

Knowledge modeling: Ontoterminologies and TEDI



Rafail Giannadakis

Dept. of Philology and TALOS-AI4SSH (UoC)

E-mail: giannadakis.uni@gmail.com

Seminar for the TALOS Lab interns of the 2025 spring semester

February 20, 2025



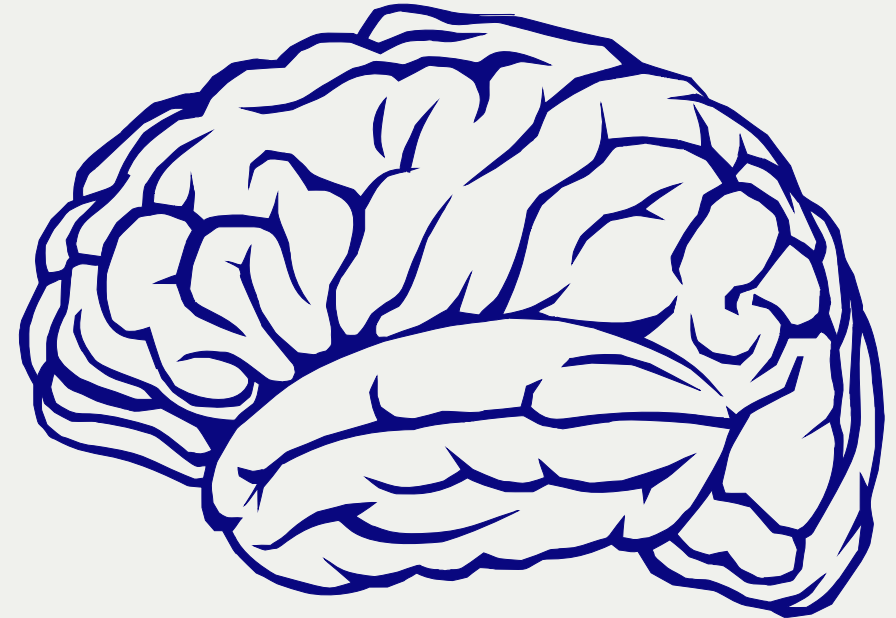
Introduction

ὄρος, ὀρισμός, γνῶσις

Ὅρος λόγος ἐκ διαφορᾶς καὶ γένους συγκείμενος.
(Plato, *Definitiones*: 414d-10)

οὐδὲν γὰρ ἕτερόν ἐστιν ἐν τῷ ὀρισμῷ πλὴν τὸ πρῶτον λεγόμενον γένος καὶ αἱ διαφοραί· τὰ δ' ἄλλα γένη ἐστὶ τό τε πρῶτον καὶ μετὰ τούτου αἱ συλλαμβανόμεναι διαφοραί, οἷον τὸ πρῶτον ζῷον, τὸ δὲ ἐχόμενον ζῷον δίπουν, καὶ πάλιν ζῷον δίπουν ἄπτερον.
(Aristotle, *Metaphysics*: Z 1037b29-33)

ὅτι πάντων ἢ γνῶσις ἢ ὁμοιότητι τινὶ καὶ ταυτότητι γίνεται ἢ ἀνομοιότητι καὶ ἑτερότητι, [...] καὶ τὴν γε φύσιν τοῦ ταύτου καὶ τοῦ ἑτέρου ἐν τῇ συστάσει ταύτης μεμίχθαι φασί.
(*Suda Lexicon*: γνῶσις)



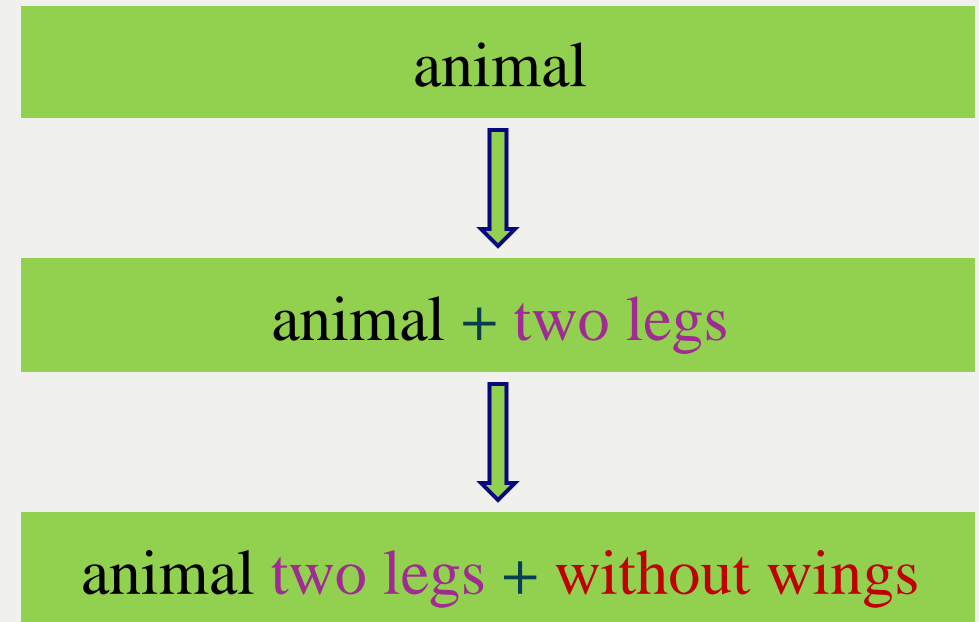
Introduction

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(Plato, *Definitiones*: 414d-10)

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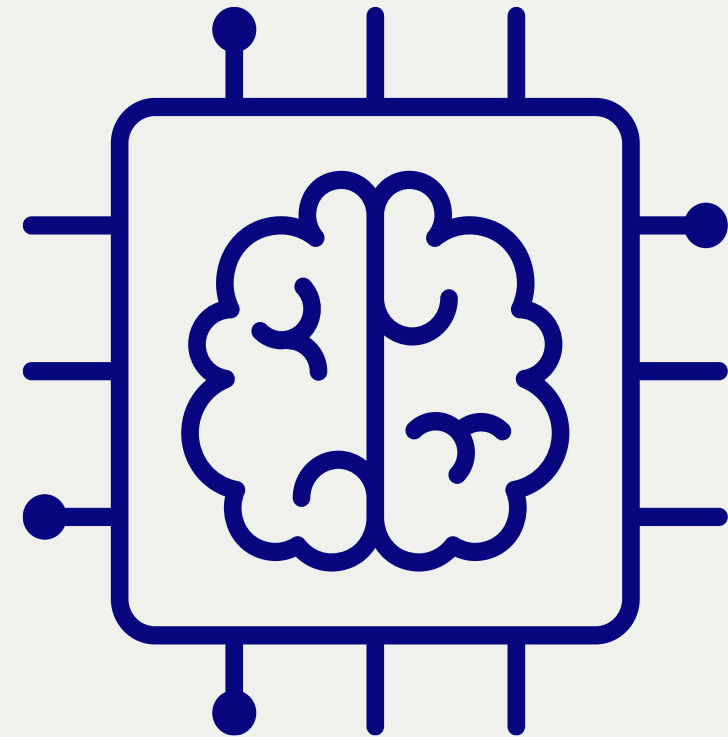


