

SOLON – a Legislative Drafting System for the Flemish Government

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SOLON is a legislative drafting system developed at the Institute of Social Law, Leuven, Belgium, by order of the Flemish government.¹

The drafting support SOLON offers, consists of three major functionalities: support of the structural design of the bill, text generation and relevant drafting information disclosure.

To ensure the correct structural design of the introductory and final part of a bill, the basic design screen (the screen the user gets after selecting the desired legal document) is a template with pre-set text and layout suggestions. In the template the changeable subparts of the introductory and final part are represented by shaded texts. They are listed in the correct order, so the user drafting these parts (by clicking the shaded text and filling in the dialogue window(s) that follow(s)) will not make errors concerning the structural design. The hierarchical structure of the body of the bill is mainly supported by the automated numbering: after inserting an article, the other articles are automatically renumbered and internal referrals are updated.

The major functionality of the system is the text generation feature which is especially useful for more formal parts of the bill like for example the subscribing part, referrals, the title of the bill etc. There are two kinds of text generation in SOLON: text generation in the introductory and final part of the bill and text generation in the body of the bill. They correspond respectively with obligatory drafting support and drafting support on a voluntary basis.

Obligatory drafting support means that the user can only make the introductory and final part using the support for it in SOLON. The completion of all variable elements in those parts can't be done by just typing the missing text directly in the word processor. An example of this is the subscribing part: this part can only be completed by selecting some ministers in a dialogue window and not by typing freely titles and names in the text.

Drafting support on a voluntary basis means that the draftsman is free to use the support in SOLON or not. For example: a referral in the body of the bill can be inserted by the use of the menu item 'insert referral', but it can also be typed directly in the word processor.

1 The system is a result of the project 'SOLON – Systeem ter ondersteuning van legistiek en het ontwerpen van normen (System to support legal drafting)', by order of the Flemish Government, n° Bel96/06.

The relevant information disclosure is guaranteed by four instruments. First instrument are pop-up tips. Pop-up tips or information windows are drafting guidelines that 'pop up' (unmasked) when the user is performing certain actions within SOLON. They reveal relevant guidelines regarding the part the user is working on. A second instrument is context sensitive help: every dialogue window contains a help button that invokes a help-screen, disclosing technical as well as substantive context-sensitive support. The third information disclosure instrument is the hypertextual help file consisting of the official drafting guidelines and technical guidelines. Finally, the system contains a text parser that parses the bill on the correct use of legal terminology and generates hypertext links to tips or error messages.

WIRE Intelligent Quantum (WIRE IQ) – Tort Evaluation by Precedent instead of ‘Rules’

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Analysis and price discovery of tort in un-settled personal injury claims has historically been conducted using fixed, *rule-based* systems. In such systems, the details of the claim (injury type, the claimant’s age, sex, earnings etc.) are entered into the system. The system then applies a set of static pre-defined ‘rules’ to determine the estimated settlement value of the claim.

Although this method of pricing claims is appealing from the point of view of the law, operating as a set of simple, deterministic procedures, there are a number of potential weaknesses with such systems in practice. In particular:

- Certain heads of damage in a claim (for instance special and general damages) can be difficult to determine in a purely rule based manner.
- Often the state of knowledge about a claim is ‘incomplete’. Rule based systems usually require complete information to make accurate predictions.
- A rule-based system has no direct link to ‘reality’. That is, such a system is based on a view of how details of a claim *should* translate into a settlement value and not on how claims have *actually* been settled in the recent past.

Intelligent Quantum (IQ) is a novel answer to the above problem that attempts to determine the torts of personal injury claims using a mixture of rules *and* recent precedent cases. At its heart, the IQ system has a structured database containing details of thousands of recently settled claims and court awards for a range of personal injury claims. The IQ system then provides the following analysis services based on this data.

1. *Trend Analysis* – The IQ system allows its database to be used for the automatic generation of views of the trends and statistics of settlement values and other claim details. For instance, the IQ system can quantify the ‘social inflation’ of certain injury types or monitor trends in the length of claim process.
2. *Comparative Analysis* – IQ can be used to conduct like-for-like comparative analysis of settlement values. For instance, the system can produce graphs showing the relative growth of claim values for certain injuries separated by geographical location or perhaps by court type.
3. *Precedent Search* – Using advanced statistical methodologies (Support Vector Machines and Non-Linear Extrapolations) IQ can be used to discover ‘precedent cases’ for an un-settled claim. It can do this even in cases where the details of the unsettled claim are incomplete.
4. *Forecasts* – Using the precedent searching techniques above, the IQ system can make a ‘forecast’ of the estimated settlement value of an unsettled claim based on the most recent precedent cases.

