CREA PROJECT – CONFLICT RESOLUTION EQUITATIVE ALGORITHMS

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Abstract: *We are presenting the project CREA (has received funding from the European Union) which aims to introduce new mechanisms of dispute resolution as a helping tool in legal procedures for lawyers, mediators and judges with the objective to reach an agreement between the parties; in some situations, it could be used directly by citizens. The project is based on revisions and innovations on the Adjusted Winner algorithm, developed by S. J. Brams, and specific adaptations to the law domain. We believe that the new procedure will have the potential to deeply change national and cross-border civil proceedings.*

1. Introduction[1]

The CREA project (Conflict Resolution through Equitative Algorithms) has received funding from the European Union's Horizon 2020 research and innovation programme for two years of work. The project has started in October 2017.

The primary goal of CREA is not a research on decision theory, looking for new models. Instead, we will test the extent to which the «state of the art» models are already directly applicable in the domain of law. New mathematical models can eventually be developed after this stage, as a result of the empirical determination of the problems arising from submitting these new procedures to judges, lawyers and citizens.

The concepts of law, jurisprudence and rule of law, both at a scientific and at a common-sense level, are generally bounded by cultural and moral principles, which the law itself is intended to determine or decide and which in turn could contribute to determining the rule applied to each single case. Nevertheless, the general theory of law recognizes a minimal, but essential role: to be a procedure for settling disputes, establishing peace where there is a state of conflict. The concrete values to be affirmed can vary on a cultural basis and often on a case-by-case basis: they are only means or instruments to achieve the primary legal goal, namely the peaceful resolution of disputes. The history of law is the history of dispute settlements, the history of ways to establish peace[2]. We can consider the history of law as a continuous development of principles and rules of conduct, as well as administrative and political institutions and structures, aimed at resolving conflicts and maintaining peace in societies that could, in this way, evolve towards increasingly complex forms of cooperation.

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[2]   Irti 2016, 186.

Some legal tools, such as the contract, are based on the agreement and consent of the parties; other legal tools are based on the institutional constraint, generally the coercive power of the State. Even if the provision of a compulsory sanctioning level is essential for the enforcement of the rules, and therefore for their fulfilment in practice – i.e. even if the rules that are not directly coercive, such as those aimed at the agreement, require the second level for their enforcement-, the absence of a state provision for such enforcement does not equal their uselessness or non-existence as a means of resolving disputes and therefore, in the first said sense, as legal tools.

Keeping this point as the centre which every other aspect can refer to, the legal professionals cannot avoid following the fair solution systems that was conceived by Steven J. Brams and evolved into a real independent scientific field[3]. These algorithms could be excellent tools, from a legal point of view, because they assume envy-freeness as the root point for the fair solution. Here, the solution is not found by establishing ex ante which values are important and by authoritatively attributing a value or an evaluation to things and behaviours, but by reversing this traditional approach, without starting from descriptions of cases and without attributing rights in order to reach the solution. In the fair solution procedure, the parties themselves attribute a value to things and behaviours; the law is reduced to its purity, namely to the procedure according to which the attributions of values of the parties could lead to an agreed conclusion or resolution of the dispute. That is our starting point. There is already a rich theoretical and mathematical framework, flowering on Steven J. Brams' pioneering works, while an adequate legal implementation is lacking until now[4]. The advantage offered by the implementation of equitative algorithms in the resolution of cross-border and national conflicts could be seen, in the first instance, in improving efficiency of justice, which is a major component in a fair trial and effective remedies. Efficiency of court proceedings is without a doubt one of the major challenges of national justice systems today.

2. Objectives

The primary objectives of the project are the following:

1. to apply game-theoretical algorithmic mechanisms to the solution of certain national and cross-border civil matters, including matrimonial regimes, successions and trusts, commercial law and consumer law, facilitating the agreement process among the parties[5]; 2. to demonstrate the efficacy of an algorithmic approach, applying it to the allocation of goods or the resolution of issues in disputes, leading the parties to a friendly solution before or during the trial; 3. to analyse new areas in which, specifically, «adjusted winner» or other algorithms could be tried out, beginning with negotiations involving easy specified issues or well-defined goods in a property community. It might include i.e. a conflict within a company over the division of job responsibilities, or the division of marital property in a divorce settlement; 4. to develop new algorithms – distinguishing available rights (*droits disponibles*) from mandatory national rules (*loi de police*) in force in the different EU Member states – in order to help the parties to reach a settlement that mirrors the most salient concern of each side; 5. to create a «European common ground» of available rights, different from standard legal principles by developing and using algorithms that rapidly implement better settlements; 6. to develop a software (eventually accessible on the EU ODR platform and/or the e-justice portal)[6]. The activities included in our project refer, firstly, to legal practitioners, including especially lawyers and judges, secondly, to all the other entities known

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[3] The theory of fair division dates back to the end of the Second World War. It was devised by a group of Polish mathematicians, Hugo Steinhaus, Bronisław Knaster and Stefan Banach, who used to meet in the Scottish Café in Lvov (then in Poland). Since then, many results have been obtained and many scientific papers have been written.

