

# IA301 Course: Logics and Symbolic AI - Ontology report

## I. Our ontology

Our ontology is based around 4 main classes: Diseases, symptoms, treatments, and regions. The idea behind this is to allow people to retrieve information about particular diseases and make some matchmaking from symptoms they may suffer from.

## II. MIRO: Guidelines

A. Basics	
Name	Common diseases, their symptoms, and treatments
Owner	Gabriel CUNY, Gwilherm LESNÉ, and Veronica VARGAS
URL	<a href="https://github.com/Gwilherm-LESNE/Ontology_diseases">https://github.com/Gwilherm-LESNE/Ontology_diseases</a>
Methodological framework	After the definition of the main theme, the main classes were defined. Members were added to each one, to continue in a later regrouping in subclasses. Finally, we proceeded to assign the properties to the objects.
B. Motivation	
Need	Retrieve information about a particular disease or try to infer what disease people may suffer from knowing what symptoms they have. And then, help them make decisions about medications and appointments with specialists.
Target audience	Medical body. People with low income or little medical information who want to have a more general overview of the diseases they may have based on symptoms, in addition to obtaining the most common treatments
C. Scope	
Scope and coverage	The goal is to make an ontology on as many diseases as possible. Of their possible symptoms and treatment. Their main origins. Health professionals are also included. It allows people to know who to see what to do or not to do in the face of a disease.
Development community	None
Communication	None
D. Knowledge Acquisition	
Methodology	Search on medical site, WHO site, and wikipedia