Introduction

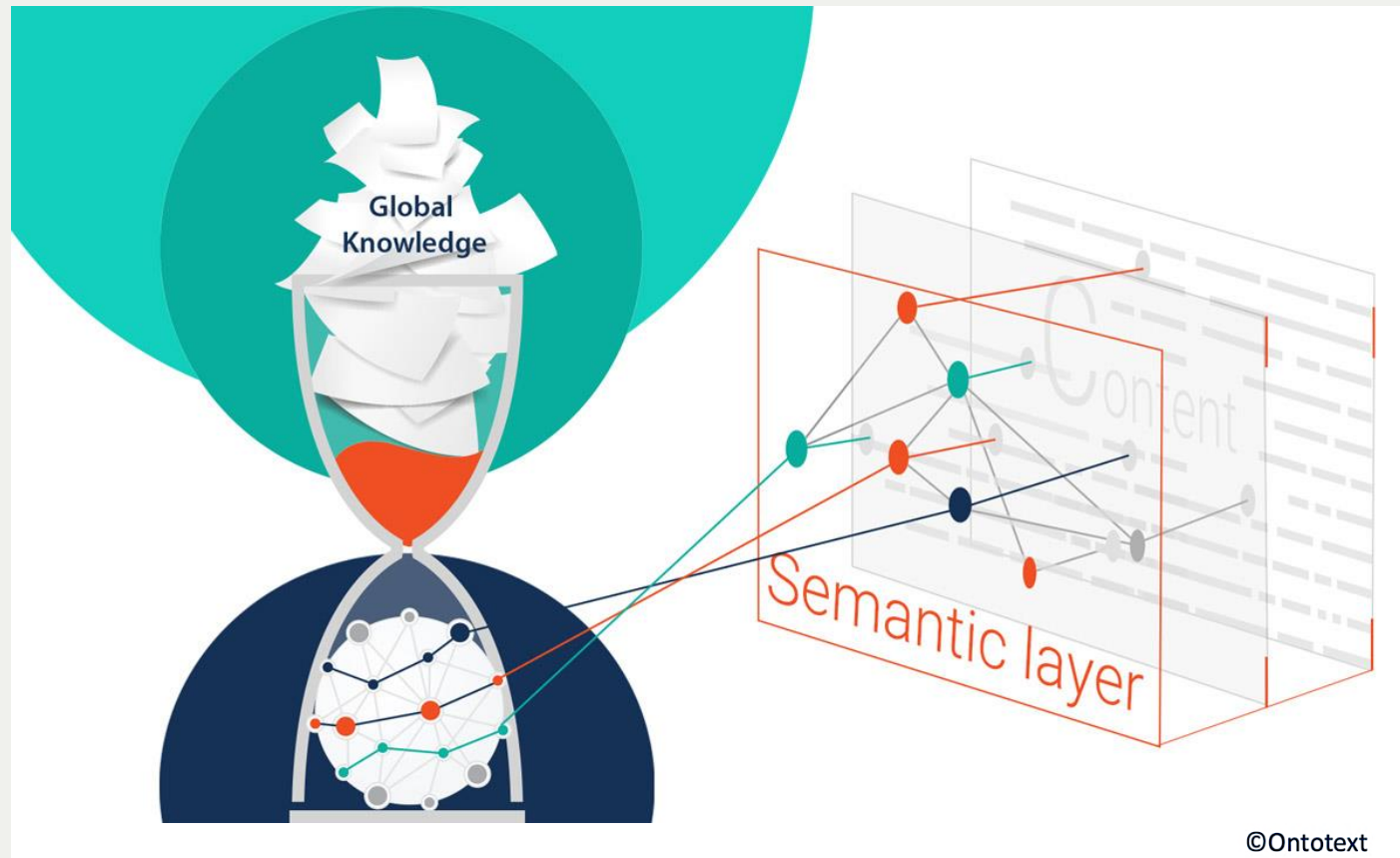
Knowledge modeling

“A process of creating a computer interpretable model of **knowledge** or standards about a language, domain, or process(es). It is expressed in a data structure that enables the knowledge to be stored in a **database** and be interpreted by software”.

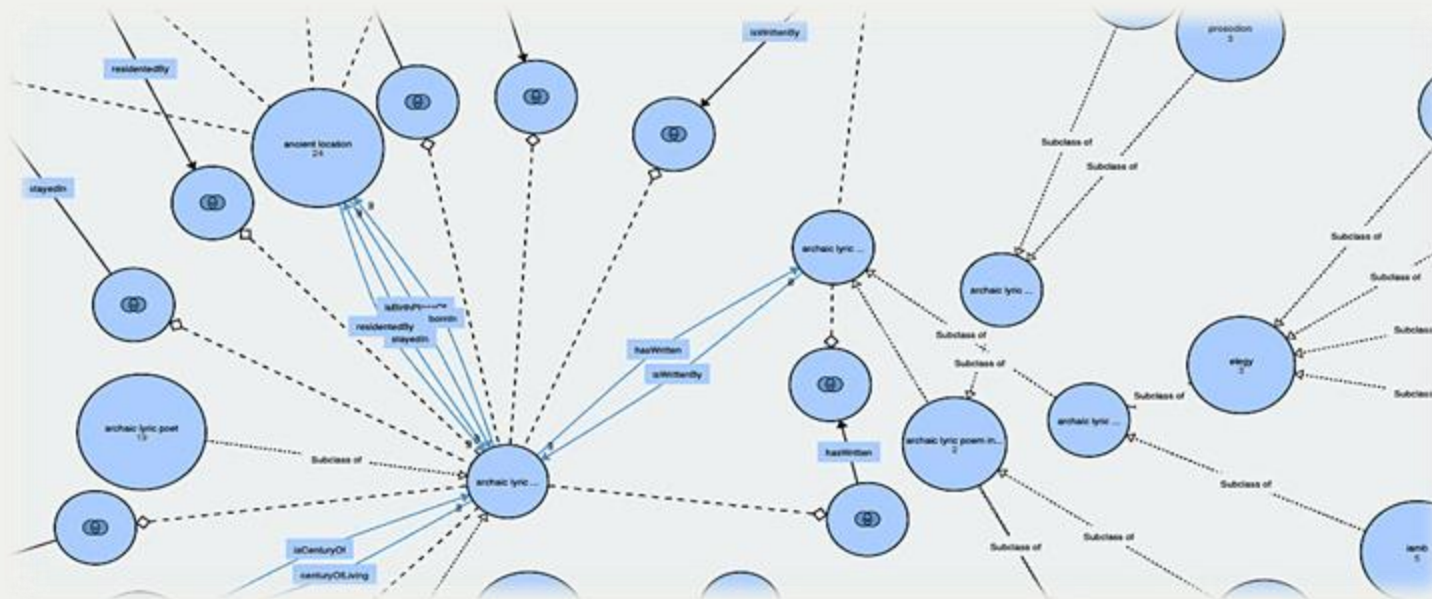
(expert.ai, ‘Knowledge Model’)



