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"Get nothing wrong": perspectives on the functions and fallibilities of professionals and algorithmic technologies in law and justice

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Introduction

In this paper, we explore questions about the definition and constitution of expertise and experts as algorithmic technologies impact professional work. It is the aim of this paper to analyse the effects the implementation of Artificial Intelligence (AI) on professions, focusing on law and justice. We draw on Eyal's (2019: 26) typology of different conceptions of expertise, and analyses that disaggregate expert work at the level of tasks (Sampson, 2020), to identify "what experts do". This allows us to examine differing degrees and forms of expertise in different facets of expert work (Dreyfus and Dreyfus, 2005). Part of a professional logic is to "get nothing wrong", yet the use of algorithmic technologies introduces new sources of imperfection, as well as revealing existing (human) ones. Based on the introduction of cases in law using algorithmic technologies, we propose a framework for understanding the different

ways algorithmic technologies do and do not reconstitute the different roles and practices of professional experts.

By questioning the nature of expertise, we seek to understand the effects of algorithmic technologies on the professions in a way that transcends binary positions that proclaim either the death of the professions (e.g., Susskind and Susskind, 2015) or continuity and failed revolution (Sutton et al., 2016). By decomposing the work of experts and identifying when algorithmic technologies have or have not changed roles and practices, we develop an understanding of both the opportunities and limitations of change and the implications for current and future conceptions of experts, expertise and professions. This advances debates about augmentation and the way professional work is enabled by algorithmic technologies (Raisch and Krakowski, 2021) by revealing both the practices augmented and the implications for those practices and others that are connected to them. Our approach also allows a wider understanding of the functions and fallibilities of algorithmic technologies in the professions, and how they are contributing to the evolution of the role of experts in society. This in turn opens up questions about regulation, ethics and trust, which can be addressed through the more nuanced understanding, provided by our analysis, of the interactions between algorithmic technologies and human experts.

In this sense, this paper makes the following contributions: (1) We investigate the use of AI in law and discuss concrete examples, (2) we apply Eyal's framework to certain cases of law and justice, and (3) we reflect on the role of AI with regards to functions and fallibilities of professionals in the legal sector.

The paper is organized as follows. After the introduction, we introduce the conceptual framework referring to the state-of-the-art of AI and professions, law and justice as professions and the Eyal's framework. Then, we present the methods applied, and point to illustrative case examples. In the discussion section, we summarise the findings, discuss the contributions and the study's limitations. Finally, this paper ends with perspectives for future research.

Conceptual framework

AI and professions

To understand the effects of using AI in law, we capture the findings of the state-of-the-art in other but related professional contexts such as policing, criminal justice, and medicine. Within these fields of expertise, studies have been exploring how algorithmic technologies mediate

professionals (Lebovitz et al., 2021, 2022), and highlighted how knowledge and expertise are changing (Brayne, 2017; Waardenburg et al., 2022).

For instance, by exploring the case of "predictive policing", Brayne (2017), focused on how predictive algorithmic technologies are used and alter professional discretion within the police, and how this discretion among the front-line policemen was partly redistributed to the algorithms and their developers. Brayne followed the use of the tool Palantir in a Los Angeles Police Department, and observed the central role of risk scores when using algorithmic technologies. In deciding which geographic areas to pay specific attention to, the police were increasingly relying on algorithmic risk scores rather than experience. Brayne notice how the ability to combine and merge data from various databases makes it easier to include and surveil larger parts of the population including people who have no prior direct contact with the police. Relatedly, Christin (2017) explored the use of the risk-assessment tool COMPAS in criminal courts. The tool assessed the "risks of violent recidivism, general recidivism, and pretrial release, ranging from 1 (low) to 10 (high)", and Christin explored how this affects decisions made within the expert field of criminal justice (Christin, 2017: 5). In contrast to Brayne, Christin (2017) found that the expertise of judges was less reconfigured. Often the judges would decouple from the algorithmic input and not use it in their decisions.

