UNIVERSITA' DEGLI STUDI DI
NAPOLI FEDERICO II

Scuola Politecnica e delle Scienze di Base
Corso di Laurea in Ingegneria Informatica

IA Project 2020/2021:

"Teaching Management System with Applications of RFID and IoT Technology " Ontology

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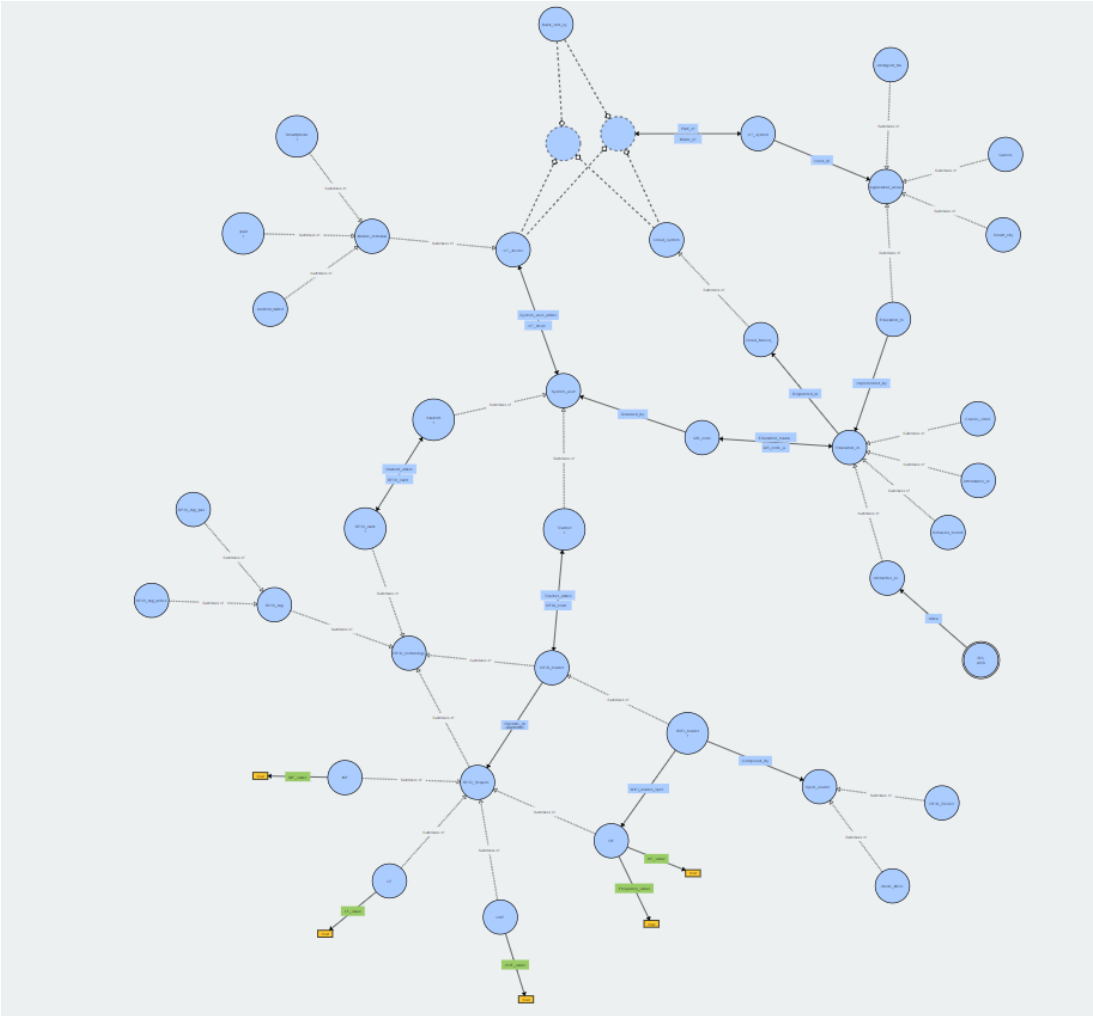
Abstract