Introduction



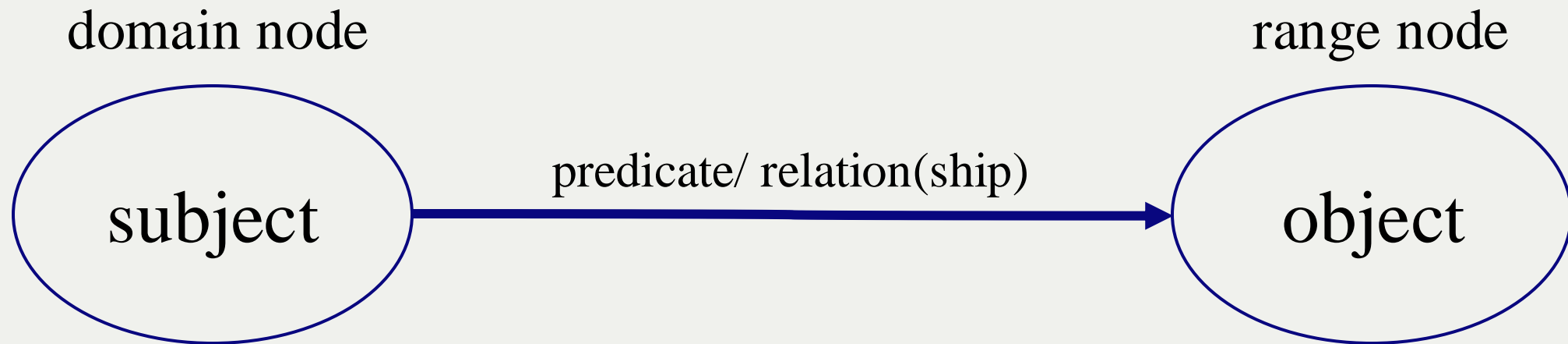
Ontology



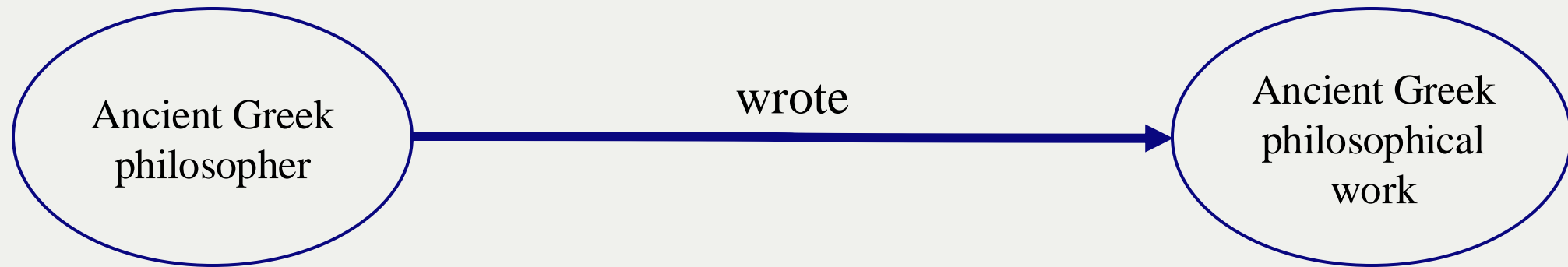
Giannadakis, R., & Papadopoulou, M. (2024). Archaic Lyric Agora (ALyRA) - Ontoterminology of Archaic Lyric Poets - version 1.0 (1.0) [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.13371967>
Visualized via WebVOWL.

“An **ontology** is a shared description of concepts and relationships of a domain expressed in a formal and computer readable language” (Roche).

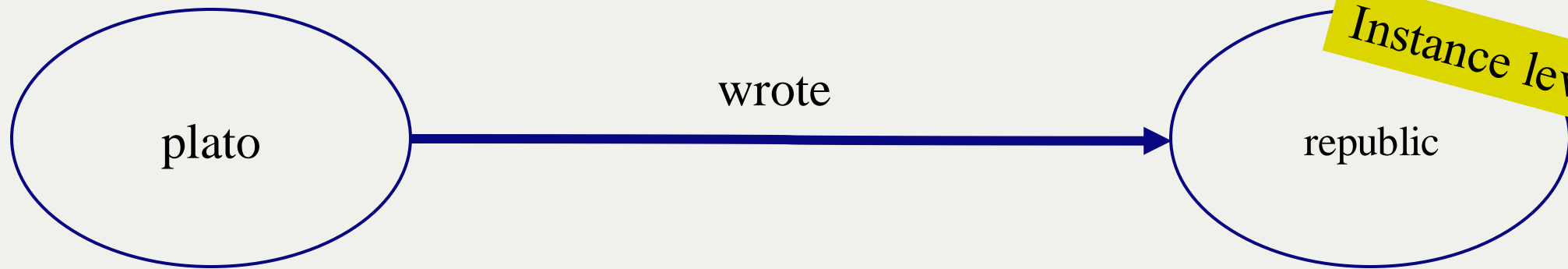
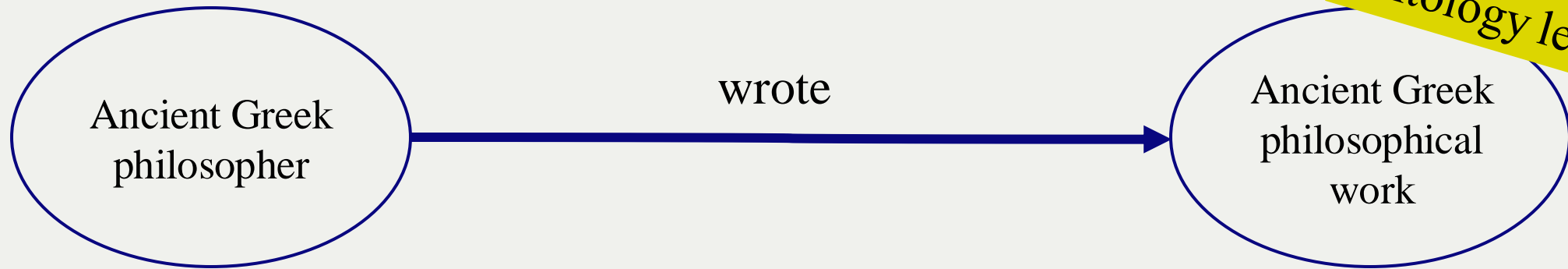
Ontology



Ontology



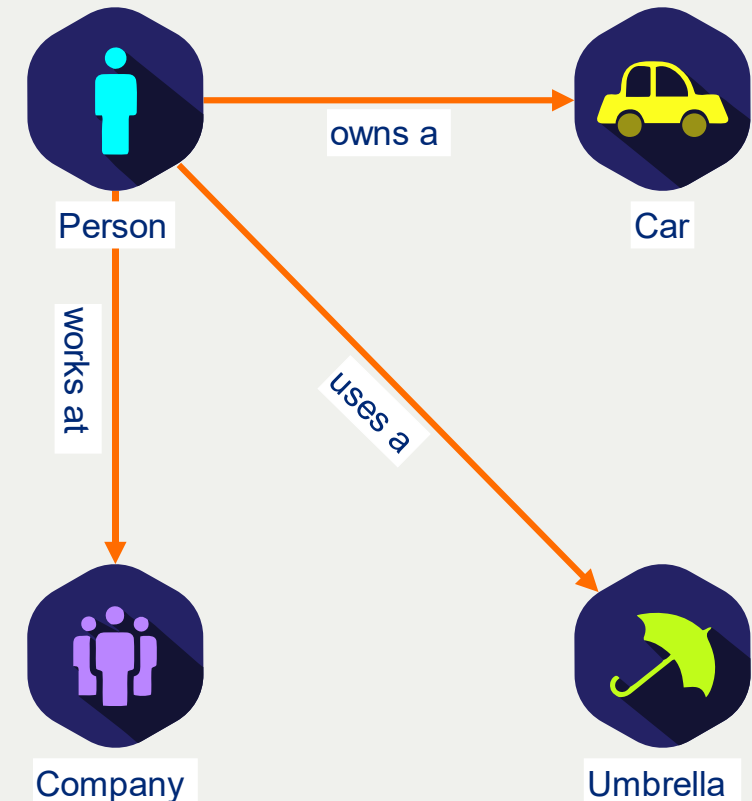
Ontology



Ontology

- “**Ontologies** are used to capture **knowledge** about some **domain** of interest. An ontology describes the concepts in the domain and also the **relationships** that hold between those concepts. Different ontology languages provide different facilities.”

