

Semantic Web Technologies in Automotive Repair and Diagnostic Documentation

Renault

1. Overview

Summary

- Integrating disparate applications and data sources in a large corporation is expensive in terms of resources and time. Using Semantic Web technologies can help to cut down these costs. RDF and OWL were used for a prototype in the area of car repair and diagnostic documentation, a field where many classes of objects have to be shared amongst several different systems.
- Sector: Automotive

Keys components

- Documentation about repair and diagnostics involves several of the key concepts of the automotive field. OWL was used in this work to provide a sharable modelling of these concepts. It must be noted that we were not concerned with the reasoning features of OWL, as we have our own reasoning tools aimed at diagnostics, based on compilation of Boolean constraints (in propositional calculus) and of probabilistic constraints (in fact, an important goal of the prototype was to provide an OWL based description of the I/O of these reasoning tools). This means that we were not concerned about restricting ourselves to OWL-DL.

2. Current Practices and Technologies

- Review of the existing systems: current systems deal with documents about repair and diagnostics. One important aspect of this work was to model the key concepts of repair and diagnostics, in order to develop a repository of repair and diagnostics operations rather than a repository about documentation about diagnostics.
- In house technology
- Usage of OWL or OWL1.1
 - small, well constrained example illustrating a particular useful feature of OWL(1.1) : set operators and enumerated classes (for the representation of the "product diversity" – that is, the "range" (the set of cars that a customer can choose among) – it is the set of solutions of a Constraint Satisfiability Problem (CSP)

3. Requirements

- System requirements
Representing Boolean expressions was a dilemma (and we have Boolean expressions everywhere). For instance: how to best represent that something (a repair document for instance) applies to a set of cars (a subset of the range, defined by a Boolean expression of properties of a car) (this involves a property whose range is a class)

4. Support

- Support required for OWL ontology/application development (e.g; mailing list for OWL users, wiki including various information on tools/software, more intelligent information system etc.) A mailing list for OWL users would be great (public-owl-dev-request@w3.org is about developing OWL, not about developing with OWL: I don't feel like asking questions there.)

5. Conclusion

References

- ["Semantic Web Technologies in Technical Automotive" - CEUR-WS.org/Vol-258 - OWL: Experiences and Directions 2007](http://ftp.informatik.rwth-aachen.de/Publications/CEUR-WS/Vol-258/paper04.pdf)
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- [Semantic Web Technologies in Automotive Repair and Diagnostic Documentation](http://www.w3.org/2001/sw/sweo/public/UseCases/Renault/)
Semantic Web Education and Outreach Interest Group: case study
<http://www.w3.org/2001/sw/sweo/public/UseCases/Renault/>