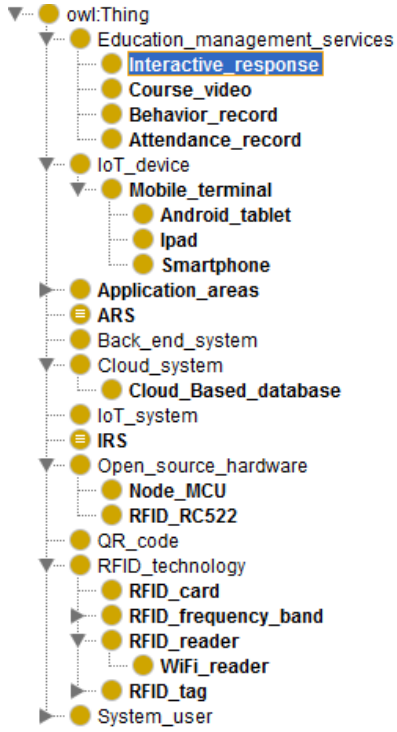
An ontology encompasses a representation, formal naming and definition of the categories, properties and relations between the concepts, data and entities that substantiate one or many domains of discourse.
It is also an explicit, shared description of a domain which define a shared vocabulary for it.
Our ontology mainly focuses on IoT and RFID technologies and their use for an improvement on teaching management system, in particular the aim of this ontology is to show the relationships between this concepts.
We extracted the informations further presented from a scientific article titled “Teaching Management System with Applications of RFID and IoT Technology”

Ontology

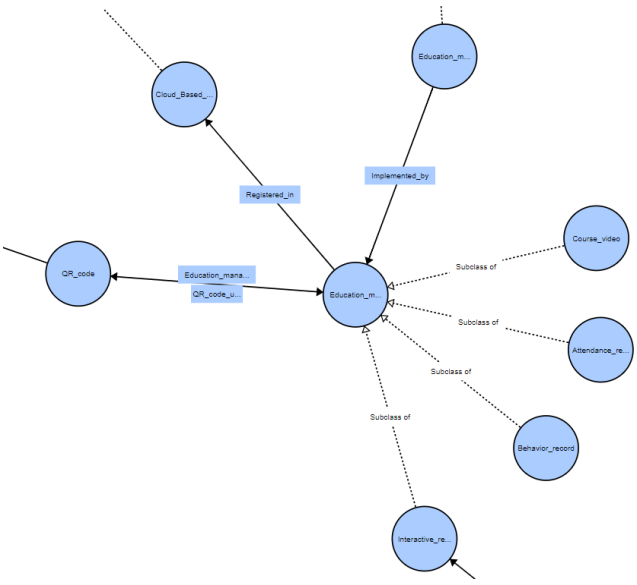
Here is presented a general overview of the entire ontology, which will be further analyzed more in detail.
For a more clear visualization of the ontolgy in its integrity we suggest using the WebVOWL tool (http://vowl.visualdataweb.org/webvowl.html) which is the one utilized here



