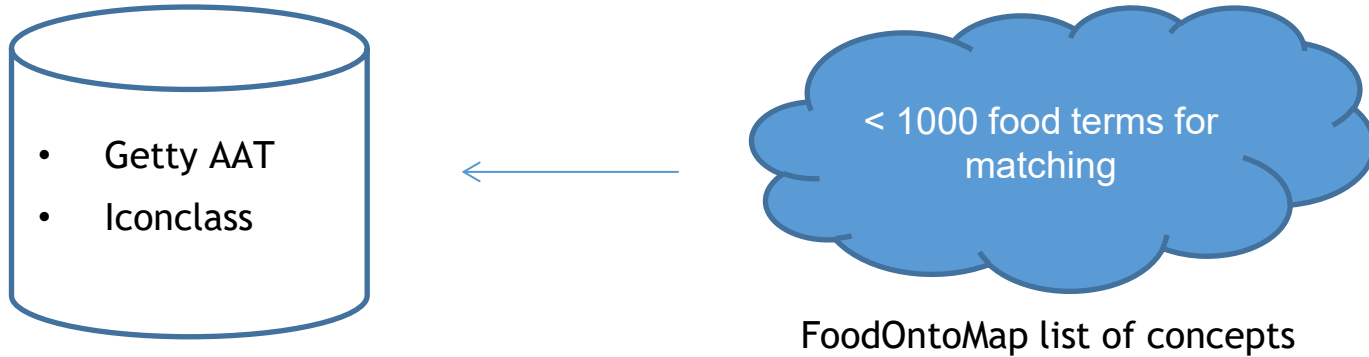
Vocabulary matching:



The Matching



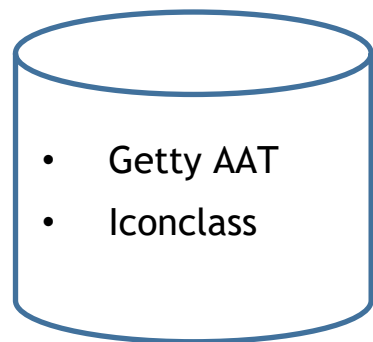
Vocabulary matching:



The Matching



Matching result:



FoodOntoMap list of concepts

AAT: 183 exact and 1076
related concepts
Iconclass: 149 exact but still
109,359 (!) related concepts

The ChIA vocabulary



Online result:

- 1003 concepts (FoodOntoMap)
- 1508 exact matches to:
 - Getty AAT
 - Iconclass
 - FoodOn
 - NCBI organismal classification
 - Chemical Entities of Biological
 - SNOMED Clinical Terms
 - Medical Subject Headings
- 1543 related matches to:
 - Getty AAT

Home | My account | About... | Advanced search

apple | Search

ChIA Vocabulary

A B **C** D E F G H I J K L M N O P Q R S T U V W X Y Z

Home ▶ C: 193 terms

1. Cabbage
2. Cake
3. Cake Mix
4. Cake Mix (Dry)
5. Cake Roll
6. Candied Cherry
7. Candied Citron
8. Candy
9. Candy Bar
10. Candy Cane
11. Candy Corn
12. Cane Sugar
13. Cane Syrup
14. Canola Oil
15. Cantaloupe
16. Cappuccino
17. Caramel
18. Cardamom
19. Carob Powder
20. Carrot
21. Carrot Cake
22. Carrot Juice
23. Cashew

ChIA Vocabulary / ChIA Project

URI:
<http://chia.ait.co.at/vocab/ChIA/>

Language:
en

Contact mail:

Date of creation:
26/03/2021

Last change date:
01/07/2021

Keywords:

Language type:
Controlled vocabulary

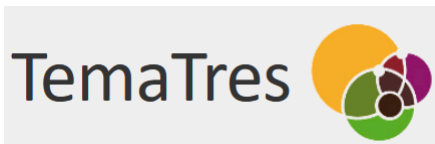
Scope:

Terms:
1003

Relations between terms:

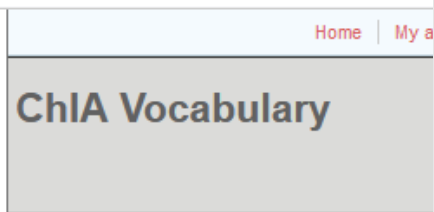
Non preferred terms:

