

Title: **Robot System Reliability and Safety A Modern Approach**

Author: **B. S. Dhillon**

Date and place of publication: **United States of America, 2015**

Publisher: **CRC Press**

ISBN: **978 1 4987 0644 5**

It is understandable that most lawyers will not necessarily have a copy of this text on their book shelf. However, given the importance of software code in our lives today, and the accidents and deaths that occur in relation to the use of industrial ‘robots’, any lawyer dealing with health and safety or personal injury claims in an industrial context will consider this text to be highly relevant.

The content of chapter 7 is instructive. People have been killed by ‘robots’ – defined by Professor Dhillon as ‘an automatic, reprogrammable, position-controlled, multifunctional manipulator, consisting of several axes designed for moving materials, components, tools, or specialized devices through variable programmed motions to perform various tasks’ (p 3).

A list of accidents, including deaths, is set out at pp 115-116. A Japanese study based on a survey reported a number of causes: erroneous robot movement during testing of teaching (16.6%), wrong action by the robot during manual operation (16.6%), wrong movement of peripheral equipment during normal operation (5.6%), wrong movement during repair, regulation, and checking (16.6%), sudden entry of the human into the robot work area (11.2%), wrong movement of peripheral equipment during testing or teaching (16.6%) and others reasons at 11.2% (p 117).

The possible sources of robot-related accidents fall into two categories: engineering factors and behavioural and organizational factors (p 118) – and it has been shown that the categories of people that might be injured or killed include line operators, maintenance personnel and software programmers (p 119).

The appendix of papers (372 mentioned) is an impressive list – and each chapter has a separate list

of references that are specific to the content of the chapter.

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Appendix A: Bibliography—Literature on the Reliability and Safety of Robot Systems

Title: **Robot Law**

Editors: **Ryan Calo, A. Michael Froomkin and Ian Kerr**

Date and place of publication: **Cheltenham, United Kingdom and Northampton, United States of America, 2016**

Publisher: **Edward Elgar Publishing**

ISBN: **978 1 78347 672**

The word ‘robot’ is defined in the Oxford English Dictionary (electronic version, v.4) as:

[Czech, f. robota forced labour; used by Karel Čapek (1890–1938) in his play R.U.R. (‘Rossum’s Universal Robots’) (1920).]

1. a. One of the mechanical men and women in Čapek’s play; hence, a machine (sometimes resembling a human being in appearance) designed to function in place of a

living agent, esp. one which carries out a variety of tasks automatically or with a minimum of external impulse.

1923 P. Selver tr. «Cbreve»apek's R.U.R. 28
You see ... the Robots have no interest in life. They have no enjoyments. 1923 Times 9 June 10/5 If Almighty God had populated the world with Robots, legislation of this sort might have been reasonable.

The word was invented by Karel Čapek in his play *Rossumovi Univerzální Roboti*, and it is interesting to note how quickly the term began to be used. The use of the word 'robot' is important – as is the use of metaphors, noted by Professor Froomkin in his introduction at p xiv. Metaphors tend to disguise the reality, and the use of the term 'robot' in the title of this excellent book, whilst in line with the meaning attributed to it, nevertheless partly perpetuates the misunderstanding about software code and hardware: that combined, they are merely machines, albeit machines that can be programmed to do some very clever and helpful things. By anthropomorphising software code, the myth continues that in some way the machines, made by humans, cannot be controlled, and the concept of the 'robot' permits of such assertions as they 'seem to have their own mental agency' (p 9). However, despite the use of 'robot' in the title, Professors Richards and Smart consider four claims that might be necessary to consider regarding substantive law in chapter 1, 'How should the law think about robots?': (i) to think carefully about the definition of a robot; (ii) to understand the technicalities of robots; (iii) to take into account the methods used to draft cyber laws, and (iv) to avoid the Android Fallacy, because it is highly dangerous to anthropomorphise machines. Kate Darling also considers this aspect in more detail in chapter 9, 'Extending Legal Protection to Social Robots: The Effects of Anthropomorphism, Empathy, and Violent Behavior Towards Robotic Objects'. The authors say, at p 6 that 'They behave intelligently when interacting with the world.' The use of the word 'intelligent' and the suggestion that a machine is capable of making 'rational decisions' is tempered by the observation that the 'ascription of agency is subjective' – an important limiting factor that reinforces the difficulty with the metaphor.

