

Introduction to the special issue on Artificial Intelligence for Justice (AI4J)

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Artificial intelligence is currently a centre of attention of legal professionals. An abundance of startup companies explore the application of AI techniques in the domain of law, and there is even talk of artificially intelligent legal assistants disrupting the legal market space. Factors driving the increased attention for legal AI include:

- Technological breakthroughs in machine learning, natural language processing, ubiquitous computing, data science, and argumentation technology;
- The changing attitude towards technology in the legal domain;
- The much increased availability of legal data on the internet;
- The recent success of AI applications in the private and public domain;
- The success of technology supporting access to law, legal empowerment, and transparency;
- The increased need for norms embedded in technology (autonomous driving and warfare, big data analysis for crime fighting and counterterrorism).

Against this background, we organized a one-day workshop ‘AI for Justice (AI4J)’ on August 30, 2017, in The Hague, The Netherlands. The workshop was held in

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association with the 22nd European Conference on Artificial Intelligence (ECAI 2016). The workshop's theme connected to the ECAI 2016 special topic 'AI for human values'. Moreover, the workshop seemed particularly appropriate at this location given that The Hague is the residence of several international courts, such as the International Court of Justice, the Permanent Court of Arbitration, the International Court of Criminal Justice and the United Nations International Criminal Tribunal for the former Yugoslavia.

The aim of the workshop was to investigate opportunities and challenges in AI applied to the law, with a particular focus on the relevance of the recent technological breakthroughs for AI & Law research and for legal practice. Questions addressed included the following:

- How can AI & Law research contribute to improving legal work in, for example, courts, law firms, public administration, police practice and businesses?
- How should AI & Law research change in light of the recent research breakthroughs and technological developments? For example, how can traditional research on legal knowledge bases, legal reasoning and legal argument be combined with data science, machine learning and natural language processing?

The program consisted of an invited lecture by Karl Branting (MITRE, USA) and paper presentations (seven long, five short). Papers were selected in a peer review procedure following an open call for papers. The program and all papers presented at the workshop are available at the workshop's web site (<http://www.ai.rug.nl/~verheij/AI4J>). Based on the proceedings of the workshop, and selected in a second round of peer review, six papers have been adapted for this special issue of the journal *Artificial Intelligence and Law*.

In the invited paper *Data-Centric and Logic-Based Models for Automated Legal Problem Solving*, Karl Branting analyzes how logic-based approaches to legal problem solving can work together with data-centric techniques, depending on the legal task one aims to support.

In the paper *Norms and Value Based Reasoning: Justifying Compliance and Violation*, Trevor Bench-Capon and Sanjay Modgil argue that software agents should be able to reason about norms and values, especially when the rules sometimes should be broken.

In the paper *On the Concept of Relevance in Legal Information Retrieval*, Marc van Opijken and Christiana Santos discuss a conceptual framework for relevance in information retrieval, tuned to the development and improvement of legal software tools.

In the paper *Reading Agendas Between the Lines, an exercise*, Giovanni Sileno, Alexander Boer and Tom van Engers discuss the operationalization of software agents in the setting of compliance checking, discussing tax frauds in real-estate transactions as an illustration.

In the paper *Recognizing Cited Facts and Principles in Legal Judgements*, Olga Shulayeva, Advaith Siddharthan and Adam Wyner investigate to what extent facts and principles can be identified in precedent cases, by studying agreement between human annotators and by supervised machine learning.

In the paper *Proof With and Without Probabilities*, Bart Verheij discusses correct evidential reasoning using arguments, scenarios and probabilities, focusing on connections between qualitative and quantitative analytic methods, and using Alfred Hitchcock's film *To Catch A Thief* as an illustration.

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- The Institute for Artificial Intelligence and Cognitive Engineering, University of Groningen (ALICE).

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