API:
<http://chia.ait.co.at/vocab/ChIA/services.php>



<http://chia.ait.co.at/vocab/ChIA/index.php>

The ChIA vocabulary



Chicken

Home ▶ Chicken

Chicken

ExactMatch **Chicken**

ExactMatch **Chicken**

ExactMatch **Gallus gallus**

ExactMatch **fowl (cock, hen, chicken, etc.)**

Identifier <http://chia.ait.co.at/vocab/ChIA/?tema=189>

RelatedMatch **chicken houses**

RelatedMatch **chicken wire**

RelatedMatch **chicken runs**

RelatedMatch **chicken coops**

RelatedMatch **chicken hatcheries**

Iconclass

Outline · Edit · Clipboard

0 Abstract, Non-representational Art

1 Religion and Magic

2 Nature

3 Human Being, Man in General

348 man and animal

348 domestic animals, kept in and outside the house

3482 domestic animal kept outside the house

34823 domestic birds kept outside the house

348233 fowl (cock, hen, chicken, etc.)

animal · bird · chicken · cock · domestic animal · fowl · hen · human being · occupations · outdoors

4 Society, Civilization, Culture

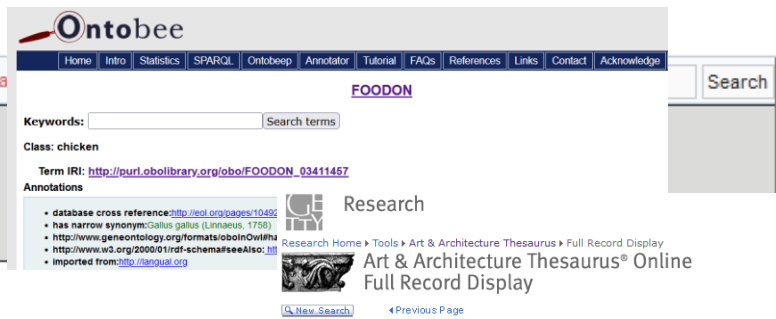
5 Abstract Ideas and Concepts


6 History

7 Bible

8 Literature

9 Classical Mythology and Ancient History




Click the  icon to view the hierarchy.

[Semantic View](#) ([JSON](#), [RDF](#), [N3/Turtle](#), [N-Triples](#))

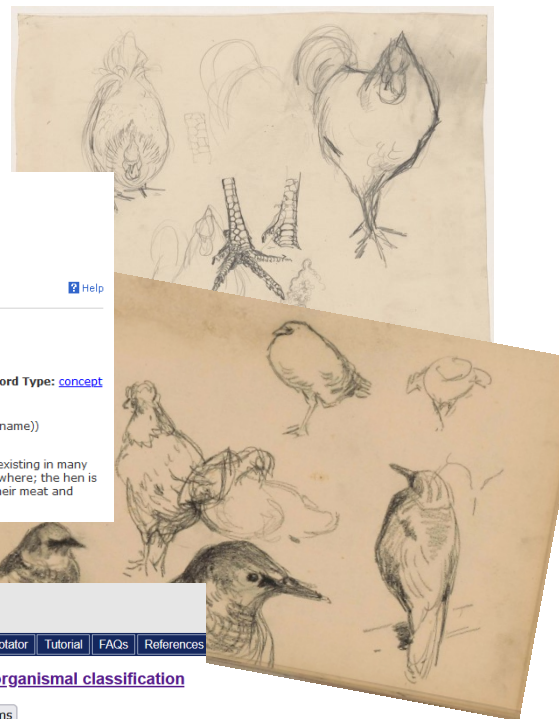
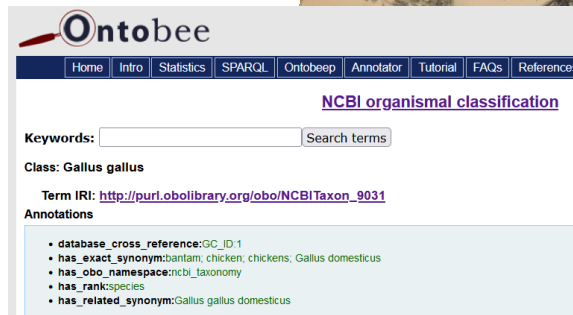
ID: 300250037

Page Link: <http://vocab.getty.edu/page/aat/300250037>

Record Type: [concept](#)

 **Gallus gallus (species)** (Gallus (genus), Phasianidae (family), ... Living Organisms (hierarchy name))

Note: Members of a species, the red jungle fowl, that is the most widely domesticated fowl and existing in many breeds. The wild cock has shining silky plumage, red on the head and back and green-black elsewhere; the hen is rusty brown with speckled neck and minimal comb. Domestic chickens are raised worldwide for their meat and eggs.



