

# A Semantic Retrieval System for Remote Sensing Web Platforms

**GEOSPATIAL WEEK**

**ENSCHDE**

**13/06/2019**

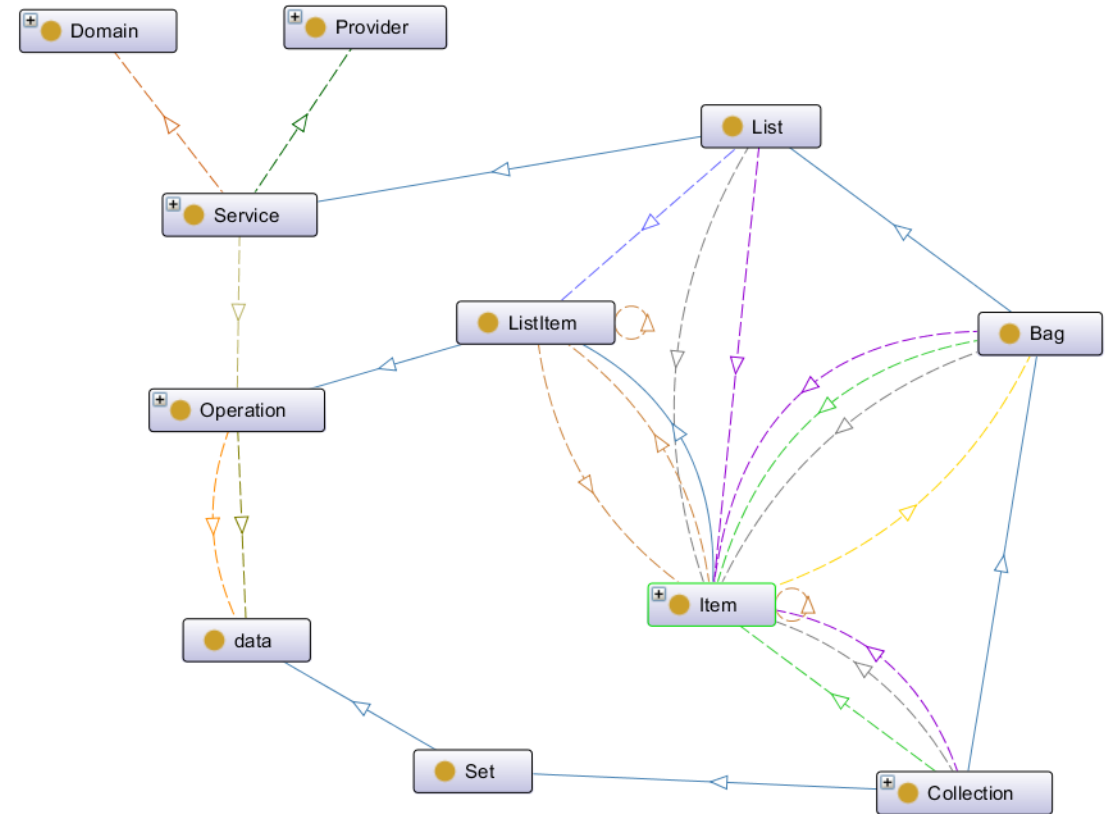
Semantic is the **meaning** and **logic** part  
of the data

Why is **semantic** important?

Reducing the **semantic gap** between services providers and end-users thank to **Ontologies** and **Natural Language Processing**