The discussion of the metaphor is illustrated by the decision of the Supreme Court in *Olmstead v. United States*, 277 U.S. 438. In this case, regarding the nature

of interception, the majority refused to apply the law to the facts, taking into account the nature of the way technology changed. The arguments used in this case are instructive, because they demonstrate that the use of a metaphor is imprecise and saves people from thinking. Justice Brandies did the opposite. He analysed the problem from first principles. This requires thought, but helps to prevent errors – and begs the question as to why it is necessary to continue to use metaphors (p 21).

Chapter 2 is a reduced version of a previous paper written by Professor Hubbard, entitled 'Allocating the risk of physical injury from "sophisticated robots": Efficiency, fairness and innovation'. The analysis considers the various issues that a lawyer would be required to consider when offering advice relating to injury or death caused by a 'robot' – or an industrial machine that is capable of being programmed and re-programmed, and is capable of undertaking a number of purposes (a detailed definition is given in fn 28, p 39). The author highlights a serious disadvantage to potential claimants at pp 41 – 43, in that there are almost insurmountable problems of proof when raising claims. It will have been useful if Professor Hubbard had discussed the problems with the discovery of software code, which is an essential element of evidence when liability is at issue, as indicated in the unintended acceleration cases – which is merely one example – banking is another, highly relevant example. Persuading judges to permit a party to view the software that forms an essential part of any machine should be an unnecessary struggle in an age when the world is rapidly relying on human beings (mainly men) to write software code to control machines that in turn control our lives.

In this respect, Judge Karnow, in chapter 3, illustrates the mistakes people make when discussing technology (pp 53 – 56) in the context of 'robot' autonomy – although in discussing 'genetic algorithms', it should be noted that although software code can be generated that no human could have written, nevertheless it remains software code initiated by a human-written code, and judges will be required to establish liability for such code in the future. However, Judge Karnow's background information illustrates the importance of the suggestion by Professor Bryant Walker Smith in chapter 4 that lawyers and technicians ought to be trying to understand the different language each use – a state of affairs that is significantly overdue, as is the outline provided by AJung Moon and colleagues in

chapter 6, 'The Open Roboethics Initiative and the Elevator-Riding Robot' in setting out the interdisciplinary review of roboethics related initiatives, and arguing that the discussions that take place in this arena ought to be included in design and policy decisions.

The chapter by Jason Millar and Professor Kerr 'Delegation: relinquishment, and responsibility: The prospect of expert robots' also seems to be predicated on a high degree of probability that software code will dominate humans, and whether humans will remain in control, given such a scenario (p 103). The assumption is that humans will consciously know when to defer to software code (p 104), yet the developments in the use of software code has been so persistent over the past 30 years, that our lives are already governed by software code. No politician has made any conscious decisions regarding this matter, and judges tend to accept the claims for confidentiality of software code in discovery exercises, as noted by Professor Shay and her colleagues on p 269. In this respect, decisions are already being made, but this is not covered in this otherwise interesting chapter, and it has repercussions for the discussion on p 118 dealing with disagreements between a 'robot' and a human. The underlying software code will be in issue as much as any other hardware or software failure, although expert software systems are already in place flying aircraft. It is instructive to note how reports on aircraft accidents play down or ignore software failures: thus we already know that people are making decisions not to challenge software code, and the chapter 'Confronting automates law enforcement' by Professor Shay and her colleagues illustrates how the present system works (just one problem is illustrated by the New York case of *People v. Rose*, 11 Misc.3d 200 (2005), 805 N.Y.S.2d 506, 2005 N.Y. Slip Op. 25526), as well as the problems that could arise if the logic of permitting everything to be done by software code is taken to its extreme – and the lack of any public debate on such issues leads to the conclusion that such extremes might occur in the fullness of time. It is a disappointment that the convictions for sudden acceleration are not discussed in this chapter, given that motor vehicles are now controlled by more software code than aircraft – without the advantage that the software code used in aircraft is the subject of strict regulation.

A significant focus for this journal is how judges and lawyers deal with software code, and this text is

impressive in how such matters are discussed, mainly by legal academics. The discussions in chapters that have not been specifically mentioned in this review illustrate urgent practical issues that cannot be ignored, such as the use of software code by the military in war and peace, and the experiment by Professor Shay and her colleagues discussed in chapter 11 'Do Robots Dream of Electric Laws? An Experiment in the Law as Algorithm' neatly illustrates the limiting factors that arise when trusting humans to write software code.

This is an excellent text that should be mandatory for all law students, but they must beware: it misses a significant point – that few in the legal fraternity understand that they do not understand that software code (or programs) are the controlling element. The failure to discover software code can be fatal in legal proceedings. How can a court reach a decision on less than half the facts?

