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The Revolutionary Impact of Artificial Intelligence on the Future of the Legal Profession

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Abstract: Two decades into the 21st Century, it is abundantly clear that Artificial Intelligence technology will fundamentally change the legal system as well as the economics of our daily lives. During the early years of AI development, computers successfully surpassed humans only in complex games requiring exceptional intelligence (e.g., chess, Go, Shogi). The legal profession assumed that AI would be unable to master the nuances and ambiguities of language and the skills required of first class lawyers. The recent history of AI advancement proved that assumption wrong. When combined with the new focus of neuroscientists and related disciplines on the study of the human brain, AI stands on the threshold of exceeding human intelligence in the areas which have historically been the exclusive domain of the legal profession. There is currently a broad array of important tools in the AI field which lawyers may use to improve efficiency and profitability, These AI tools are just the beginning. We can also anticipate that AI will necessarily and substantially affect decisions traditionally relegated to the autonomy of individual citizenry as well, with dramatic consequences. This paper attempts to identify the implications of AI technology on the legal profession, the broader society in which it operates, and the challenges confronted by the next generation of lawyers and law students.

Keywords: Artificial Intelligence; legal profession; project debater; neuroscience

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I. Alpha Zero

Let us begin by focusing on one the most significant turning points in the AI saga — which seems like ancient history to so many. In 1997, IBM's computer Deep Blue, the most advanced computer at time, confirmed the premonitions of many: a machine defeated Garry Kasparov, then the world's pre-eminent chess player (the score was 3½ to 2½). Some dismissed this at the time as attributable to perhaps a "bad day" for Garry — an aberration, and not proof of the superior capability possessed by machines. And, in fact, human chess players did indeed still flourish in the immediate years that followed. Teams composed of *both* humans and computers still proved superior to computers playing it alone.

Professor Yuval Harari of Hebrew University recently published an insightful book addressing what is ahead in the 21st century (Harari, 2019). Commenting on the Kasparov loss, he noted that in the aftermath, AI was used to train human prodigies, and together — that is humans working with the mechanical/electric computer, defeated this new and formidable competitor.

However, in recent years, Professor Harari highlights, "computers have become so good in playing chess that their human collaborators have lost their value and might soon become entirely irrelevant." To prove his thesis, he cited the December 6, 2017, "crucial milestone" when Google's Alpha Zero program defeated the Stockfish 8 program. Stockfish 8 had earlier won a world chess championship in 2016. It was given access to centuries of accumulated human experience in chess, combined with more recent computer data. By sharp contrast,

the Alpha Zero program had been exposed to *nothing* in terms of chess strategies by humans. It relied *entirely* on the latest AI machine-learning principles — not even standard chess openings from human sources. Alpha Zero played against itself.

In this 2017 champion faceoff, Alpha Zero swept the table! In 100 games, it tied in 72, and won 28. Since Alpha Zero had learned nothing from any humans — unlike its competitor machine which had the benefits of centuries of human experience, its winning moves and strategies were unconventional and unprecedented to human perception. Their moves were beyond human ingenuity.

And how long did it take for Alpha Zero to learn chess from scratch by playing against itself unhindered by human input? Four hours is the answer! From complete ignorance to complete mastery! Professor Harari tells us that if chess is the "canary" to test how humans fare, we have been warned that the canary is dying. And chess is just the first of many. Checkers, backgammon, then Jeopardy followed. And, surprising to some, Alpha Zero proved more powerful than humans in the games of Go and Shogi, which was perceived as an impossible feat just a few years ago.

II. IBM's Project Debater Debut in 2019

Some in the legal profession may take comfort by fooling themselves that lawyers need not worry about being displaced by an AI computer that only prevails — they erroneously believe — in high level games. They may feel that dealing with the nuances and ambiguities of language, assessing and evaluating complicated facts, fashioning creative arguments designed to prevail when presented to judges and government officials, etc., are surely beyond the reach of AI driven computers.

