Jednoduchá sémantika RDF
Zhrnutie

Výklad k W3C štandardom

- RDF 1.1 Concepts and abstract syntax https://www.w3.org/TR/rdf11-concepts
- RDF 1.1 Semantics https://www.w3.org/TR/rdf11-mt

Opakovanie

Zhrnutie z predchádzjúcej prednášky - formálna definícia RDF-grafu
Pozri: https://www.w3.org/TR/rdf11-concepts/#section-rdf-graph

Základná terminológia

- **slovník**

A *name* is any IRI or literal. A typed literal contains two names: itself and its internal type IRI. A *vocabulary* is a set of names.

- **prázdny graf**

The *empty graph* is the empty set of triples.

- **podgraf**

A *subgraph* of an RDF graph is a subset of the triples in the graph. A triple is identified with the singleton set containing it, so that each triple in a graph is considered to be a subgraph.

- **vlastný podgraf**

A *proper subgraph* is a proper subset of the triples in the graph.

- **základný graf**

A *ground* RDF graph is one that contains no blank nodes.

- **inštancia grafu**

Suppose that M is a functional mapping from a set of blank nodes to some set of literals, blank nodes and IRIs. Any graph obtained from a graph G by replacing some or all of the blank nodes N in G by M(N) is an *instance* of G.

- **inštancia grafu vzhľadom na slovník**

An *instance with respect to* a vocabulary V is an instance in which all the names in the instance that were substituted for blank nodes in the original are names from V.

Pozri: https://www.w3.org/TR/rdf11-mt/#notation-and-terminology

Definícia izomorfizmu grafov

Two RDF graphs *G* and *G'* are *isomorphic* (that is, they have an identical form) if there is a bijection *M* between the sets of nodes of the two graphs, such that:

1. *M* maps blank nodes to blank nodes.
2. *M(lit)=lit* for all RDF literals *lit* which are nodes of *G*.
3. *M(iri)=iri* for all IRIs *iri* which are nodes of *G*.
4. The triple *(s, p, o)* is in *G* if and only if the triple *(M(s), p, M(o))* is in *G'*

Pozri. https://www.w3.org/TR/rdf11-concepts/#graph-isomorphism

Zjednotenie a zlúčenie grafov

Pozri: https://www.w3.org/TR/rdf11-mt/#shared-blank-nodes-unions-and-merges

Definícia jednoduchej interpretácie.

Jednoduchá interpretácia je pätica I = (IR, IP, IEXT, IS IL) kde:

1. A non-empty set IR of resources, called the domain or universe of I.
2. A set IP, called the set of properties of I.
3. A mapping IEXT from IP into the powerset of IR x IR i.e. the set of sets of pairs < x, y > with x and y in IR .
4. A mapping IS from IRIs into (IR union IP)
5. A partial mapping IL from literals into IR

Pozri: https://www.w3.org/TR/rdf11-mt/#simple-interpretations

Definícia pravdivostnej hodnoty grafu.

Základný graf E je pravdivý v jednoduchej interpretácii I ak sú splnené nasledujúce **sémantické podmienky pre základný graf**:

Semantic conditions for ground graphs.

if E is a literal then I(E) = IL(E)

if E is an IRI then I(E) = IS(E)

if E is a ground triple s p o. then I(E) = true if
I(p) is in IP and the pair <I(s),I(o)> is in IEXT(I(p))
otherwise I(E) = false.

if E is a ground RDF graph then I(E) = false if I(E') = false for some triple E' in E, otherwise I(E) =true.

Graf E je pravdivý v jednoduchej interpretácii I ak sú navyše splnené nasledujúce **sémantické podmienky pre prázdne uzly**:

Semantic condition for blank nodes.

If E is an RDF graph then I(E) = true if [I+A](E) = true for some mapping A from the set of blank nodes in E to IR, otherwise I(E)= false.

Pozri: https://www.w3.org/TR/rdf11-mt/#simple-interpretations

Jednoduchý dôsledok.

Nech E je graf, hovoríme, že

- interpretacia **I jednoducho spĺňa E** (resp. E je pravdivý v I, I je modelom E), ak...

Following standard terminology, we say that I (simply) *satisfies* E when I(E)=true,

- E je **jednoducho splniteľný** resp. **nesplniteľný** ak...

that E is (simply) *satisfiable* when a simple interpretation exists which satisfies it, otherwise (simply) *unsatisfiable*,

- E **jednoducho vyplýva** z grafu G (je jednoduchým dôsledkom G) ak...

and that a graph G simply *entail***s** a graph E when every interpretation which satisfies G also satisfies E.

- grafy E a f sú **jednoducho logicky ekvivalentné** ak...

If two graphs E and F each entail the other then they are logically *equivalent*.

Pozri: https://www.w3.org/TR/rdf11-mt/#simpleentailment

Vlastnosti jednoduchého dôsledku.

- **Interpolačná lemma:**
  G simply entails a graph E if and only if a subgraph of G is an instance of E.

Ďalšie vlastnosti pozri: https://www.w3.org/TR/rdf11-mt/#properties-of-simple-entailment-informative