SYSTEMATIZING DEFINITIONS IN ONTOLOGIES

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Ontology Summit 2021 – Track B: Definitions
Advantages of Formal Definitions
March 17, 2021
BACKGROUND
**hospital function**

A function inhering in a material entity that is realized by the material entity at which inpatient and outpatient healthcare is provided to a patient population.

*Source: OMRSE*
A function inhering in a material entity that is realized by the material entity at which inpatient and outpatient healthcare is provided to a patient population.

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hospital function
subClassOf function
  inheres_in some material entity
  realized_in some health care encounter
  and (has_participant some material entity)
OUTLINE OF THE METHOD
hospital function

A function inhering in a material entity that is realized by the material entity at which inpatient and outpatient healthcare is provided to a patient population.
hospital function

is_a FUNCTION in hering in a material entity that is realized by the material entity at which inpatient and outpatient healthcare is provided to a patient population.
CREATE CLASS TEMPLATE

hospital function

is_a FUNCTION inhering in a material entity
that is realized by the material entity at which inpatient and outpatient healthcare is provided to a patient population.

FUNCTION
exists_at TEMPORAL REGION
has_material_basis MATERIAL ENTITY
has_specific_dependent PROCESS
inheres_in MATERIAL ENTITY
participates_in PROCESS
realized_in PROCESS
s-depends_on INDEPENDENT CONTINUANT
inheres_in SPATIAL REGION
part_of INDEPENDENT CONTINUANT
...

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hospital function

is_a FUNCTION
inheres_in MATERIAL ENTITY

realized_in PROCESS
A function inhering in a material entity at which inpatient and outpatient healthcare is provided to a patient population.

FUNCTION

inheres_in MATERIAL ENTITY

realized_in PROCESS

PROCESS

has_part PROCESS
has_part TEMPORAL_REGION
has_participant MATERIAL ENTITY
occupies SPATIOTEMPORAL_REGION
occupies TEMPORAL INSTANT
occupies TEMPORAL INTERVAL
...

describe semantic structure...
realized_in PROCESS hospital function

is_a FUNCTION

inheres_in MATERIAL ENTITY

is_a PROCESS

has_participant MATERIAL ENTITY

FUNCTION

inheres_in MATERIAL ENTITY

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...
hospital function

is_a FUNCTION

inheres_in MATERIAL ENTITY

is_a PROCESS

has_participant MATERIAL ENTITY

FUNCTION

inheres_in MATERIAL ENTITY

realized_in PROCESS

has_participant MATERIAL ENTITY
<architectural structure> function
A function inhering in a <architectural structure> that is realized by the <architectural structure> at which <health care encounter>.

<architectural structure> function
subClassOf function
  inheres_in some <architectural structure>
  realized_in some <health care encounter>
  and (has_participant some <architectural structure>)
<architectural structure> function
A function inhering in a <architectural structure> that is realized by the <architectural structure> at which <health care encounter>.

<hospital> function
A function inhering in a <health care facility> that is realized by the <health care facility> at which <inpatient and outpatient healthcare is provided to a patient population>.

hospital function
subClassOf function
  inheres_in some <health care facility>
  realized_in some <health care encounter>
  and (has_participant
          some <health care facility>)

<architectural structure> function
subClassOf function
  inheres_in some <architectural structure>
  realized_in some <health care encounter>
  and (has_participant
          some <architectural structure>)
<architectural structure> function
A function inhering in a <architectural structure> that is realized by the <architectural structure> at which <health care encounter>.

<emergency department> function
A function inhering in a <emergency department facility> that is realized by the <emergency department facility> at which <urgent healthcare is provided to a patient population>.

emergency department function
subClassOf function
  inheres_in some <emergency department facility>
  realized_in some <health care encounter>
  and (has_participant some <architectural structure>)

<architectural structure> function
subClassOf function
  inheres_in some <architectural structure>
  realized_in some <health care encounter>
  and (has_participant some <architectural structure>)
CONCLUSION
Summary

Analyze definition structure of existing definitions (genus & differentiae)

Identify relevant ontology class

Create corresponding class template using class specifications (features)

Describe semantic structure using class template

Refine class template with observed features

Output templates for textual and logical definitions & specialize
USES

• Ontology template & ODP development (e.g., ENVO templates)
• Semi-automatic generation of (partial) definitions & axioms
• Definition checking (textual & logical)
• Quality control of ontologies
ADVANTAGES

• Works for textual and logical definitions
• Creates recursively specifiable templates
• Systematizes & accelerates definition creation
• Increases consistency of definitions & ontologies
THANK YOU!

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