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Can Robot Judges Solve the So-Called "Hard Cases"?

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Abstract

From the perspective of legal theory, there are two types of cases for judges to decide: "easy cases" and "hard cases". This line of thought relates to cases that are decided by humans. The last few years have seen rapid progress in the development of artificial intelligence, and an increasing number of ideas have been put forward that envisage the transfer of algorithmic task execution to the world of law. Legal theory and jurisprudence are interdependent, and a solution needs to be found to the question of how much algorithms can reduce the burden on the judiciary in the application of the law. This problem is not alien to legal theory, since the idea of law as an axiomatic system and the idea of judgment machines was already present in *Leibniz's* philosophy.

Keywords

Hard Cases; Leibniz; Mechanical Decision-Making; Robot Judges.

1 Introduction

The last few years have seen rapid progress in the development of artificial intelligence ("AI"), and an increasing number of ideas have been put forward that envisage the transfer of algorithmic task execution to the world of law. A proper solution needs to be found to the question of how much algorithms can reduce the burden on the judiciary in the application of the law. This problem is not alien to legal theory, since the idea of law as an axiomatic system and the idea of how we think about "robot-judges" are not new dilemmas. In this paper, therefore, I seek to answer the following

questions. To what extent does the legal theoretical tradition help to solve this judicial problem of our time? Application of which acts of law can be algorithmized? In solving "hard cases", what are the patterns of thought and ability where technology fails?

First of all, it should be noted that the topic is interdisciplinary; it is an interesting problem for law, philosophy, logic and technology as well. I would like to emphasise that there is no paradigm position at the moment, so I will mainly try to formulate my own ideas based on the relatively recent literature available.

2 On the Nature of Legal Cases

2.1 Types of Cases – The Easy Case-Hard Case Distinction

The study of judicial decision-making is a classic topic in legal theory. The pair of concepts in this paper, the "easy case-hard case" dichotomy, is a much debated pair of concepts. There are legal scholars and practitioners who do not identify with this viewpoint, which can be located in the common field of practice and theory, and of course there are many for whom it provides a valuable explanation. The pair of concepts under consideration does not distinguish according to the separation of legal fields, but is based on the nature of the cases, and is thus able to reveal deeper connections.

Legal professions are related to practical cases (legal cases) and this fact is more eye-catching when judges are coming into question because judges solve many cases day by day. Definitely, judges usually experience something important: some cases are clear and unambiguous, while others are the opposite and unfortunately, because of these kind of hard cases, judges "can not sleep quietly".[1] We can take a risk: judges among themselves do not say phrases like "I have easy cases / hard cases in my practice", because their practical perspective systematizes the cases according to legal fields (for example, there are criminal cases, civil law cases, employment disputes, etc.). Our two dilemmas, easy case and hard case are relevant from the viewpoint

1 BENCZE, M. *"Nincs füst, ahol nincsen tűz." Az ártatlanság vélelmének érvényesülése a magyar büntetőbíróságok gyakorlatában* ["There is no smoke where there is no fire." Validation of the presumption of innocence in the practice of Hungarian criminal courts]. Budapest: Gondolat Kiadó, 2016, pp. 39–42.

of legal dogmatics; of course, judges can meet them but they do not use the proper terminology to label these type of cases. Judicial work's natural characteristics is the obligation to decide every case – so, in judicial practice, category of easiness or hardness is not so essential, because judges concentrate on *solving* the cases. They must solve legal disputes because *non liquet* is not welcomed.

First of all, we should accept and should not challenge the distinction easy cases-hard cases. Whether it is proceeded from the terminus made by ancient Roman lawyers *"casus normalis"*, or from the most relevant theories (of *Hart* and *Dworkin*), one thing is clearly common: *easy case* means a situation where the judge can be sure in the conclusion thanks to a written rule – as this rule's content is unambiguous and unequivocal. The solution can be found in the field of *ius* which is articulated in an undisupted way. Furthermore, something is also needed: the factual situation and the written rule should match to and the judge simply "put" the rule to the case. From this viewpoint, easy case can be invoked as rule-based decision as well: the judge do not have to use discretion or do not have to find values and aims behind the written rule; the decision is simply born like a result of a mathematical problem comes to an end.

The question is much more complex in *hard cases* where written rules do not play a traditional role in decision-making. There are a lot of cases which prove that we can not solve every legal case with written rules. In addition to that, judicial application of law should not be restricted to a mechanical process! Hence, our task is to emphasize what does hard case mean – briefly, the problem has many interesting sides, and hardness of a case can come from various sources. Hardness can arise from the law itself and there are cases when factors over law come to the front. The adjective "hard" expresses that there are disputes which challenge the most prepared judges, and even theorists solve them in different ways – accordingly, hard cases have different solutions and all of them could be right even if these solutions are opposing. Accepting *Bix's* idea: *"Hard cases are those in which competently trained and thoughtful lawyers or judges might come to different conclusions about the result. In a sense, the difficulty or easiness of a case could be seen along a few variables: the extent to which all (competently trained) people would agree about the outcome, and, for*

any given evaluator, the quickness with which the conclusion is reached and the confidence or certainty with which the conclusion is maintained." [2]

The question of the origin of the easy case – hard case distinction deserves special attention. According to the so-called traditional reading, legal positivism has finalized the thesis, but if it is true, then a specific legal positivism concept and position is needed, as it does not matter at all who (which theorist) handles it and what does legal positivism mean.[3] In fact, the hard case-question is most vividly seen in the work of *Hart* and *Dworkin*, and in the debates between these two. The other two versions of origin go back much further. In agreement with *Szabó*, it can be said that there were already numerous difficult cases in Roman law, as Roman lawyers sought to ensure that the decision corresponded to the universal aim of law, *aequitas*.[4] The third answer is an intermediate stage between Roman law and legal positivism: *Leibniz*. He, as he also wrote his doctoral thesis on the problem of the *casus perplexus*, was innovative because he dealt with logical puzzles, hence a kind of variant of hard cases. He highlighted these cases from the pure logical-linguistic area and made them legally relevant, associating a legal solution with them. He thought that all cases can be solved, and this follows from his natural law-attitude. *Leibniz* was also a reformer in assuming that the subjects of law were not ordinary cases.[5]

