An Ontology Design Pattern for Spatial Data Quality Characterization in the Semantic Sensor Web

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OUTLINE

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- The pattern
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MOTIVATIONS

- The SSN Ontology (Compton et al 2012, JWS)
  - Concepts and relations relevant to sensors
  - Modular

- The OGC SWE (Bröring et al 2011, sensors)
  - Knowledge about quality of sensor outputs is needed and is missing
SPATIAL DATA QUALITY

Quality: the degree to which a data or service fulfills the needs of a consumer

Spatial data quality components
- Vary from author to author
  - E.g. 1 Completeness, logical consistency, positional accuracy, temporal accuracy, attribute accuracy
  - E.g. 2 Accuracy, resolution, consistency, lineage
  - E.g. 3 Accuracy, resolution, consistency, completeness

Quality: a function of intangible properties of the data considered pertinent to the satisfaction of the consumer’s need
THE PATTERN

DUL:SocialObject isA DUL:Situation

DUL:Method isA DUL:Quality

xsd data type hasValue DUL:hasRegionDataValue

DUL:Region isA DUL:Quality

DUL:isQualityOf

Data isA DataQualityComponent

isQualityComponentOf

approximates

DataQualityObservation

satisfies DUL:satisfies

involves

‘Resolution’

‘Raster Cell’

‘20meters’

‘dqobs1’
BENEFITS / TRADE-OFFS

Benefits

- Inference of spatial data component values
- Detection of inconsistencies when different quality criteria are used for quality assessment
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- **Benefits**
  - Inference of spatial data component values
  - Detection of inconsistencies when different quality criteria are used for quality assessment

- **Trade-offs**
  - The pattern helps only to infer the value of spatial data quality components
  - The user would have to decide if for example ‘resolution = 20m’ means high/low quality

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A consumer’s view on data quality

A pattern with 5 elements
- Data
- DataQualityComponent
- DataQualityCriterion
- DataQualityResult
- DataQualityObservation

Usefulness
- A complementing module to the SSN Ontology
- Inference of spatial data quality component values
- Semantic integration of datasets
REFERENCES


THANKS FOR YOUR ATTENTION!