



UncertML - XML for exchanging uncertainty

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Recent developments for sensor observation modelling within the Open Geospatial Consortium (e.g., the SensorML standard) have opened opportunities for interoperable, sensor-derived datasets to be exchanged over the Internet. As this Sensor-Web community grows, an increasing volume of data will become available and require processing, and much of this data will be used for decision support. However, rational decision making using incomplete knowledge (i.e., sensor measurements) is only possible when uncertainty in the measurements, and their subsequent processing, is quantified. This uncertainty must be represented in an interoperable manner. Currently, within the Sensor-Web framework no formal method of quantifying complex uncertainties (e.g. probabilistic representations) exists. This paper discusses a solution to the problem, entitled 'UncertML'.

UncertML (<http://www.intamap.org/uncertml>) is an XML schema for describing uncertain information, for example, in online risk management chains. UncertML is capable of describing a range of uncertainties: from summaries, such as simple statistics (e.g. the mean and variance of an observation), to more complex representations such as parametric distributions at each point of a regular grid, perhaps generated by some geostatistical interpolation process. Substituting for the GML 'AbstractFeatureType', the 'AbstractUncertaintyType' within UncertML provides a solid foundation for a hierarchical framework. Inherited properties from GML (such as name and description) provide a constant location for semantics while the addition of an affordances property allows the specification of permissible operations. An extensive set of uncertainty features inherit from this base type, creating a complement to existing Sensor-Web technologies, with a potentially broader impact in web based decision support systems.