E. Ontology content	
Knowledge representation language	OWL

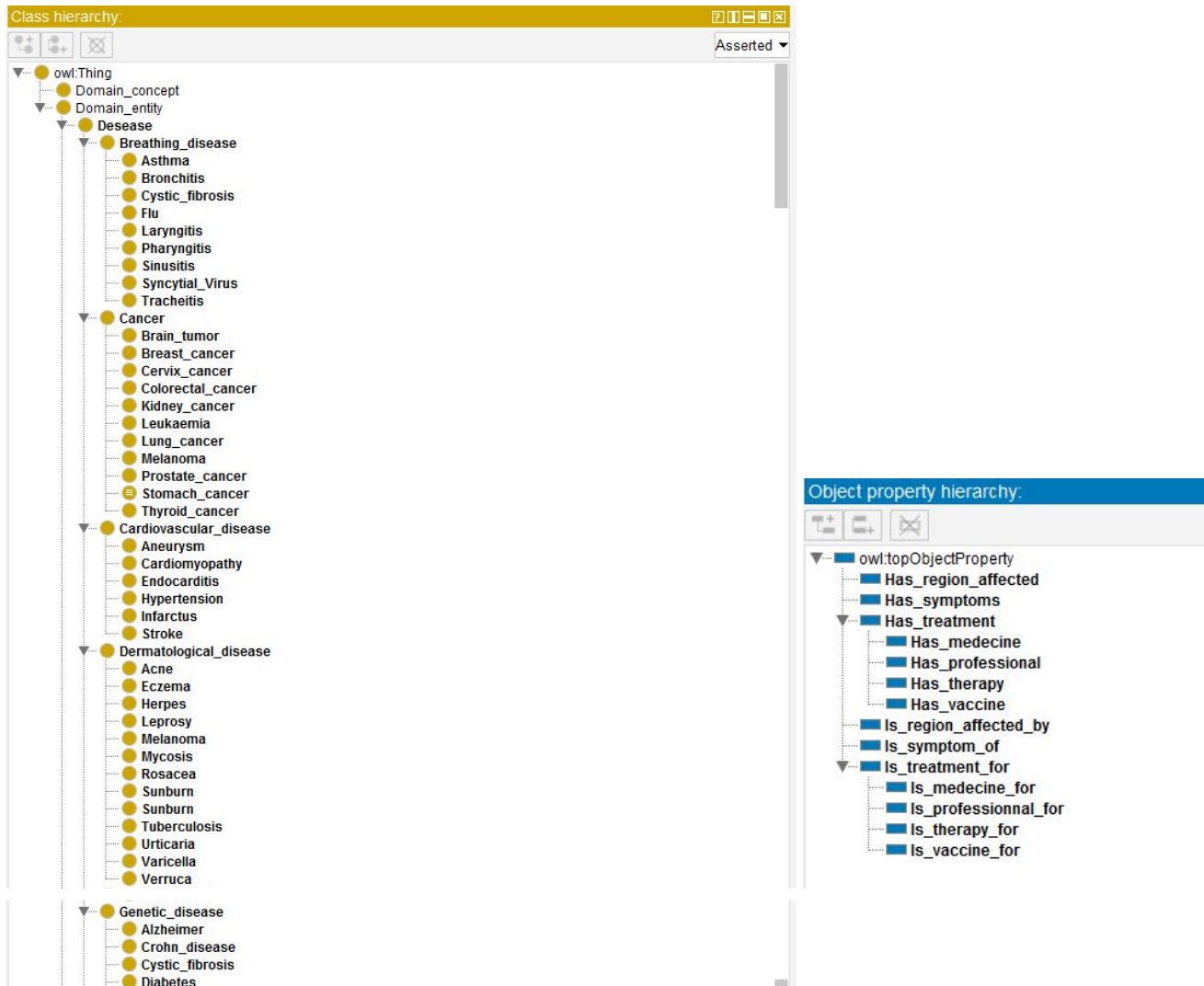
### III. Screenshots

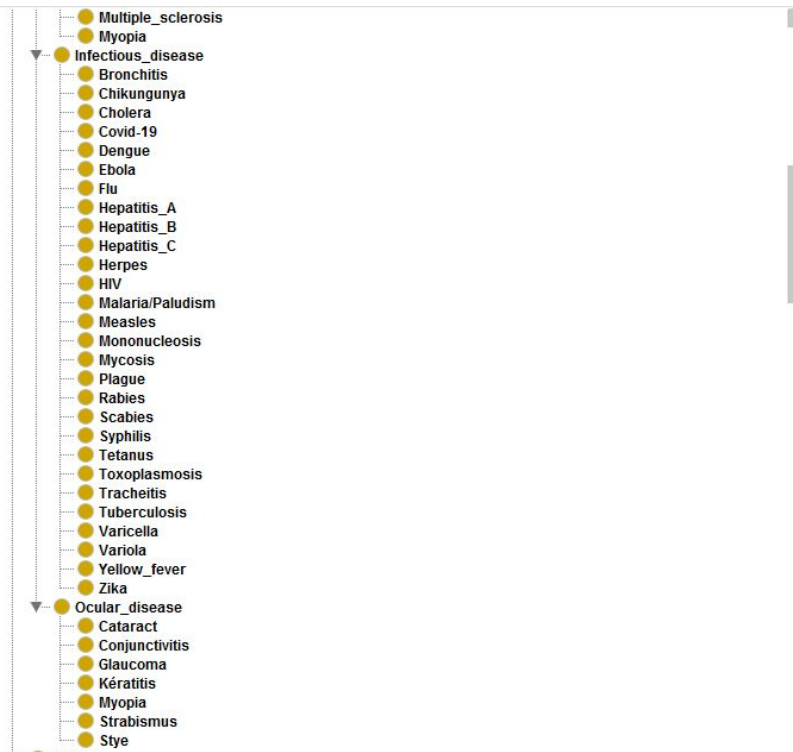
#### A - Full ontology graph



## B - Classes

### Disease

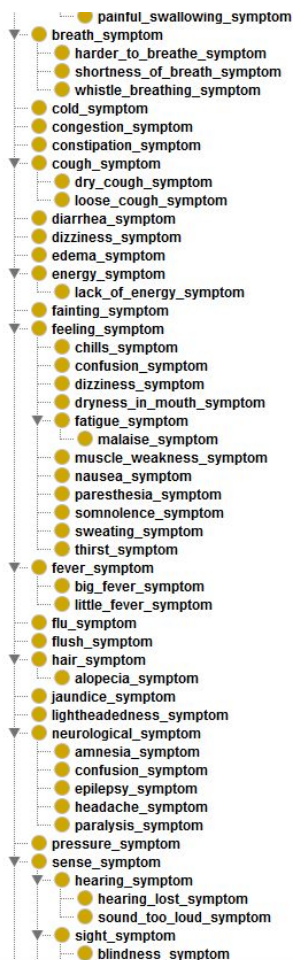
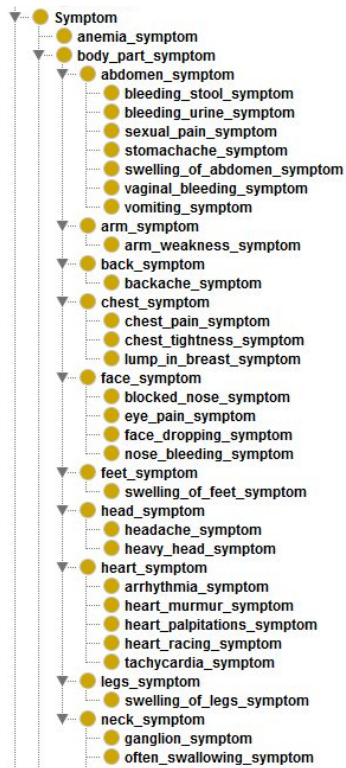