IQ operates as an Internet delivered system, allowing lawyers, insurers, and re-insurers access to the same up-to-the-minute quantitative analysis of current claims settlement values for a wide range of personal injuries. One of the goals of the IQ system is that, by making this process of precedent and price discovery 'transparent' to all of these participants, claims can be settled faster, and more 'efficiently' in terms of consistent settlement values. This has advantages both for the claimants in terms of reduced settlement times and the insurers/re-insurers in terms of consistent and hence less volatile claim's awards.

Cosmos for Enterprises

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Cosmos for Enterprises is a PC application with a relational database which allows to update and search for information on the subsidiaries or the group shareholdings.

Each of the group companies is identified by different information items: company statutes, ownership, financial links, capital, balance sheets, officers, appointments.

Mainly intended for the Legal Management, the Corporate Secretariat or the Financial Management, COSMOS FOR ENTERPRISES allows to consult the composition of the group, either for a punctual search of information, or for preparing periodical tasks such as the consolidation of accounts, the preparation of general meetings, the renewal of mandates. COSMOS FOR ENTERPRISES can be defined as the group cornerstone and obviously constitutes a key strategic tool.

Last but not least, the possibilities for the further use of these data are various: standard reports, specific selections and queries which allow to produce customised reports, or by the automatic integration of data in wordprocessors, spreadsheets and files of different formats.

Each event is recorded at its date of effectiveness: statutory information, capital, business sectors, shareholdings, ownership, officers' appointments, key figures, balance sheet information. Very powerful functions allow the user to travel backwards and forwards in time and to display a complete history. It is also possible to make simulations by recording events in the future. More particularly, modifications of capital and ownership are handled as operations. A capital increase, a sale of shares, a conversion of bonds, a depreciation, are operations which can be inputted with a detail level determined by the user and the managed company.

Multilinguism, adapted parameters, the compliance with the local regulations, legal reports per country are key assets for using COSMOS FOR ENTERPRISES in an international group. With respect to this, the legal rules Data Base is a very important feature. It allows to associate the valid legal forms, management bodies and functions in each country.

This Data Base, which is enlarged by each user group, makes the input easier and improves at the same time the quality of the information managed.

COSMOS FOR ENTERPRISES, designed for the management of large international groups, takes the language aspect into account, and this in different ways :

- the application exists in English in French and in German
- whatever the language you are working in, the report generator allows to print reports in the language of your choice
- the functions and function categories or statutory bodies of different languages and

- countries can be linked to each other

Electronic Annual Belgian Case Law Report

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The 'Recueil Annuel de Jurisprudence Belge Informatisé' (RAJBi) is a CD-ROM database which allows you to do research on more than 150,000 Belgian case law summaries but also on references of doctrine articles and book references, published from 1978 in the main Belgian law journals.

It is the electronic version of the Recueil Annuel de Jurisprudence Belge (paper edition) published every year since 1949 and edited by Jacques, Christian and Claude Lepaffe, barristers. The CD-ROM is updated every year.

Functions

Several search criteria can be used.

- *Texte intégral*: any word you choose in the text: keyword, surname, expression. The following operators can be used to combine words: *et* (and), *ou* (or), *sauf* (unless) and the distance operator (d/number). With these criteria, you can also benefit of the lemmatization and of the truncation.
- *Rubrique*: research by subject matters with an existing classification
- *Jurisdiction*: research by level of court
- *Date de décision*: research by date, between two dates, from a date or until a date
- *Type de source*: case law, doctrine articles references, books references

Words, subject matters, courts and publications lexicon will help you in your search. You can combine the research criteria all together with the following operators: *et* (and), *ou* (or), *sauf* (unless).

You can be helped by a "help function" at each step of your search. Besides, several examples are available within this function. You can, whenever you want, re-formulate, narrow or qualify your question. The searches already made are available all the time thanks to the historical function. Thanks to the links ("renvois"), you can go to related subject matters. At the same time, you can check the position of the starting paragraph in the starting subject matter. The results of the search can be exported to a printer or to a word processor.

