Report - Ontology

"Destination choice in Europe for a group of friends"

https://github.com/lesieulo/ontology-europe/tree/main

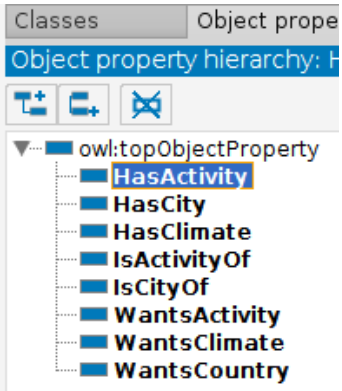
I. INTRODUCTION / DESCRIPTION

In this report, we present our work and result on an ontology called "*Destination Choice in Europe for a group of friends*". The goal of this ontology is to recommend the best destination regarding everyone's preferences (or even to know who could be interesting to go to a specific city). In order to do so, we considered four persons : Natalia, Lili, Louis and Thomas. We have considered a restricted number of possible locations : several cities among a dozen countries in Europe.

We tried to implement a "SDG" aspect by including inside the preferences a "distance" and "a time of travel" aspect. Indeed, someone who doesn't really care about its carbon footprint would like to go very far very fast, while someone more concerned would choose to go to a closest location or won't mind taking days to go on a more distant one.

Regarding the other preferences, we have specified 6 different ones : the climate of the country in which the city is located, the presence of **beaches, sport possibilities** (*i.e. the city is near to either mountains or forests*), **cultural possibilities** (*i.e. "is this city a good destination on a cultural aspect ?"*), **gastronomic possibilities** (*i.e. "is this city a good destination on a food aspect ?"*) and **musical possibilities** (*i.e. "is this city a good place to party ? (festival, clubs, bars,...)"*).

All those aspects (except "*distances*", "*climate*" and "*beaches*") are purely **subjectives** and have been distributed among the different cities only for the purpose of this project : even if we tried to fit a certain point to the real world, it doesn't necessarily represent the reality of those cities : **this is the reason why we didn't choose hundreds of cities and preferences**, it would not have had any interest to add more cities/preferences/persons other than artificially increasing the number of classes/individuals (ie it will not have the ontology complexity).



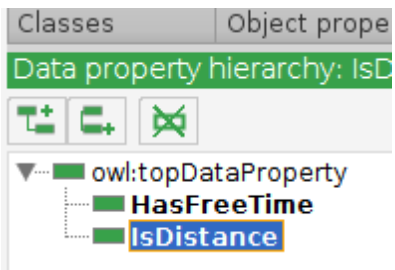
Issue with "HasFreeTime":

As explained above, at first we aimed to make a link between the *free time of the persons*, and the *distance of the cities* from Paris in order to illustrate the carbon footprint aspects :

To do this we designed the following data properties:

- *HasFreeTime()*, domain Person, range int (in days).
- *IsDistance()*, domain City, range int (in km).

The issue is that it seems impossible to compare these values or apply some math operators (by multiplying some speed value to the FreeTime preference of a person to see if it matches a city distance) to them in DLQuery. We managed to filter people based on their free time, to filter the cities based on their distance from paris, but not articulate both data properties.



Some explanation regarding our main structure :

We have decided (like it has been done in the pizza ontology) to do 2 main classes ***DomainThing*** and ***ValuePartition***. The first one is used for **classes that represent objects**. The second one is for the **classes that represent some entities that have some separation by metric** (for example Climat has three possible values, Hot, Average and Cold).

II. MIRO : MINIMUM INFORMATION FOR REPORTING OF AN ONTOLOGY :

A. Basics

A.1. *Ontology name:* Destination choice in Europe for a group of friends
A.2 *Ontology owner:* Thomas Gentilhomme, thomas.gentilhomme@telecom-paris.fr
Louis Lesieur, louis.lesieur@telecom-paris.fr
Liliia Sinitsyna, liliia.sinitsyna@telecom-paris.fr
A.3 *Ontology license*: Public, free use
A.4 *Ontology URL*:
A.5 *Ontology repository*: https://github.com/lesieulo/ontology-europe/tree/main

B. Motivation

B.1 *Need*: This ontology can be used for solve the problem of monitor sustainable tourism that is lined with goal 12 of SDG (Responsible consumption and production)
B.2 *Competition*: Trip Ontology (https://enterpriseintegrationlab.github.io/icity/Trip/doc/index-en.html)
Travel (https://protege.stanford.edu/ontologies/travel.owl)
B.3 *Target audience*: Course IA301, professor: Natalia DIAZ RODRIGUEZ, natalia.diaz@ensta-paris.fr

C. Scope, requirements, development community

C.1 *Scope and coverage*: This ontology describes the interest of a person, and the possibilities of their satisfaction in different cities. The person has a list of activities that he would like to do and what climate he prefers.
In turn, each country is characterized by climate, and each city - by activity, what can be done there.
Ontology solves the problem of the best coincidence of interests and directions.
C.2 *Development community*: Team of Thomas, Louis, Lili.