<http://chia.ait.co.at/vocab/ChIA/index.php>

ChIA vocabulary usage



ChIA Search infrastructure

Europeana Search

Europeana Search My Baskets

This page allows to perform a search in Europeana and to save the result in the users own Baskets.
Is it possible to search on multiple fields using boolean operator or to perform a simple search.

Any copyright No thematic restriction Exact term

-- Any field -- + -

ChIA Vocabulary Chicken Delete

Search on Europeana 100

Pick a target Basket

Select Below

Add to basket

Previous Searches ...

Title Chicken Create

Showing results: 1 - 100 of 750

1 2 4 6

List Grid

Scharrelend gevogelt...
Rijksmuseum
Blad 13 verso uit een schetsboek met 15 bladen.

Hoenderhof
Rijksmuseum

Studies van een haan...
Rijksmuseum

Kippen en vogels
Rijksmuseum
Blad 22 verso uit een schetsboek met 28 bladen.

Kippen, een haan en ...
Rijksmuseum

Add to Chicken

Add to Chicken

Add to Chicken

Add to Chicken

Add to Chicken

The screenshot displays the Europeana Search interface. At the top, there's a search bar and navigation tabs for 'Europeana Search' and 'My Baskets'. Below this, a text box explains the search functionality. The main search area includes dropdown menus for 'Any copyright', 'No thematic restriction', and 'Exact term', along with a field for '-- Any field --' and '+' '-' buttons. A green button labeled 'ChIA Vocabulary' is visible, along with 'Chicken' and 'Delete' buttons. A 'Search on Europeana' button with a value of '100' is also present. A modal window titled 'Title' contains the text 'Chicken' and a 'Create' button. To the right, a section titled 'Pick a target Basket' shows a 'Select Below' dropdown and an 'Add to basket' button. Below this, a 'Previous Searches ...' section is visible. The search results are displayed in a grid view, showing five items from the Rijksmuseum. Each item includes a title, a description, and an 'Add to Chicken' button. A blue arrow points from the 'Create' button in the modal window to the first search result.

ChIA vocabulary usage



Vocabulary terms selection

The screenshot displays the Europeana Search interface with a 'ChIA Vocabulary' modal open. The modal lists various terms, with 'Chicken' selected. The search results show a list of items related to chicken, including 'Scharrelend gevogelt...', 'Hoenderhof', 'Studies van een haan...', 'Kippen en vogels', and 'Kippen, een haan en ...'. The interface includes search filters, a search bar, and a results grid.

Europeana Search

Europeana Search My Baskets

This page allows to perform a search in Europeana and is possible to search on multiple fields using boolean

Any copyright No thematic res

Summer -- Any field --

Chicken Delete

Facets

Color palette Any

Search on Europeana 100

Showing results

1 2 3 4 ... 10 Query

ChIA Vocabulary

- Cheese Dip
- Cheese Filling
- Cheese Salad Dressing
- Cheese Sauce
- Cheese Spread
- Cheese Stick
- Cheese Substitute
- Cheesecake
- Cheesecake Batter
- Cherry
- Cherry Jam
- Cherry Juice
- Cherry Liqueur
- Cherry Pie
- Cherry Preserves
- Chestnut Puree
- Chicken**
- Chicken Broth
- Chicken Fat
- Chicken Gravy
- Chicken Roll
- Chicken Soup

Pick a target Basket

Select Below

Add to basket

Previous Searches ...

ChIA Vocabulary

Or vocab.getty.edu/page/aa -- Any field --

ChIA Vocabulary

Or vocab.getty.edu/page/aa -- Any field --

ChIA Vocabulary

Facets

Color palette Any

Search on Europeana 100

Showing results: 1 - 100 of 284004

1 2 3 4 ... 10 Query exceeded maximum of 1000 results

List Grid

Scharrelend gevogelt...

Rijksmuseum

Blad 13 verso uit een schetsboek met 15 bladen.

Hoenderhof

Rijksmuseum

Studies van een haan...

Rijksmuseum

Kippen en vogels

Rijksmuseum

Blad 22 verso uit een schetsboek met 28 bladen.

Kippen, een haan en ...

Rijksmuseum

ChIA vocabulary usage



This screenshot shows the Europeana search interface with the query 'chicken'. The search filters include 'Any copyright', 'No thematic restriction', and 'Exact term'. The results show 501 to 600 of 4244 items. The first row of results includes items from 'Tronic', 'Húsvéti udvöslöt', 'Höns i burar.', 'Chocolate chickens ~', 'Incubator', and 'doll (pastimes: toys)'. Each item has a small thumbnail image and a brief description.