Yet AI has now, in fact, reached that very point. IBM recently announced the advent of Project Debater, a new AI computer system: "In development since 2012, Project Debater is IBM's next big milestone for AI, following previous breakthroughs like Deep Blue (1996/1997) and Watson on Jeopardy (2011)" (International Business Machines, 2021). This breakthrough is described as follows:

"Project Debater is the first AI system that can debate humans on complex topics. Project Debater digests massive texts, constructs a well-structured speech on a given topic, delivers it with clarity and purpose, and rebuts its opponent. Eventually, Project Debater will help people reason by providing compelling, evidence-based arguments and limiting the influence of emotion, bias, or ambiguity *(Id.)*.

On March 18, 2021, the cover article in Nature magazine (Slonim, Bilu, Alzate et al., 2021), a leading international journal of science, provided details on the underlying research (IBM Research Editorial Staff, 2019; IBM News Room, 2019). Authored by several dozen IBM employees, and reflecting 10 years of work, the article outlined the achievement of this potentially revolutionary accomplishment.[1] Project Debater's objective was to compare the capabilities of an AI designed system with a champion human debater: In this case, the grand finalist in the 2016 World Universities Debating Championships, Harish Natarajan (who was the Garry Kasparov equivalent in this latest contest). Audiences were employed to determine the winner of a variety of arguments and motions relating to issues of public importance; the contestant who was able to pull more votes to its side was declared the winner. For purposes of its data base, the AI system drew a knowledge base from a "large corpus of some 400 million newspaper articles" (*Id*.). The exercise from the perspective of the human participant was quite similar to arguing issues of law, fact and precedent very familiar to legal practitioners.

Although the bottom line outcome was an overall loss in the initial competitions, the AI system scores were "rather close to the human expert scores" in many areas. Acknowledging the "the fundamental differences between debating with humans as opposed to challenging humans in game competitions," the IBM researchers concluded that "novel paradigms" in AI development will still be required before consistent wins are credited to AI, as has now been achieved in the world of games. In the interim (which may be very short-lived), Project Debater is portrayed as a highly valuable tool that will eventually "help

[1] It should be noted that since 2014, the IBM Project Debater team has released more than 50 technical papers and associated benchmark datasets across multiple research domains.

people reason by providing compelling, evidence-based arguments" (*Id.*).

The reader is encouraged to read an account of an illustrative debate between Harish Natarajan and the IBM Project Debater before an estimated 300 people in Cambridge, Massachusetts on November 21, 2019. The proposition at issue: "AI will not be able to make morally correct decisions because morality is unique to humans." It ended with this dramatically thin margin:

"The audience had three doors to choose from to go through — a 'ayes' door in support of the proposition, a 'noes' door in support of the opposition, and 'abstain' door for those who were wavering. The narrow majority crowded in front of the noes door — meaning that they voted in favor of AI *(the final tally: 48.17 % ayes, 51.22 % noes and 0.61 % abstention)"* (IBM Research Editorial Staff, 2019; IBM News Room, 2019).

III. New Research into the Brain

While dramatic advances in AI proceed, neuroscientists are just beginning to understand the complexity of the human brain. Weighing just three pounds, and encased in a very small space, this miracle organ contains over 100 billion neurons floating in cerebrospinal fluid[2] (Walsh, 2021). Yale University is one among many institutions of higher education that are now focusing of truly understanding how the brain works. It recently established three new interdisciplinary centers to understand these incredible phenomena. The Center for Neurodevelopment and Plasticity will undertake research on "where does cognition come from"; the Center for Neurocognition and Behavior will examine "what is cognition and how does it manifest itself"; and the Center for Neurocomputation and Machine Intelligence will examine

[2] Fashioned by nature in an evolutionary process over billions of years and fueled by the energy of the Big Bang, astrophysicists and neuroscientists inform us that under microscopes and through telescopes, the visual patterns of human neurons and the stars and galaxies of the universe are "strikingly similar." See for a full discussion (SciArt Magazine, 2020), where substantial differences are also identified in this fascinating comparison.

"how can cognition be modeled" using the most advanced technology available (Walsh, 2021).

The head of these three Centers summarizes their challenge as "The question is: how do you make sense of this broad range of information [in the brain]? How do you relate something as complex as thought, decision, or language to chemicals and synapses?" (Walsh, 2021). The ambitious research underway at Yale, like similar projects replicated around the world, is likely to yield even more dramatic advances in AI technology as neuroscientists, psychologists, and disciplines from every sector devote enormous resources to such issues. The potential here is beyond our ability to even imagine.