D. Knowledge acquisition

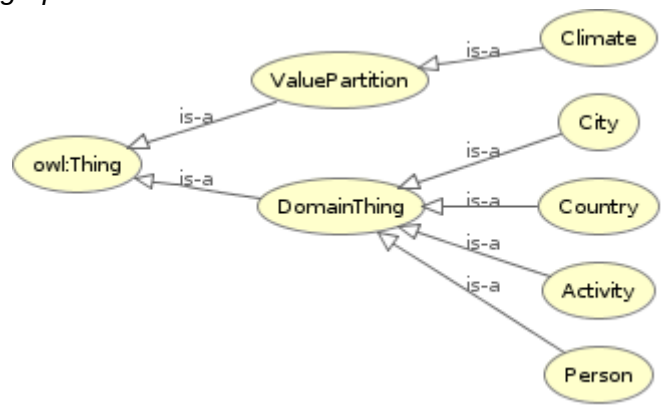
D.1 *Knowledge acquisition methodology*: all data was obtained by direct google query or in wikipedia.

E. Ontology content

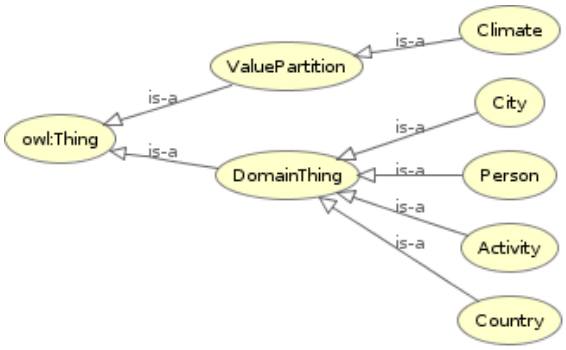
E.1 *Knowledge Representation language:* OWL 2, DL query
E.2 *Development environment:* Protégé 5.5
E.3 *Ontology metrics*: 2 main classes, 7 classes in total, 2 data properties, 8 object properties, 33 entities.

III. SOME GRAPHS PROVIDED BY PROTEGE :

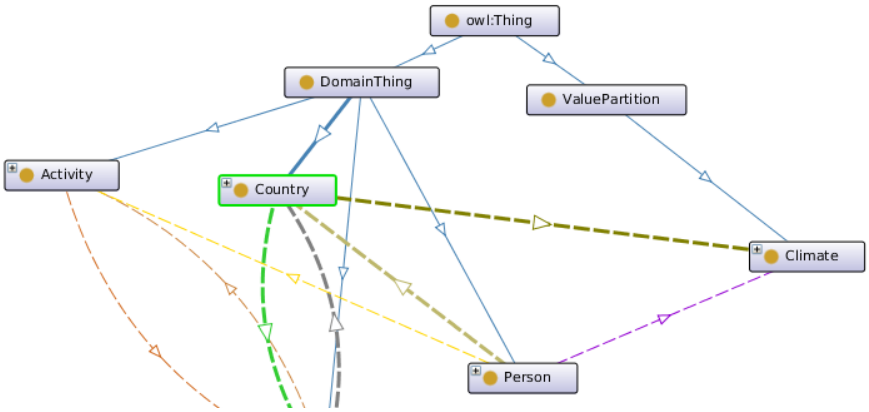
OWLViz - Asserted graph:



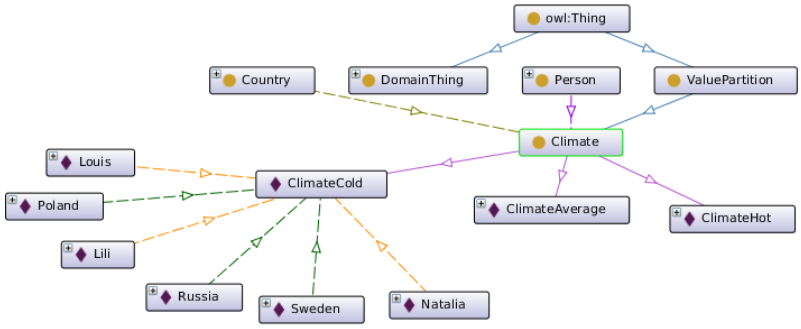
OWLViz - Inferred Graph, before and after Reasonner:



OntoGraph - Object properties:

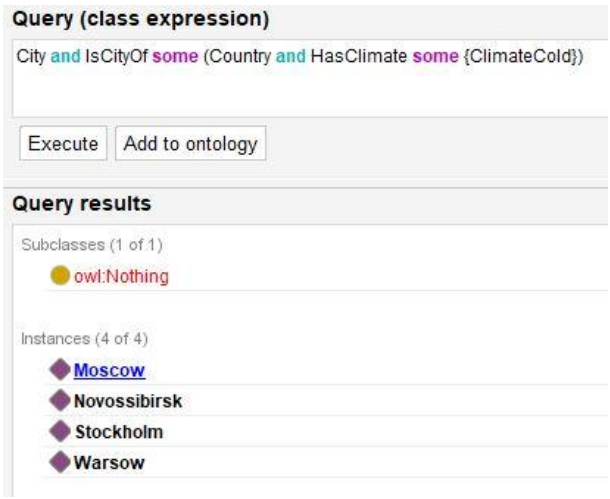


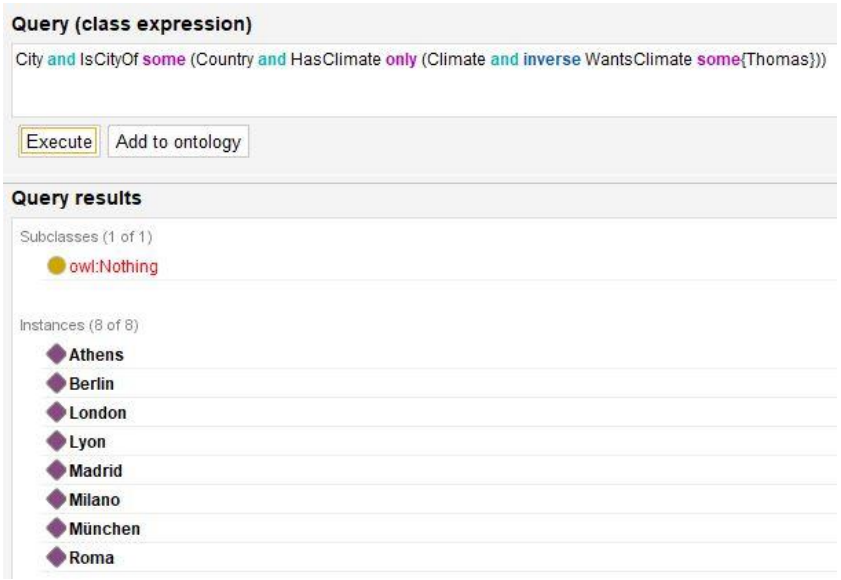
OntoGraph -
Some individuals related to ClimateCold:



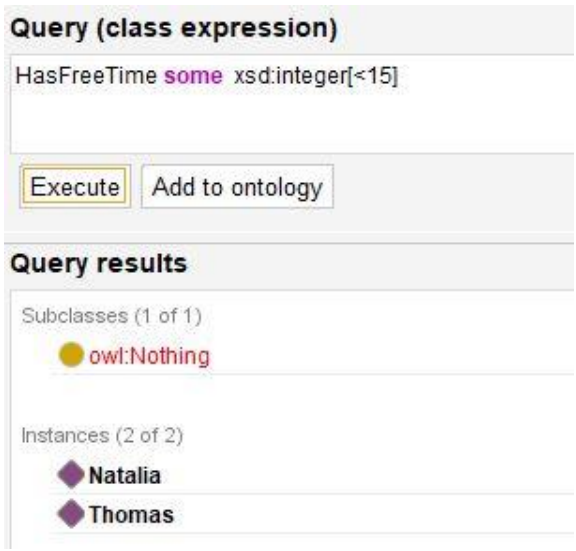
IV. SOME QUERIES :

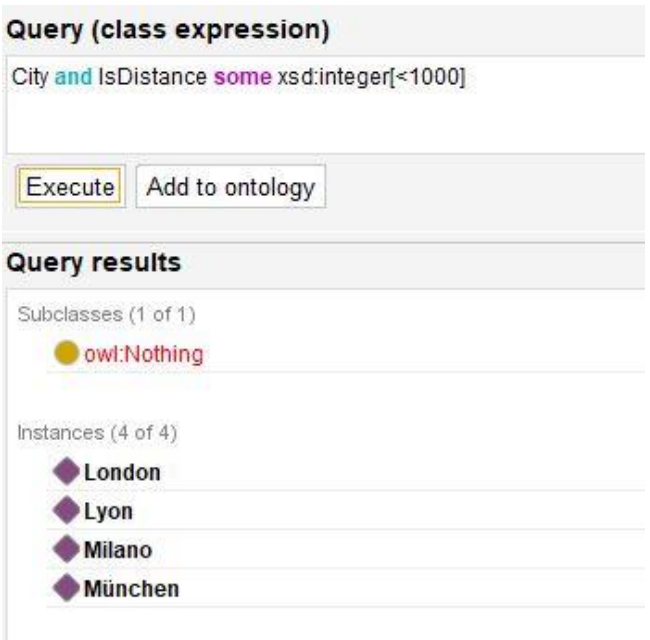
Query 1: What are the cities in cold climate countries ?
Query 2: What are the cities which climate is wanted by Thomas ?