Without ChIA vocabulary: **4244** results

This screenshot shows the Europeana search interface with the query 'chicken' and the ChIA Vocabulary filter applied. The search filters include 'Any copyright', 'No thematic restriction', and 'Exact term'. The results show 501 to 600 of 4874 items. The first row of results includes items from 'Beschouw eens deze ..', 'Meisje met een hond ..', 'Geen dieren staan op..', 'Oud en jong, / uit d..', 'Allegorische voorste..', and 'Kindervraag / of pl..'. Each item has a small thumbnail image and a brief description.

With ChIA vocabulary: **4874** results (+ ~15%)

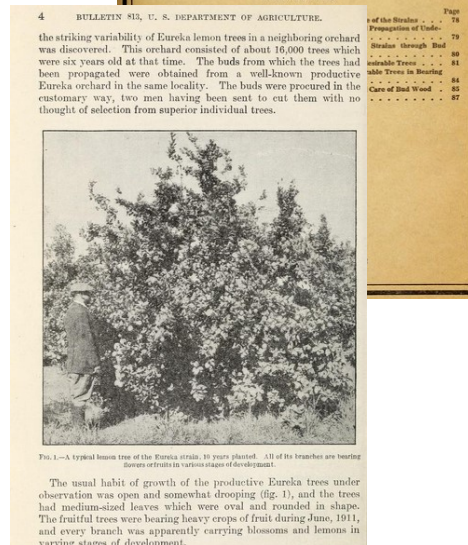
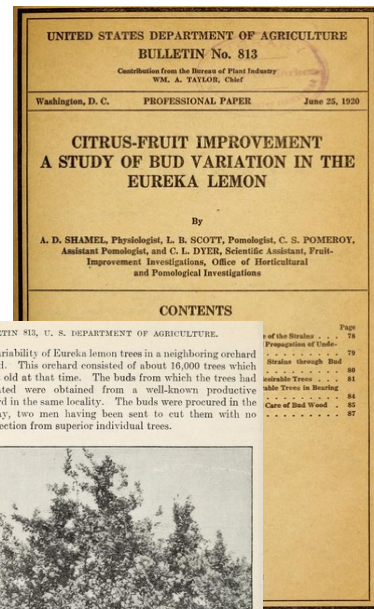
ChIA vocabulary usage



```
<dc:title>Citrus-fruit improvement : a study of bud variation in the Eureka lemon</dc:title>
<dc:contributor>Shamel, A. D. (Archibald Dixon), 1878-</dc:contributor>
<dc:description>no.813 (1920)</dc:description>
<dc:format>print</dc:format>
<dc:publisher>U.S. Dept. of Agriculture,</dc:publisher>
<dc:publisher>Washington, D.C. :</dc:publisher>
<dc:relation>Citrus fruit improvement.</dc:relation>
<dc:relation>Bulletin of the U.S. Department of Agriculture ; no. 813.</dc:relation>
<dc:rights>The contributing institution believes that this item is not in copyright</dc:rights>
<dc:subject>Lemon</dc:subject>
<dc:type>text</dc:type>
<dcterms:issued>1920</dcterms:issued>
<dcterms:language>English</dcterms:language>
<dc:type>book</dc:type>
<dc:subject rdf:resource="http://purl.obolibrary.org/obo/FOODON_03301441"/>
<dc:subject rdf:resource="http://vocab.getty.edu/page/aat/300266423"/>
<dc:subject rdf:resource="http://iconclass.org/25G21%28LEMON%29"/>
```

Vocabulary enrichments

Library data



Conclusion

- Food & Art/Cultural Heritage
- ChIA Vocabulary >
<http://chia.ait.co.at/vocab/ChIA/index.php>
- Search
- Data enrichment



The Future

- DBpedia
- Getty Iconographic Authority

ChIA outcomes & activities

Project website: <https://chia.acdh.oeaw.ac.at/publications/>

Open Access repository on Zenodo: <https://zenodo.org/communities/chia4dh>

Researchgate: <https://www.researchgate.net/project/ChIA-project>

Github: <https://github.com/acdh-oeaw/Chia>

Zotero: https://www.zotero.org/groups/2548379/chia_project/library

Social Media: Twitter #chia4dh



Thank You

Check out our website

<https://chia.acdh.oeaw.ac.at>



Image source: <https://www.europeana.eu/de/item/9200579/j83efggh> (Wellcome Collection, CC-BY)