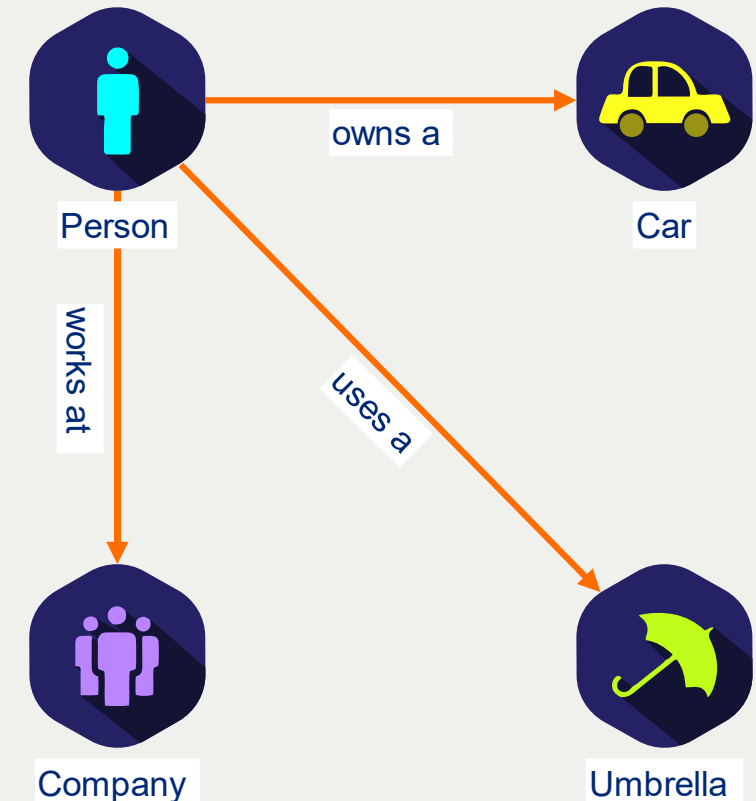
(“A Practical Guide to Building OWL Ontologies Using Protégé 4 and CO-ODE Tools Edition 1.3”, Matthew Horridge)



Visualizing an Ontology. yWorks. Retrieved June 27, 2024, from <https://www.yworks.com/use-case/visualizing-an-ontology>

Ontology + terminology

- “**Terminology** studies specialized language (‘terms’), which designate concepts within a domain.”
(ISO 1087:2019)
- “Unit of **knowledge** created by a **unique combination** of characteristics.”
(ISO 1087-1:2000)
- “An **ontology is not a terminology**, and a **terminology is not an ontology**: they do not have the same goal. Nevertheless, ontology is today one of the most promising perspectives to Terminology (e.g. for IT applications).”
(Roche, 2005)



Visualizing an Ontology. yWorks. Retrieved June 27, 2024, from <https://www.yworks.com/use-case/visualizing-an-ontology>

Ontoterminology

“An **Ontoterminology** is a **terminology** whose conceptual system is a formal ontology. [...] Based on the fact that **linguistic** and **conceptual** dimensions do not match, Ontoterminology makes explicit the **double dimension of Terminology**. Ontoterminology preserves the **linguistic** diversity taking into account multilingualism and allows to standardize the **domain knowledge**.”
(Roche, 2012)





Conceptual and linguistic dimension



timepiece



timepiece + portable



timepiece portable+ wrist

“A **term** is a verbal designation of a **concept**” (ISO 1087)

“The definition of a **term** is a paraphrase of the **logical definition** of the **concept** denoted by the **term**.”

(C. Roche 02/08/2019).

Conceptual and linguistic dimension



timepiece



timepiece + portable



timepiece portable + wrist

<Timepiece portable wrist>

“wrist watch”@en

Conceptual and linguistic dimension & ontology and instance level



timepiece



timepiece + portable



timepiece portable + wrist

isA

<Timepiece portable wrist>

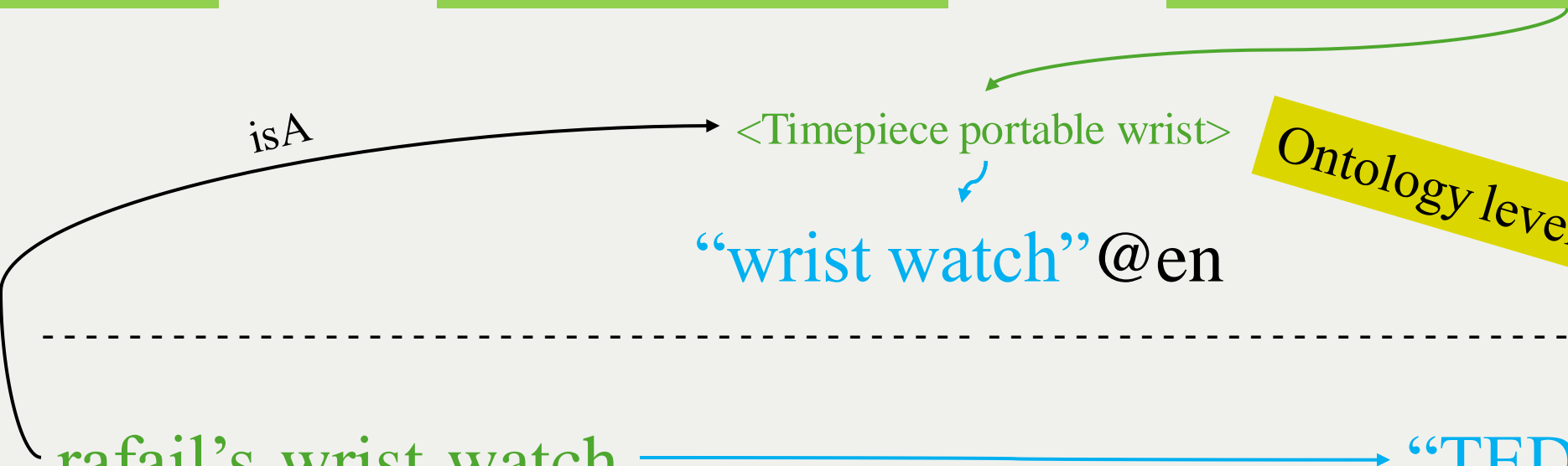
“wrist watch”@en

Ontology level

Instance level

rafail's-wrist-watch

“TEDI”@en



Conceptual and linguistic dimension
&
ontology and instance level



	Ontology level	Instance level
Conceptual dimension	<Timepiece portable wrist> → concept	rafael's-wrist-watch → object
Linguistic dimension	“wrist watch” → term	“TEDI” → proper name

Hands-on part:

Let's model this sentence with TEDI

Plato was an Ancient Greek philosopher born 428/7 BCE, died 347 BCE. He was born in the Ancient Greek city of Athens, and he has written the *Republic*, a very famous Ancient Greek philosophical work.



TEDI
ONTO**TERMINOLOGY** **EDITOR**
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for academic non-commercial use only

Academic version
© Christophe Roche

Hands-on part:

Let's model this sentence with TEDI

Plato was an **Ancient Greek** philosopher **born** 428/7 BCE, **died** 347 BCE. He was **born in** the **Ancient Greek** city of **Athens**, and he has **written** the **Republic**, a very famous **Ancient Greek** philosophical work.