Focusing on the "triumvirate" of the case-question, it is clear that Leibniz can be considered a somewhat special author compared to *Hart* and *Dworkin*. In *Leibniz's* system, all cases can be solved *ex mero jure*; regarding easy cases this is almost natural, and for hard cases it is reassuring. So there are no unsolvable, impossible cases, and he also considers hard cases to be puzzles – the response to these is aided by logic, which is rooted in natural law. For *Leibniz*, logic is also important for modeling, explanation, and understanding, and what he writes about the relationship between logic and law has remained a rather fruitful thought on the continent and in the

2 BIX, B. H. *A Dictionary of Legal Theory*. Oxford: Oxford University Press, 2009, pp. 81–82.
3 MARMOR, A. *Interpretation and Legal Theory*. Oxford: Hart Publishing, 2005, p. 95.
4 SZABÓ, M. *A jogdogmatika előkérdéseiről* [On the preliminary questions of legal dogmatics]. Miskolc: Bíbor Kiadó, 1996, pp. 40–41.
5 PAKSY, M. Leibniz, a jogász – Leibniz, a filozófus. Észrevételek az életmű jogtudományai vonatkozásairól [Leibniz the lawyer – Leibniz the philosopher. Reflections on the jurisprudential aspects of his life's work]. *Working Papers in Philosophy.* 2015, no. 5, p. 5.

Anglo-Saxon world. In his life, *Leibniz* tried to introduce rationality into the world of law through logic – a great accomplishment as he sought to bring order and system into the true "legal cacophony" that prevailed in his day.[6] His paradigmatically hard case, the *Protagoras-case*, is also special because he declared this puzzle to be legally relevant by associating a legal solution with it, thus making it fit to reinforce his commitment to logic, the close connection between law and logic. As Paksy writes: *"*[Leibniz …] *makes full use of the logical paradox potential inherent in the terms of contracts of an aleatoric nature, which is in fact the result of a combination of a contingent factual truth (i.e., the contractual term) and a perpetual reasoning (i.e., the obligation to keep the promise in the contract)."*[7] What we may have a sense of lack of, although *Leibniz* might have expected because of his genius, is an incomplete interpretation of the range of hard cases because of the focus on a particular type of hardness. It is likely that the concept of *Leibniz's* legal system and decision-making will once again be as important as it once was, and this is because the rapid development of technology again requires a legal system that works like a mathematical system, and the idea of *Leibniz's* judgment machine may become interesting again. It is therefore conceivable that AI will be able to relieve the burden of law enforcement by the fact that many so called mechanical actions, which do not necessarily require thinking, will be performed by machines, so they will "make decisions" – we will come back later to analyse this impact of the oeuvre.

6 In addition to these thoughts, *Brewer's* excellent study also points out that the famous *Leibniz* view that law is an axiomatic system is far from the common law world – as many have previously thought. Axiomatic certainties need to be known to provide a clear method for deciding whether a particular argument is justified according to the rules of the axiomatic system. The axiomatic system supports the exclusion of judicial arbitrariness and expects justified and reasoned decisions to be made. In *Leibniz*, axioms have two sources: on the one hand, rationality, reason, reasons as principles of natural law, and, on the other hand, specific judicial judgments given by judges under a particular law of a given state. (Of course, *Leibniz* was not the only one to idealize axiomatic systems, there are other authors, e.g., *Savigny*, *Austin*, or *Blackstone*, but it is different who sees what as the source of the axioms of law.) See BREWER, S. Law, Logic and Leibniz. A Contemporary Perspective. In: ARTOSI, A. et al. (eds.). *Leibniz: Logico-Philosophical Puzzles in the Law. Philosophical Questions and Perplexing Cases in the Law*. Dordrecht: Springer, 2013, pp. 199–226.

7 PAKSY, M. A jog barokk birodalma. A jogtudomány helye Leibniz életművébe [The baroque realm of law. The place of jurisprudence in Leibniz's oeuvre]. *Különbség*. 2017, no. 1, p. 271.

Regarding *Hart* and *Dworkin*, the very fortunate situation is that it is not particularly necessary to prove why their work is essentially relevant – there is a very strong consensus in jurisprudence because a large part of the legal theory-community acknowledges that they laid the groundwork for the case-problem. Many have already criticized *Hart* (e.g., he did not make good use of the Waissmann-Wittgenstein foundations and drew from them superficially), and we know his reformer thoughts, too (e.g., focus on the linguistic aspect, the duality of the core of meaning and the core of penumbra and their effect on the application of law). *Dworkin's* entire legacy is imbued with an interest in hard cases. He criticizes *Hart's* legal positivism and his colleague's case-explanations, but at the same time he reconsiders and revises his own views throughout his life. His greatest invention – to value the principles and strengthen their role in resolving hard cases. This should be complemented by the important statement that while emphasizing the contrasts of rules and principles are indeed very important, it is best to look at the principles as follows: late Dworkin has already clearly described them as having a direct connection with the morality that underpins the law, more precisely with the political morality of the given community. This is why we can say that the hard case of *Dworkin* completely leaves the path illuminated by *Leibniz* (logic) or *Hart* (linguistic issues, judicial discretion) and enters a new path where moral-political dilemmas lie.

