

Law and Computational Social Science: Brief Notes of a Civil Procedure Law Scholar

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Recently, relationships between law and science¹ have witnessed the development of an area of great importance and interest represented by computational social science (hereinafter CSS), understood as “the integrated, interdisciplinary investigation of social systems as information-processing organizations and through the medium of advanced computational systems”².

Research methodologies that characterize contemporary science (statistics, mathematics and computation) have already played an important role in all social sciences, including an area, like the law, where this may seem less obvious. Just think, as a mere example, about the contribution statistics have made, and continue to make, in this field³.

In this context, further research perspectives have been opened up by CSS. As pointed out by Cioffi-Revilla “computational social scientists are learning to exploit the advanced and increasingly powerful instruments of computation to see beyond the visible spectrum of more traditional disciplinary analyses”⁴, and it is interesting to look at (current or potential) applications for legal science of each of the five basic CSS research methods, namely automated information extraction, social network analysis, geospa-

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¹ See, overall, also for further references: N. BOBBIO, *Diritto e scienze sociali* in ID., “Dalla struttura alla funzione. Nuovi studi di teoria del diritto”, Roma-Bari, 2007, p. 31 ff.; S. RODOTÀ, *Diritto, scienza, tecnologia: modelli e scelte di regolamentazione*, in “Rivista critica di diritto privato”, 2004, p. 357 ff.; G. OPPO, *Scienza, diritto, vita umana*, in “Rivista di diritto civile”, 2002, I, p. 11 ff.; A. SANTOSUOSSO, *Diritto, scienza, nuove tecnologie*, Padova, Cedam, 2011; O. ROSELLI, *Scienza, scienza giuridica, scienza della formazione giuridica* in ID., “Scritti per una scienza della formazione giuridica”, Napoli, ESI, 2012, p. 215 ff.

² C. CIOFFI-REVILLA, *Computational Social Science*, in “WIREs Computational Statistics”, Vol. 2, 2010, n. 3, p. 259 ff., p. 259.

³ Examples might be different, but I think it is enough to remember that, as particularly significant, at least from a more strictly procedural point of view, the Italian Supreme Court has for a long time widely used statistics for extracting multiple data, concerning proceedings pending before it, that are of undoubted importance – in several respects – both in the civil and criminal matters.

⁴ See C. CIOFFI-REVILLA, *op. cit.*, p. 260.

tial analysis (socio-GIS or social GIS), complexity modelling and social simulation models⁵.

A very recent contribution on the matter⁶, drawing on research in which these methods are used as much to study the law as to deepen knowledge of social phenomena relevant to the law, underlined the fact that the application of CSS methodologies can lead to promising developments in at least four directions: (i) the analysis of structural and functional aspects of legal systems, (ii) the analysis of procedures regulated by law, (iii) the analysis of criminal phenomenon, and (iv) the analysis of the structure and dynamics of international relations and organizations.

In the light of these considerations, I believe it is advisable for lawyers to start looking, closely and with interest, at these research methods, trying to understand, from an interdisciplinary perspective, what are the areas of law where the use of CSS can (at least potentially) be more profitable.

It is what I would like to do here, in a tentative way, focusing on the area of law I have been working in for years: civil procedure law. From this viewpoint I would like to identify, based on personal intuition, some issues of civil procedure law which appear to demonstrate the greatest number of points of contact with CSS. The goal is to offer a contribution to interdisciplinary dialogue by identifying legal problems that can result in just as many research questions for the computational social scientist.

At first glance, civil procedure law seems able to benefit, in various ways, from CSS methods, which appear to offer, in general terms, new interpretations of civil proceedings⁷.

Looking at some of the best known among introductory writings published on the subject, one gets the feeling that CSS cannot only provide a better understanding of proceedings, but also suggest, based on this understanding, solutions for changing and improving existing rules and procedures.

In the light of this premise, the research objects could be even more varied: rules of civil procedure; actors who apply the rules (judges, judicial

⁵ *Ibidem*.

