Development of the eLen Regulation Database to Support Legislation of Municipalities

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1. Introduction

The rules of law enacted by municipalities include regulations, rules, notifications, orders, etc., among which only regulations require the approval of local assemblies. The rest, which substantially outnumber regulations, are drawn up by administrative agencies or other organizations created by relevant acts or regulations. Those who write statutes for municipalities are not necessarily experts at law, despite the importance of such a task for administration. Drafting requires a lot work, not only for policy design, but also for the regulation's description. When proofreading a bill, drafters often refer to regulations enacted in other municipalities. However, at present, there is no database of regulations for cross-searching among municipalities. Therefore, drafters are forced to manually cross-search the website of each municipality, which makes it virtually impossible to cover all 1,790 municipalities.

Our project of e-Legislation aims to develop a database, which we call the *eLen* regulation database, to support municipal legislation. We conducted a field investigation of the demand for such a database. Our interviews with drafters revealed the need for various functions for a keyword search, which we then included in our system.

2. The eLen Regulation Database System

This section is roughly divided into two parts: The first half presents the main functions of the eLen Regulation Database System[2]. The second half describes the system architecture.

The *Cross-Searching* function makes it possible to search regulations among the municipalities, which has not previously been possible due to the difficulty of collection. We also provide *a search refinement function with attributes*, which allows users to refer to similar regulations enacted by other municipalities by specifying a population range, industries, sister cities, sightseeing spots, and transportation services.

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[2]`http://elensv.law.nagoya-u.ac.jp/en/project/elen/` (English version)

The *Benchmarking table*, which is a comparison table for each article of a number of regulations, is what most drafters requested during our interviews. Articles in each regulation are organized according to article headings, thereby reducing to a few seconds what would normally take an entire day to benchmark by hand for just a few regulations. The benchmarking table is used not only for drafting, but also for providing evidence in support of a bill to the assembly and residents, that is, presenting the legislative facts that other municipalities have actually enacted regarding the proposed regulations.

The *Clustering Regulations for Display* function classifies regulations in terms of descriptive similarity. In most cases, the descriptions imitate those enacted by other municipalities. In other words, even if all of the municipalities had regulations with a common theme, each would belong to one of several descriptive patterns that are essentially different from each other. Thus, clustering similar regulations drastically reduces the number of regulations to be compared. The regulation cluster table achieves this purpose.

The database mainly consists of the regulation data and the regulation cluster table, both of which are stored in the relational database (RDB). The regulation data was collected from 1,606 municipalities. We stored 1,087,281 regulations in total consisting of 12,293,893 provisions. Although regulations are, in many cases, provided on each municipality's website, the format of the data differs from one municipality to another. Since we were unable to obtain regulations at one time using an existing web crawler, we manually collected as many as possible.

The regulation data are stored in RDB and HTML formats for processing various search functions and displaying the search results, respectively. We converted the original regulation data given in XML format into these formats in advance. This XML format employs the document type definition (DTD) of the Japan Law Translation Database System[3]. We developed a tool for automatic XML annotation using pattern match based on the strict wording style in regulations.

The regulation cluster table is stored as a list of clusters consisting of similar regulations. Search results are sorted based on the table. We employed the similarity measure based on a word-based Levenshtein distance and the length of sentences, and the single linkage method for the clustering algorithm. We calculated the similarity between an arbitrary two regulations for all in advance. The number of calculations exceeded 7.56×10^{13} in total and took about ten days with a super computer.

3. Utilization Status

Our system has provided services since October 2012, currently only to municipalities. We mailed a login account and password to all of the municipalities, but some may have missed it. Of the 1,790 municipalities in Japan, 771 have logged in to date. The system had 697 page views daily between November 2012 and July 2013. The site is maintained and updated to add newly enacted regulations and for calculating similarities.

Based on our follow-up interviews with the municipalities, our system has gained quite a favorable reputation, particularly for its benchmarking table function. Our study demonstrates that legislative supports using a regulation database must give weight to similarities among regulations. In the future, we will try to extract a template from similar regulations, which will further facilitate legislative work.

[3] `http://www.japaneselawtranslation.go.jp/`