2.2 Sources of Hardness in Cases

What makes a case hard? Over the centuries, legal scholars (such as *Leibniz*, *Hart*, *Dworkin*, *Raz*, *Shauer*, *MacCormick*, *Szabó*, *Bencze*, *Paksy*, etc.) have explored many sources of the hardness; generally speaking, there may be several, even conflicting, solutions to the hardness. More precisely, the characteristics of "hard cases" can be summarised as follows, based on the theoretical history of case-problem theory.[8] There are three main sources of hardness (from which additional subcategories can be developed): the hardness of establishing the facts (the evidence itself); the hardness of determining

8 See this theory in details PŐDÖR, L. The nature of "easy case-hard case" distinction in judicial decision-making – A legal theoretical approach. Doctoral thesis. Győr: Széchenyi István University Doctoral School of State and Law, 2021, 285 p. Available at: https://doktiskjog.sze.hu/downloadmanager/details/id/38839/m/3620 [cit. 1. 5. 2022].

(interpreting) the applicable law; or the moral rightness of the decision as a factor of hardness. The easy case-hard case dilemma is fundamentally determined by what concept of law we use, what we consider to be a source of law, and which phenomenon beyond positive law should be the element of law as well.

As it is not possible to fully analyze all the subcategories belonging to the main sources, I would like just to highlight the relevant aspects.

The decision based on principle is significant because it has been explicitly brought to the fore since *Dworkin*. There is a great tension between the rule and the principles, this was also clear from the normative examination. In the common law legal system, there was less promotion of the principles to a normative level, all the more so in continental law – but this does not mean that in Hungary, for example, all principles can be found in codes. The decision in the case of the lack of norms is a very divisive issue, and the theories do not even touch it, although it is a classic topic of legal theory. Legal theorists can also be divided into two groups, as many deny the existence of a legal loophole, while others acknowledge it. It is also difficult to give an example of a loophole, only because judges cannot deny their obligation to decide every single case even if there is a loophole, the phenomenon remains hidden. The difficulties centered around legal interpretation are widely known, as interpretation interweaves the entire decision-making process.

Hardness in the fact-finding process may be the most controversial question. Researchers usually look at the facts from two perspectives: general epistemological and sociological-psychological perspectives. The thing opens up more in the fact that in judicial decision-making the decision on the question of fact and law is closely intertwined. The nature of law is indeed linked to the obligation to choose the legally relevant facts and, in the same way, to the discretion of the judiciary. Both the establishment of the relevant facts and the difficult questions and dilemmas that require interpretation in relation to the classification of judicial discretion arise, so we regard it sustainable to consider the problems of fact-finding as one of the typical bases of the range of hard cases. Not only because the general wording of judicial discretion in many cases does not facilitate the

work of judges and therefore can lead to the formation of a hard case, but also because the legal inclusion of relevant facts requires the resolution of dogmatic conflicts and interpretations.

Moral difficulty can rightly be one of the hardest cases, as deciding legal cases and their moral justification is one of the most complex and controversial issue. This is because the relationship between law and morals is not clear either, there is no eternal answer that is valid everywhere and at all times. The problem is thus diverse, there are a lot of type of moral difficulty from a particular aspect through a specific legal case, where the moral principles of law are at the center in a case becoming a precedent. This is most often the case when human life and dignity as an absolute value are at stake.

Finally, we confirm that this typology, and the easy case-hard case types included in it, may be relevant to both the continental and common law legal systems. Obviously, there are legal system-specific applications of law-techniques and perspectives, but along many sub-issues, it emerges that they have an equivalent in the other legal system as well. Belonging to a legal culture has less impact on the judge on how to decide easy and hard cases, and in fact, representatives of legal systems do not have a specific strategy for solving these. It is more correct to say that the nature of the case determines how the case at hand should be decided. Moreover, presumably, almost the same cases are considered easy or hard by a continental and an Anglo-Saxon judge. In the common law and the continental legal system, the hard cases are similar, the only difference is in the reasoning.

3 The Process of Decision-Making

The process of judicial application of law is characterized from the point of view of practice as a decision in matters of facts and law. Above, we have seen what is the difference between easy and hard cases – we may add that this theory applies to cases decided by human judges. And what happens when a human decides a judicial case (whether the easy or the hard case)? Judgment refers to the very complex mental workings of the human mind. The judge builds a bridge between the facts of the case and the applicable rule. Legal methodology attempts to define more precisely what this intellectual process

is. Historically, law has developed three methods for decision-making: the deductive method (syllogism), the argumentative method and the case method. All of them involve the most difficult challenge in the application of the law: the constant interplay between the *general* (which is the legal norm itself) and the *specific* (which means the case itself). However, it should be known that human thinking is a real "black box"; it has never been written down, nor can it be described today, how human beings (judges) think, and consequently we cannot have an accurate knowledge of the real processes of law enforcement. Now, I also would like to concentrate on the two most important methods – syllogism and case method.

It is a general finding that the application of law on the continent can best be described by legal syllogism (deduction), while in the Anglo-Saxon legal system it can be described by the case method. It is wrong, however, that if this differentiation is strictly justified. Legal systems and legal cultures are far from separable, they have a lot in common, and a lot of institutions have their own special version in the other legal system as well. The third method, argumentation has an important benefit; it calls attention to the importance of reasoning and warns that a decision is never made, but must be found. Just to refer to some of the components that are relevant in both main methods: the role of previous court judgments in the application of law, *verba* vs. *ratio*, the formalism-problem, usage of analogy, the nature of universalism and particularism, the search for the idea of law, casuistry or the Roman legal roots of the two dominant legal systems.