[4] Brams/Taylor 1996; Brams/Taylor 2000; Dall'Aglio/Di Luca/Milone 2017, 35–50; Dall'Aglio/Mosca 2007, 218–237; Lodder/Ernest 2003.

[5] Carneiro/Paulo/Andrade/Zeleznikow/Neves 2014, 211–240; Bellucci/Zeleznikow 2005, 233–271; Giacalone 2016; Jennings/Faratin/Lomuscio/Parsons/Wooldridge/Sierra 2001, 199–215; Governatori/Duy 2009, 187–199.

[6] Fersini/Messina/Manenti/Bagnara/El Jelali/Arosio 2014, 228–236.

as third parties, such as arbitrators, mediators, negotiators and experts from other sectors such as court officers, members of judicial cooperation networks, experts in consumer disputes and in e-justice.

3. Methodology

We focus on division procedures that are not only proportional but also «envy-free». This way, they produce allocations in which each participant believes he or she receives the largest portion of the goods being divided, or obtains his way on more issues, based on their subjective references.

This methodology has been applied to the allocation of goods in areas such as divorce[7] and estate division[8]. A point-allocation procedure could be tried out in negotiations that involve easily specified issues or well-defined goods. Out-of-court cases might include a dispute within a company over the division of job responsibilities or between companies over a contract. If a procedure works well in these cases, it might be used in more complex disputes. The approach could help judges and lawyers to set the legal procedure not as a confrontation-clash of the parties, but as a process aimed towards the consensual agreement. The judge and the lawyer will not be viewed as custodians of the right or true legal solution anymore, but only as an aid to the parties who themselves become the authors of the solution. Therefore will be four main areas/workstreams: Legal, Analytical – Mathematics, Cognitive – Experimental, Informatics. The work is extremely interconnected, and it will be necessary to keep comparisons and queries in the various areas, but we can focus just on the first two workstreams for now.

4. Workstreams

In the legal area, we will start with the immediate processing of some application examples in areas where some lines of research have already opened up the field and where we have pretty powerful algorithms, such as the division of assets in the communion between two parties and where there is no dispute about rights but goods (see i.e. www.fairoutcomes.com). In this case, the choice of the algorithm to be used can only be based on a criterion of efficiency. This first example will be immediately extended to cross-border disputes. Then we will develop two other project lines: the first one, in order to verify the applicability of the algorithms already used or of their variants in cases with more than two parties and where there is no dispute about rights but goods. The second line is aimed directly at the citizens. The development of a strategy will allow for involvement of citizens and other algorithms, even in the event of a dispute on a legal point. This line will split into two sub-project lines: The first one intended to determine some cases where even in the presence of national legislation, the parties may independently have available rights. The second one is intended to draw up specific legal procedures in order to maximize the efficiency of algorithms in the legal field. In this line, we need a constant confrontation with the analytical-mathematical and experimental areas in order to identify and develop the most suitable algorithms.

The last step of the legal part is a phase of fine-tuning the results obtained, along with the attempt to create a «European common ground» of available rights, which would not be grounded in legal principles but instead in the properties of the algorithms. These, we believe, would facilitate faster and less expensive settlements.

The main activities carried out in the Analytical – Mathematics area will be the following: (A) advice and choice of algorithms to be applied in different situations listed for the area 1; (B) any modification and adaptation of existing algorithms to legal peculiarities and, where possible and profitable, development of new algorithms on different assumptions than those investigated so far.

The methods that are generally considered to be investigated the most and easiest to apply to the legal framework are the point allocation method, the picking sequences method and the descending demand procedu-

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7   ARASZKIEWICZ/LOPATKIEWICZ/ZIENKIEWICZ 2014.

8   CHU-CARROLL/CARBERRY 2000, 969–1015.

res[9].You can find out variants or modifications and adaptations of these algorithms for the legal peculiarities, for example by introducing the possibility for the parties to use money as a means of exchange or clearance of vacancies and approximate solutions. This variant is little studied, but for many areas of the law can be a marvellous help; it will therefore be useful to examine this issue. If appropriate, and where it will be possible and profitable, we will develop new algorithms on different assumptions than those investigated so far, but this area will be investigated only after full investigation of the previous categories.

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[9] CARAGIANNIS/KUROKAWA/MOULIN/PROCACCIA/SHAH/WANG 2016; BOUVERET/LANG 2011, 73–78.