Classes

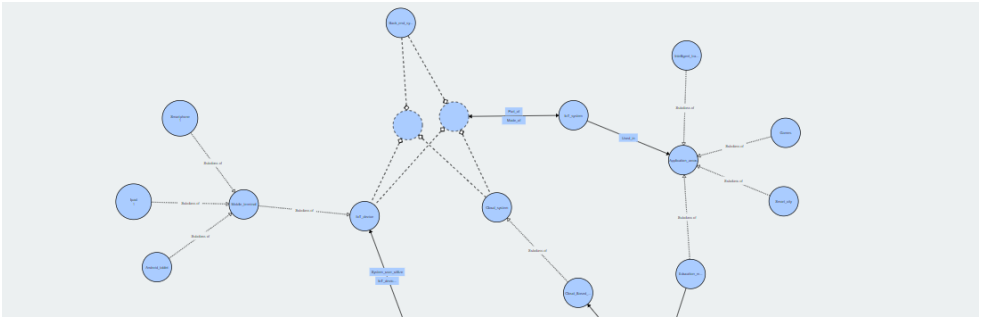


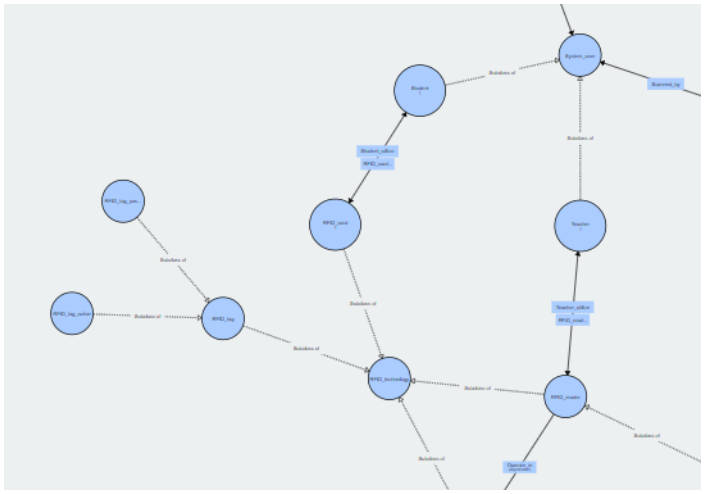
In this first part of the ontology a brief summary of classes from Protegé is reported.
We highlighted the most important concept of our domain of interest, in particular IoT systems and their uses.
Only the tassonomic relationships are here represented, and a multilevel hierarchy is shown.
Most important concepts are also strongly connected thogheter by object properties that will be further presented

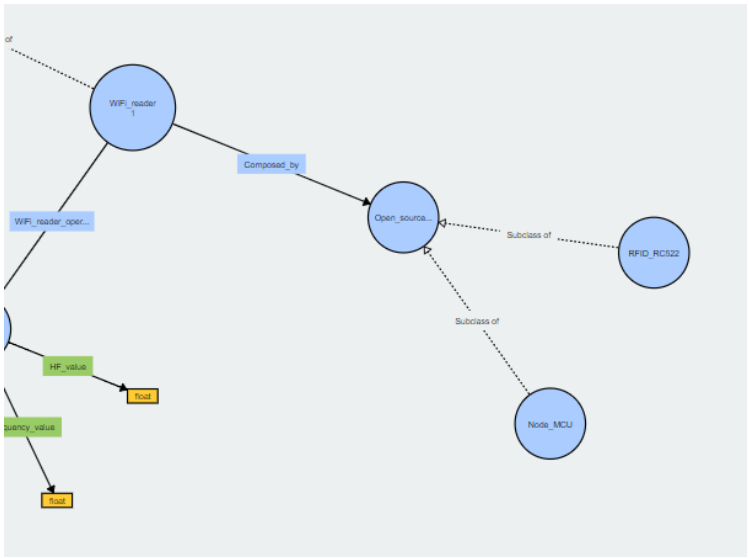


In this screen the education management services class is highlighted. It is (togheter with the IoT devices class) probably the most important concept in the entire ontology.
As shown it's composed of different subclasses which complete this concept