(Legal) syllogism is synonymous with the deductive method. This refers to the idea of legal reasoning as a logical conclusion. The syllogistic character of legal reasoning is not a descriptive statement but a prescriptive statement.[9] Thus, syllogism is in practice a deductive form of deduction, consisting of two premises: *premissa maior* (upper proposition) and *premissa minor* (lower proposition). In the process, the lower proposition must be subordinated to the upper proposition (sub-summation), which creates (deduces) the conclusion. In terms of the application of the law, this works as follows: the legal norm applied is the upper item, and in addition there is the assertion that a fact of the

9 SZABÓ, M. *Rendszeres jogelmélet* [Systematic legal theory]. Miskolc: Bíbor Kiadó, 2014, p. 169.

case has occurred. From all this we infer the conclusion of the application of the law, so the lower proposition is subordinated to the upper proposition.[10]

Some emphasise that in the operation of syllogism, the judge is dealing with classes: the rule refers to a typical class of facts, which in turn point towards a particular conclusion. The judge's task is to decide whether or not the client's particular situation, the historical facts, fall within the class defined by the rule. The general difficulty with the deductive process is that legal reasoning can create a great deal of uncertainty; the judge cannot reach a firm conclusion if he or she simply focuses on the linguistic correspondence between the rule and the facts. The complexity of the linguistic aspect lies in the use of general terminology: it is often the case that the litigants' situation can be described by several different factual situations, so that more than two possible alternatives emerge as premissa minor. The final conclusion will depend on which premissa minor is finally chosen by the practitioner. And the concepts (classes) contained in the rule are highly generalised, but ultimately this is a requirement of legislation – which is also the cause of many difficulties in the application of the law.[11]

In the context of the case method, reference should be made to the following. Methodologically, it is not the literal "model" of the application of the law, as already discussed in the syllogism, but reasoning from case to case. The judge looks for similarities, or analogies, between individual, concrete cases.[12] The system of precedent requires the court to give a genuinely identical judgment in cases with identical facts. The rule of stare decisis (or "maintenance of the decision") requires subsequent courts to adapt their decisions to the pattern of decisions laid down in earlier decisions on similar facts by higher or equivalent courts.[13] In this method of applying the law,

10 WRÓBLEWSKI, J. A jogi szillogizmus és a bírói döntés racionalitása [Legal syllogism and the rationality of judicial decisions]. In: BÓDIG, M. and M. SZABÓ (eds.). *Logikai olvasókönyv joghallgatók számára*. Miskolc: Bíbor Kiadó, 1996, p. 209.

11 VANDEVELDE, K. J. *Thinking Like a Lawyer. An Introduction to Legal Reasoning*. Boulder, Colorado: Westview Press, 2011, pp. 95–96.

12 EÖRSI, Gy. *Összehasonlító polgári jog. Jogtípusok, jogcsoportok és a jogfejlődés útjai* [Comparative civil law. Types of law, groups of law and paths of legal development]. Budapest: Akadémiai Kiadó, 1975, p. 472.

13 SZABÓ, M. Mi a "precedens"? Előadások a precedensek szerepéről a magyar joggyakorlatban [What is "precedent"? Lectures on the role of precedents in Hungarian jurisprudence]. *Jogesetek Magyarázata*. 2012, no. 2, p. 74.

judges engage in inductive reasoning (cf. *Bacon* and inductive inference). The inductive chain of reasoning is also echoed in the works of traditional Anglo-Saxon legal theorists. However, these authors polemicise over the question of how inductive reasoning can be properly defined in case law. One possible direction is to define it as the opposite of the deductive chain of inference, i.e., the judge must discover the general rule from individual cases. The most striking difference between these two methods is what is taken to be the source of the upper theorem: in deductive reasoning it is taken as a given, whereas in inductive reasoning it is produced by specific examples. The past case is actually an example of the rule – hence why induction is referred to as the inverse of deduction. Moreover, it should be remembered that precedent is reasoning by example, case by case: the judge therefore decides the case before him in the same way as he decides a past case, provided that this past case is sufficiently reminiscent of the present case in the relevant respects.[14]

4 Leibniz Back in the Spotlight – What Is Leibniz's Ingenuity? Some Thoughts on Law, Language, and Mathematics

Having clarified the preliminary questions, we must now turn to the next question: why is *Leibniz's* work so relevant to the technological revolution of the 21st century? What can be drawn from *Leibniz's* views in relation to the modern challenges of decision-making?

Hart was the first who drew attention to the vagueness of language and consequently, for him, this problem was also the dividing line between easy and hard cases. As for legal language, it can be considered part of everyday language. Until the Age of Enlightment, there was no suggestion that law had anything to do with logic or mathematics – *Leibniz* was the first to approach the legal system mathematically, so he could see there is a connection between language, mathematics, and law.

Leibniz is known as the founder of modern legal thinking. He was a truly reformer thanks to his philosophical, legal, and scientific views, moreover,

14 HART, H. L. A. A jogi érvelés problémái [The problems of legal reasoning]. *Jogesetek Magyarázata*. 2010, no. 3, p. 88.

in the 21st century, his theory should be appreciated again – of course with special emphasis. His oeuvre is so alive in the era of AI, because his legacy has a significant effect on characterizing the legal system and on understanding the nature of the judicial decision-making process. The rapid development of technology requires a legal system that works like a mathematical system, and the idea of *Leibniz's* "judgment-machine" may become interesting again.

To understand *Leibniz's* eternal and always current views on legal system and judicial decision-making, we need to know his life and work, as well as the particular historical epoch when he lived. *Leibniz* was a genius, some refer to him directly as the "last polyhistor"[15], as he was also proficient in mathematics, theology, law, history, and medicine. *Leibniz's* ideas are characterized by impressive intellectual independence and originality, and this was true of him even in his young years. In terms of cultural history, *Leibniz* was a scholar of the Baroque era, which, with its monumentality, emphasized its ambitious goals similarly, a peculiar Baroque imprint of *Leibniz's* oeuvre is polyhistory rooted in versatility.[16] As far as the conception of law is concerned, this period can correspond to an advanced period of natural law; in a sense, this already means modern natural law.[17] During this time, the German territories also showed specific administrative and legal features; we are well ahead of the great codifications, but key figures in history had already made great strides in the world of science, and these steps were excellent for the creation of unification and codified law. The "Holy Roman Empire" consisted of more than 300 ecclesiastical and secular states of all sizes, and such a vast and fragmented empire did not have a unified legal system. Due to fragmentation, various written and unwritten imperial laws, local and regional customs and treaties were considered the "constitution" of the empire. This situation favored the judiciary, and the judges were greatly strengthened. In the fragmented German territories, Roman law continued to be the "common law", mainly in the court practice. *Leibniz* perceived the

15 LENDVAI, F. *A gondolkodás története* [The history of thinking]. Budapest: Móra Könyvkiadó, 1983, pp. 105–107.

16 FRIEDELL, E. *Az újkori kultúra története I. Az európai lélek válsága a fekete pestistől az I. világháborúig. Bevezetés, reneszánsz és rokokó* [History of culture. I. The crisis of the European soul from the black plague to World War I. Introduction, renaissance and rococo]. Budapest: Holnap Kiadó, 1998, p. 624.