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Hands-on part: Open TEDI



TEDI
ONTO**T**ERMINOLOGY **EDITOR**
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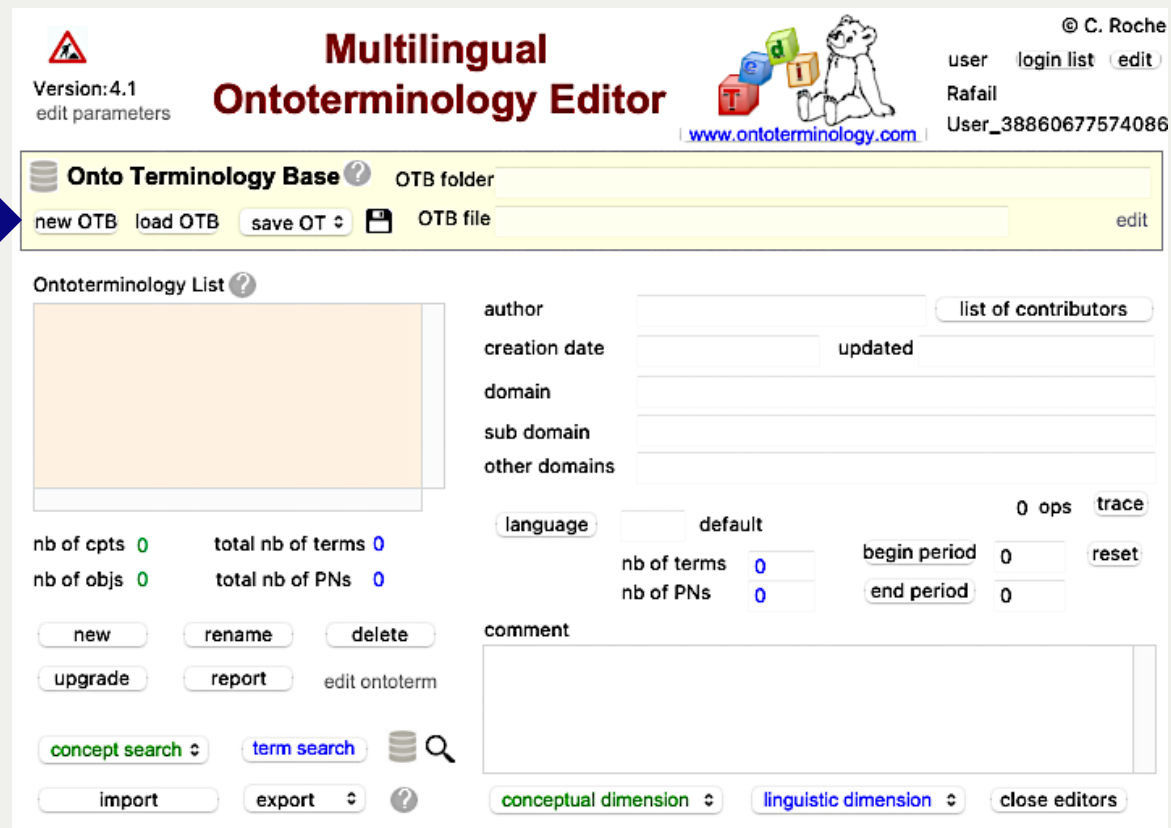
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Academic version

© Christophe Roche

Hands-on part: create a “plato” OTB file



Multilingual Ontoterminology Editor

Version: 4.1
edit parameters

© C. Roche
user login list edit
Rafail
User_38860677574086

www.ontoterminology.com

Onto Terminology Base ? OTB folder

new OTB load OTB save OT ↕ OTB file edit

Ontoterminology List ?

author list of contributors

creation date updated

domain

sub domain

other domains

language default 0 ops trace

nb of terms 0 begin period 0 reset

nb of PNs 0 end period 0

comment

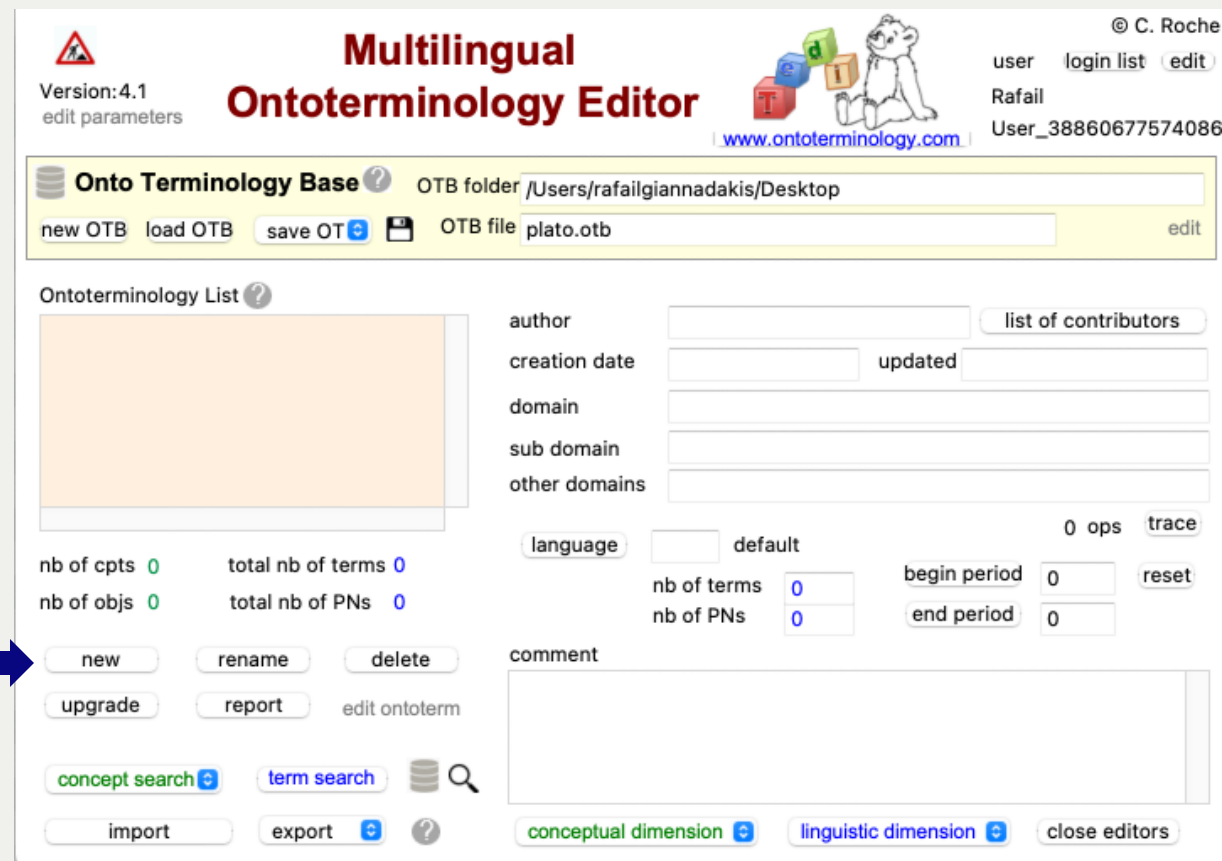
concept search ↕ term search 🔍

import export ↕ ? conceptual dimension ↕ linguistic dimension ↕ close editors

new rename delete

upgrade report edit ontoterm

Hands-on part: create a new “Plato” ontoterminology



Multilingual Ontoterminology Editor
Version: 4.1
edit parameters

© C. Roche
user login list edit
Rafail
User_38860677574086

www.ontoterminology.com

Onto Terminology Base ? OTB folder /Users/rafiailgiannadakis/Desktop

new OTB load OTB save OTB OTB file plato.otb edit

Ontoterminology List ?

author [input] list of contributors
creation date [input] updated [input]
domain [input]
sub domain [input]
other domains [input]

language [input] default 0 ops trace
nb of terms 0 begin period 0 reset
nb of PNs 0 end period 0

comment [input]

conceptual dimension linguistic dimension close editors

nb of cpts 0 total nb of terms 0
nb of objs 0 total nb of PNs 0

new rename delete
upgrade report edit ontoterm

concept search term search
import export

Hands-on part: explore the fields and the editors

The screenshot displays the 'Multilingual Ontoterminology Editor' interface. At the top, it shows the version (4.1) and the user 'Rafail'. The main area is titled 'Onto Terminology Base' and shows the current OTB folder and file name ('plato.otb'). A list of terminology entries is shown on the left, with 'Plato' selected. The right side contains a form for editing the entry, with fields for author, creation date, domain, sub domain, and other domains. There are also buttons for 'new', 'rename', 'delete', 'upgrade', and 'report'. At the bottom, there are search and export options, and a list of editors to choose from.