Classes

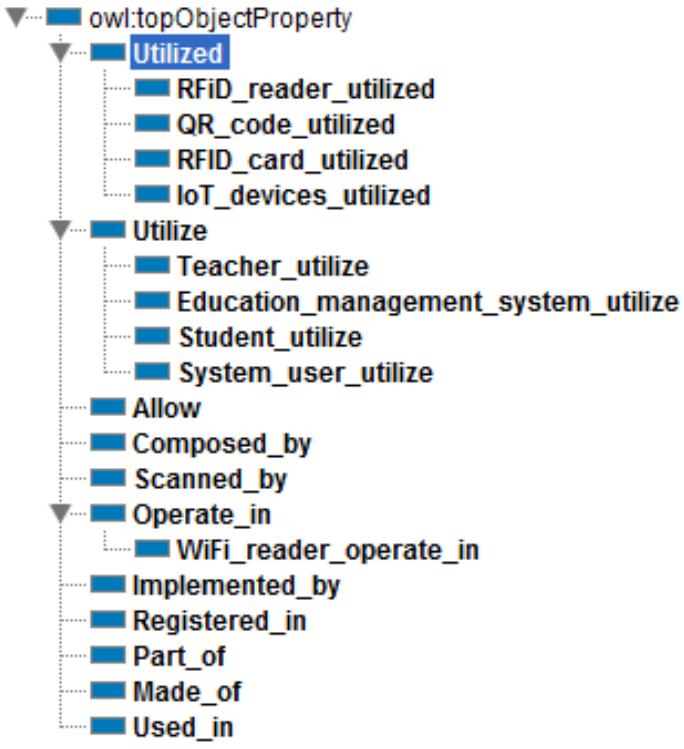






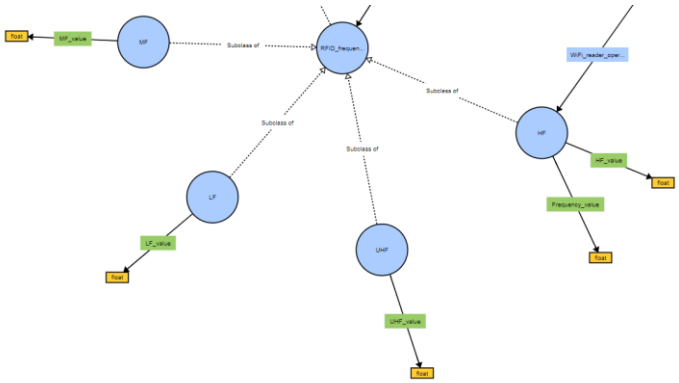
Here are presented other screens from our ontology visual representation which show the most relevant informations grouped by theme.
Other and more specific informations about each class can be found in the Protegé project version.

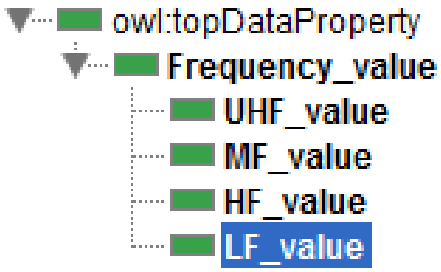
Object properties



The list of all object properties is here shown. In particular as in laboratory, we've identified two general super_properties (utilize and utilized, which are inverse of each other) and several sub_properties that specialize the more general ones.
Here it's also shown how the most important concepts of IoT systems and Teaching Management are related

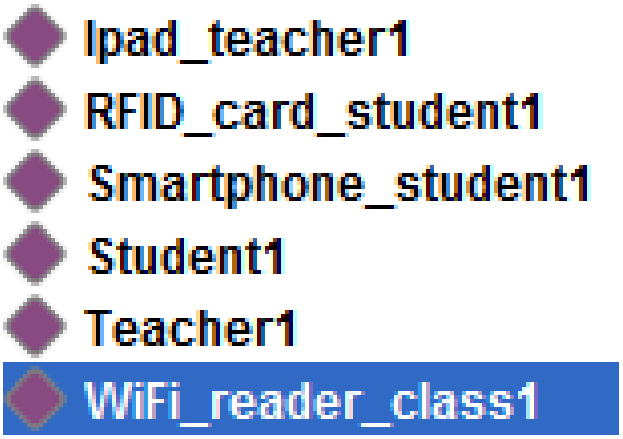
Data properties





Our ontology also includes data properties which involve frequency band of the RFID systems that are here represented.
In particular in this case the range type for this data properties was float in order to describe the frequency working value of each system

Instances



A list of all the instances of our ontology is here shown.
In paritcular we wanted to test some of the Protegé tools for representing instances, so we defined some test instances of the most important classes in order to simulate a small possible implementation of this project