## Region



## Symptom

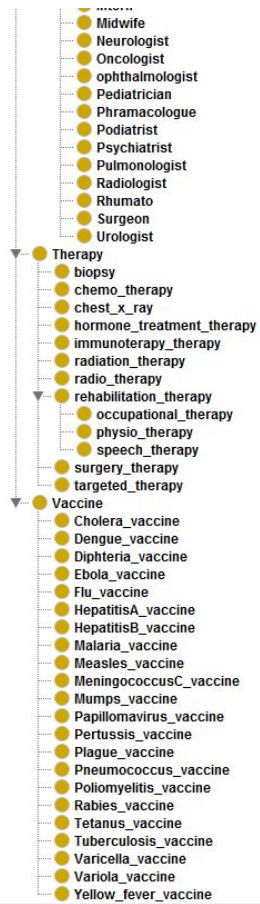


- blurred\_vision\_symptom
- double\_vision\_symptom
- sight\_lost\_symptom
- ▼ ● smell\_symptom
  - smell\_lost\_symptom
- ▼ ● taste\_symptom
  - taste\_lost\_symptom
- ▼ ● touch\_symptom
  - touch\_lost\_symptom
- ▼ ● skin\_symptom
  - burning\_symptom
  - edema\_symptom
  - laceration\_symptom
  - pain\_symptom
  - rash\_symptom
  - red\_patch\_symptom
  - urticaria\_symptom
- ▼ ● sleeping\_symptom
  - difficulty\_sleeping\_symptom
- ▼ ● speaking\_symptom
  - dysphonia\_symptom
  - nasal\_voice\_symptom
  - unable\_to\_speak\_symptom
- ▼ ● stiffness\_symptom
  - walking\_symptom
  - trouble\_walking\_symptom
- ▼ ● weight\_symptom
  - weight\_gain\_symptom
  - weight\_loss\_symptom
- ▼ ● wheezing\_symptom

## Treatment

- ▼ ● Treatment
  - ▼ ● Medicine
    - ▼ ● Alternative\_medicine
      - dietary\_supplements
      - herbal\_medicine
    - ▼ ● Conventional\_medicine
      - ACE\_inhibitor\_medicament
      - acetylcholinesterase\_inhibitors\_medicament
      - Analgesic\_medicament
      - Analgesic\_medicament
      - Antalgic\_medicament
      - ▼ ● Anti-acid\_medicament
        - omeprazol\_medicament
      - Anti-allergenic\_medicament
      - Anti-diarrheal\_medicament
      - ▼ ● Anti-infective\_medicament
        - antibiotics\_medicament
        - antifungals\_medicament
        - antiparasitic\_medicament
        - antivirals\_medicament
      - Anti-inflammatory\_medicament
      - Anti\_diabetic\_medicament




