Ontological Representation of Social Relationships

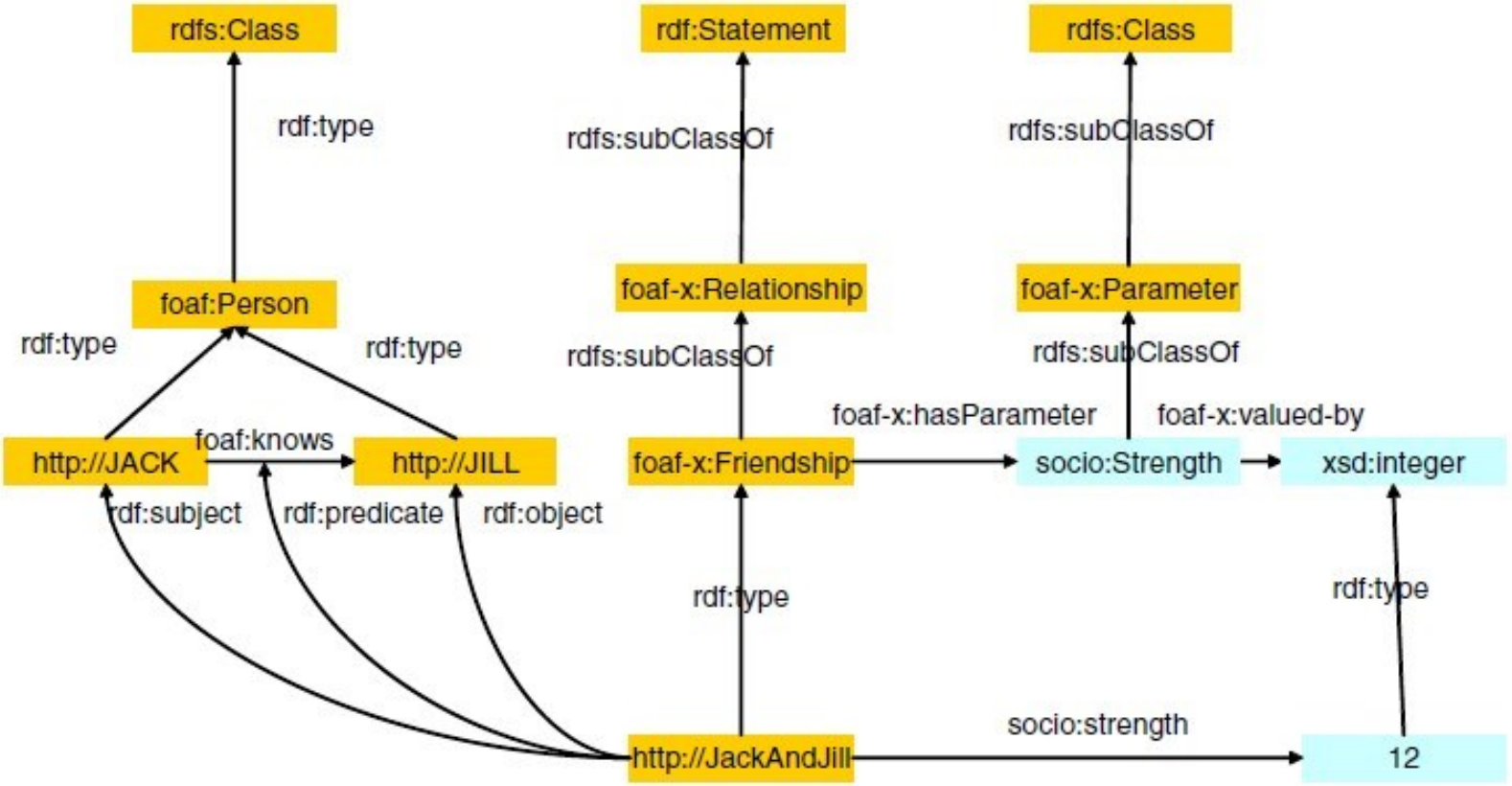
Conceptual Model

- Social relationships treated as first-class citizens in SNA
- Social relations could be represented as n-ary predicates
- n-ary relations not supported directly by RDF/OWL languages, but alternative exists
- *Reification is employed to represent* n-ary relations
- *relation is represented as a class, whose instances are concrete relations* of that type