Another important body of literature on professions and AI is found within studies of medicine and healthcare. In a study of artificial intelligence in radiology, Lebovitz and co-authors (2021) revealed that the radiologists struggled to translate between the algorithmic outputs providing a "knowing-that" kind of knowledge, and the "knowing-how" to approach a problem, which is a more experience-based kind of knowledge. Further, in another study, Lebovitz and co-authors (2022) showed how the use of algorithmic inputs ended up being either ignored or used in an unreflective way, hence they concluded that only an "un-engaged augmentation" was taking place. AI in medicine is also used in cancer treatment ranging from computer-aided diagnosis to decision support of treatments (Tseng et al., 2018). Tseng et al. (2018: 16) revealed that AI serves as a powerful tool to improve medical practice by reducing human labor and possible errors. Thus, AI potentially improves a patient's diagnosis and treatment precision by complementing human perception. But they also pointed to the necessary quality and quantity of data available for improving AI diagnosis support. Topol (2019) discussed the convergence of human and AI for high-performance medicine and provides a comprehensive review of peer-reviewed publications of AI algorithms compared with doctors discussing the use of AI in different medical fields. However, they also noted that although this field is high on promise, it is only relatively low on data and proof. Consequently,

the risk of wrong AI recommendations is expected to be higher than that of a single doctor-patient interaction.

Finally, AI has the potential to allow personalized medicine and treatments to be tailored to each patient's specific biological profile (Fleming, 2018; Raisch and Krakowski, 2021). However, Longoni et al. (2019) focused on the consumer side and reflect on the resistance to AI since they argued that the adoption of medical AI ultimately depends on consumer receptivity. They applied the psychology of automation to consumers in medical settings and reveal mechanisms by which consumers decide on using AI or not. In this sense, Promberger and Baron (2006) found that people are more likely to follow the recommendation of a physician than the recommendation of a computer, assuming that the computer's performance was inferior to the doctor's. In their studies, Longoni et al. (2019) identified uniqueness neglect as a psychological driver of resistance to medical AI. Consumers believed that AI providers are unable to consider the uniqueness of their case to the same extent as a human provider. While these studies takes in contexts, which are only partly connected to law and justice.

Law and justice as profession and organizational context for technology use

Law & justice provides another critical field of expertise for the study of AI within professional practices, and stands out an as-yet under-studied domains for empirical research. We use the case of legal experts to illustrate how the constitution of expertise and the effects of algorithmic technologies are mediated by profession and organizationally specific contexts in different expert groups. This allows us to consider important questions about organizational structures and governance, the data needed by algorithmic technologies, regulation, risk and trust.

Contrary to popular opinion, lawyers spend only a tiny fraction of their time in court. Most of their time is given to clarifying their clients' needs and designing appropriate solutions for them (Howarth, 2013). To do this, they constantly monitor legal developments, search the vast legal literature, select and compare legal information, draft and negotiate contracts, manage litigation files, prepare studies, and advise their – potential – clients. Over the past fifteen years, most of these practices have increasingly been taking place online, to such an extent that some authors have concluded that algorithmic technologies are disrupting the legal profession (Susskind & Susskind, 2015). Indeed, new modes of production, storage, analysis, and dissemination of legal information have been emerging, such as online dispute resolution, contract analysis, case-law prediction, legal risk management, and legal design. Today, this

evolution is brought to a new level by the advent of AI, which helps lawyers in many decision-making activities, while new types of legal services are being designed and delivered by legal tech start-ups and law firms (Dubois, 2021).

To understand the nature of the technologies in more detail, the categorization of legal tech startups by Codex, the legal tech center at Stanford, is particularly useful. They separate 1880 legal tech start-ups they have curated into 9 categories: Legal Research, Analytics, Document Automation, eDiscovery, Practice Management, Compliance, Marketplace, Online Dispute Resolution and Legal Education. The first 4 deal with what is commonly described as augmentation of legal work - this will be discussed in more depth below. The last four categories deal with online services for clients in their compliance work, their access to legal services, as well as dispute resolutions and competence development. In addition, practice management points to the augmentation of legal support services, where AI thus far has been used to a relatively limited degree. Companies such as UNIK are leveraging AI technologies in the further development of management software for the legal industry, but this area is currently under development.

To appreciate the impact of technology on legal work, it is useful to outline some concrete examples of how algorithmic technologies are being used in law. (In later sections, we explore some applications in more depth.) In e-discovery processes, automated tools are used to select and prioritize documents for review by the lawyer. E-discovery builds on predictive coding that allows a computer application to “read” and sort or organize large numbers of electronic documents, often to reduce costs. For example, CaseMine uses AI techniques to uncover latent linkages between case laws. More developed companies offer integrated solutions for analytics, legal research and eDiscovery, some of them using AI in their searches. An example, is Casetext, which enables researchers to search its database with CARA A.I., which searches for similar cases and questions across jurisdictions. Nonetheless, in a typical workflow, human reviewers code a limited number of random documents, and the technology applies those decisions to a much larger document set. Thus, the quality of the coding and analysis is dependent on the quality of those who code.