17 ARMGARDT, M. Leibniz as legal scholar. *Fundamina*. 2014, Vol. 20, no. 1, pp. 32–33.

potential of Roman law and saw it not only as a redundant substance, but as a basis of law. In contrast to Roman law, contemporary German laws were the result of "barbarism" rather than the "fruits" of nice work. *Leibniz* believed that if Roman law was the basis of law, its corpus should have been restricted to a few general rules. In fact, throughout his life he dreamed of the culmination of this program, and for the rest of his life he admired Roman jurists and the quasi-geometric subtlety of their reasoning.[18]

There are three important facts in connection with *Leibniz's* theory of law. Firstly, the analysis of legal (mainly law enforcement) dilemmas requires a multidisciplinary dialogue, i.e., a dialogue between law and other sciences such as philosophy, logic, mathematics, physics and theology. *Leibniz* thought that there is a great deal of harmony between law and mathematics and physics, and this is because of the Roman legal foundations; Roman law operates with solutions that coincide with the functioning of nature. Philosophy is also an essential discipline, because without it, the law is an inexplicable maze; if philosophy helps law, then unsolvable cases (e.g., paradoxes[19]) will also be solvable. Secondly, law also requires a dialogue between its own schools, incidentally, natural law and positive law (which one includes Roman law and the law of the various Germanic states). And last but not least, understanding the law requires a multitude of different ways of reasoning and cognition that can be chosen on a pragmatic basis.[20]

Leibniz discovered that mathematics (and its field, combinatorics) and logic help to settle the legal system and to solve legal problems as well. Jurisprudence is very similar to geometry, because both are made up of elements and there are cases in law and in geometry as well. The concept of "case" first had appeared in geometry and it means the arrangement of lines, planes, and bodies by which mechanicians demonstrate certain issues (such as quantity, relation or similarity). Lawyers actually do the same thing, that is, they

18 ARTOSI, A., PIERI, B., SARTOR, G. Introduction. In: ARTOSI, A. et al. (eds.). *Leibniz: Logico-Philosophical Puzzles in the Law. Philosophical Questions and Perplexing Cases in the Law*. Dordrecht: Springer, 2013, pp. XVI–XX.

19 One of his famous paradoxes is called Protagoras-case which is a *perplexing case*. See it in details: GELLIUS, A. *Attikai éjszakák* [Attic Nights]. Budapest: Franklin Társulat, 1905, pp. 363–365.

20 ARTOSI, A., SARTOR, G. Leibniz as jurist. In: ANTOGNAZZA, M. R. (ed.). *The Oxford Handbook of Leibniz*. Oxford: Oxford University Press, 2018, pp. 644–645.

demonstrate legal situations with the help of facts.[21] In *Leibniz*, the concept of case *"… in general is the antecedent of a hypothetical proposition; as applied to jurisprudence, this antecedent is called the fact, the consequent the legal position, and a case will be defined as a fact in relation to a legal position."*[22]

The relationship between law and geometry is not new in itself, as it has been formulated since ancient times. *Leibniz's* innovation lies in the fact that he explains that combinatorics also appears in law, and with the help of which the possible cases and also the applicable rules can be calculated. This means that both law and geometry deal with cases, and cases can be formed by combining elements (based on the order of demonstration).[23] The usual elements of geometry are various shapes (e.g., triangles), and in jurisprudence an element can be an act, a promise, an alienation, and so on. Elements of law can be read from the *Corpus Iuris*, but law also includes more complicated cases.[24]

When he was 20, he wrote *De Arte Combinatoria*; the dissertation has a very thoughtful logical content, so his theory in it anticipates *"modern ideas of proof system and algorithm"*[25]; through these views, Leibniz anticipates some really modern ideas.[26] He created the following idea: *Characteristica Universalis* (i.e., *Universal Mathematics*) which was just a symbolic method, but its greatest advantage is as follows: results could be achieved in all sciences – the same way as mathematics produces its results.[27] This method is strange in a way because it can eliminate human thinking with the help and use of some formal rules. But what about controversies? *Leibniz* writes: *"If controversies*

21 LEIBNIZ, G. W. Inaugural Dissertation on Perplexing Cases in the Law. In: ARTOSI, A. et al. (eds.). *Leibniz: Logico-Philosophical Puzzles in the Law. Philosophical Questions and Perplexing Cases in the Law*. Dordrecht: Springer, 2013, p. 72.

22 Ibid.

23 VARGA, Cs. Leibniz és a jogi rendszerképzés kérdése [Leibniz and the Question of Legal System-Formation]. *Jogtudományi Közlöny*. 1973, no. 11, p. 603.

24 SZABÓ, M. Ars casus formandi. In: SZIGETI, P. (ed.). *Ordo et connexio idearum. Ünnepi tanulmányok Takács Péter 65. születésnapjára* [Ordo et connexio idearum. Celebratory Studies for Péter Takács' 65th birthday]. Budapest, Győr: Gondolat Kiadó, Széchenyi István Egyetem Deák Ferenc Állam- és Jogtudományi Kara, 2020, p. 173.