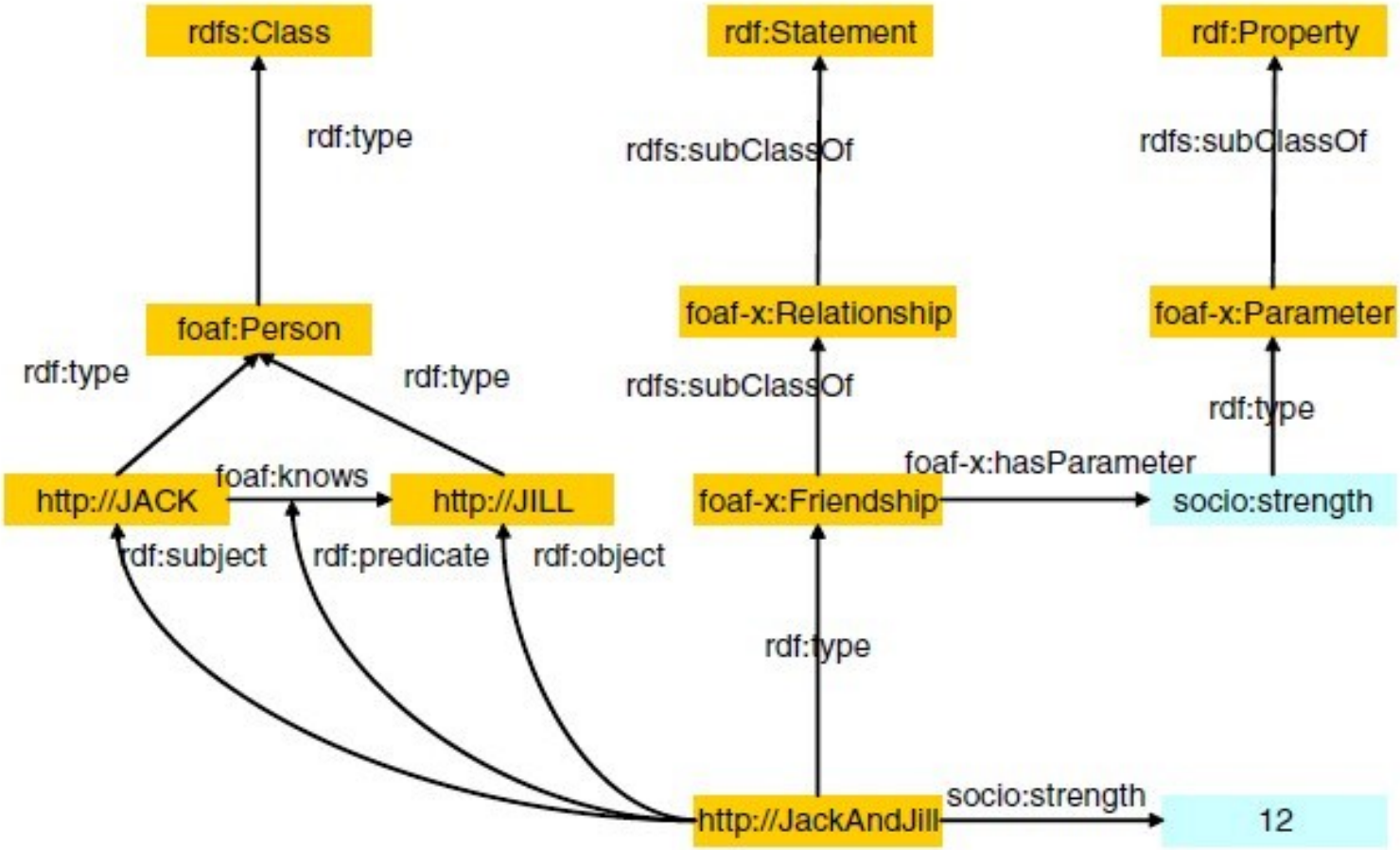
Contd…

- RDF has a reified representation of statements - *rdf :Statement object*
- *It represents the class of statements*
- *Class has three* properties that correspond to the components of a statement - *rdf :subject, rdf :predicate, rdf :object*
- *These properties are used to link the statement instance to* resources involved in the statement.
- To enrich the representation of relations in FOAF is to use reification feature of the RDF language.

Example


rdfs:Class
rdf:type
foaf:Person
rdf:type
rdf:type
http://JACK
foaf:knows
http://JILL
rdf:subject
rdf:predicate
rdf:object
rdf:Statement
rdfs:subClassOf
foaf-x:Relationship
rdfs:subClassOf
foaf-x:Friendship
rdf:type
http://JackAndJill
rdfs:Class
rdfs:subClassOf
foaf-x:Parameter
rdfs:subClassOf
foaf-x:hasParameter
foaf-x:valued-by
socio:Strength
xsd:integer
rdf:type
socio:strength
12

Example


rdfs:Class
rdf:type
rdf:Statement
rdfs:subClassOf
rdf:Property
rdfs:subClassOf
foaf:Person
rdf:type
rdf:type
foaf-x:Relationship
rdfs:subClassOf
foaf-x:Parameter
rdf:type
foaf-x:hasParameter
http://JACK
foaf:knows
http://JILL
foaf-x:Friendship
socio:strength
rdf:subject
rdf:predicate
rdf:object
rdf:type
http://JackAndJill
socio:strength
12

Explanation of previous 2 slides

- Common to both alternative - new Relationship class is related to a general Parameter class by the hasParameter relationship
- Two alternatives differ in the representation of parameters.
- a) Strength may be a subclass of Parameter valued-by integers, but requires 2 statements
- b) use rdf native method generic parameter class is defined as sub- class of *rdf :Property*
  - Adv. – allows to represent parameter values and restrictions on them
  - Disadv – not complaint to OWL -DL

Advanced Representation

- Two characteristics captured in advanced representation
  - Context dependence of social relations
  - separation between observed situation and its interpretation, as a social

relation between two individuals

- Masolo et al. - relationships have a strong contextual dependence in which they are interpretable

- Identify and interpret certain interaction-pattern among individuals as a certain kind of relationship

- cognitive structuring – apply generic pattern with relationship to the actual state-of-affairs

- same observed state-of-affairs interpreted according to another pattern as different kind of relationship.