Smart contracts use a program or code to execute the terms of an agreement on its own, creating and enforcing a contract automatically, thus reducing the costs of setting up and monitoring the terms. Smart contracts often build on blockchain technology, as it allows the tracking of information and increased transparency in the process. Genie AI is an interesting case, which offers legal templates to streamline and ease contract creation and management. In particular, Genie offers clauses from relevant contracts – and develops further as more clients

use the system, suggesting a network model for many of these businesses. Also, Robin AI handles and automates contracts in the form of NDAs that are collected and organized based on AI.

Several firms offer AI solutions to automate due diligence processes. For instance, Kira automates the analysis and extraction of key provisions from contracts. Luminance Diligence uses supervised and unsupervised machine learning to provide contractual reviews, from M&A due diligence to redactions. Further, Eigen Technologies takes a somewhat broader approach and uses their natural language processing (NLP) platform to analyze unstructured qualitative data to gain context relevant insights in legal documents. In such cases, AI technologies are used to improve efficiency, gain insights and create value from data.

Law firms offer digital platforms, sold as subscriptions, which clients can use to automatically generate contracts, agreements, documents, etc., and have access to human lawyers in case they need assistance in a specific matter. In this sense, these solutions offer legal-outsourcing based on technology. Algorithmic technologies are used in managing the business, as well as the practice, of law. For example, technologies that predict the outcome of cases can inform decisions about whether and how to contest cases, and large clients use continuously more advanced technologies to map and manage their legal spend. Lex Machina uses NLP, integrating a large set of documents to predict case outcomes. Also Ravel uses NLP and machine learning to map how cases interrelate, and how judges tend to rule. These companies have been purchased by LexisNexis. At the same time, start-ups are exploring the use of AI in combination with other advanced technologies to develop new and more advanced value for lawyers and their clients from technology.

The examples above reveal two important considerations in terms of the impacts of algorithmic technologies on law: they effect particular tasks that are constituent parts of legal work, but not necessarily all tasks; and they operate in conjunction with human experts, who train and act upon the outputs of technologies. It is, therefore, particularly insightful to analyse the reciprocal shaping between algorithmic technologies and professional expertise, with the impacts offering insight into the evolving functions and fallibilities of both technologies and human experts. Furthermore, although we focus here on technology's role in the tasks and processes of legal work, the organizational and institutional context of the professional service firm (PSF) must also be considered as we try to understand how expertise is or is not reconfigured by algorithmic technologies. PSFs are distinctive contexts (von Nordenflycht, 2010), with law firms being particularly affected by the atypical governance structure of partnerships, high degrees of autonomy for professional experts, and when implementing new

technologies processes of change influenced by the limited forms of managerial authority invested in firm leaders (Faulconbridge and Muzio, 2008, 2013). The law firm context thus provides insights into how the impacts of algorithmic technologies are also mediated by organizational contexts and the associated institutions that affect everything from how the data needed by AI is managed through to decisions about how responsibility for tasks is delegated, to humans and technologies.

Conceptualising the dimensions of expertise and their links to professional practices

We draw on Eyal's (2019) framework to inform our discussion. This framework comprises a two-by-two typology of theories of expertise. On the one axis, expertise is considered to reside either within or outside the individual, and on the other axis, knowledge is conceptualized to be either abstract and explicated or tacit and situated in practice (Figure 1).

Figure 1. Typology of theories of expertise (Eyal, 2005: 26)

		What makes expert knowledge different from lay knowledge?	
		Explicit, abstract knowledge ("theory")	Tacit, practical knowledge
Where is expertise?	Inside individuals	Early AI and expert systems research	Phenomenology, critique of AI (Hubert Dreyfus)
	Outside individuals	Sociology of professions	Distributed cognition, ANT

The typology draws on early studies of expert systems (Langley and Simon, 1995), phenomenological approaches to expertise (Dreyfus and Dreyfus, 2005), the sociology of professions (Abbott, 1988), and studies of distributed cognition (Hutchins, 1995). Eyal (2013: 869) considers expertise as closely related to the ability to accomplish a task, and he defines expertise as "the capacity to get a task accomplished better and faster". Building on this, the typology suggests that expertise resides in many places, including abstract conceptual knowledge, tasks, technology, the body, and code. All of these may be considered elements in a network of expertise, and many may claim expertise in relation to a given task. This understanding provides a sensitivity to the many ways that expertise may or may not be

changed when algorithmic technologies are used, with different constituent elements of professional practices being foregrounded through different conceptualisations.

