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sensors.ws
Site for Web-based Sensor Ontologies

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Introduction

- Sensor Web Enablement (SWE) is highly dependent on the presence of online definitions

- Ontologies provide best means for providing definitions
  - Can define as flat list in RDF
  - Can define mappings between ontologies as we go (i.e. "this term is the same as that term")

- SWE has always stated the importance of online semantic definitions that can be resolved through a URI, but we have always lacked them in reality
  - Needs include both general and community-specific terms
  - Providing tools for creating, editing, searching, and resolving term is critical to making online ontologies a reality

An Approach – MMI Tools

- The Marine Metadata Initiative (MMI) has done an excellent job of gathering tools and making them interoperate within a web environment (services and browsers)
  - These have also been heavily integrated with the sensor/observation/processing needs for SWE
  - Currently supported within the oceans community
    - Observables
    - Sensor terms, site characteristics, etc.
    - QC Tests types and parameters (i.e. lineage)

- Links:
  - Main site: http://mmisw.org/
  - Ontologies and tools: http://mmisw.org/orr/#b
  - Framework Description: http://marinemetadata.org/semanticframework
  - Manual: http://marinemetadata.org/mmiorrusrman/

MMI ONT Tool Suite

- MMI ONT is an integrated collection of separate tools
  - Stanford Bioportal backend – Registry and Repository
  - VOC2RDF - Import csv file into RDF
  - Vine - Mapping between ontologies and terms
  - SparQL   - Ontology Query Language
  - Reasoner - handles inferences
  - More tools planned
  - Other tools can be used but not integrated into web service

- MMI ONT is being reconfigured to ease deployment on other sites

- MMI looking for interested parties who can contribute to suite

- Without account: browse, search, reference ontologies
- With account: create/edit ontologies and maps

- Special thanks to the MMI Team (John Graybeal, Carlos Rueda, Luis Bermudez, and Paul Alexander, now of BioPortal), as well as the Stanford BioPortal team.

Examples

- Demonstrate current MMI tools
  - http://mmisw.org/orr/#b

- Example ontology (from sensor OEM):
  - http://mmisw.org/orr/#http://mmisw.org/ont/rdi/rdi

- Example SensorML description using terms in ontology:

```
<sml:input name="seaWaterTemperature">
    <swe:ObservableProperty
         definition="http://mmisw.org/ont/mvco/properties/seaWaterTemperature">
    </swe:ObservableProperty>
 </sml:input>
 <sml:input name="volumetricBackscatter">
    <swe:ObservableProperty
        definition="http://mmisw.org/ont/mvco/properties/volumetricBackscatter">
        <gml:description>doppler backscatter</gml:description>
    </swe:ObservableProperty>
</sml:input>
```

Direction

- Botts-Inc recently purchased sensors.ws domain to use as a community agnostic site for providing ontologies, etc

- Have installed the MMI ONT tools on sensors.ws (thanks to Carlos Rueda) – http://sensors.ws/orr

- Will begin building necessary ontologies on sensors.ws

- Would welcome any help adding ontologies and maps, or helping with tool development

Ontologies Needed

Observable properties / phenomena / deriveable properties

temperature, radiance, species , exceedingOfThreshold, earthquake, SST, etc.

rotation angles, spectral curve, histogram, time-series, swath, etc.

Identifiers and classifiers

Identifiers – longName, shortName, model number, serial number, wing ID, etc.

Classifiers – sensorType, intendedApplication, processType, etc.

Sensor and process types and terms

.thermometer, weatherStation, videoCamera, FLIR, passiveMicrowave, FFT, edgeDetection, etc.

IFOV, focal length, slant angle, weight, Polynomial coefficients, matrix, etc.

Role types

Expert, manufacturer, integrator, etc.

Specification document, product_Image, algorithm, etc.

Capabilities, Characteristics, Interfaces, etc.

Width, height, material composition, etc.

Ground resolution, dynamic range, peak wavelength, etc.

RS-232, USB-2, bitSize, baud rate, base64, etc.

Sensor and process events

Deployment, decommissioning, calibration, etc.