25 MARTIN, J. N. Leibniz's De arte combinatoria. *University of Cincinnati* [online]. 2003, 17 p. [cit. 1. 5. 2022]. Available at: https://homepages.uc.edu/~martinj/Rationalism/Leibniz/Leibniz%20-%20Art%20of%20Combinations%201666.pdf

26 Ibid.

27 CAIRNS, H. *Legal philosophy from Plato to Hegel*. Baltimore, Maryland: The John Hopkins Press, 1949, p. 300.

were to arise, there would be no more need of disputation between two philosophers than between two accountants. For it would suffice to take their pencils in their hands, to sit down to their slates, and to say to each other (with a friend as witness, if they liked): Let us calculate."[28] These phrases sound really modernized, no doubt, these can be the very early articulation of expressions-as-data idea. And why is it so precious and important? Because *"it eventually led to mathematical logic, stored program computers, artificial intelligence, and meta-programming."*[29] According to *Leibniz*, *Characteristica Universalis* is very similar to syllogism and he emphasised that it is a kind of universal mathematics, a great human invention.[30]

Leibniz also wanted to create a "universal language" which works with several important basic terms[31] (as mentioned above). Combinating these basic terms, every dilemma could have a solution, or we can say: every true judgment could be expressed by these (if we exclude the false ones).[32] This thought came to an interesting conclusion: a so-called "judgment-machine" could be the key, i.e., the mission of these machines could be invention *(ars inveniendi)*. The philosopher-jurist believed that judicial judgments could be mechanized, too, which means that a special machine has the judgments in advance as judgments are *"programmed into it"*.[33] The law strives for completeness and predictability in the spirit of rationalism – and this desire can only be provided by such a machinery[34]. The consequence

28 Otherwise, the work's much-quoted keyword is this famous *calculemus*-idea. Cited by RUSSEL, B. *A Critical Exposition of the Philosophy of Leibniz*. London: Routledge, 1992, p. 201.

29 PEARCE, J. *Programming and Meta-Programming in Scheme*. New York: Springer, 1998, p. 293.

30 Unfortunately, syllogism is not perfect. As *Russel* writes: *"But* […] *it had the formalist defect which results from a belief in analytic propositions, and which led Spinoza to employ a geometrical method.* […] *The Universal Characteristic, therefore, though in mathematics it was an idea of the highest importance, showed, in philosophy, a radical misconception, encouraged by the syllogism, and based upon the belief in the analytic nature of necessary truths."* RUSSEL, B. *A Critical Exposition of the Philosophy of Leibniz*. London: Routledge, 1992, pp. 201–202.

31 SZABÓ, M. *Logica Magna. Utazások a logika birodalmában* [Logica Magna. Journeys in the empire of logic]. Miskolc: Bíbor Kiadó, 2014, p. 29.

32 VARGA, Cs. *A jogi gondolkodás paradigmái* [Paradigms of Legal Thoughts]. Budapest: Szent István Társulat, 2006, p. 345.

33 BERKOWITZ, R. *The Gift of Science. Leibniz and the Modern Legal Tradition*. Cambridge, Massachusetts: Harvard University Press, 2005, pp. 60–72.

34 VARGA, Cs. *Politikum* és *logikum a jogban. A jog társadalomelmélete felé* [Politics and logic in law. Towards a social theory of law]. Budapest: Magvető Kiadó, 1987, p. 46.

is simply fantastic: every case can be solved *ex mero jure*. This undertaking was a particular success *"in a wider endeavour of axiomatisation and rationalisation of law."*[35]

The jurist-philospher considered that it was not a correct statement in his time to perceive that there were cases that could not be decided under civil law or that in such a situation judges would have to make an arbitrary decision.[36] To prove this, he argued for the axiomatizable legal system that we have already discussed above. According to *Leibniz*, there is no difficulty in applying the law in "routine cases", where judges use *syllogism* (a quasi mathematical method) to decide the case; difficulty only occurs in more complex cases – at him, this situation is called *casus perplexus* (perplexing case). As researchers emphasise, this view correlates with *Leibniz's* attitude that there is a similarity between law and geometry; and of course, the legal system is a complete whole in which all the answers can be found. In this idea, law-making is kind of an economic method because there are only a few laws and these are enough to cover countless cases – because (as combinatorics claims) countless combinations can be made.[37]

As we have seen above, the legal system should be axiomatized. Axiomatic certainties need to be known to provide a clear method for deciding whether a particular argument is justified according to the rules of the axiomatic system. The axiomatic system supports the exclusion of judicial arbitrariness and expects justified and reasoned decisions to be made. In *Leibniz*, axioms have two sources: on the one hand, rationality, reason, reasons as principles of natural law, and, on the other hand, specific judicial judgments given by judges under a particular law of a given state. Of course, Leibniz was not the only one to idealize axiomatic systems, there are other authors, e.g., *Savigny*, *Austin*, or *Blackstone*, but it is different who sees what as the

35 BOUCHER, P. What Kind of Legal Rationalism? In: DASCAL, M. (ed.). *Leibniz: What Kind of Rationalist?* Dordrecht: Springer, 2008, p. 232.

36 ANTOGNAZZA, M. R. *Leibniz. An Intellectual Biography*. Cambridge: Cambridge University Press, 2009, p. 66.

37 DASCAL, M. (ed.). *G. W. Leibniz: The Art of Controversies*. Dordrecht: Springer, 2006, p. 88.

source of the axioms of law.[38] In Leibniz's system, all cases can be solved *ex mero jure*; regarding "routine" or "easy cases" this is almost a natural feature, and for "hard cases", it is reassuring. So there are no unsolvable, impossible cases, and he also considers "hard cases" to be "puzzles" – the response to these is aided by logic, which is rooted in natural law. For *Leibniz*, logic is also important for modeling, explanation, and understanding, and what he wrote about the relationship between logic and law has remained a seriously fruitful thought on the continent and in the Anglo-Saxon world. Throughout his life, *Leibniz* tried to introduce rationality into the world of law through logic – a great accomplishment as he sought to bring order and system into the true "legal cacophony" that prevailed in his time. His paradigmatically "hard case", the Protagoras-case, is also special because he declared this puzzle to be legally relevant by associating a legal solution with it, thus making it fit to reinforce his commitment to logic, the close connection between law and logic.