Our approach is to consider how each perspective on expertise in Eyal's framework allows us to generate insights and develop research questions, when applied to settings where law professionals are using, or contemplating using, algorithmic technologies. The guiding theme we adopt is the imperfection and fallibility of expertise, as framed and understood within each of the perspectives, and the consequences of this imperfection. We, therefore, utilize Eyal's typology to point out not only how legal expertise is being redistributed, but also how new actors may claim authority to perform certain tasks. We also consider how legal expertise might be explicated in new ways in the context of algorithmic technologies.

Research approach

We draw on a range of sources and insights for our empirical illustrations. These are mainly examples synthesized from our primary research across a range of projects. Our intention is to use the breadth of examples that this approach makes available for consideration, as a way to generate a number of insights across a range of issues. This is commensurate with the breadth of potential application of the Eyal framework, and with the stage our research has reached: our main concern is to generate initial insights and new questions. Where appropriate and helpful, we complement the synthesized primary examples with additional detail and insights from secondary sources, such as technology providers' websites. The illustrative examples are not intended to be exhaustive or theoretically sampled, but rather draw on diverse examples that we have access to, so as to generate insights from contrasts and similarities that we are able to identify and explore.

The three aspects of change that we choose to describe and explore touch on different levels of analysis. The first, augmentation, mainly concerns the level of the individual lawyer and, in some instances, those working alongside the lawyer, such as para-legals or technologists. The second is at the level of the dyad between the law firm and its client, being concerned with how technology is used to redistribute and reconfigure expertise between the two. The third has a still wider focus, as it is concerned with how differential access to technology and the data required to benefit from it may accentuate inequalities between large and small firms, and between other classes of actor, across the landscape of law firms and other organizations in the wider legal system.

Three aspects of AI-driven change

Augmentation

One of the most widely recognized roles for AI systems in legal work is augmentation. Building on literature that emphasizes the idea of humans working with AI rather than being replaced by it (Davenport and Kirby, 2016; Fleming, 2019; Pettersen, 2019), augmentation is defined as when "humans collaborate closely with machines to perform a task" (Raisch and Krakowski, 2021: 193). Fundamental to augmentation is, in particular, the idea that lawyers can enhance their expertise by working with AI and re-secure their role. But what does this augmentation involve, and what are the implications for how we think about expertise?

AI has a number of interrelated effects on the work of professionals. It removes tasks and relocates them to the domain of AI and/or 'non-professionals' that complete tasks with the assistance of AI. For example, reviewing legal documents such as leases to identify defined clause types can be done with systems such as Kira and Luminance. Lawyers would have previously reviewed documents manually (using pen and paper or PDF annotation tools). They now pass the task to the AI system and receive an output in the form of reviewed documents with significant clauses highlighted ready for further analysis. At first glance this appears, then, like task substitution – AI replacing what lawyers did previously. However, this is only part of the story.

There is also a story of new task creation. Lawyers have to train AI systems to recognize the clauses that are significant, this requiring an initial stage of marking up a set of documents to 'show' the AI system what different clause types look like in a document. Systems with machine learning capabilities can then use this initial training to develop their own expertise by reviewing hundreds or thousands of documents to identify patterns relating to the construction of legal clauses. Similarly, in systems that automate contract production, machine learning allows, after an initial period of training, AI systems to learn from reviewing banks of contracts about a range of different structures that can then be deployed when automating contract production.

There is also a story of new collaborations. AI systems need to be maintained and managed and for every review a series of parameters need to be defined, document datasets assembled and outputs managed. Whilst in some cases lawyers might perform this task, more commonly a new group of what are often called 'technologists' emerges to manage and operate

AI systems. Technologists have diverse career histories, some being lawyers that have decided to pursue an interest in the use of technology, others being computer scientists.