Hardware, software and electronic requirements

- PC 486 DX2/66 Mhz or Pentium with 8 Mo RAM
- VGA screen with 256 colours graphic card (minimum size: 640 x 480)
- At least Windows 3.1
- Double speed CD-Rom driver (XA norm)
- Mousepad

- 10 Mb available on the hard disk

Tools to Effectively Access the Content of Legal Texts

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Presently, we are confronted with a huge amount of legal texts, which contain a wealth of data. If law has to remain manageable, available and realistic, it is absolutely necessary that the information contained in legal texts can be easily identified. Fortunately, the texts are more and more recorded in electronic format. The availability of electronic documents opens vistas for an automated identification of the information in legal texts and retrieval of relevant information. Over the years, the Interdisciplinary Centre for Law and Information Technology (ICRI) researched the problems of information extraction from and retrieval of legal texts and has developed several successful applications in this domain.

The SALOMON system automatically summarises Belgian criminal cases. SALOMON offers techniques for extraction of relevant data from the cases. In a first abstracting step the structure and irrelevant text passages are identified with the help of discourse knowledge in the form of a text grammar. This allows identifying essential information in the case (such as the date of the case, name of the court, and relevant foundations). In a second step, key paragraphs and terms are identified with the help of advanced statistical techniques in the offence and motivation parts of the case.

As part of the *Media On Line project*, a system is developed that automatically classifies texts and assigns descriptors to them. In order to carry out categorisation, a text classifier is developed that learns knowledge patterns from categorised example texts. Different classical learning algorithms and one novel technique are implemented. The results of training a text classifier with the χ_2 algorithm are generally very successful.

The *Agora-Lex project* develops a relational database model for retrieval of historical versions of the federal legislation of Belgium. User-friendly, web-based interfaces guide towards relevant legislation. In a later phase, the project must also provide guidelines and norms for the co-ordination of the different versions of laws and for the legislative drafting by governmental departments, which would facilitate an automated implementation and maintenance of the data in the information system.

Manual summarisation and categorisation of texts, and information extraction from them are labour-intensive tasks. The manual processing of legal texts for storage in information systems is limited. Consequently, Belgian legal texts are currently only available in specialised journals and

information systems. The technology of the above systems makes it possible to broaden the coverage of the information systems and to make the complete Belgian jurisprudence and legislation automatically accessible.

JURIDISK INTERNET: the Most Complete Social-Juridical Databank on the www

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Ever since 1979 the juridical study centre of SD WORX, the HR-servicegroup of the Vlaams Economisch Verbond (Flemish economical organisation), has been collecting everything concerning social law in a legal database. This has become a unique collection under which we find all collective labour agreements who were closed in Belgium, all texts concerning social and labour law, jurisprudence, legal doctrine, indexed amounts, in short, the complete triangle between employer, employee and government.

The 20 employees of the study centre also take care of the content of the legal databank. Every piece of social-juridical information – whatever origin – goes through juridical analysis and qualification.

The staff members insert the data in the contents of the metastructure of the juridical databank. The codes and the structure of this metastructure were developed by the study centre about 15 years ago and this is still the juridical skeleton of all activities of SD WORX. Due to the automatisation and the disposition of the legal information, the SD WORX advisors can answer questions in a fast, correct and efficient way.

JURIDISK has been commercialised since early 1990. In the meanwhile this databank has become a common and well known source for providing information for: federations, temporary service-offices, insurance-companies, employer's organisations, human resource departments, lawyers etc..

Originally JURIDISK was provided by IBM-mainframe (TSO).

Afterwards CD-ROM applications were put in (Windows 95 and Windows NT) and Intranet-versions commercialised (on NT and UNIX, with databases on Oracle, Informix or SQL server). Since October 1998 JURIDISK can be found on the Internet, daily updated: two working days after the legal act has been published in the 'Belgisch Staatsblad' (Belgian Law gazette), the user will find the complete co-ordinated version on JURIDISK INTERNET.