⁶ S. FARO, N. LETTIERI, *Diritto e computazione: modelli e metodi delle scienze sociali computazionali nel diritto*, in "Cyberspazio e diritto", Vol. 13, 2012, n. 2, pp. 185-204, p. 191 ff; see also N. LETTIERI, S. FARO, *Computational Social Science and Its Potential Impact upon Law*, in "European Journal of Law and Technology", Vol. 3, 2012, n. 3, <http://ejlt.org/article/view/175/267>.

⁷ See on this point, on the one hand, with more specific reference to the social simulation and, on the other, more generally concerning the law B. EDMONDS, *What Social Simulation Might Tell Us About How Law Works*, in this Issue.

officials, court clerks, etc.), and, more generally, that particular type of “organization” on which the so-called justice administration rests.

In legislation and in procedural acts (including court orders and, above all, the judgment), techniques for automated information extraction and automated text analysis may allow the user to obtain interesting information about the concepts therein and the relations that link the various entities evoked in the text⁸. In this case, the study, understanding and analysis of the text plays an important cognitive role; in particular, I have in mind the possibility of acquiring relevant information and inferences regarding: 1) the evolution in legislation and/or case law, which occurred in relation to certain procedural institutions, as also evidenced by research in this direction that has already been carried out in other legal systems⁹; 2) the evolution of drafting techniques and content of the parties’ pleadings (for example, in terms of the greater use of the citation of legal precedents over time) or court documents (for example, in parallel, in terms of more space and/or weight dedicated to case law in the judgment; or, I should say, with even more interesting and meaningful prospects in terms of the content and the way the court drafts a judgment, if necessary, with a parallel comparison between the trial court and the Supreme Court¹⁰). In relation to the procedural acts, research of this kind would also encourage the availability of the relevant texts in electronic format, and a certain “standardization” in relation to their structure and content. From this point of view, especially for court orders, the final introduction of electronic civil proceedings, still at an experimental stage into the Italian legal system, may prove particularly important.

Regarding specific institutions of civil procedure law, the use of CSS research methodologies, where necessary suitably combined, seems to make it possible to acquire information and make inferences that are very important for a better understanding of them, especially in their realm of application,

⁸ See C. CIOFFI-REVILLA, *op. cit.*

⁹ See J.H. FOWLER, T.R. JOHNSON, J.F. SPRIGGS II, S. JEON, P.J. WAHLBECK, *Network Analysis and Law: Measuring the Legal Importance of Precedents at the U.S. Supreme Court*, <http://papers.ssrn.com/sol3/papers.cfm?abstract-id=906827>.

¹⁰ In this regard, I am convinced that quantitative and qualitative indications could emerge that would no longer constitute only the result of a mere sensation of a scholar of civil proceedings but rather the result of a “scientific measurement”. We could, for example, study the differences in the way the Supreme Court motivates its judgment with respect to the trial court and the way in which the Court exercises its judicial review on the facts in cases brought before it.

highlighting at the same time limits, if any, which could then be subjected to intervention by the legislator and/or when they are interpreted or applied.

Just to give a simple but concrete example linked to the Italian legal system, consider a forced sale (or, in other words, the legal tool that allows the process of forcible expropriation to transform an asset owned by a debtor into a sum of money – i.e, the money paid by a third party to purchase the goods – based on which the creditor can be satisfied), which the court can delegate to a notary public and even to a lawyer or an accountant¹¹.

Here, the use of computational methodologies seems to allow the researcher to acquire a range of information and inferences regarding the way in which this institution is applied by the various Italian courts and its greater or lesser functionality in practice because of the different possible operation (and combination with each other) of a series of especially significant variables, such as:

- the court’s use or not of the institution of the delegation of the sale (given that there are areas in Italy where the court does not use the institution of the delegation for forced sales but carries out this activity itself, or uses it in a very limited and circumscribed way);
- the delegation of all sales transactions or only part of them to one or more professionals (given that different possibilities can be imagined, which are also reflected in the practices of Italian courts);
- delegation to a single professional (for example, a notary public) or more than one professional (for example, lawyers and accountants);
- the delegation to professionals working or not as part of an association together with other professionals that was specially created to work in this sector (given that there are areas in Italy where certain associations have been active for some time providing results that seem particularly valuable in terms of time, costs, etc.);
- the choices made by the court and/or the delegated professional regarding certain pivot points of the sales process (assuming that, even on this point, there are different practices among the various Italian courts, even significantly different from each other).