- Anti\_malaria\_medicament
- Anti\_psychotic\_medicament
- Anti\_septic\_medicament
- Anti\_spasmodic\_medicament
- Anti\_virals\_medicament
- Anticoagulant\_medicament
- Antihistamines\_medicament
- ▼ ● Antipyretics\_medicament
  - ibuprofeno\_medicament
  - paracetamol\_medicament
- Antipyretics\_medicament
- Antitussives\_medicament
- Beta\_blockers\_medicament
- Bronchodilator\_medicament
- Contraceptive\_medicament
- Corticoid\_medicament
- diuretic\_medicament
- Immunosuppressants\_medicament
- Laxative\_medicament
- Mucolytics\_medicament
- ▼ ● Painkiller\_medicament
  - aspirin\_medicament
  - ibuprofen\_medicament
  - paracetamol\_medicament
- Specialized\_lotion
- Syrup\_medicament
- Vitamin\_medicament
- ▼ ● Professional
  - ▼ ● Alternative\_professionnel
    - Acupuncturist
    - Chiropractor
    - Herbalist
    - Homeopath
  - ▼ ● Auxiliaries
    - Caregivers
    - Childcare\_auxiliaries
    - chiropodists
    - dieticians
    - ergotherapists
    - masseurs-kinetherapists
    - Nurse
    - opticians
    - prosthetists
    - psychomotor\_therapists
    - speech\_therapists
  - ▼ ● Conventional\_professionnel
    - Cardiologist
    - Dermatologue
    - Endocrinologist
    - Gastroenterologist
    - General\_practitioner
    - Intern















## C - Individuals




Region > Africa



Direct instances:   


 



















For:  Central\_Africa




-  Angola
-  Cameroon
-  Central\_African\_Republic
-  Chad
-  Democratic\_Republic\_of\_the\_Congo
-  Equatorial\_Guinea
-  Gabon
-  Republic\_of\_the\_Congo
-  São\_Tomé\_and\_Príncipe



Direct instances:   


 







For:  Eastern\_Africa





-  Burundi
-  Comoros
-  Djibouti
-  Eritrea
-  Ethiopia
-  Kenya
-  Madagascar
-  Malawi
-  Mauritius
-  Mozambique
-  Rwanda
-  Seychelles
-  Somalia
-  South\_Sudan
-  Tanzania
-  Uganda
-  Zambia
-  Zimbabwe



Direct instances:   


 






For:  Northern\_Africa

-  Algeria
-  Egypt
-  Libya
-  Morocco
-  Sudan
-  Tunisia


Direct instances:    

For:  Southern\_Africa

-  Botswana
-  Eswatini
-  Lesotho
-  Namibia
-  South\_Africa

Region > America

Direct instances:   

For:  Central\_America

-  Belize
-  Costa\_Rica
-  El\_Salvador
-  Guatemala
-  Honduras
-  Nicaragua
-  Panama

Direct instances:   

For:  Northern\_America

-  Canada
-  Mexico
-  USA



Direct instances:   

For:  Southern\_America

-  Argentina
-  Bolivia
-  Brazil
-  Chile
-  Colombia
-  Ecuador
-  Guyana
-  Paraguay
-  Peru
-  Suriname
-  Uruguay
-  Venezuela

Direct instances:   

For:  West\_Indies

-  Bahamas
-  Barbados
-  Cuba
-  Dominica
-  Dominican\_Republic
-  Grenada
-  Haiti
-  Jamaica
-  Republic\_of\_Trinidad\_and\_Tobago
-  Saint\_Lucia
-  Saint\_Vincent\_and\_the\_Grenadines




Region> Asia



Direct instances:   


 







For:  Central\_Asia

-  Kazakhstan
-  Kyrgyzstan
-  Tajikistan
-  Turkmenistan
-  Uzbekistan

Direct instances:   

For:  Eastern\_Asia




-  China
-  Japan
-  Mongolia
-  North\_Korea
-  South\_Korea
-  Taiwan



Direct instances:   


 












For:  Middle\_East




-  Bahrain
-  Cyprus
-  Egypt
-  Iran
-  Iraq
-  Israel
-  Jordan
-  Kuwait
-  Lebanon
-  Oman
-  Qatar
-  Saudi\_Arabia
-  Syria
-  Turkey
-  United\_Arab\_Emirates
-  Yemen



Direct instances:   


 


For:  South-Eastern\_Asia




-  Brunei
-  Cambodia
-  East\_Timor
-  Indonesia
-  Laos
-  Malaysia
-  Myanmar
-  Philippines
-  Singapore
-  Thailand
-  Vietnam



Direct instances:   


 








For:  Northern\_Asia

-  Russia




Direct instances:   



 


For:  Southern\_Asia












-  Bangladesh
-  Bhutan
-  India
-  Maldives
-  Nepal
-  Pakistan
-  Sri\_Lanka




## Region&gt;Europe



Direct instances:   


 












For:  Eastern\_Europe




-  Azerbaijan
-  Belarus
-  Bulgaria
-  Czech\_Republic
-  Hungary
-  Moldova
-  Poland
-  Romania
-  Russia
-  Slovakia
-  Ukraine