Version: 4.1
edit parameters

Multilingual Ontoterminology Editor

© C. Roche
user login list edit
Rafail
User_38860677574086

Onto Terminology Base ? OTB folder /Users/rafaigliannadakis/Desktop
new OTB load OTB save OTB OTB file plato.otb not saved edit

Ontoterminology List ?
Plato

author Rafail list of contributors
creation date February 20, 2025 updated February 20, 2025
domain Philosophy
sub domain Ancient Greek philosophy
other domains

language en default 3 ops trace
nb of terms 0 begin period 0 reset
nb of PNs 0 end period 0

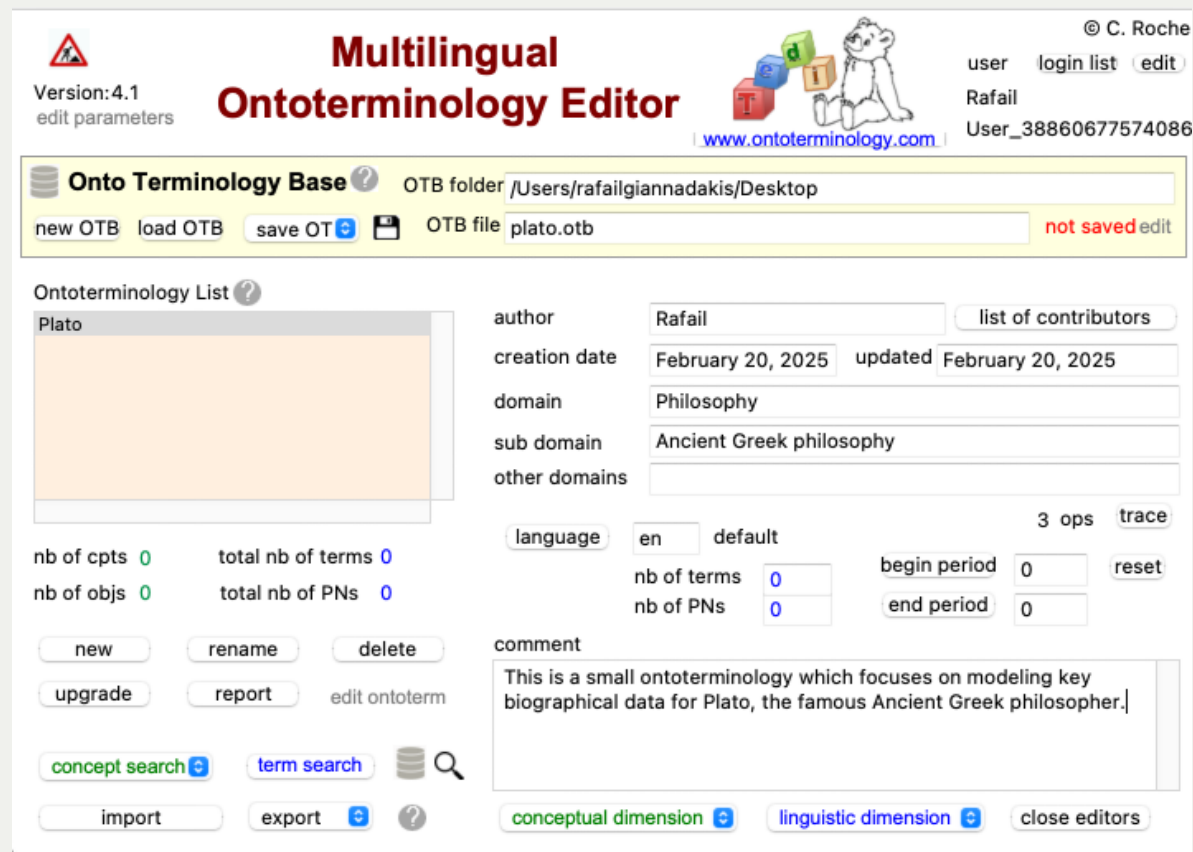
comment
This is a small ontoterminology which focuses on modeling key biographical data for Plato, the famous Ancient Greek philosopher.

conceptual dimension linguistic dimension close editors

concept editor
object editor
axis editor
relation editor
attribute editor

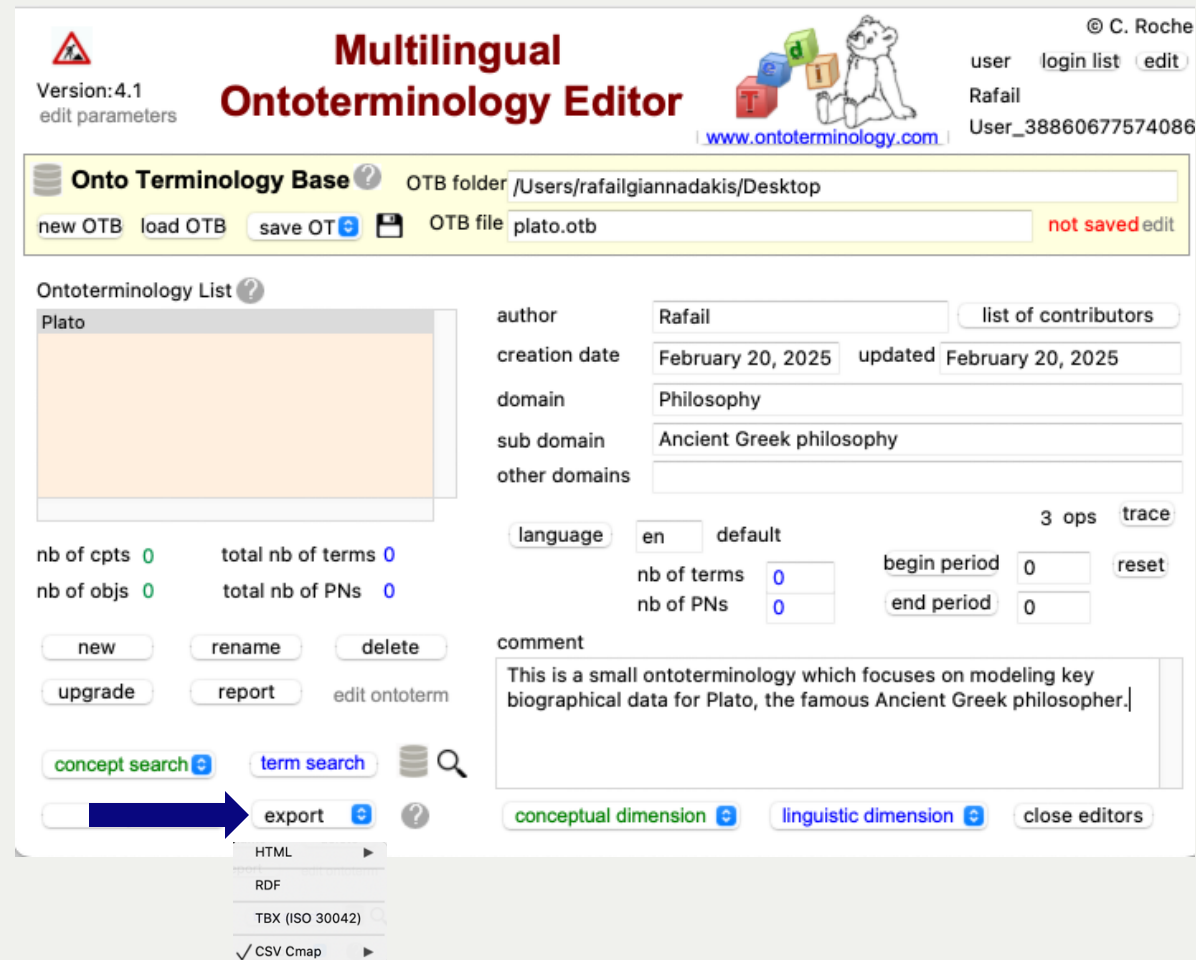
term editor
proper name editor
feature editor

