TALOS ERA CHAIR IN ARTIFICIAL INTELLIGENCE FOR HUMANITIES AND SOCIAL SCIENCES

ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
UNIVERSITY OF CRETE

https://talos-ai4ssh.uoc.gr/

"TEDI"

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Hello everyone! In this part of the MOOC, we will discuss the TEDI software!

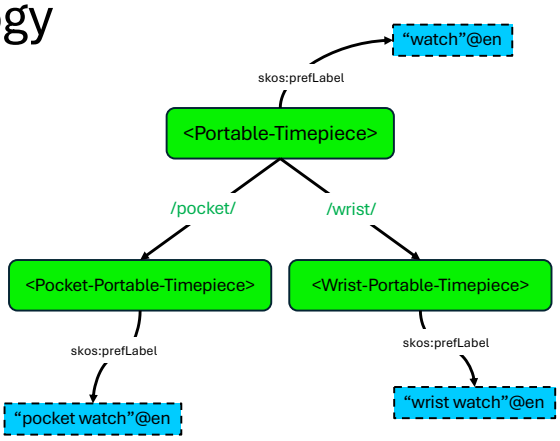
Contents

- Recap of Ontoterminology
- What is TEDI?
  - Introduction
  - Conceptual Dimension
  - Linguistic Dimension
  - Exports
- Conclusion

Today, we will cover the following topics: a recap of Ontoterminology, an introduction to TEDI, its conceptual and linguistic dimensions, the available export options, and finally, a brief conclusion.

Recap of Ontoterminology

- Ontology + Terminology
- "An Ontoterminology is a terminology whose conceptual system is a formal ontology". (Roche 2007)
- Double dimension of Terminology.
- Representation and standardization of domain knowledge.



Let's start by clarifying what an ontoterminology is.

An ontology is essentially a shared description of concepts and relationships within a particular domain, expressed in a formal and computer-readable language.

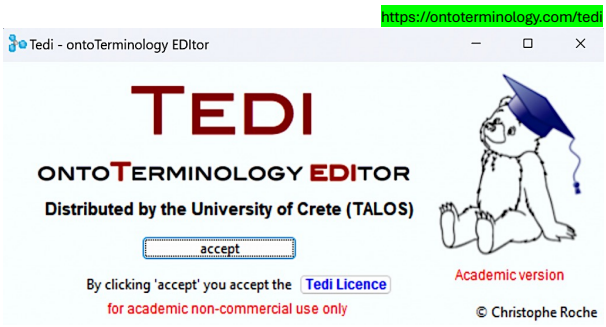
On the other hand, Terminology focuses on the study of specialized language, and 'terms' are defined by ISO 1087:2019 as verbal designations of concepts within a domain.

The key point here is that an ontology and a terminology serve different purposes. An ontology is not a terminology, and vice versa. However, ontology has been seen as a promising approach to terminology.

Thus, an ontoterminology is a terminology whose conceptual system is a formal ontology. In this context, ontoterminology makes explicit the double dimension of terminology, and aims to represent and standardize domain knowledge.

What is TEDI?

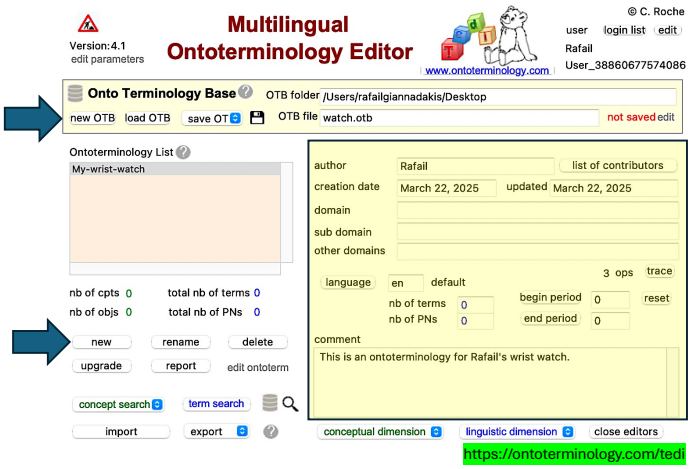
- ontoTerminology **EDI**tor
- A software environment dedicated to building multilingual ontoterminologies.
- Symbolic Artificial Intelligence
- ISO 1087 and ISO 704



Tedi, for ontoTerminology **EDI**tor, is a software environment distributed free of charge by the University of Crete as part of the European TALOS project for academic, research and teaching purposes only, to the exclusion of all commercial applications. Designed specifically for building multilingual ontoterminologies, the software allows users to define formal ontologies and designative terms in various languages independently, which are then linked through the shared ontology.