The whole consists of 140.000 documents in Dutch and French, originated from 110 law sources and 252 Parity committees and subcommittees. The databank uses up to 2 gigabyte. This e-commerce-application is based on web-technology (servers-side scripts in Perl, fine-tuned for browsers of the 4-family) and is secured with SSL 3.0 The data are stored in a relation SGL-database and are converted to HTML "on the fly".

JURIDISK INTERNET was developed bij ZENO, a company that specialises in information retrieval and information re-engineering. The application was developed for SD WORX.

A Knowledge Added Internet Database for Texts of Environmental Legislation

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Environmental legislation is a very complex and often technical matter. Nevertheless, it can have a large impact on the way industry and SMEs have to organise and operate their business. Therefore, the Flemish Government (Aminal) has instructed the Flemish Institute for Technological Research (Vito) in co-operation with the Gent University (UG, prof. Bocken, prof. de Corte) to develop a user friendly access to the most important Flemish environmental legislation. The result, the Flemish Navigator for Environmental Legislation, is a very powerful web application that incorporates a lot of knowledge. It has been developed with standard software (MS SQL Server) and a custom made management application.

With the Flemish Navigator for Environmental Legislation, users have now free access to the most recent texts of the legislation. But the navigator is more than just a collection of texts. Each text has been split into subtexts (e.g. chapters, articles, paragraphs). Each of these subtexts has its own, unique code. This division is dynamic and flexible. Now it is possible to couple these text fragments with additional information (the knowledge part).

The simplest information that is linked with these text fragments, e.g. dates of changes, date of impact). This additional information is added by legal experts. Another rather easy way of adding information to legal texts, is by using hyperlinks. When a reference is made in a legal text to another text fragment, the user can go directly to this fragment by clicking on the hyperlink. These hyperlinks are used for links to define terms, annexes, etc. Because the same word can have several meanings according to its context, these hyperlinks cannot be added automatically, but require a human intervention.

Beside text information and hyperlinks, the main technique for adding knowledge to the legal texts used in the navigator are hierarchical indexes. Each index consists of descriptors that are ordered hierarchically. Text fragments are linked to each of these descriptors. By making intelligent use of the hierarchy in the indexes and in the text fragments, a very powerful way of searching and indexing texts is possible. In each index a lot of knowledge is implied in a formal way. Both the selection and structuring of the descriptors and the links between the indexes and the texts require intellectual efforts. Some indexes are rather legal, other are more technical. Each descriptor in the indexes has also a number of synonyms. The descriptors, their synonyms and combinations of them can also be searched, apart from the indexes. To implement the navigator, a standard relational database (MS SQL Server 6.5 + Active Server Pages) has been chosen. This has reduced development time and

costs considerably. Possible extensions are an archive function for substituted text fragments and a link to a judgement database.

Can Computers Administer the Law? An Expert System for Environmental Permit Law

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In the past years the section Legal Information Science of the University of Groningen has studied two main questions. Can applicable legal knowledge be represented in a legal expert system? And if so, can the legal expert system be used to improve the quality of the application of legal knowledge in legal practice? In order to answer these questions a series of research has been carried out. Firstly a theoretical basis with respect to legal knowledge was outlined. Secondly the theoretical basis was described as a formal model (the Logic of Reasonable Inferences) and as the computer program based on this (Argumentator, a legal expert system shell). Thirdly knowledge from the field of Environmental Permit Law was acquired and entered into the legal expert system shell. Finally the resulting Expert System for Environmental Permit Law (ESM) was tested against 40 cases from legal practice.

Testing the ESM

In order to ascertain whether the legal knowledge contained in the ESM in the field of Environmental Permit Law is a good description of the application of legal knowledge in legal practice, and whether the ESM could have a qualitative supplementary effect, the ESM has been tested against 40 environmental cases, 35 of a general nature (petrol stations) and 5 of a complex nature (secondary aluminium smelters). Each of the 5 complex cases consisted of 9 separate decisions and their justifications and each of the 35 general cases consisted of 11 separate decisions and their justifications. So, a total of 430 decisions and accompanying justifications in 40 cases have been examined.

The testing was conducted in two ways. Firstly, an investigation was made of which rules the expert system applies and which conclusions it draws if it starts with the same data as the cases from legal practice (*descriptive mode*). This investigation made it possible to draw conclusions about the expert system as a model of actual implementation by comparing the rules employed and the conclusions drawn. Secondly, an investigation was made of which rules the expert system applies and which conclusions it draws if it not only considers the case data but is also enabled to apply all the known rules and to collect independent data (*supplementary mode*). This investigation made it possible to draw conclusions about the expert system as a (normative) model of the rules in force within Environmental Permit Law.