Concerning the justice administration as a whole, network analysis and geospatial analysis (if appropriate, in combination with each other) appear to be of noteworthy interesting. My impression is that these methods can

¹¹ See, on the point, E. FABIANI, *Delega delle operazioni di vendita in sede di espropriazione forzata immobiliare*, in “Digesto delle Discipline Privatistiche, Sezione civile, Aggiornamento 5”, Torino, Utet, 2010, p. 456 ff.

help the user acquire very detailed information and inferences on the functionality of this special type of organization¹², understood broadly speaking, to be used not only to reach more thorough knowledge of the operation of it, but also for possible interventions to amend or improve it. Consider, for example, the spatial distribution of the seats of courts (including branches) and the optimization of the same, the distribution of workloads within individual offices within the courts, etc.

Finally, the predictive dimension that characterizes CSS research methods and, in particular, social simulation models (system dynamics models¹³, agent-based models¹⁴ or hybrid models¹⁵) is even more fascinating for law¹⁶.

In fact, in conformity with the characteristics of (social) simulations¹⁷, one could imagine using them not only to achieve a better understanding

¹² See, on this point, C. CIOFFI-REVILLA, *op. cit.*, p. 264 which illustrates, in particular, how “Social network analysis (SNA) has many computational applications across the social science disciplines - not just for visualizing network structures - and is supported by a large family of metrics and exact methods. For example, SNA can provide insightful information and inferences on the functionality of an organization, given its structural pattern of nodes and relations. Such properties as resilience, vulnerability, decomposability, functionality, and others provide insightful information and knowledge not available through plain observation or through more traditional methods”. The analysis of network systems began to be applied in the study of the fundamental structure of many phenomena that affect the law: organizations, procedures, international alliances and agreements, for example, are sets of entities linked by relationships.

¹³ See C. CIOFFI-REVILLA, *op. cit.*, p. 268.

¹⁴ *Ibidem.*

¹⁵ That is models that, concerning an individual case, aim to make the most of the characteristics of the two different types of social simulation models mentioned above (namely, models of system dynamics and agent-based models). See, overall, the use of a hybrid model in the field of legal science, S. BOYLE, S. GUERIN, D. KUNKLE, *An Application of Multi-agent Simulation to Policy Appraisal in the Criminal Justice System*, in Chen S.-H., Jain L., Tai C.-C. (eds.), “Computational Economics: A Perspective from Computational Intelligence”, Hershey, Idea Group Publishing, 2005.

¹⁶ See, *i.a.*, D.M. KATZ, *Quantitative Legal Prediction – or – How I Learned to Stop Worrying and Start Preparing for the Data Driven Future of the Legal Services Industry*, in “Emory Law Journal”, Vol. 62, 2013, available at SSRN <http://ssrn.com/abstract=2187752>.

¹⁷ Simulations have been used, or are beginning to be used, in all fields of science, and “are an important tool for the analysis of the problems of human society and for the identification of possible solutions,” given that “simulations are tools for the knowledge of reality, but are also tools of analysis of these problems and for testing solutions” (D. PARISI, *Simulare per capire* in Faro S., Lettieri N., Tartaglia Polcini A. (a cura di), “Diritto e tecnologie. Verso le scienze sociali computazionali. Attualità e orizzonti dell’Informatica giuridica”, *cit.*, pp. 231-232).

of the dynamics of civil proceedings but also to predict the likely impact of legislative reforms and/or the practical implications of different possible interpretations of a procedural rule¹⁸.

Merely as an example, for civil proceedings, it would seem to me to be very interesting to be able to “measure” the possible reactions of individuals, in terms of access to legal protection against certain procedural reforms aimed at discouraging such access, when faced with specific cases, with the intention, more generally, of reducing the total number of civil proceedings which ordinary civil courts have to contend with (as a whole or, in a more limited sense, those dealing with a specific type of disputes).

¹⁸ With regard to criminal proceedings see, L. BONAVENTURA, A. CONSOLI, *Priorities for Backlog of Criminal Cases Pending in Courts: A Computational Agent-based Model*, in this Issue.