

The Marriage of Artificial Intelligence and Tax Law: (II) Presence & Future

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This second and last part of the contribution concentrates on the present and future of artificial intelligence (AI)^[1] and tax law. Let us see if AI can be happily married with tax law in order to get the best of both worlds.

Present: Assisting Rather Than Replacing of Tax Lawyers

All of the features that are indispensable to lawyers, as depicted in the previous part of this contribution, have until recently also appeared to be extremely resistant to AI.^[2] That is to say, the complexity, uncertainty, and dynamic nature of legal reasoning have presented significant barriers to the development of commercial AI applications. On the supply side, moreover, developing an AI program applicable to law is very time consuming and extremely expensive. On the demand side, the cost-effectiveness of a stand-alone computer equipped with the traditional applications for the legal professions (e.g. statutory and case law databases, commentaries to laws and cases) far exceed the potential gains of investing in the development of an AI program capable of applying the law.^[3]

These barriers to the development of commercial applications of AI to law have diminished the ambitions of AI developers and legal scholars: Rather than seeking to replace legal experts with AI, they are turning their attention to projects in which AI is developed to perform specific, well-defined tasks, typically in one area of law and in one jurisdiction only.^[4] This paradigm shift seems rational and may lead to commercially useful AI programs of use to lawyers in their work.

By mid-1990s, scholars specializing in AI and law had already noticed that information technology was better suited as an aid in the lawyer's work rather than a replacement of the lawyer.^[5] Recent research and commercial projects on AI and law have reached the same conclusion.

Present and the Future: Hopefully just Augmenting but Never Replacing of Tax Lawyers

In September 2013, Frey and Osborne from the University of Oxford published the results of their research on the probability of computerisation (i.e. job automation by means of computer-controlled equipment) in 702 detailed occupations in the US, including legal professionals (lawyers).^[6] To estimate probability they used a novel methodology using a Gaussian process classifier, which appears in many contexts such as statistics, probability theory and machine learning.^[7] Pivotal to the current study is their finding that lawyers are generally not fully computerisable, or, so to say, they belong to the group of least-computerisable occupations with a probability of only 3.5 per cent of being more or less replaced by automatized computer systems. By comparison, tax examiners and collectors, and revenue agents were classified as fully computerisable with 93 per cent probability, which is more than for taxi drivers (89 per cent) or parking lot attendants (87 per cent). Recreational therapists, in turn, were classified as the least-computerisable occupation.

More specifically, Frey and Osborne observed that occupations that involve complex perception, creative intelligence tasks, and social intelligence tasks (i.e. cognitive non-routine tasks) are likely to be supplemented rather than substituted by AI "over the next decade or two". Their research confirms current ideas that AI is best suited to play a complementary role in tasks performed by lawyers.

Although the approach of Frey and Osborne has been criticised for focusing on whole occupations rather than activities within a specific occupation, resulting in an overestimation of job automatibility, the most recent research (the critical studies on the methodology of Frey and Osborne) sanctions the above findings in respect of the scope of this contribution.^[8]

That being said, tasks requiring highly sophisticated legal expertise, such as in tax avoidance cases, are unlikely to be fully replaced by AI in the near future, because they: (i) belong to the domain of cognitive non-routine tasks; (ii) engage powers of persuasion, judgement and common sense (including creative and social intelligence); (iii) take place in complex situations; and (iv) often require group work or face-to-face interactions with stakeholders (clients, employees of tax authorities, judges, etc.).

If AI achieved those capabilities, it would be an articulation of what is known as artificial general intelligence (AGI), i.e. AI with human-level general intelligence *and* computational capacity exceeding that of humans millions of times. Such AI programs would quickly become capable of *everything* (i.e. become an artificial super intelligence, ASI).^[9] So why use it only or mainly for tax law?

It is clear that AI in its current state of development can be used to augment the work of a lawyer, including work on taxes, rather than replacing them.^[10] Recent commercial AI projects have shown this assertion to be true. These AI projects are supporting lawyers in legal research, organization and management of legal tasks, and in predicting outcomes of legal cases.^[11]

This shows that the current marriage of AI and tax law is not yet very fruitful, but it is promising. In the near future, it presumably gives a birth to many children in the form of various AI & tax law programs, which will be capable of helping tax lawyers or accountants to perform their tax related tasks faster and better, effectively augmenting their work. In the long term, however, tax law will have to accept the polyamorous relationship with AI, since AI may become AGI willing to marry many objects more appealing than tax law. Consequently, a reasonable scepticism towards AI in the area of tax law is advisable, likewise a property separation of spouses (AI & tax law).