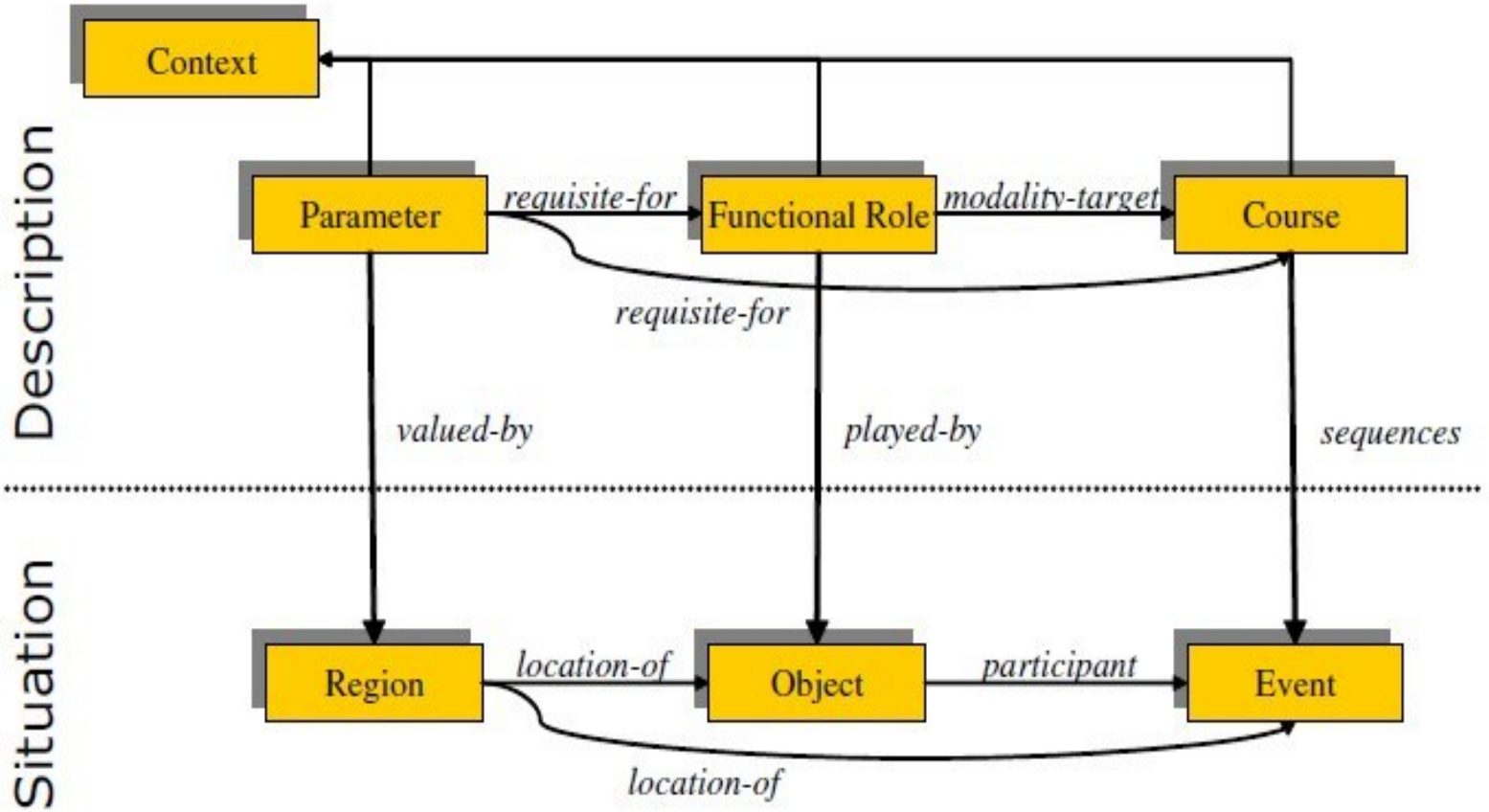
Contd…

- Ex. Student /Professor relationship (within university and global)
- Individual relationships and their generic description are thus clearly separate
- generic pattern of relationship comprises aspects shared among particular occurrences of the relationship
- Problem in knowledge representation - representation of context and the separation of the level of state-of-affairs
- Solution - Descriptions and Situations ontology design pattern clearly delineate these two layers of representation

Description & Situation (D&S) Pattern

- D&S is a generic pattern for modelling non-physical objects
- Intended meaning results from statements(combination with other entities)
- Ex. a norm, a plan, or a social role is usually represented as a set of statements
- Non-physical objects may change and be manipulated
- Ontology consider this by modelling the context or frame of reference on which they depend
- Ex. D&S applied in SLA & description of Web Services

D & S Model


Description
Situation
Context
Parameter
requisite-for
Functional Role
modality-target
Course
requisite-for
valued-by
played-by
sequences
Region
location-of
Object
participant
Event
location-of

Example of D&S