IV. The Implications for the Legal Profession

AI as already been deployed as important tools in the legal professions in what should be viewed as phase 1 of the new era. These AI tools are designed to improve productivity and provide better legal services to clients — as well as increase legal firms' profitability. Phase 2 of AI development will trigger more dramatic changes as discussed below.

Current examples include (Cerny and Delchin, 2019):[3]

1. Electronic Discovery

Through a method of predictive coding, AI technology categorizes documents as responsive or nonresponsive, relevant or irrelevant, among other classifications, after reviewing the massive amounts frequently assembled in the litigation discovery process (Gordon and Ambrose, 2017). It reduces what may take months of laborious screening into days, if not in some cases even hours.

2. Litigation Analysis/Predictive Analysis

AI also is being used to predict the outcome of litigation and the probabilities of prevailing through methods of predictive analytics. AI tools utilize case law, public records, dockets, and jury verdicts among other sources to identify patterns in past and current data (Miller, 2017). Such analysis is also used to determine which large cases are

[3] The listing of seven examples cited in this article is based on the excellent summary by lawyers in the prominent law firm of these authors.

worthy targets of speculative financing, a growing area of a burgeoning investment community.

3. Contract Management

AI tools can identify important information in contracts for special analysis and monitoring, such as termination dates, most favored nation clauses, indemnification obligations, choice of law provisions, and other clauses that have high value in complex undertakings (Miller, 2017).

4. Due Diligence Reviews

AI assists in due diligence review for corporate transactions to reduce the burden of time-consuming examinations of thousands, and sometimes tens of thousands, of corporate documents that must be carefully reviewed in the merger and acquisition world. AI assists in the task of identifying especially important key provisions (liabilities, mortgages, etc.) in key clauses from contracts, or pending lawsuits or government investigations which might otherwise be overlooked in human reviews that may be associated with substantial financial exposure (Donahue, 2018).

5. "Exposure" Identification

AI is being used to search company records to detect activity that might also expose a corporation to substantial liability because of non-compliance with regulatory standards. Compliance Control programs are now an accepted part of every major corporation, and AI can uncover attempts to disguise wrongdoing and identify code words (Miller, 2017). AI can also review employee emails to determine suspicious conduct that requires further inquiries (Partnoy, 2018).

6. Legal Research

With AI, lawyers can rely on natural language queries to return more meaningful and more insightful results (Miller, 2017). AI can be used to generate as well as to double check for accuracy and completeness: basic legal memos, legal opinions, contracts, and almost every form of legal documents that are the bread-and-butter of legal practice.

7. Deception Analysis

Researchers are working on developing AI that can detect deception in the courtroom which is frequently exceedingly difficult, especially because the time for analyzing unfolding testimony is measured in minutes, if not seconds. By relying on micro-expressions known to

indicate that someone is lying — frowning, eyebrows raising, lip corners turning up, lips protruded and head side turn, the AI system was reported to yield a 92 percent accuracy (Best, 2017).[4]

V. The Fundamental Transformations Ahead

The foregoing listing of AI tools are designed primarily by the private sector to empower lawyers to accomplish traditional tasks. The real challenge ahead, however, will occur when AI approaches — and then exceeds, human intelligence — a finish line that few doubts. Ray Kurzweil, former Director of Engineering for Google, and author of five futuristic books, informs us we have already entered the decade where this goal may be reached:

"The expectation is that computers will pass the *Turing* test, meaning that computers will be able to think like a human, by 2029 and at that point computers actually will do everything that humans can do far better than any human" (Ajmera, 2020; Blais, 2020).

Whatever the year (Elon Musk placed it at 2025), it appears inevitable (IANS, 2020). At such time, the legal profession must be prepared to accept AI-based determinations that displace traditional methods on a scale, and with consequences, that are now hard to conceive.

A few examples illustrate possible future scenarios:

i. Project Debater, discussed earlier in this article, is likely to follow the trajectory of its IBM sisters Deep Blue and Watson and ultimately out-compete its human competitors, once new "paradigms" are developed.