5 Judicial Decision-Making by Humans or by Machines?

A vision of "judgment-maschines" is becoming a reality. Algorithms can definitely solve some type of cases (especially easy cases) in advance. This is why several methods do not need thinking – these could be solved automatically by machines, because syllosigm, in a sense, can be done mechanically (as we have seen it in this paper, in chapter 3). We point out that there are a number of rules that do not need a robot or even a human judge to enforce them; people are often lucky enough to behave in a law-abiding way. This trend is likely to continue under AI. Of course, there are many arguments in favour of machine decision making, such as: quasi-formalised perfection, the possibility of testing, quickness of the procedure, the pursuit of norm fidelity, the exclusion of arbitrariness, the elimination of subconscious factors from the decision, etc. But it must not be forgotten that legal disputes, thus the application of law, take place in a discursive space, language may raise some problems.

38 BREWER, S. Law, Logic and Leibniz. A Contemporary Perspective. In: ARTOSI, A. et al. (eds.). *Leibniz: Logico-Philosophical Puzzles in the Law. Philosophical Questions and Perplexing Cases in the Law*. Dordrecht: Springer, 2013, pp. 201–205.

As with so many other phenomena, globalisation is leaving its mark on digitalisation. It is hard to find a rule that is supposedly nation-specific. For a very long time in the history of law – and even in *Leibniz's* time – Roman law was a kind of common set of solutions, so Roman law had a certain globalising power, bringing the different legal systems closer together. Nowadays and in the future, an interesting question will be the following one: which instrumental system can fill the role in law that Roman law once played – perhaps the new body of rules on AI will become such a universal body of law? Furthermore, what is new is that law is becoming increasingly proactive. This means that its function is changing: it no longer seeks primarily to react to past breaches of the law, but rather to promote a desirable state of affairs – perhaps this is the role that regulatory algorithms will play? These dilemmas suggest that we are on the threshold of a new world, and perhaps we have already entered it. Let us look at what lies ahead for law enforcers in this new area.[39]

Firstly, we know very well that technology can help everyday life in a lot of way, and some type of machines ("judgment-machines") may also facilitate the work of lawyers. It seems *Leibniz's* vision of "judgment-machines" is becoming a reality. Algorithms can solve some type of cases (especially "easy cases") in advance, so they take the burden off the lawyers' shoulders.[40] But it must not be forgotten that legal disputes, and thus the application of law, take place in a discursive space. The poles of the space of natural language are constantly moving – and this is done by the participants of the legal procedure (judge, plaintiff, defendant, etc.). Two things can create a connection between the world of man and the machine: the *sign* and the *rule*, but both are radically different in these two worlds.[41] *"Man finds meaning*

39 ZŐDI, Zs. A digitalizáció hatása a jogászi szakmára [The impact of digitalisation on the legal profession]. *Gazdaság és jog*. 2018, no. 12, pp. 3–4.

40 An excellent example of this phenomenon is the VÉDA system in Hungary, which deals with infringement procedures. See RITÓ, E., CZÉKMANN, Z. Okos megoldás a közlekedésszervezésben – avagy az automatikus döntéshozatali eljárás egy példán keresztül [Clever solution in transport organization – or the automatic decision-making procedure as an example across]. *Miskolci Jogi Szemle*. 2018, no. 2, pp. 104–118.

41 ZŐDI, Zs. Gépek a jogban. Jogelméleti gondolatok a számítógépek jogalkalmazásáról [Machines in law. Legal Theoretical Thoughts on the Application of Law by Computers] [online]. *Jogelméleti Szemle*. 2013, Vol. 2 [cit. 22. 3. 2022]. Available at: http://jesz.ajk.elte.hu/zodi54.pdf

in natural events, the machine, on the other hand, assigns a rule to any 'sign', physical phenomenon, so that information and then 'action' is not filtered through meaning, but directly through causal relationships; these causal relationships are very complex and many times conditional."[42] The machine can create the illusion that it is a sensible, thinking creature like human beings – but we know this thought is a total illusion.

In the context of the coordination of the "judgment machines" of the future, some complex dilemmas need to be referred to. AI-based systems are not governed by rules, but by codes – the human judge, on the other hand, is, of course, rule-based, as explained above. The connection between computers and rules is not new; in practice, computers work according to the same logic as law ("if … then …"). So far, AI cannot enforce the rules to which we humans adjust our behaviour. The AI needs these rules to be translated into codes so that the software can interpret and process them. All of this being said, translating rules into codes could in practice become a new legal profession, since it requires a new kind of specialised expertise. It is not simply a question of "translation", but of AI requiring procedures to be developed for them.[43] As *Zsődi* writes: *"… all operations that consist of serving information will be fully automated in a very short time. This is also the case in law: here, too, it is often only necessary to find and recall the text of one or more specific rules in order to find a solution. The text recognition, analysis and summarisation algorithms, some of which are available to the general public through the major internet search engines, are becoming more and more advanced and will soon be able to provide meaningful and useful answers to questions in natural language."*[44]

Furthermore, there is an other problem. *Leibniz* also saw that the legal cacophony that prevailed at his time could be put in order by narrowing the legal system to certain general rules – the ideal for him was shown by Roman

42 ZŐDI, Zs. Gépek a jogban. Jogelméleti gondolatok a számítógépek jogalkalmazásáról [Machines in law. Legal Theoretical Thoughts on the Application of Law by Computers] [online]. *Jogelméleti Szemle*. 2013, Vol. 2 [cit. 22. 3. 2022]. Available at: http://jesz.ajk.elte.hu/zodi54.pdf

43 ZŐDI, Zs. A robottanácsadók jogi problémái: hogyan szabályozzuk a robotokat? [Legal problems for robot advisors: how to regulate robots?]. Állam- és *Jogtudomány*, 2020, no. 4, pp. 125–127.