Based on Symbolic Artificial Intelligence, TEDI adheres to the main principles of ISO 1087 and ISO 704. This makes it a powerful tool for experts who want to structure domain knowledge in a clear and coherent manner.

Introduction



When you launch TEDI, the landing window displays the current version of the software, and after logging in, you can can create an OTB file, and then an ontoterminology to start building your base!

Also, on the right side, you can edit and view the ontoterminology's metadata, which includes the author, contributors, date of creation and updates, domains, languages, relevant comments, and population.

Conceptual dimension

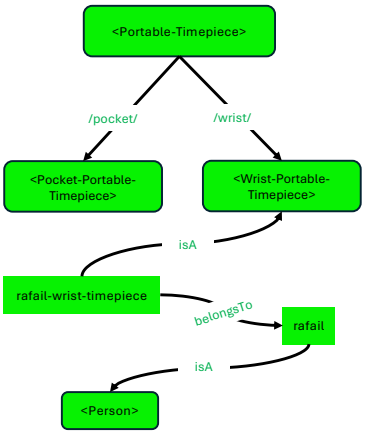
- Aristotelian principles for definitions=> essential and descriptive characteristics (TEDI online).

Now, let's move on to the conceptual dimension.

TEDI provides epistemological guidelines based on the Aristotelian principles of definitions (essential and descriptive characteristics), which help us build a consistent conceptual system. The software offers several editors to achieve this, including:
•The Concept Editor, dedicated to ontology building.
•The Object Editor, allows for specifying instances or individuals of concepts.
•The Axis of Analysis Editor, where you define essential characteristics.
•The Relation Editor, for defining relationships between objects.
•And finally, the Attribute Editor, where you define various attributes.

All of these editors work together to ensure logical consistency, providing valid concepts as you build the ontology.

Conceptual dimension



To build an ontoterminology for portable timepieces in TEDI, let's follow these steps, although there are many alternative ways to get started:

First, we'll utilize the Concept editor, which is designed for ontology building. Here, we can establish our hierarchy and define concepts enclosed in angle brackets, using the 3 buttons located in the upper left corner.

Next, we move to the Axis of Analysis editor to define essential characteristics. For instance, what distinguishes a wrist-watch and a pocket-watch is placement, so I create an axis to encompass these differences, namely wrist and pocket. Then, return to the Concept editor to incorporate these distinctions in the "inherited and own differences window".

Remember to save your progress regularly!

Moving forward, we define relations in the relation-editor. While we won't be using attributes here, the process remains similar. We create the belongsTo relationship that links the time-piece as a subject and the person as an object. It's crucial to specify the domain and range for optimal reasoning and system functionality.

Finally, we populate our database by creating instances of our defined concepts in the object editor. For example, we can create instances of the 'person' concept and the 'wrist-portable-timepiece' concept to represent rafail's-wrist-timepiece. We establish links between them based on the defined relationships in the relation editor.

Additionally, links can be added by double-clicking on concepts or objects.

This structured approach ensures a comprehensive and organized development of our ontoterminology.