Hands-on part: Let's do it



The screenshot displays the 'Multilingual Ontoterminology Editor' interface. At the top, it shows the version (4.1), the user 'Rafail', and the current user ID 'User_38860677574086'. The main area is titled 'Onto Terminology Base' and shows the current OTB folder and file ('plato.otb'). The 'Ontoterminology List' on the left shows a single entry for 'Plato'. The main form on the right contains fields for 'author' (Rafail), 'creation date' (February 20, 2025), 'domain' (Philosophy), and 'sub domain' (Ancient Greek philosophy). It also includes a 'comment' field with the text: 'This is a small ontoterminology which focuses on modeling key biographical data for Plato, the famous Ancient Greek philosopher.' The interface includes various navigation and management buttons such as 'new', 'rename', 'delete', 'import', 'export', and 'close editors'.

Hands-on part: Export!



The screenshot displays the Multilingual Ontoterminology Editor interface. At the top, it shows the version (4.1), user information (Rafail), and the current OTB file (plato.otb). The main area is divided into several sections:

- Ontoterminology List:** A list containing the term "Plato".
- Metadata:** Fields for author (Rafail), creation date (February 20, 2025), domain (Philosophy), and sub domain (Ancient Greek philosophy).
- Statistics:** Metrics for number of concepts (0), objects (0), terms (0), and PNs (0).
- Actions:** Buttons for new, rename, delete, upgrade, report, and edit ontoterm.
- Search and Export:** A search bar and an "export" button. A blue arrow points to the "export" button, which has a dropdown menu open showing options: HTML, RDF, TBX (ISO 30042), and CSV Cmap.
- Comment:** A text area containing the comment: "This is a small ontoterminology which focuses on modeling key biographical data for Plato, the famous Ancient Greek philosopher."

Hands-on part: Export: HTML— onto-dictionary

Proper Name Dictionary on "Plato" (en)

Category: "philosopher"

TEDI Version: 4.1 - Date: February 20, 2025 - Time: 2:50:38 PM - www.ontoterminology.com/tedi

search:

Plato

Platon

Plato

is a: Ancient Greek philosopher

allonym(s): Platon,

Comment: Plato was an Ancient Greek philosopher born 428/7 BCE, died 347 BCE. He was born in the Ancient Greek city of Athens, and he has written the Republic, a very famous Ancient Greek philosophical work.

Note(s):

1) Kraut, Richard, "Plato", *The Stanford Encyclopedia of Philosophy (Spring 2022 Edition)*, Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/spr2022/entries/plato/>.

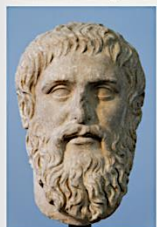
Equivalent(s):

- el: Πλάτων

Denoted object: plato

is a: <Ancient-Greek-philosopher>

Comment: By © Marie-Lan Nguyen / Wikimedia Commons, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=7831217>



hasBirthyear: -428

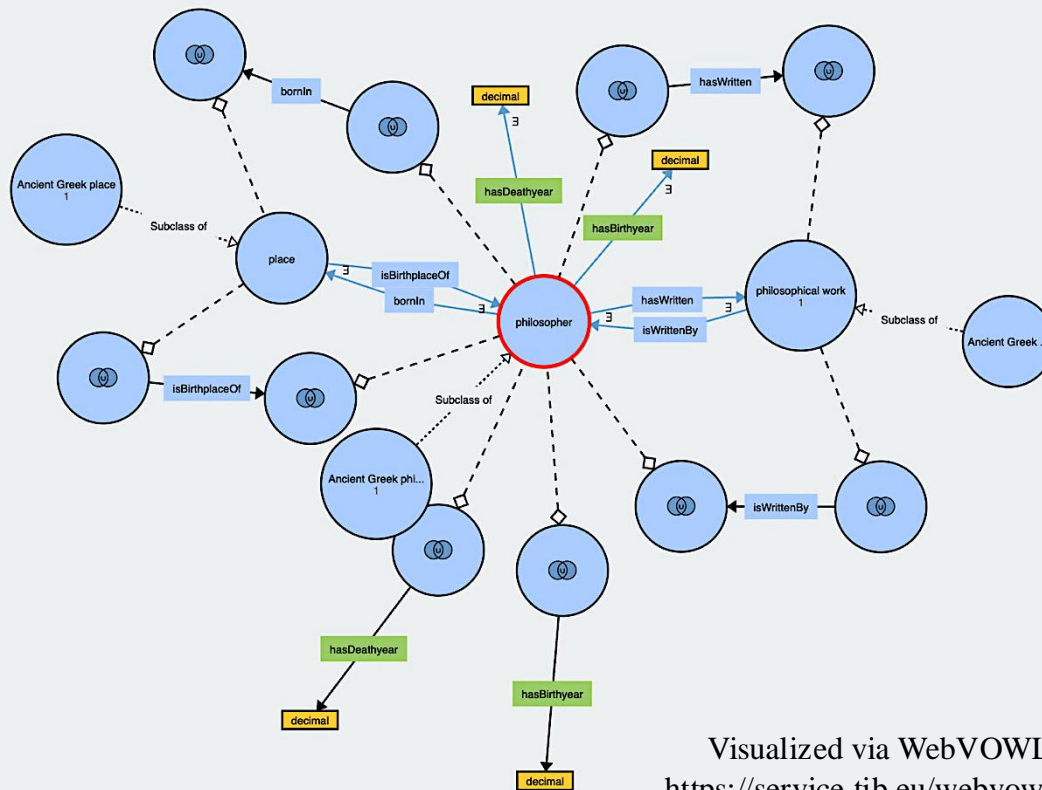
hasDeathyear: -347

bornIn: Athens

hasWritten: Republic

foaf:depiction https://upload.wikimedia.org/wikipedia/commons/thumb/8/88/Plato_Silanian_Musei_Capitolini_MC1377.jpg/1024px-Plato_Silanian_Musei_Capitolini_MC1377.jpg