44 ZŐDI, Zs. A digitalizáció hatása a jogászi szakmára [The impact of digitalisation on the legal profession]. *Gazdaság* és *jog*, 2018, no. 12, pp. 7–8.

law. The transfer of mathematical and logical solutions to the world of law served to eliminate linguistic uncertainty. *Leibniz,* and many others, have noticed that law cannot be made perfectly predictable and mathematizable, because natural language involves uncertainties. Language should be more exact, but for lawyers (and for machines!), this is a hard task. Of course there are fields of law where efforts have been made to algorithmize the language, but these fields has resisted. The situation is even more complicated if we include in this formula the observation made above, i.e., the translation of rules into codes. In fact, there are multiple translations to be done, since first the natural language has to be translated into the language of law and then the resulting rules have to be transformed into codes. This level of legislation, which stops here, unlike the human judge, who is constantly referring from facts to norms, and vice versa – all of which it does countless times in the course of deciding a case.

There are complex relations where language cannot be made predictable, so it remains incessantly obscure. The meanings of the words show their faces in unique situations which cannot be fixed in advance.[45] Let just think of some special types of "hard cases" which were not examined by *Leibniz,* for example here are some types of hardness: hardness of interpreting the applicable law; hardness in the fact-finding process (it may be the most controversial question, but judicial discretion or legally relevant facts are often the typical bases of the range of hard cases – as we have discussed); or moral rightness or wrongness of the decision as a factor of hardness. It is safe to say that decision-making dilemmas cannot be solved on an algorithmic basis or with the help of so-called "judgment-machines". All in all, instead of machines, we need to have real human beings, more precisely judges, who can solve these hard cases – creativity, thinking, considering or exercising discretion are things that only could be feasible by humans, not machines. So in a way, regarding the greatest dilemmas of judging, *Leibniz,* algorithms and AI technology cannot be satisfying enough.

45 ZŐDI, Zs. Hogyan változtatja meg a jog nyelvezetét a számítógép? A logika és a tekhné a jogban [How Does Computers Change the Language of Law? Logic and practical knowledge in law]. *Glossa Iuridica*, 2014, no. 2, p. 119.

6 Conclusion

In this paper we have attempted to explore some of the current and future dilemmas affecting the application of law. The ideas expressed here have answered the research hypotheses, but now, by way of conclusion, we summarise the results.

Using the jurisprudential tradition, we have defined the cases to be decided as easy and hard cases, as this distinction draws attention to the intellectual challenges inherent in judicial decision-making. In the traditional view, the process of applying the law can be described by the deductive or case method, while the former seems to be adaptable to the world of AI – since it is an idea inherently related to the field of mathematical logic. To a certain extent, therefore, machines, "robot judges" could, in principle, relieve judges of their workload, if they derive decisions on a mathematical principle similar to deduction. This statement, however, would only hold true for the so-called easy cases, which are mostly described as quasi-mathematical examples (routine cases) by legal philosophers. The most complex tasks of theory and practice, the decision of hard cases, most certainly require and will continue to require human thinking and creativity, i.e., the decision of difficult cases will remain a decision situation that requires human review. Because AI, at least in the present circumstances, is less effective at supporting human reasoning in difficult cases. Judging means deciding about human lives; from this point of view, it is also important to note that the formulation of the conclusion is perhaps better left in human hands. Of course, the impartiality and speed of the machines can be seen as positive aspects, and there is no doubt that technology can be involved in the lower court process, but the adjudication of appeals without a human judge is unthinkable.[46] This study concentrated mainly on the shortcomings of the technology in terms of language; the precise foundations that would prepare machines for learning and problem solving cannot be created, since the possibility of translating questions of fact and law into the language of machines is already doubtful. The linguistic translation from the natural

46 LŐRINCZ, Gy. A mesterséges intelligencia alkalmazásával hozott döntés jogi megítélésének egyes kérdései [Some questions on the legal assessment of a decision using artificial intelligence]. *Gazdaság és Jog*. 2019, no. 4, pp. 1–7.

to the language of law, and then from the language of law to the "codes" of machines – we argue that this raises the need for a specific new skill set to create robot judges, which would probably even be the outline of a new legal profession. Linguistic doubts are not resolved even if a "normal" judge decides the case in the absence of a robot judge, since most of the hard cases revolve around linguistic aspects – think, for example, of the judicial dilemmas on the ascertainability (interpretation) of the law, which several legal scholars (led by *Hart)* have argued are present. In such a situation, the suitability of a robo-judge to decide cases may therefore be understandably questionable.

From what is described in this study, we can conclude that algorithms are more likely to be more effective in ordering the future than the past. Judicial work, on the other hand, is typically a legal profession where there is a strong emphasis on exploring the past, as it is always necessary to reconstruct events in the past and formulate the appropriate legal response. The nature of legal disputes presents a number of challenges to which machines, however well "prepared", cannot respond in the same way as the human mind. It has also been shown in the outline of legal techniques that the typical task is one of decision making tailored for thinking human beings, not machines. Moreover, the complexity and resolution of difficult cases in practice also calls for human reasoning – this was also evident in the outlining of the dilemmas.

Of course, we can accept that our near future's legal system is quite similar to *Leibniz's* vision: it is a system which will have a well-known ideal, *mathematics*. This was law's ideal when *Leibniz* lived, but later, an other ideal, *argumentation* overcame it. But, as we see, *Lebniz's* theory is topical again, law is becoming something special like mathematics. This view is supported with strong arguments, but cannot face a serious dilemma: solving hard cases of the legal systems. Machines and algorithms will, in a sense, ease the problems of the legal system, but they will not be able to solve the eternal and most burning issues of law, such as hard cases.

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