AI systems remove, then, some tasks from the work of experts, but create new tasks and collaborations. They also create new opportunities for analysis that can create different advisory roles for experts. As with all AI systems, those used by lawyers rely on large-scale datasets. As described above, typically this dataset takes the form of a bank of documents, some of which are used to train the system, others being made available to the system for automated review that enables machine learning and the development of new capabilities. Analysis of large-scale datasets can generate new insights into both legal documents themselves and patterns of past legal outcomes. In relation to new insights into documents, an example is the ability to review a high volume of documents to identify the recurrence of particular legal obligations, such as force majeure liabilities, to allow planning of legal strategies and exploitation of business opportunities; i.e. preemptive rather than reactive legal advice. Without the automation capabilities of AI systems like Kira and Luminance, manual review by a lawyer to identify recurrences across thousands of documents would have been prohibitively expensive. In relation to patterns of past outcomes, reviews can identify patterns relating to things such as: past legal decisions (for example by judges) which can then be used to predict the outcome of future cases; or patterns relating to the causes of legal claims, such as which contract types or employment settings create higher risks of employment disputes arising. Understanding patterns allows new approaches to be taken to advising clients; approaches that would have been impossible without the insights provided by AI into patterns in large-scale datasets. Hence, AI can create new tasks relating to the use of the outputs of AI systems to inform new kinds of analysis and advisory work that would have been impossible previously.

Augmentation has, then, multidimensional effects: it removes task and allows them to be completed more efficiently and effectively; but it also creates new tasks and new opportunities for experts. Augmentation involves therefore not only about humans working with AI, to perform a task. It is also about humans redefining their tasks in ways, as we discuss below, that have implications for how we understand expertise claims.

Lawyer-client relationship change

Another recurring use for AI-based systems is to allow clients to self-serve with legal advice. Law firms adopt and adapt commercially available systems, incorporating their lawyers' legal

know-how into a tool that provides context- and task-specific advice to clients' staff such as in-house legal teams or procurement agents. One example of this is in relation to contracts, both the writing of contracts by a law firm's clients, and their evaluation of contracts proposed by trading counterparts such as suppliers. The law firm draws together their experience and expertise related to the contracting needs of the client or sector, and this is captured in the system. The AI is then used by the client in conjunction with their contract drafting technology (e.g., MS Word) and provides context-specific, pop-up advice and suggestions in relation to particular clauses and phrases in the contract, as the client's staff work on the contract. Rather than seeking advice from their legal service provider in a series of many small enquiries, clients can self-serve for most queries, and only need to resort to direct enquiries to the law firm's staff for occasional, more complex matters. This means the client's work can continue without interruption, and that the law firm's staff do not have to deal with many small, relatively trivial matters, but concentrate on larger, more interesting ones. The access to the technology is typically paid for on a per-licence basis. In some cases, the clients are other law firms, who may benefit from a technology-providing law firm's distinctive expertise in a particular area of law. Systems are adapted for different legal areas, such as: contract law, data protection (GDPR compliance etc.) and cyber security, intellectual property, finance and M&A, family and company law. In some cases, the technology is mingled with traditional approaches, so that clients may enter via the traditional routes but be guided toward technology-based provision where appropriate, for particular aspects of the work they require.

As well as providing the convenience of real-time advice to clients' staff, self-serve technologies can, in some instances, allow client employees with lower levels of legal skills – para-legals or even procurement agents – to complete tasks that would normally require greater legal expertise. Thus, we see the legal expertise of the law firm's staff captured and made available under the control of the client, augmenting the expertise of the human employees in the client firm, whether that be the in-house legal team in a commercial organisation, or the staff in another law firm, and potentially reducing cost by allowing clients to use cheaper, less expert staff.

The client's judgement about the quality of the service shifts from evaluating the competence of lawyers in the law firm providing the service, to evaluating the competence of both the lawyers – in the form of the "baked in" expertise – and the technology, in respect of when/how it offers which advice. The function of the AI component is to recognise combinations of circumstances and provide relevant advice at the right time or the right place in a document. In terms of the institutional evaluation or accreditation of expertise, without the

technology, the accreditation of the lawyer is what matters; with the technology, what might be accredited? One element is the expertise of the team of lawyers whose knowledge is embedded in the software: in at least one instance, the website description of each of the document packages names the legal experts who have helped develop and scrutinize the content. But another element is the technology itself, since it plays a part in "deciding" what advice to give under what circumstances. Do we need to have "accredited technology"?