[1] AI is a very broad term and therefore may be confusing. For the purpose of this draft, AI is understood broadly as "activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment". For more on this, see N. Nilsson, *The Quest for Artificial Intelligence: A History of Ideas and Achievements* p. 13 (Cambridge U. Press 2009): "The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience." Such activities and/or processes are very multidisciplinary, including engineering, statistics, linguistics, logic and computer science. See B.J. Copeland, *Artificial intelligence* (last updated 3 May 2018), available at www.britannica.com/technology/artificial-intelligence (accessed 17 January 2018). In order to avoid confusion, technically, machine learning is a subfield of AI. See P. Domingos, *The Master Algorithm: How the Quest for the Ultimate Learning Machine will Remake Our World*, p. 8 (Basic Books 2015).

[2] See Ch. Stevens, V. Barot, and J. Carter, *The Next Generation of Legal Expert Systems-New Dawn or False Dawn?*, in *Research and Development in Intelligent Systems XXVI*, M. Bramer, et al. (eds.), London: Springer, 2012, p. 12; D. E. Wilkins, *That's Something I Could Not Allow to Happen*, in *Hal's Legacy: 2001's Computer as Dream and Reality*, Massachusetts: MIT Press, 1997, p. 305; C. Shank, *I'm Sorry, Dave, I'm Afraid I Can't Do That: How Could HAL Use Language*, in *Hal's Legacy: 2001's Computer as Dream and Reality*, Massachusetts: MIT Press, 1997, pp. 182-186; M. McJohn, *Review of the "Artificial Legal Intelligence" by Pamela N. Gray*, *Brookfield, VT: Dartmouth Publishing Co., 1997*, 12 *Harvard Journal of Law & Technology* 1, 1998, p. 252.

[3] Cf. Ch. Stevens, V. Barot, and J. Carter, *The Next Generation of Legal Expert Systems-New Dawn or False Dawn?*, in *Research and Development in Intelligent Systems XXVI*, M. Bramer, et al. (eds.), London: Springer, 2012, p. 12.

[4] See S. M. McJohn, *Review of the "Artificial Legal Intelligence" by Pamela N. Gray*, *Brookfield, VT: Dartmouth Publishing Co., 1997*, 12 *Harvard Journal of Law & Technology* 1, 1998, p. 253.

[5] See R. E. Susskind, *The Future of Law*, 1996, pp. 120-125.

[6] See C. B. Frey & M. A. Osborne, *The Future of Employment: How Susceptible Are Jobs to Computerisation?*, available online at: https://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf (24/1/2018).

[7] See C. E. Rasmussen & H. Nickisch, *Gaussian processes for machine learning (GPML) toolbox*, 11 *The Journal of Machine Learning Research*, 2010, pp. 3011-3015.

[8] See J. Manyika, et al., *A Future that Works: Automation, Employment, and Productivity*, the McKinsey Global Institute (MGI), January 2017, pp. 5-6; M. Arntz, T. Gregory and U. Zierahn, *The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis*, OECD Social, Employment and Migration Working Papers, No. 189, Paris: OECD Publishing, May 2016.

[9] See T. Urban, *The AI Revolution: The Road to Superintelligence*, Wait By Way, 22 February, 2015, available at <https://waitbutwhy.com/2015/01/artificial-intelligence-revolution-1.html>.

[10] Cf. A. Krishna, M. Fleming and S. Assefa, *Instilling Digital Trust: Blockchain and Cognitive Computing for Government*, in *Digital Revolutions in Public Finance*, S. Gupta, M. Keen, A. Shah and G. Verdier (eds.), Washington: International Monetary Fund, 2017, p. 194. These authors stated that cognitive systems are the perfect partners in high-value jobs that require human judgment, domain expertise, goal setting, good relations with clients and creativity.

[11] See, for example, "ROSS Intelligence", which serves mainly for legal research in the domain of bankruptcy law (<http://rossintelligence.com>); "Clio", which automatizes certain processes relevant to legal work (e.g. billing, calendaring, and task management) (<https://www.clio.com>); "Anaqua", which protects g and manages IP portfolios (<http://www.anaqua.com>) and "Disco", which focuses on e-discovery (e.g. storing and managing digital data in order to identify and front-load relevant documents early stage of their review (<http://www.csdisco.com>). See more B. Goodman & J. Harder, *Four Areas of Legal Ripe for Disruption by Smart Startups*, *Law and Technology Today*, 2014, available online at: <http://www.lawtechnologytoday.org/2014/12/smart-startups/> (accessed: 24/1/2018); *Is Artificial Intelligence No Longer Cutting Edge?*, available online at: <https://biglawbusiness.com/is-artificial-intelligence-no-longer-cutting-edge> (accessed: 20/3/2018). For AI with "predictive function" see, for example, Lex Machina, which, in respect to patent law, aims to predict how likely a judge will grant or deny a specific motion or how likely a judge is to find infringement of a patent, fair use of a trademark (<https://lexmachina.com/legal-analytics>).