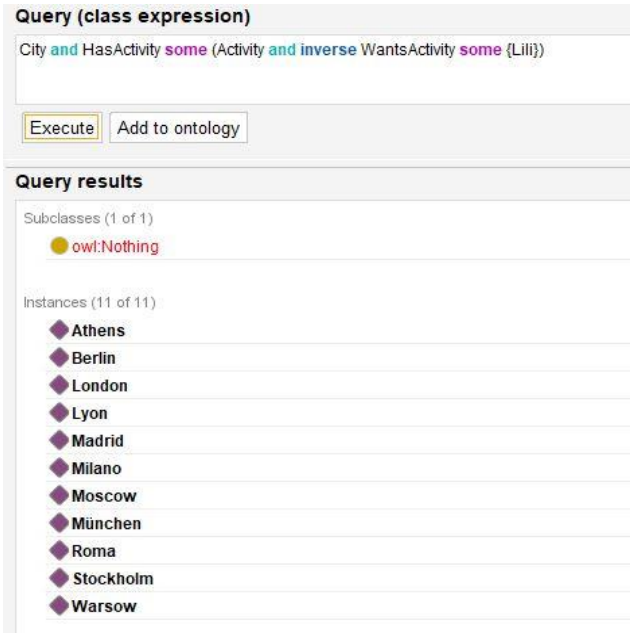


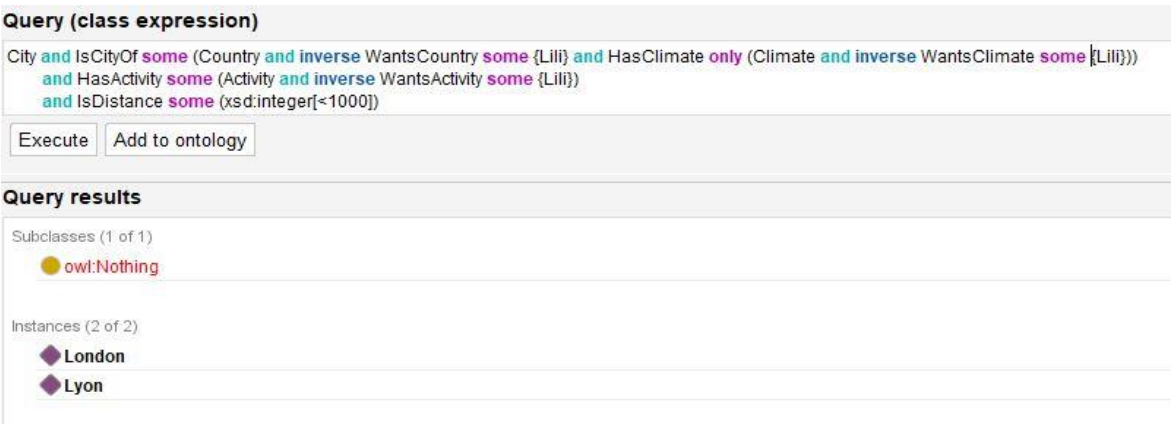
Query 3: What are the cities that have an activity wanted by Lili ?
Query 4: What are the cities which distance is less than 1000 (km) ?





Query 5: Who has a free time of at least 15 (days) ?
Query 6: What cities are suited to Lili, as regards to her preferred countries, climates, activities, and which distance is less than 1000 (km) ?





Query 7: What cities are suited to Lili, Thomas, Louis and Natalia, as regards to all their preferences (distances included) ?

INPUT:

(City and IsCityOf some (Country and inverse WantsCountry some {Lili} and HasClimate only (Climate and inverse WantsClimate some {Lili}))
and HasActivity some (Activity and inverse WantsActivity some {Lili})
and IsDistance some (xsd:integer[<1000]))
and
(City and IsCityOf some (Country and inverse WantsCountry some {Louis} and HasClimate only (Climate and inverse WantsClimate some {Louis}))
and HasActivity some (Activity and inverse WantsActivity some {Louis})
and IsDistance some (xsd:integer[<500]))
and
(City and IsCityOf some (Country and inverse WantsCountry some {Thomas} and HasClimate only (Climate and inverse WantsClimate some {Thomas}))
and HasActivity some (Activity and inverse WantsActivity some {Thomas})
and IsDistance some (xsd:integer[<1500]))
and
(City and IsCityOf some (Country and inverse WantsCountry some {Natalia} and HasClimate only (Climate and inverse WantsClimate some {Natalia}))
and HasActivity some (Activity and inverse WantsActivity some {Natalia})
and IsDistance some (xsd:integer[<5000]))

OUTPUT: “Lyon”