Reconfigured assemblages of legal expertise

As noted in the previous section, new technologies now allow lawyers to work differently, i.e., faster, more effectively, more accurately and more efficiently. While little is known at present about the concrete uses of these technologies, i.e. how many lawyers use them and how often, at what cost and with what added value, and while ethnographic research would be welcome to answer these questions (Salmerón-Manzano, 2021), several hypotheses can already be formulated. They concern, in a general way, new forms of dependence of lawyers on AI tools, datasets, experts, algorithms, and hardware.

AI tools can increase lawyers' task efficiency, allow them to reduce their working time, and speed up their practices (research, analysis, structuring, writing, etc.), but all of this comes at a price. And if some lawyers increasingly rely on these tools and technologies, we assume that these tools are not affordable for every lawyer. Consequently, AI tools probably increase the inequality between the firms that can and those that cannot afford them. Taking this one step further given that lawyers are taking part in the justice system, the use of AI tools by lawyers might increase inequality in the justice system. The use of AI tools seems to give lawyers, especially from private – big – law firms 1, an advantage compared to public prosecutors and judges. This most likely is even further amplified by the differences in structures, objectives and incentives of private versus public justice organizations.

New technologies require a large amount of data to be collected, structured by often invisible digital work, then generated and maintained on a daily basis by the use of databases. We assume that important sources of legal data are not yet widely available, open and shared, i.e. easily and freely accessible to every lawyer. Even if the data would be available, data quality and integrity as well as client privacy are crucial, yet hardly understood how to secure this. Specifically, privacy is mainly regulated on the level of individual persons. The lack of regulations on privacy of groups and the use of big data on beyond-individual level might again strengthen the perceived inequality in society. Thus, in addition to technical issues, legal,

ethical and social values are at stake when retrieving and using big data. How to secure enough data to allow technology to support professions while considering these values?

While NLP and ML systems require a large number of records to learn and produce effective results, some experts suggest that a database of at least two million files is required, including contracts, decisions, rulings, etc. (Johnson Raba, 2022). Not all areas of law allow the collection of such large amounts of data, especially in a competitive field. Therefore, firm size matters, which again reinforces the inequality between the firms capable and those unable to collect big data. An alternative is the creation of collaborative networks between medium and small law firms, but do they really use them? And why?

AI tools are leading to the redefinition of the techno-legal infrastructure of law firms (Ontanu, 2019). New professional profiles are also emerging, like technological and techno-legal experts. However, which organizational structures are able to employ or collaborate with such experts? Again, we assume that big law firms have more capacity to have such in-house experts, who need big data to develop innovative technologies and develop their own expertise. And what about small and medium law firms? And what about professions as bodies of knowledge? Are lawyers increasingly belonging to an inter-professional jurisdiction? Given that AI tools are mainly made of algorithms and code, the use of AI tools and the need for techno-legal infrastructure raises even further questions. Are their users, whether they are lawyers or IT specialists, able to explain the knowledge and expertise inscribed in these algorithms? Or do they depend on certain black boxes whose operation is partly based on zones of ignorance? And don't these new tools deprive lawyers of a certain know-how in terms of research and analysis?

Finally, these AI tools are systematically operated on the basis of hardware, the costs, breakdowns, maintenance and efficiency of which are all areas of uncertainty that require technical, commercial and management expertise (Mania, 2022). Are these areas of expertise being internalised in (some, but which kind of) law firms, or do they remain located in distribution networks?

As we can see, the new reconfigurations between the legal profession and techno-legal expertise probably lead to new forms of inequality between lawyers, between law firms, but also between lawyers and magistrates' professions and organizations. These socio-material reconfigurations are happening between the technical and human entities that make up the law. And they most certainly affect the law being produced by these new socio-material agencies, requiring new forms of expertise to unravel the making of law.

Discussion & Conclusions

The aim of this paper is to analyse the effects of implementing AI on professions, focusing on law and justice. We develop our analysis by drawing on examples of when algorithmic technologies have and have not been used by legal experts and the impacts thereof. This allows us to distinguish between scenarios when roles and practices are replaced, augmented, reconfigured and unchanged. The paper's contributions are threefold. We provide concrete examples of the use of AI in law and justice, in a way that reveals the details of the role and impacts of the technologies. In particular, we reveal the changes occurring and some of the finer details of what drives the change and the implications for legal experts, the reasons for continuity in some aspects of expert work, and some of the wider ramifications when AI, the big data it draws on, and technological investment reconfigure expert occupations. Second, the three aspects focused upon allow us to apply Eyal's framework to the case of law and justice, something we develop further below. Finally, and also below, we reflect on the role of AI with regards to functions and fallibilities of professionals in the legal sector.

