A mathematical theory of legal texts' versioning

Master's thesis

ANR LaVerSE — Supervized by Luc Pellissier (LACL) and Samuel Mimram (LIX)

1   Introduction

Legal texts that stay in effect for an extended period of time often tend not to stay static and undergo a process of *modification*. Some of these modifications are carried by a new legal act changing the text of the first one. Viewed with a computer science lens, such acts read as a list of *patches*.

Publishers — and sometimes also custodian institutions, raising questions on legal intelligibility [4, 9] — often present the text and its successive modifications as a *consolidated text* that is obtained by applying all the patches to the original text. These patches are written in a semi-formal way: for instances, the patches written through an amendment proposed by a French senator[1] should follow [7, Section III].

This practice presents an interesting theoretical conundrum: the consolidated text — which is widely read and used in all practical matters — has never been adopted; while the ones that did and so are the only ones to have legal standing — the modifying texts — lay forgotten. Furthermore, the process of *consolidating* the text (that is, applying the many patches to the initial text) is mostly done manually[2], is time-consuming [1] and error-prone[3].

The LaVerSE project aims at studying this pratice computationally, as a peculiar versioning system and as a system of interacting programs. It also aims at studying and interacting with other already existing systems, such as `Legistix` [8], and `pijul` [2].

2   Objectives

A versioning system can be seen as a *category*, whose objects are files and arrows patches. The properties of a versioning systems then translate into properties of the category (and, say, the fact that all pair of patches merge well is a co-completeness property: having all small pushouts). In the seminal work [3], the authors consider such a category with files as linear objects, and patches consisting in additions or deletions of lines. We aim at expanding this work by enriching the mathematical representation of files and patches so as to follow legal texts: Legal texts are highly structured, and the patches are given explicitly. A first task of the project is to adapt [3]'s work to a category whose files have a tree structure, and whose morphisms can change the structure of trees only by adding or deleting a subtree.

The objective is thus to get familiar with both a mathematical model of versioning system, and a potential application of it, and adapt the model to the application.

3   Prerequisites

Candidates should be motivated by the interaction of theoretical computer science and social sciences (here law). A strong background on category theory or programming is a bonus.

---

[1]Different institutions have different guidelines.

[2]The French administration consolidating legal texts has announced to be developing an artificial intelligence system to do so; while the ministry of finances has supposedly developed an experimental tool (Legistix).

[3]For instance, the consolidated bylaws of Université Paris-Est Créteil contain an article 26 *bis* whose vote is not recorded in the minutes of its board of regents, the situation recounted in [5, §2-3] in which the French legislator amended twice (in 2000 and 2016) a law abrogated in 1983 because it was not marked as such in Légifrance, or [6] which documents a case where the modifications do not make any sense.

4 Contact

If interested, contact Luc Pellissier (`luc.pellissier@u-pec.fr`) with a résumé, an introduction, a transcript of the grades of your master's degree and one or two references among faculty.

5 Bibliography

[1] Thierry-Xavier Girardot. "Accéder au droit : importance et défis de la consolidation". In: *Documentaliste-Sciences de l'Information* (2014).

[2] Pierre-Étienne Meunier and Florent Becker. *Pijul*. 2016-2022.

[3] Samuel Mimram and Cinzia Di Giusto. "A Categorical Theory of Patches". In: MFPS. 2013.

[4] Hervé Moyan. "La consolidation des codes, lois, décrets : positions doctrinales d'éditeurs ou devoir de l'État ?" In: *La Semaine Juridique Edition Générale* (2006).

[5] Matthieu Poumarède. "L'évolution de la loi de 1967 relative aux VIC et à l'obligation de garantie à raison des vices de construction : d'une bonne loi à une grande loi". In: *La Semaine Juridique Notariale et Immobilière* (2017).

[6] Pierre Sablière. "Mais où est donc passé le 6$^{\text{è}}$ alinéa?" In: *AJDA* (2010).

[7] Sénat. *La Rédaction des amendements, sous-amendements et motions de procédure*. 2017.

[8] Georges-André Silber. "Towards an Automatic Consolidation of French Law". In: *Workshop on Programming Languages and the Law*. 2023.

[9] Jean Waline. "Le grand bazar juridique". In: *AJDA* (2010).