Linguistic dimension

https://ontoterminology.com/tedi

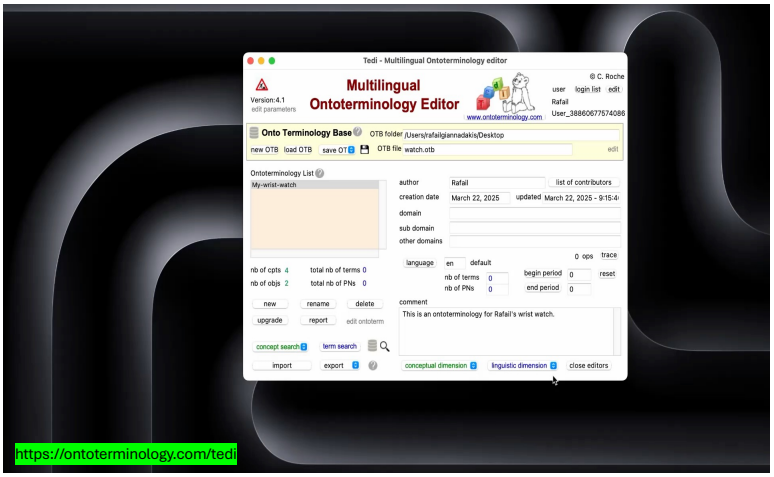
- "*terms* are verbal designations of concepts" (ISO 1087:2019)
- Terms are defined independently of each other in each language.
- The different set of terms are linked through the shared ontology.

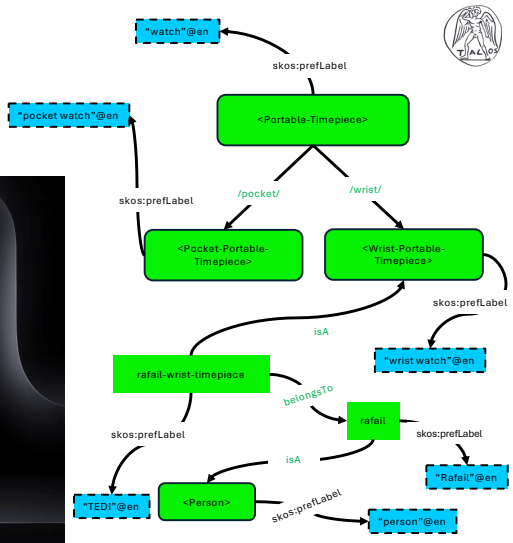
Based on the ISO principle that "terms are verbal designations of concepts", TEDI's linguistic dimension focuses on the terms and proper names that designate concepts and objects, respectively. The software allows you to define these independently for each language, but they will still be linked through the common ontology. This means you can create multilingual terminologies without compromising the underlying conceptual structure.

There are three main editors within this dimension:
•The Term Editor, which is dedicated to defining terms, namely the designations of concepts, in various languages.
•The Proper Name Editor, is used for editing proper names, namely the designations of objects.
•And the Feature Editor, for designating essential characteristics.

One of the key strengths of TEDI is its ability to automatically identify equivalent terms across languages due to the shared ontology. This makes it particularly valuable for multilingual projects.

Linguistic dimension





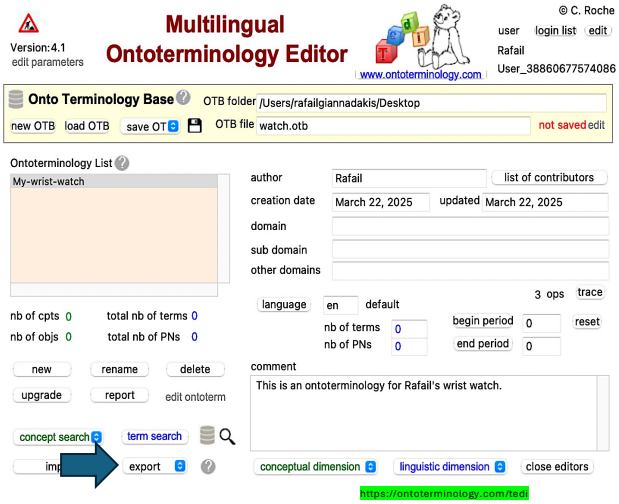
Now it's time to define terms and proper names for our ontoterminology.

We'll begin with the Term editor, where we specify the different terms used to designate concepts. Make sure to check the status of each term (you can decide among preferred, alternative, tolerated, not recommended, and obsolete) and optionally set the part of speech and gender. You can also automatically generate a term definition, which is based on the formal definition of the corresponding concept, and further edit it as needed.

Next, we move to the Proper Name editor to define the various proper names that designate objects. Here, I can add comments, context, and notes. Additionally, by double-clicking, I can insert links—something that, as I've mentioned earlier, can also be done in the other editors.