Our analysis reveals the different characteristics of the role and practices of experts in different task domains, the affordances of algorithmic technologies, and the way organizational contexts mediate the use of the technologies. These insights can be better understood through each of the four perspectives in Eyal's typology (see Figure 1).

Starting with the top left of the diagram and the focus on explicit knowledge, early AI was based on the notion of expertise being abstract knowledge that is held by the individual – in our setting, the individual lawyer. Except for a very few applications of expert systems, designed to apply to very narrow and closely defined sets of legal problems and associated tasks (e.g., handling high-volume, repetitive and very similar insurance claims), this conception of expertise, and therefore technology based on rules-based logic, is now rarely applicable. The latest generations of AI use machine learning in ways that move beyond the idea that expertise can be captured in explicit form. They instead rely on the continuous development through machine learning of pattern recognition within datasets.

The top-right of the diagram and the focus on tacit knowledge has significantly more relevance when considering the impacts of the algorithmic nature of contemporary AI. Consider, for example, how in our discussion of changes to lawyer-client relationships, clients may now judge expertise not just by the credentials of the lawyer as a proxy for tacit knowledge, but also by the capabilities of the technology and the specialists operating the

technology. This perspective allows us to begin to develop a reframed definition of expertise that considers relationally the interaction between humans and technology. One of the main claims about the distinctiveness of human experts compared to AI is the ability of humans to use experience and accumulated tacit knowledge to prescribe treatments that respond to context specificities, ambiguities and the particular interests of a client (Fleming, 2019; Pettersen, 2019). Such claims, while still valid, cannot be understood in isolation for discussion of AI and how it develops its own tacit capabilities and contributes to the development of the tacit knowledge of human experts. Machine learning, and the insights that can only emerge from the large-scale data analysis and pattern recognition that AI is capable of, generate new forms of tacit insight that are particularly relevant for predicting outcomes of legal cases and identifying through eDiscovery new relationships between legal rulings and precedents. Such pattern-based tacit insights are an increasingly important contributor to the ability of human experts to engage in effective prescription. As a result, the tacit practical knowledge of humans becomes increasingly difficult to disaggregate from the abilities of AI systems. This brings into sight the way contextualized understandings of risk, ethics, societal responsibility and data management all play a role in a human-technology interactions and a reconstituted understanding of expertise. It also bridges to further questions relating to the other two cells in the diagram.

Moving to the bottom right of the framework foregrounds even more the particular form of the technology and its contribution to expertise, as illustrated in our discussion of augmentation. Some technologies essentially provide data inputs upon which the human expert exercises judgment. Other technologies, however, involve greater translations of expertise by setting parameters in an algorithmic search tool, using dashboard summaries of output as a basis for decision-making, or providing compelling graphical displays of analyses that are then used in client meetings to develop solutions and provide more wide-ranging advice. Technologies also develop their own interpretations such as predictions of the outcomes of cases, which then influence the actions of professionals. In this sense, then, we can conceive of an expertise that is distributed across a network of humans and technologies. The human professional is no longer the sole locus of expertise construction.

Finally, as we move to the bottom left of the framework, we also show that a reframed definition of expertise raises questions about how the expertise of the system is evaluated, judged and regulated. This may include the qualification of technologies, as well as of professionals, and the extension of professional bodies' spheres of influence to include