## Definition of what a **processing chain** is. What is it made of?

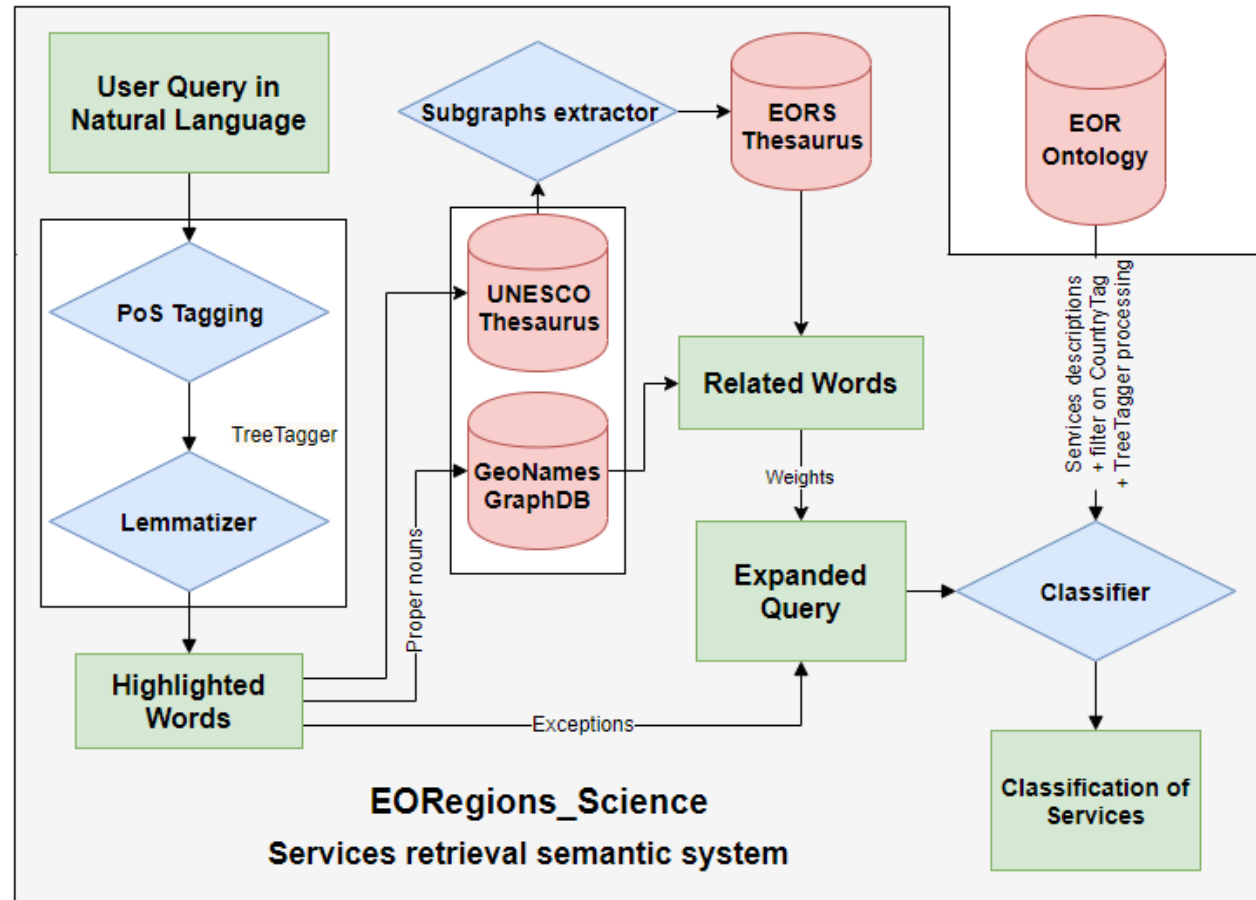
Nys, G.-A., Kasprzyk, J.-P., Hallot, P., & Billen, R. 2018. Towards an ontology for the structuring of remote sensing operations shared by different processing chains. *ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XLII-4*, pp. 483–490.



# Natural Language Processing

How to program computers to **process** and analyze large amounts of **natural language** data.

# Technical workflow



Query expressed in a natural language  
formulation :

**How many trees are in a forest in  
Enschede ?**

# Part of Speech Tagging

process of marking up a word in a text (corpus)  
as corresponding to a particular part of speech