Under circumstances where AI is capable of winning in head-to-head (or one should say:machine-to-head) debates on issues of public policy, including resolving legal disputes, big corporation will surely opt to retain AI advocates for their positions. Recalling the post-Kasparov decade, note that initially human chess champions worked *together* with computers, but later fell by the wayside because of their second-

[4] For additional applications of the AI tools now available, see: https://emerj.com/ai-sector-overviews/ai-in-law-legal-practice-current-applications/ (Business Intelligence Analytics, Mar 14, 2020).

rate performance. The same fate may *foreseeably* await experienced lawyers and law firms.

ii. When AI computers can soundly evaluate complex facts, assess the legal issues presented, and render optimal decisions based on the applicable law and facts, will they replace judges and regulatory panels in their entirety?

Are judges — for that matter any human decisionmaker — required, if wiser opinion can be achieved more efficiently, more thoroughly, and more timely, through AI? From more routine (although still difficult) decision (e.g., whether to grant a prisoner probation or parole) to defining "the relevant market" in complicated antitrust and competition cases, why not utilize the "smartest" judge in town?

iii. In cases dependent on the credibility of witnesses, AI may employ sensors that measure blood pressure, voice patterns, eyes movements, etc., in order to identify perjurers and false statements.

What role do judges, or juries, play when credibility is no longer an issue in the legal system because of AI? Indeed, in the criminal justice sphere, can the process be reduced to simply asking the defendant: "Did you do it?" The mere existence of such arguably infallible techniques will surely alter the dynamics of any investigation, civil as well as criminal, in the 21st century.

iv. Will corporate lawyers who specialize in mergers, bankruptcy, acquisition and liquidation matters be necessary, or certainly relied upon to the present extent, when AI can replicate their services (in whole or in part) and achieve the objectives of the parties more efficiently and effectively?

Given the premise of this section of the article — that AI ultimately becomes "more intelligent" than humans, the answers to all these questions are self-evident.

v. What role do legislatures and parliaments play when AI can evaluate the pros and cons of any proposed legislation and simultaneously assess whether the voter base supports or opposes the provisions?

If AI tells the representatives that the legislation lacks public support, can it be approved? Would passage be legal — or, or at the very least, prudent?

VI. The Deeper Meaning of an AI Dominant World

Professor Harari's book referenced earlier probes deeper into the AI world of the future, and poses troubling questions as to the effect of AI on man's relationship with society, and with himself/herself. In his thoughtful analysis, these are among his questions, starting with the somewhat mundane and ascending to the very profound:

"Every year millions of youngsters need to decide what to study in college. This is a very important and difficult decision. What does it take to succeed as a lawyer? How do I perform under pressure? Am I a good team worker? In the future we will be able to rely on Google to make such decisions for us. Google could tell me that I would be wasting my time in law... but that I might make an excellent (and very happy) psychologist or plumber. Once AI makes better decisions that we do about careers and perhaps even relationships, our concept of humanity and of life will have to change. What will happen to this view of life [about our making choices] as we increasingly rely on AI to make decisions for us?.. As authority shifts from humans to algorithms, we may no longer view the world as the playground of autonomous individuals struggling to make the right choices. Instead, we might perceive the entire universe as a flow of data, see organisms as little more than biochemical algorithms, and believe that humanity's cosmic vocation is to create an all-encompassing data-processing system — and then merge into it" (Harari, 2019, pp. 56–57).

The apocalyptic-like consequences of AI foreseen by Professor Harari are more than unsettling, and highlight the perilous course ahead. They call to mind the words of one of America's greatest constitutional judges and scholars, Justice Louis Brandeis. He viewed individual autonomy and independence as essential to the health and psychological well-being of a nation's citizenry. In a decision now considered one of the classics of American jurisprudence, Justice Brandeis opined:

"[Our founders] undertook to secure conditions favorable to the pursuit of happiness. They recognized the significance of man's spiritual nature, of his feelings and of his intellect. They knew that only a part of the pain, pleasure and satisfactions of life are to be found in material things. They sought to protect Americans in their beliefs, their thoughts,

their emotions and their sensations. They conferred, as against the government, the right to be let alone — the most comprehensive of rights and the right most valued by civilized men" (Brandeis, 1928).

Where AI may take modern society and how it will affect the human condition are highly uncertain. But it is absolutely clear that AI will usher in very fundamental changes. The legal profession has the responsibility by virtue of the privileged positions it holds in each nation to react to these challenges intelligently and humanely, and to harness the enormous power of AI to create a more just and equitable society.

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