# ISF vocabulary model

ISF Vocabulary model

An ontology is mostly composed of classes of things (types, sets, etc.) from the domain of interest. These classes are then instantiated by creating class members (individual things) to represent the details of the domain. These individuals are given unique identifiers and are related to each other accordingly. However, there is also a need for being able to reference a concept in a way that is different from referencing individual instances. The following example clarifies this issue and describes our approach. This was one of the major goals discussed in the proposal - to develop a standardized mechanism to leverage non-ontological vocabularies.

In the ISF there is a class labeled "awarded degree" and instances of this class are created when a degree is created or given to a person. The individual degree instances are uniquely identified for every degree given to a person. This class, in ISF, is meant to relate a unique degree to the organization issuing it, the person receiving it, time values, location, etc. (it is a representation of an n-ary relation) but instances of this class need to also specify the type of degree received. One option is to create additional classes in the ontology for every possible degree type (either as subtypes of "awarded degree" or as a separate branch) and instantiate the type for each instance of an "awarded degree". This level of granularity was not found to be useful in our ISF modeling and our approach was to create a "degree type" class and create a single shared instance for each type (vs. creating classes for each type). We consider these instances to be a vocabulary for the various degree types and this vocabulary can be used wherever there is a need to refer to a "degree type". An instance of "awarded degree" is then related to one of the vocabulary entries to specify the type of awarded degree. The diagram in Figure 2 shows this approach.

Figure 2. Use of vocabularies in the context of the ISF, illustrated using the awarded degree example. An instance of the "awarded degree" class that belong to the "person X", which is an instance of the "person" class. This awarded degree is also related to a specific university instance and to the vocabulary instance "PhD" that is an instance of the SKOS concept "degree type" (see the SKOS and "reified relationship" explanations below).
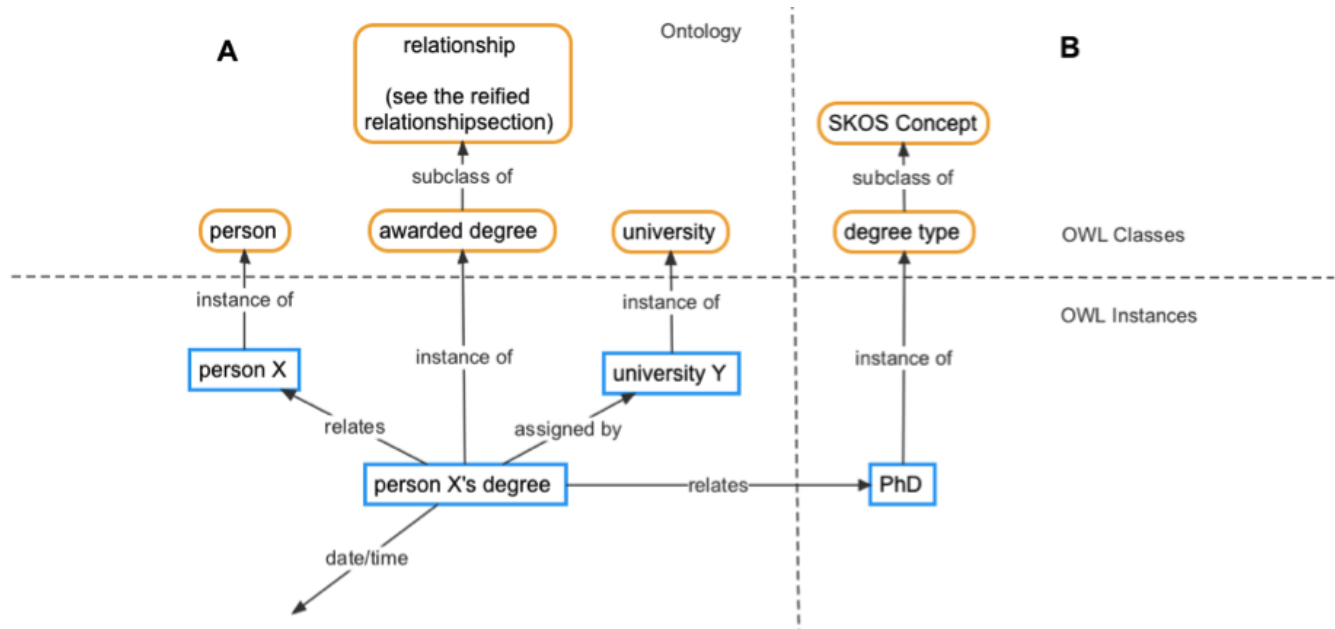
The SKOS ontology is an ideal option for representing this type of knowledge (where concepts are represented as individuals/instances instead of classes) and we use it in the ISF to organize our vocabularies. The top SKOS class "Concept" is subclassed for a specific vocabulary and then class instances are created for each vocabulary entry. We are still developing this model, but we are currently using it for ICD9, MeSH, and UMLS codes (with appropriate SKOS relationships) and few other vocabularies being considered for the final release.

Next: ISF reified relationship model