Descriptive mode

In descriptive mode the ESM successfully (re)constructs 425 of the 430 examined decisions. So, only 5 mismatches were encountered, 3 of them in one complex case and 2 of them in general cases. In case of 4 of the 5 mismatches an invalid rule was applied in the actual cases. The 5th mismatch could be accounted for by the application of an unusual local rule in the actual case.

The test research confirms the theoretical basis. The utilization of legal knowledge when issuing environmental permits may be modelled as the administering of subsidiary collections of known legal rules (in a broad sense) to known facts and of known decision rules to derived legal solutions. The legal expert system is a good model of the use of legal knowledge in legal practice because it can (re)construct these subsidiary collections and apply them with a result that is in agreement with legal practice.

Supplementary mode

In supplementary mode the ESM corrects 134 (31%) of the 430 examined decisions. In the 5 complex cases 30 (66%) of the 45 decisions were amended by the ESM: 9 (20%) of the 45 examined decisions were revised (contradicted), furthermore 11 (24%) of the 45 examined decisions turned out to be subject to competition of legitimate (contradicting) alternatives, which were not taken into consideration in these cases, and 10 (22%) of the 45 examined decisions qualified for legitimate extensions. In the 35 general cases 315 of the 385 decisions turned out to be based on insufficient gathering of data. As a consequence of this and the erroneous or non application of valid rules according to the ESM 104 (27%) of the 385 decisions should be amended: 7 (2%) of the 385 decisions should be revised, 34 (9%) of the decisions are certainly subject to the competition of legitimate alternative (contradicting) decisions, 31 (8%) of the decisions are subject to the competition of legitimate alternative (contradicting) decisions depending on the content of unknown additional data and 32 (8%) of the decisions should be extended.

The administration of environmental permit law in practice turns out to contain a number of drawbacks. The main defects are: incomplete collection of data, incomplete application of rules and insufficient justification of decisions. These defects are caused by the use of incomplete technical data models, incomplete models of legal rules and lack of (knowledge of) applicable principles and policies. The legal expert system in supplementary mode is an instrument for measuring these drawbacks and at the same time a solution for the problems arising from them.

Conclusion

The ESM has been successfully tested against forty cases from actual legal practice (petrol stations and secondary aluminium smelters). The system appears to be a good model for the executive practice and to have an important supplementary function. This supplementary function rests on the ESM's more comprehensive database, its ability to apply rules more thoroughly, and its better arguments for the administrative orders suggested.

ESM's decisions and arguments have been checked by eighteen independent assessors.

EXIT Guides You Safely through any Dismissal or Resignation

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EXIT is a commercial application that gives a user-friendly and complete answer to any question you may have about any situation of dismissal or resignation. In addition to calculating terms and compensations, the package also has all the information your need on sectoral exceptions, contracts of a specified duration and replacement contracts, dismissal during the probationary period, shortened terms of notice, counter-notice, indemnification for eviction, etc.

After indicating the correct answers to a series of multiple-choice questions and completing a few data on the employee, EXIT will carry out its calculations. If EXIT still does not have all the information it needs, the application will pose a few extra questions. The result is an overview of these calculations, which take the specific situation of the sector, the company, and the employee into account.

Practically throughout the application, EXIT supports the user with informational help: help texts containing very specific information, geared to the case at hand. The user is only shown texts that are relevant to the particular situation. Moreover, the user can also request to print a personalised notice of dismissal.

EXIT combines calculations and documentation. The answer to the user is not just a sum, but includes all the information and documentation necessary for the particular case of dismissal or resignation. The user can also simulate certain situations.

The contents of EXIT are very extensive, but all the information is checked for its relevance: in addition to the national regulations on dismissal and resignation, it also contains all the specific rules (which sometimes deviate from the general rules) established at the level of about 200 different sectors.

The application is built in Visual Basic. Some of the data are stored in a relational database, while the various documentary texts are saved in HTML. EXIT was developed by ZENO, a company that specialises in information retrieval and information reengineering. The package was developed for SD WORX.