

BCB410 Exercise 3
Semantic Automated Discovery and Integration (SADI)

1. What is the fundamental difference between the Web Services and the Semantic Web?
2. What is SADI proposed to achieve that make the SADI Web Services behave like the Semantic Web?
3. Using Semantic Health And Research Environment (SHARE)
<http://biordf.net/cardioSHARE/>

- a) From the question that was addressed in lecture, "Patients whose creatinine level is increasing over time, along with their latest BUN and creatinine levels."

Observe the following queries and note how both retrieve the same table but the latter uses an owl class instead of directly implementing the regression model:

- 1) PREFIX regress: <<http://sadiframework.org/examples/regression.owl#>>
PREFIX patients: <<http://sadiframework.org/ontologies/patients.owl#>>
PREFIX pred: <<http://sadiframework.org/ontologies/predicates.owl#>>
SELECT ?patient ?bun ?creat
FROM <<http://sadiframework.org/ontologies/patients.rdf>>
WHERE {
 ?patient patients:creatinineLevels ?collection .
 ?collection regress:hasRegressionModel ?model .
 ?model regress:slope ?slope
 FILTER (?slope > 0) .
 ?patient pred:latestBUN ?bun .
 ?patient pred:latestCreatinine ?creat .
}
- 2) PREFIX rdf: <<http://www.w3.org/1999/02/22-rdf-syntax-ns#>>
PREFIX patients: <<http://sadiframework.org/ontologies/patients.owl#>>
PREFIX pred: <<http://sadiframework.org/ontologies/predicates.owl#>>
SELECT ?patient ?bun ?creat
FROM <<http://sadiframework.org/ontologies/patients.rdf>>
WHERE {
 ?patient rdf:type patients:ElevatedCreatininePatient .
 ?patient pred:latestBUN ?bun .
 ?patient pred:latestCreatinine ?creat .
}

- b) From the data file provided in Pattern Discovery lecture,
<http://people.sc.fsu.edu/~jburkardt/datasets/pcl/i29111.pcl>
Propose a query in SHARE that retrieves the genes of interest.

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1. What is the fundamental difference between the Web Services and the Semantic Web?

The Web Services utilize HTTP POST of SOAP-XML and XML Schema whereas the Semantic Web uses the HTTP GET of RDF/XML in combination of OWL. In other words, the Web Services uses no rigorous semantics whereas the Semantic Web is full of rich, flexible semantics.

2. What is SADI proposed to achieve that make the SADI Web Services behave like the Semantic Web?

*1. SADI makes the implicit **explicit** by having both the input and output data as RDF instances of OWL classes. 2. The URI of the input is preserved in the output by simply annotating the same node with additional information.*

3. Using Semantic Health And Research Environment (SHARE)

<http://biordf.net/cardioSHARE/>

- a) From the question that was addressed in lecture, "Patients whose creatinine level is increasing over time, along with their latest BUN and creatinine levels."

Observe the following queries and note how both retrieve the same table but the latter uses an owl class instead of directly implementing the regression model:

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SELECT ?patient ?bun ?creat
FROM <<http://sadiframework.org/ontologies/patients.rdf>>
WHERE {
 ?patient patients:creatinineLevels ?collection .
 ?collection regress:hasRegressionModel ?model .
 ?model regress:slope ?slope
 FILTER (?slope > 0).
 ?patient pred:latestBUN ?bun .
 ?patient pred:latestCreatinine ?creat .
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- 2) PREFIX rdf: <<http://www.w3.org/1999/02/22-rdf-syntax-ns#>>
PREFIX patients: <<http://sadiframework.org/ontologies/patients.owl#>>
PREFIX pred: <<http://sadiframework.org/ontologies/predicates.owl#>>
SELECT ?patient ?bun ?creat
FROM <<http://sadiframework.org/ontologies/patients.rdf>>
WHERE {
 ?patient rdf:type patients:ElevatedCreatininePatient .
 ?patient pred:latestBUN ?bun .
 ?patient pred:latestCreatinine ?creat .
}

The lines underlined shows how calling of a regression model can be simplified by reference to an OWL RDF that is publically available.

- b) Try running the above two query in SHARE and comment on the performance.

The downside of the second query being that it requires more time to call upon the rdf that contains the regression model.

- c) From the data file provided in Pattern Discovery lecture,
<http://people.sc.fsu.edu/~jburkardt/datasets/pcl/i29111.pcl>
Propose a query in SHARE that retrieves the genes of interest.

```
PREFIX sadi: <http://sadiframe.org/ontologies/predicates.owl>  
PREFIX ss: <http://people.sc.fsu.edu/~jburkardt/datasets/pcl/i29111.pcl>  
SELECT ?gene ?protein ?description  
WHERE {  
    ss:CLID ?gene .  
    ?gene ss:CLID ?protein .  
    ?protein sadi:hasDescription ?description .  
}
```

**Note how this is actually not a real query that can be passed into SHARE.
Experimentally pcl files cannot be processed in the SHARE web server.*