technologists as well as lawyers. Technologies can also alter the boundaries between professional jurisdictions. For example, the "Big Four" accountancy firms have used technology to take on routine legal matters for their clients, thus challenging boundaries around the markets of law firms. Furthermore, while lawyers have always worked with support staff, the role has changed. Previously, the 'para-professional' operated alongside the lawyer to deliver non-technical inputs such as typed documents or manage databases to provide access to documents needed for legal research. The role is now better conceived of as 'allied-professional', as those without licenses to practice as a lawyer, and in some cases individuals with no legal training but computer science expertise, operate AI systems and become active contributors to the production and delivery of advice to clients. Such changes are significant because the literature on the sociology of the professions (Abbott, 1988; Krause, 1996; MacDonald, 1995) explains how different expert groups seek to protect their work and distinguish themselves from other groups, with the result that only 'insiders' to the profession are authorized to deliver services. While such protections remain in place for lawyers, the boundaries are increasingly blurred by AI, with technologists being able to conduct some of the diagnostic analysis that had been reserved for lawyers. Such collaborations are necessary to allow the benefits of augmentation to be exploited. But they also imply not only boundary changes in professions such as law but also adjustments in professional organizations, as collaborators are accommodated through new roles, regulatory systems and career structures.

All of the above developments also raise questions about the possibility of new fallibilities. The mantra of 'get nothing wrong' represents the primacy for experts of seeking to always deliver a thorough analysis that, to the best of the expert's ability, prescribes optimum treatments to the client's problems. No expert would ever claim that their analysis is infallible, but a key assumption is that the expert is aware of the limits of her/his analysis and takes account of the limits and the risks they create when prescribing treatments. The use of AI raises new questions about the fallibilities of professionals when they rely on the outputs of AI systems to inform decisions about the prescribing of treatments. On one hand, it is arguable that AI removes some fallibilities. For example, systems such as Kira and Luminance that assist with document review do not suffer from the very human fallibilities of tiredness and boredom. Whereas a lawyer will potentially tire and lose focus after reviewing hundreds of legal documents, AI systems afford the same level of attention to each document. Law firms adopting Kira and Luminance have run equivalence testing exercises with the findings of human and AI review compared. These suggest that AI systems are at least as effective as

humans at identifying relevant aspects of legal documentation, and even potentially more effective and less likely to miss relevant elements. However, AI also potentially brings in new fallibilities. Two are particularly notable. First, AI in its current form is not explainable and hence lawyers are unable to interrogate the results it generates. This creates a risk of blind-spots created by hidden assumptions embedded within AI analyses. Second and related, the machine learning algorithms within many AI systems operate as black boxes. Over time, this both has the potential to allow new insights to be developed but also to generate outputs that are based on assumptions that lawyers are unaware of and cannot scrutinize or take account of in decision making. Ultimately, advice to clients could be based on AI-generated insights that, if proven flawed, would be the responsibility of the lawyer.

Figure 2: How Eyal's four categories of expertise might be rethought as a result of AI

		What makes expert knowledge different from lay knowledge?	
		Explicit, abstract knowledge ("theory")	**Tacit, practical knowledge**
Where is expertise?	**Inside individuals**	Can expertise embedded into AI systems be made explicable?	Depending on machine learning abilities, AI may or may not continue to develop new practical expertise based on insights into latent patterns. How does such tacit expertise co-exist with the tacit expertise of human professionals? How do we account for the new type of tacit AI expertise and its role in professional decision-making and prescriptions?
	Outside individuals	Expertise no longer restricted to full members of a profession, as both AI systems and 'allied professionals' develop knowledge needed to perform certain tasks. Either new insiders to a profession, or a redrawing of boundaries, but with what implications for the system of professions? Who regulates AI – professional bodies or data authorities? Who is accountable when things go wrong?	Expertise emerges as an assemblage as professionals, AI systems and 'allied professionals' cooperate. No one actor possesses all of the elements that comprise expertise. How do we understand the way interactions between actors in the assemblage affect professional expertise formation and advice delivery? Can the concept of expertise be theorized anymore without taking account of the role of socio-materialities associated with AI systems?

Our application of the Eyal framework to the use of algorithmic technologies in law and justice (see Figure 2) provides, then, the basis for a structured enquiry into the nature and fallibility of expertise. We have developed this specifically in relation to law and justice, but the future questions raised in Figure 2 are equally applicable to the other expert occupations discussed in the literature review, such as doctors. In particular, our analysis reveals the importance of considering the way that what changes and what doesn't is partly a consequence of the affordances of technologies, and partly a result of the organizational and individual responses to the possibilities presented by the technologies. One implication of this is the extent to which, and the way in which, the expert principle of 'getting nothing wrong' holds sway. We have shown using Eyal's framework that the questions that need to be asked are changed by the adoption of AI – as the locus of tacit expertise, role of distributed human-technology collaborations, and changing regulation of professions and professional work transform where expertise is found.

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