Medical Roles Ontology

A Description Set for Patient Care Providers

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Project Overview

- Creation and implementation of a medical roles ontology
- Delineation and standardization of various roles in healthcare
- Data presentation and knowledge representation based on these roles
Overarching Goals

• Improved efficiency in understanding data by both practitioner and patient
  – Physicians are able to quickly grasp the underlying pharmacological effects and current lab results from visualizations than strict text display
  – Patients are able to better understand a visualization over numbers on a page

• Different specialties focus on different aspects of medicine
Motivating Use Case

- Patient visits General Practitioner.
- GP modifies medication dosage.
- Patient notices problem in another area.
- Patient visits Specialist.
- Specialist uses system to view patient data, finding possible correlation.
- Specialist changes drug dosage.
Claim: Visualizations

- Visualizing medical data allows more accurate and efficient care
Claim: Data Reasoning

- Automatic semantic reasoning facilitates healthcare treatments
  - Incorporation of known (authorized) drug-disease relationships
    - Drugs are approved to treat only certain diseases
  - Correlations between labs and drugs/specialties
• The Medical Role Ontology provides an extensible and expandable framework
  – Can be incorporated into variety of electronic medical records
  – Addition of new drugs or authorized treatments is made simpler
Ontology
# System Architecture

<table>
<thead>
<tr>
<th>Component</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front end</td>
<td>HTML, Javascript, Google Visualization API, SPARQL</td>
</tr>
<tr>
<td>Middle</td>
<td>Joseki, Jena, Pellet</td>
</tr>
<tr>
<td>Back end</td>
<td>csv2rdf4lod-automation, TDB</td>
</tr>
<tr>
<td>Ontology</td>
<td>Protege, OWL 2</td>
</tr>
</tbody>
</table>
Data Processing

- Smart Sample Patients
- TW Synthetic Data
  - Data Conversion
    - csv2rdf4lod
      - Smart Sample Patients RDF
      - TW Synthetic Data RDF
        - Data Loading
          - TDB + Joseki
          - Jena + Pellet
            - Data Query
              - Data Reasoning
                - Interactor
                  - Data Visualization
                    - Semantic EHR Interface

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• Drug-disease integration
  – Possibly improvements to the RxNav system
  – Possibly new sources
• Lab-disease integration
  – Unknown status. May need to be created/gleamed from various sources from scratch
Questions...