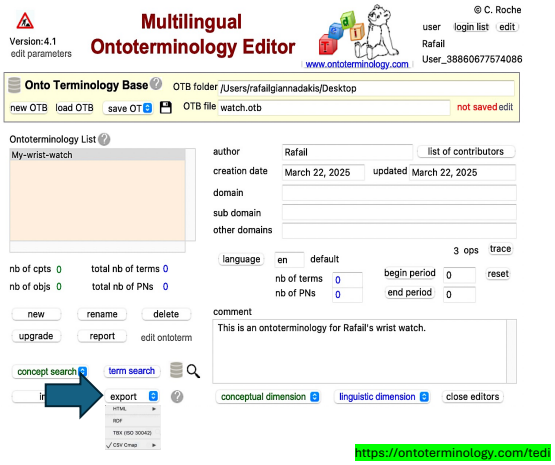
In this session, we won't be using the Feature editor, as it's particularly useful when building a multilingual ontoterminology.

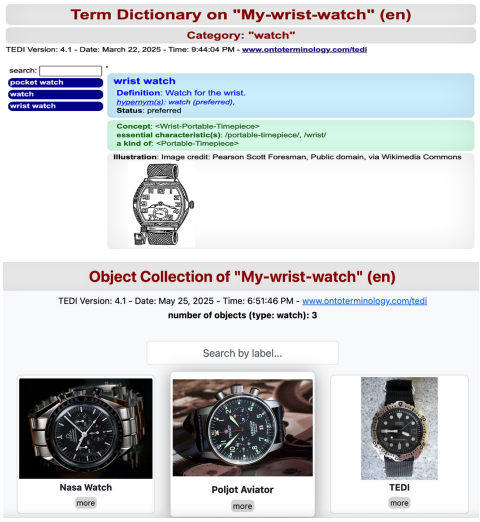
Exports



In this last part of the session, we will see the export options of TEDI back in its landing window.

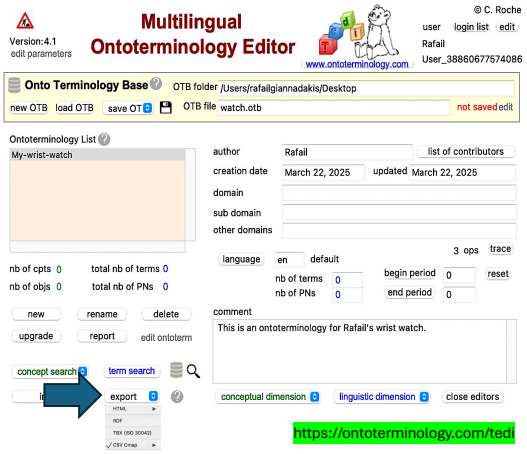
Exports: HTML

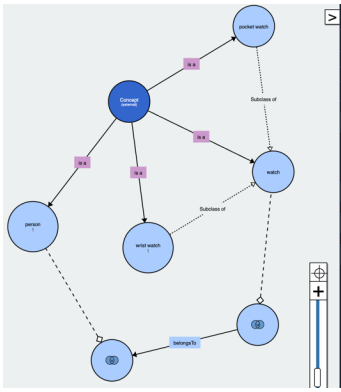




TEDI's HTML export allows you to visualize ontoterminologies as e-Dictionaries and object collections. This feature is particularly useful for making your work accessible to a broader audience through web browsers.

Exports: RDF



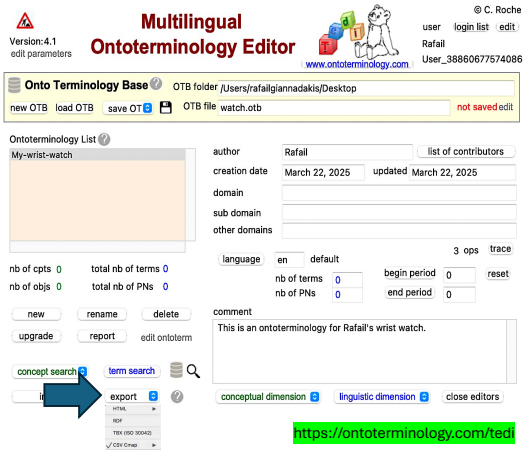


Visualized via WebVOWL: https://service.tib.eu/webvowl/

```
<?xml version="1.0" encoding="utf-8"?>
<!-- Ontoterminology: My-wrist-watch -->
<!-- Author: Rafail Giannadakis -->
<!-- Creation date: March 22, 2025 -->
<!-- Export date: March 22, 2025 time: 9:46:07 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#">
```