WRB

NNS

IN

NN

NNP

**How many trees are in a forest in Enschede ?**

JJ

VBP

DT

IN

SYM



# Lemmatization

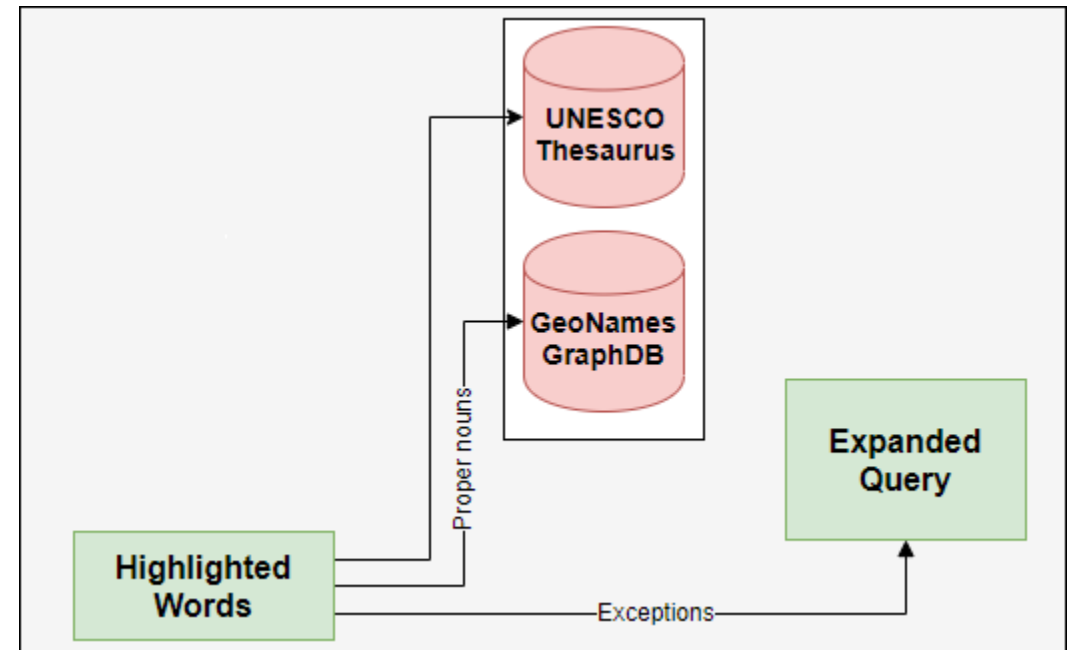
process of grouping together the inflected forms of a word  
so they can be analysed as a single item

how many tree be forest Enschede

**Result :** Array of highlighted lemma words

## 3 possibilities:

1. Reference thesaurus
2. Spatial content
3. Exceptions



Need to structure remote sensing words in a **shared common** and **well-described** format.

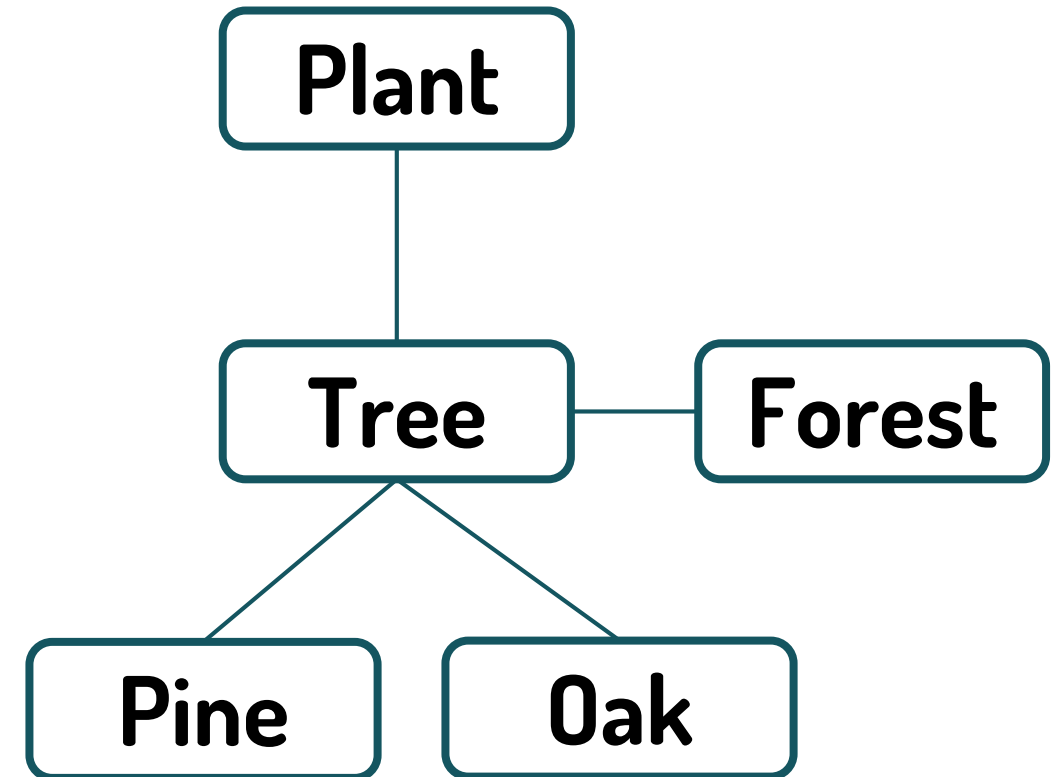
There is no remote sensing thesaurus.