Hands-on part: Export: RDF



Visualized via WebVOWL:
<https://service.tib.eu/webvowl/>

```
<?xml version="1.0" encoding="utf-8"?>
<!-- Ontoterminology: Plato -->
<!-- Author: Rafail Giannadakis -->
<!-- Creation date: February 20, 2025 -->
<!-- Export date: February 20, 2025 time: 2:54:38 PM -->
<!-- TEDI version: 4.1 -->
<!-- http://ontoterminology.com/tedi -->
<rdf:RDF xmlns="http://www.ontologia.fr/OTB/*#"
  xml:base="http://www.ontologia.fr/OTB/*#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
  xmlns:skos="http://www.w3.org/2004/02/skos/core#"
  xmlns:foaf="http://xmlns.com/foaf/0.1/"
  xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns:xml="http://www.w3.org/XML/1998/namespace"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:otv="http://www.ontologia.fr/OTB/otv#"
  xmlns:vs="http://www.w3.org/2003/06/sw-vocab-status/ns#"
  xmlns:vann="http://purl.org/vocab/vann/"
  xmlns:ontolex="http://www.w3.org/ns/lemon/ontolex#"

  <!--
  ////////////////////////////////////////////////////////////////////
  //
  //  OWL
  //
  ////////////////////////////////////////////////////////////////////
  -->

  <!--  OWL Ontology -->

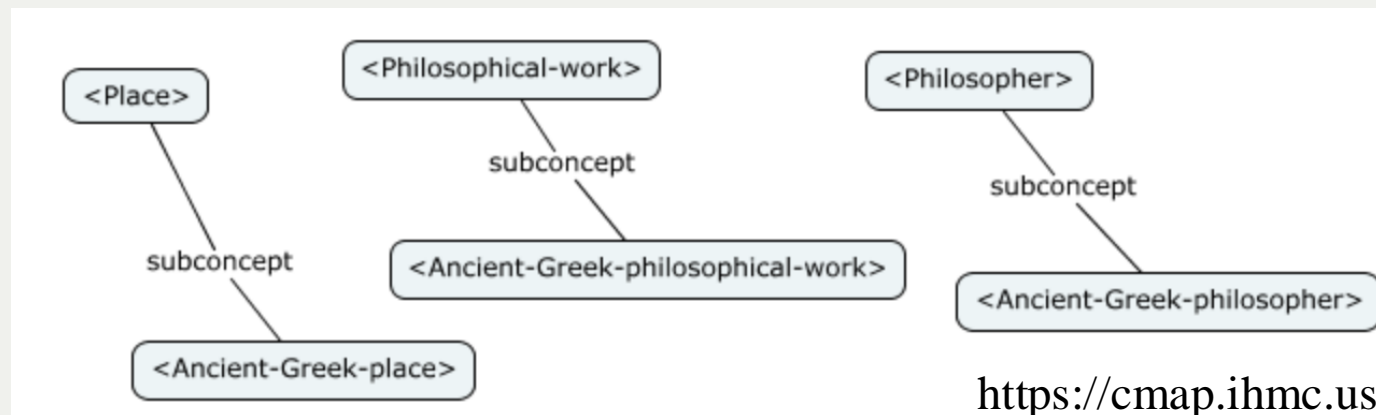
  <owl:Ontology rdf:about="http://www.ontologia.fr/OTB/*#"
    <dc:title>Plato</dc:title>
    <dc:description>This is a small ontoterminology which
  focuses on modeling key biographical data for Plato, the famous
  Ancient Greek philosopher.</dc:description>
    <dc:issued rdf:datatype="http://www.w3.org/2001/
```



Hands-on part: Export: TBX (ISO 30042)

```
<?xml version="1.0" encoding="utf-8"?>
<!-- Export date: February 20, 2025 time: 3:01:15 PM -->
<!-- TEDI version: 4.1 -->
<!-- http://ontoterminology.com/tedi -->
<TBX xmlns="urn:iso:std:iso:30042:ed-2" style="dca">
  <tbx type="TBX-Basic" style="dca">
    <tbxHeader>
      <fileDesc>
        <titleStmt>
          <title>Plato</title>
          <author>Rafail Giannadakis</author>
        </titleStmt>
        <publicationStmt>
          <p>Creation date: February 20, 2025</p>
        </publicationStmt>
        <sourceDesc>
          <p>This is a small ontoterminology which focuses on modeling key biographical data for Plato, the famous Ancient Greek philosopher.</p>
        </sourceDesc>
        <revisionDesc>
          <change when="OrderedCollection (February 20, 2025 2:44:29 PM)"</change>
        </revisionDesc>
      </fileDesc>
    </tbxHeader>
    <text>
      <body>
        <conceptEntry id="c1">
          <descripGrp>
            <descrip type="definition" xml:lang="en"></descrip>
            <descrip type="definition" xml:lang="el"></descrip>
          </descripGrp>
          <langSec xml:lang="en">
            <termSec>
              <term type="preferred">Ancient Greek philosopher</term>
              <termNote type="partOfSpeech">none</termNote>
              <termNote type="definition"></termNote>
            </termSec>
          </langSec>
        </conceptEntry>
      </body>
    </text>
  </tbx>
</TBX>
```

Hands-on part: Export: csv and Cmap Tools

```
<Ancient-Greek-philosopher>  
<Philosopher>      subconcept  <Ancient-Greek-philosopher>  
<Philosopher>  
<Place>  
<Philosophical-work>  
<Ancient-Greek-philosophical-work>  
<Philosophical-work>      subconcept  <Ancient-Greek-philosophical-work>  
<Ancient-Greek-place>  
<Place>      subconcept  <Ancient-Greek-place>
```





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Grant agreement ID: 101087269.

Thank you so much for your
attention and patience!



Rafail Giannadakis

Dept. of Philology and TALOS-AI4SSH (UoC)

E-mail: giannadakis.uni@gmail.com

February 20, 2025



Key bibliography for ontoterminologies

Christophe Roche. "Le terme et le concept: fondements d'une ontoterminologie." TOTh 2007: « Terminologie & Ontologie : Théories et Applications », Annecy, 1er juin 2007, pp. 1-22. Available at: http://ontologia.fr/Bibliographie/Ontoterminologie_TOTh_2007.pdf.

Christophe Roche. "OntoTerminology Editor." Presentation introducing TEDI and ontoterminology. June 2024. Available at: <https://ontoterminology.com/wp-content/uploads/2024/08/Tedi-Presentation-June-2024-Print.pdf>.

Christophe Roche. "Ontoterminology: How to unify terminology and ontology into a single paradigm." In: *LREC 2012 - Eighth International Conference on Language Resources and Evaluation*, Istanbul, 21-27 May 2012, pp. 2626-2630. Available at: http://ontologia.fr/Bibliographie/567_Paper_Header.pdf.

Christophe Roche and Maria Papadopoulou. "Mind the Gap: Ontology Authoring for Humanists." In: *Joint Ontology Workshops*, 2019. Available at: <https://api.semanticscholar.org/CorpusID:209430626>.

Christophe Roche and Maria Papadopoulou. "Rencontre entre une philologue et un terminologue au pays des ontologies." *Revue Ouverte d'Intelligence Artificielle*, Volume 1, no 1 (2020), p. 43-70. Available at: http://roia.centre-merseenne.org/item?id=ROIA_2020_1_1_43_0.

Christophe Roche and Maria Papadopoulou. "Terminology Evaluation: The Contribution of Formal Approaches." Presented at the *3rd International Conference on "Multilingual Digital Terminology Today: Design, Representation Formats and Management Systems" (MDTT) 2024*, June 27-28, 2024, Granada, Spain. Available at: <https://ceur-ws.org/Vol-3703/paper3.pdf>.

ISO/TC 37/SC 1. *ISO 1087:2019*. ISO, 2019. Available at <https://www.iso.org/standard/62330.html>.

ISO/TC 37/SC 1. *ISO 704:2022*. ISO, 2022. Available at <https://www.iso.org/standard/79077.html>.

Maria Papadopoulou and Rafail Giannadakis. "Foundations of the Semantic Web: Querying and Modelling Ontoterminologies (SPARQL & TEDI)." Online Short Course for Nanjing University of Aeronautics and Astronautics graduate students. July 9 & 11, 2024. Available at: <https://www.youtube.com/watch?v=yQcrXjUBX3U>.