The RDF (OWL, SKOS, OntoLex-Lemon, OTV) export is beneficial as we can easily export and further edit our ontoterminology in other ontology editors, such as Protégé, while this format allows us to query ontoterminologies using SPARQL.

Exports: TBX

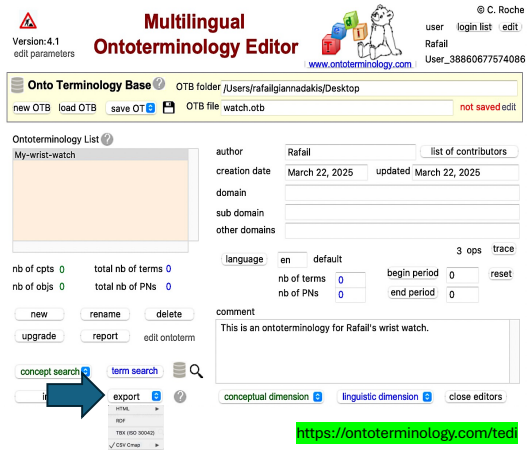


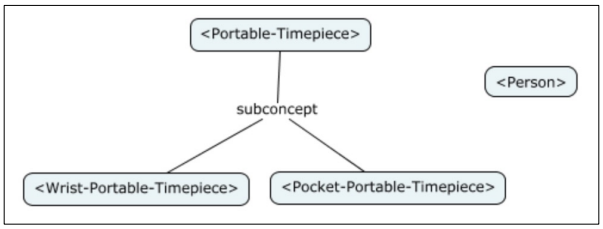

```
<?xml version="1.0" encoding="utf-8"?>
<!-- Export date: March 22, 2025 time: 9:50:47 PM -->
<!-- TEDI version: 4.1 -->
<!-- http://ontoterminology.com/tedi -->
<TBX xmlns="urn:iso:std:iso:30042:ed-2" style="dca">
    <tbx type="TBX-Basic" style="dca">
        <tbxHeader>
            <fileDesc>
                <titleStmt>
                    <title>My-wrist-watch</title>
                    <author>Rafail Giannadakis</author>
                </titleStmt>
                <publicationStmt>
                    <p>Creation date: March 22, 2025</p>
                </publicationStmt>
                <sourceDesc>
                    <p>This is an ontoterminology for Rafail's wrist watch.</p>
                </sourceDesc>
                <revisionDesc>
                    <change when="OrderedCollection (March 22, 2025 9:41:17
PM)"</change>
```

(ISO 30041:2019)

TEDI also allows exporting in TBX short for TermBase eXchange, the ISO 30042:2019 international standard for the representation of structured concept-oriented terminological data.

Exports: CSV





https://cmap.ihmc.us/

And lastly there is the CSV export option for straightforward integration with tools like CmapTools.

Conclusion

- Free tool (Windows and macOS)
- TEDI is designed for humanities experts (Papadopoulou & Roche 2019).
- Create multilingual terminologies linked with a common ontology.
- Export in standards (OWL, OntoLex, TBX, SKOS) and in visualization (HTML Onto-Dictionaries and Object Collections, CSV).
- Enhancing accessibility for research and education.

To sum up, an ontoterminology is a terminology whose conceptual system is a formal ontology, and Tedi is an ontoterminology building environment.
It's specifically designed for humanities experts who wish to create multilingual terminologies that are linked through a common ontology.

The software's adherence to standards like OWL, OntoLex, TBX, and SKOS, along with visualization options like HTML and CSV, makes it a versatile and valuable tool for both research and education.

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Thank you very much for your attention!