Direct instances:   


 

















For:  Northern\_Europe




-  Denmark
-  Estonia
-  Finland
-  Iceland
-  Ireland
-  Latvia
-  Lithuania
-  Netherlands
-  Norway
-  Sweden
-  United\_Kingdom



Direct instances:   


 









For:  Southern\_Europe

-  Albania
-  Andorra
-  Bosnia\_and\_Herzegovina
-  Croatia
-  Greece
-  Italy
-  Malta
-  Montenegro
-  North\_Macedonia
-  Portugal
-  San\_Marino
-  Serbia
-  Slovenia
-  Spain
-  Turkey
-  Vatican

Direct instances:   

For:  Western\_Europe

-  Austria
-  Belgium
-  France
-  Germany
-  Liechtenstein
-  Luxembourg
-  Monaco
-  Switzerland

Direct instances:

For: ● Oceania

- ◆ Australia
- ◆ East\_Timor
- ◆ Federated\_States\_of\_Micronesia
- ◆ Fidji
- ◆ Indonesia
- ◆ Kiribati
- ◆ Marshall\_Islands
- ◆ Nauru
- ◆ New\_Zealand
- ◆ Palaos
- ◆ Papua\_New\_Guinea
- ◆ Samoa
- ◆ Solomon\_Islands
- ◆ Tonga
- ◆ Tuvalu
- ◆ Vanuatu

## D - Classification power of your ontology

### Example 1: A Symptom is also a Disease

One of the inferences we observe is that some symptoms were considered as diseases. This is consistent, because even though we have considered the symptoms as symptoms, they can also be considered as diseases.

Description: breath_symptom	Description: cough_symptom
Equivalent To +	Equivalent To +
SubClass Of + <ul style="list-style-type: none"><li>● Has_medecine some Bronchodilator_medicament</li><li>● Symptom</li><li>● Disease</li></ul>	SubClass Of + <ul style="list-style-type: none"><li>● Has_medecine some Analgesic_medicament</li><li>● Has_medecine some Analgesic_medicament</li><li>● Has_medecine some herbal_medicine</li><li>● Symptom</li><li>● Disease</li></ul>
General class axioms +	General class axioms +
SubClass Of (Anonymous Ancestor)	SubClass Of (Anonymous Ancestor)
Instances +	Instances +
Target for Key +	Target for Key +
Disjoint With +	Disjoint With +
Disjoint Union Of +	Disjoint Union Of +

## Example 2: A Disease is also a Symptom

In the same way, diseases can also be considered as symptoms. They can be triggered by other diseases.

### Description: Stroke

Equivalent To

SubClass Of

- Cardiovascular\_disease
- Has\_medecine **some** Anticoagulant\_medicament
- Has\_professional **only**  
(General\_practitioner or Caregivers or Neurologist or Nurse or ergotherapists or masseurs-kinetherapists or psychomotor\_therapists or speech\_therapists)
- Has\_symptoms **only**  
(dizziness\_symptom or double\_vision\_symptom or headache\_symptom or paralysis\_symptom or paresthesia\_symptom or sight\_lost\_symptom or unable\_to\_speak\_symptom)
- Symptom

General class axioms

SubClass Of (Anonymous Ancestor)

Instances

Target for Key

Disjoint With

- Infarctus, Aneurysm, Endocarditis, Cardiomyopathy, Hypertension

Disjoint Union Of

### Description: Dengue

Equivalent To

SubClass Of

- Ebola
- Has\_region\_affected **only**  
(Africa or Central\_America or West\_Indies or Asia or Southern\_America)
- Has\_symptoms **only**  
(fatigue\_symptom or headache\_symptom or nausea\_symptom or rash\_symptom or big\_fever\_symptom or vomiting\_symptom or stiffness\_symptom)
- Infectious\_disease

General class axioms

SubClass Of (Anonymous Ancestor)

- Has\_region\_affected **only**  
(Central\_Africa or Western\_Africa)
- Has\_symptoms **only**  
(diarrhea\_symptom or fatigue\_symptom or headache\_symptom or stomachache\_symptom or big\_fever\_symptom or vomiting\_symptom or stiffness\_symptom)
- Has\_vaccine **only** Ebola\_vaccine

Instances