

# RDF/OWL Representation of WordNet 2.1 and Japanese EDR Electronic Dictionary

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**Abstract.** We investigated the OWL conversion of WordNet proposed by W3C for WordNet 2.0, and applied the conversion proposal to WordNet 2.1 with the extension of several pointer properties. Then, we have converted Japanese EDR Electronic Dictionary into OWL in the similar way of the W3C Proposal. Our final goal of this research is the Japanization of WordNet. In this paper, we report the first step of our works.

## 1 W3C Working Draft and OWL Conversion of WordNet 2.1

The OWL conversion of WordNet was proposed for WordNet 2.0 in the Working Draft by W3C [1], and the OWL representation of WordNet and the Prolog program that provides WordNet data were delivered by W3C. We have extended the WordNet schema of OWL from WordNet 2.0 to WordNet 2.1. There are several extensions of new relations in WordNet 2.1, i.e., instanceHyponymOf, classifiesTopic, classifiesRegion, classifiesUsage, etc. We have also developed a Lisp program for the OWL conversion, using Semantic Web Processor SWCLOS [2]. Then, WordNet 2.1 from Princeton has been converted to OWL.

## 2 OWL Conversion of EDR

EDR<sup>3</sup> Japanese Electronic Dictionary [3] consists of several dictionaries, i.e., Word Dictionary, Concept Dictionary, English-Japanese Dictionary, Japanese English Dictionary, etc. At least, two dictionaries, Word Dictionary and Concept Dictionary, are necessary to make a Japanese ontology from EDR. The Word Dictionary contains the information of part of speech (POS) and concept identifiers of Japanese words. The Concept Dictionary contains the hypernym/hyponym relationship of concepts.

We have defined the OWL schema for EDR in consideration of mapping from WordNet to EDR as follows.

<sup>3</sup> <http://www2.nict.go.jp/r/r312/EDR/index.html>

- The EDR concept corresponds to the WordNet synset. The QName local part of EDR concept is set to “concept identifier” + “concept lexical form”.
- The EDR word corresponds to the WordNet word sense. The QName local part of EDR word is set to “word-record-number” + “word lexical form”.
- The EDR word lexical form corresponds to the WordNet word. The QName local part of EDR lexical form is same as the lexical form in EDR Word Dictionary.

### 3 Translation of WordNet into Japanese

The following is the motivation of localization of WordNet into Japanese.

- The EDR dictionaries are not open-source.
- The structure of EDR ontology is not suitable to the upper ontology for Science and Engineering domains.

We expect that multilingual WordNets support the ontology sharing in Science and Engineering domains worldwide. The most of terms in Science and Engineering can be sharable worldwide in nature. Terminal nodes of upper ontology are connected to top nodes of specific domain ontology, and some of them can be mapped between WordNet and EDR one by one. For example, `wn20instances:synset-valve-noun-1` (hypernym of `heart_valve`) and `wn20instances:synset-valve-noun-2` (of horn or trumpet) does not match any of EDR exactly, but `wn20instances:synset-valve-noun-3` (control device) is same as `edr:3c54a0弁`. We utilize EDR for the Japanization of WordNet. The translation procedure is described as follows.

- to translate WordNet words into Japanese one by one using English-Japanese dictionaries.
- to translate senses and synsets by taking the links from a WordNet word to senses and synsets. We use EDR for the disambiguation of polysemous words. For example, `wn21instances:synset-depository_financial_institution-noun-1` is translated to `wn21instances:synset-銀行-1`, and `wn21instances:synset-bank-noun-2` to `wn21instances:synset-土手-1`.
- The incomplete Japanese WordNet is published by Semantic Wiki [4], and volunteers assist the revisions.

### References

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