Need to build a dedicated one :



## Subgraph extraction and reconstruction

Simple Knowledge Organisation System  
Edges definitions





## Geographic content

Contextualisation based on toponyms and place names:

- Nearest neighbours

- Administrative subdivisions

Contextualisation using the background map

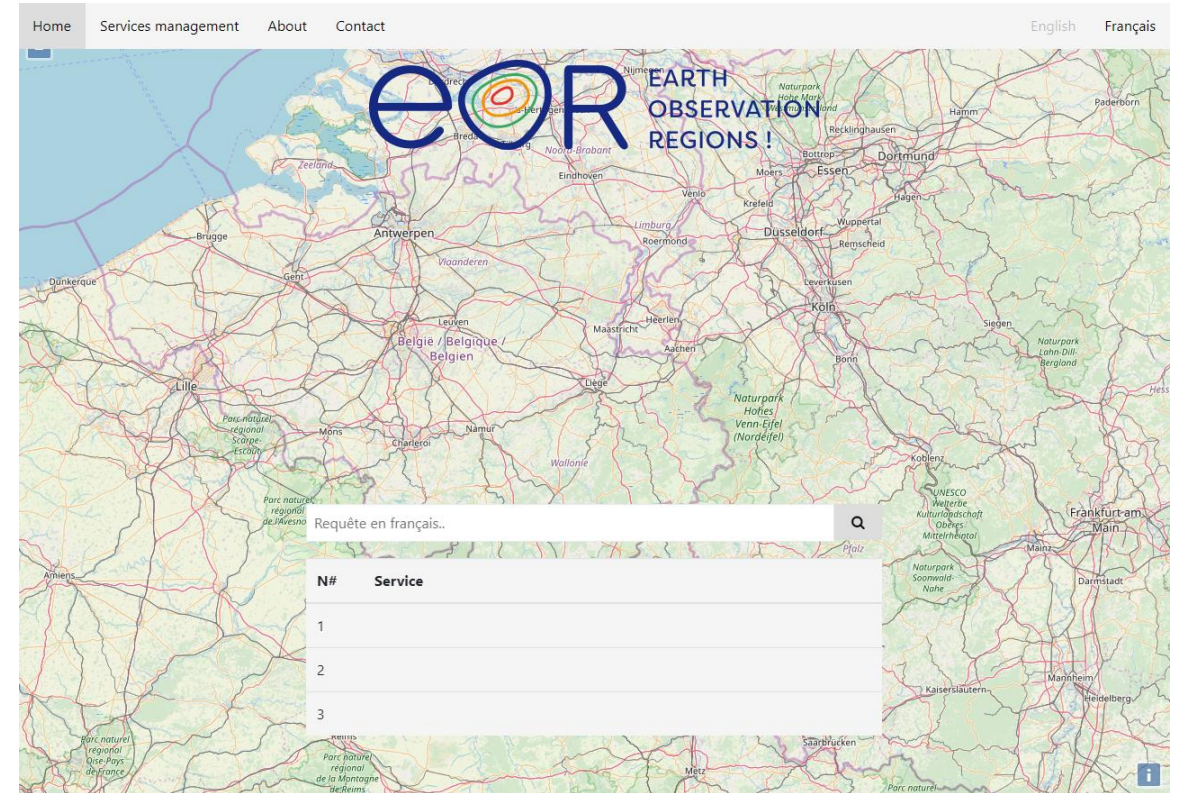
# Weighted average based on the occurrences between the **3 arrays** and the **EOROntology**

SEARCH

N#	Service	
1	SeF04S_TreeCountingProcedure	3
2	SPB03S_TreeCountingProcedure	3
3	SPB01S_TreeSpeciesClassification	2.75



<http://www.eoregions.com/>





geomatics.ulg.ac.be



GILLES-ANTOINE  
NYS

FACULTY OF SCIENCES  
GEOMATICS

**RESEARCH ASSOCIATE**



DR. JEAN-PAUL  
KASPRZYK

FACULTY OF SCIENCES  
GEOMATICS

**RESEARCH ASSOCIATE**



PROF. PIERRE  
HALLOT

FACULTY OF  
ARCHITECTURE  
LNA - DIVA

**ASSOCIATE PROFESSOR**



PROF. ROLAND  
BILLEN

FACULTY OF SCIENCES  
GEOMATICS

**HEAD OF UNIT**