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Title: **The Electronic Evidence and E-Disclosure Handbook**

Author: **Peter Hibbert**

Date and place of publication: **2016, London**

Publisher: **Sweet and Maxwell**

ISBN: **978 0 414 05539 1**

Some well-qualified commentators have already commented on this text, and their observations can readily be found on-line, including Chris Dale and Gordon Exall, Barrister, Zenith Chambers, Leeds and Hardwicke Building, London.

It was only a matter of time before somebody wrote the first book to cover the topic in greater depth than was previously covered by Stephen Mason in *Electronic Evidence* (the first edition which was published in 2007).

This book by Peter Hibbert is the first to undertake the task, covering England and Wales.

This is a comprehensive text on the topic of electronic disclosure *in civil proceedings only*. If you took the title of the book literally, as one Queen's Council of my acquaintance did, you will be surprised. This senior barrister understood, from the title, that it covered

electronic evidence and *electronic disclosure in criminal proceedings*. Had the book included these additional topics, it would have been twice as long. You can imagine their disappointment at money spent on a book they would not use.

In the preface, Peter Hibbert notes that the book ***only*** deals with electronic disclosure in civil proceedings. This means that when considering whether to buy a copy of this book, be aware that the content and the title do not match.

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Title: **Expert Evidence Deficiencies in the Judgments of the Courts of the European Union and the European Court of Human Rights**

Author: **George Cumming**

Date and place of publication: **2014, The Netherlands**

Publisher: **Kluwer Law International**

ISBN: **9789041141231**

The need for expert evidence in legal proceedings is now greater than it has ever been. None of us are able to offer anything other than a guess about the intricate nature of most topics of every-day life. This is particularly so regarding evidence in digital format that control banking systems; aircraft; motor vehicles; ships; traffic lights; railway systems; satellites; hand held devices; smart meters, etc, etc, etc.

The author considers how the courts reach what can be considered to be the rectitude of decision where a decision requires knowledge that the adjudicator does not possess. He concludes that the international courts of Europe do not follow their own rules of procedure in the use of expert opinion. By so failing, it is arguable that they breach the right to a fair trial set out in article 6(1) of the European Convention on Human Rights.

The author carries out a comparative examination of the use of expert evidence (or failure to use expert evidence) in cases in five tribunals: the European Court of Human Rights, the Court of Justice of the European Union, the Supreme Court of the United States, the Supreme Court of Canada, and the Supreme Court of British Columbia, Canada. The Canadian and US courts have taken a credible approach to the quality of the expert evidence. Such a finding is lacking in the European decisions.

Given the need to accept that we know little about the world in which we live, it is essential that the judges of the European Courts reconsider how they approach judgments.

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Title: **La preuve technologique**

Author: **Vincent Gautrais**

Date and place of publication: **2014, Canada**

Publisher: **LexisNexis**

ISBN: **9780433474944**

This text aims at providing a response to the legal issues covering information technology and the Law of evidence provided in the Civil Code Quebec.

PARTIE 1 – Transition du papier au technologique

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Title: **System Safety Engineering and Risk Management A Practical Approach**

Author: **Nicholas J. Bahr**

Date and place of publication: **United States of America, 2015**

Publisher: **CRC Press**

ISBN: **978 1 4665 5160**

Most lawyers will probably not have a copy of this text on their book shelf. However, given the importance of establishing the facts behind such catastrophic events as building a nuclear reactor (against advice) in a vulnerable location that caused three of the reactors at Fukushima Daiichi to be disabled, and the Deepwater Horizon oil spill in the Gulf of Mexico on the BP-operated Macondo Prospect, the issue of negligence will always arise.

This text, which includes a useful discussion on software code at 8.3, sets out what planners ought to consider when assessing and dealing with risks. In particular, it is important for software engineers work closely with other system and hardware engineers when developing the software. In addition, safety requirements should be developed at the same time that other software requirements are written – and the author demonstrates that an important point is that one should not depend on software controls to prevent a catastrophic hazard (p 246).

This book is a useful background text for any lawyer that specialises in negligence.

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Title: **Wrap Contracts Foundations and Ramifications**

Author: **Nancy S. Kim**

Date and place of publication: **United States of America, 2013**

Publisher: **Oxford University Press**

ISBN: **978 0 19 933697 5**

This book may appear to be confined to the jurisdiction of the United States of America, but the practical implications of what Professor Kim outlines in this book are of significance in all jurisdictions.

'Wrap' contracts are, possibly, unique to the US, and from the analysis of the jurisprudence set out in this text, it is arguable that the judges in the US have fundamentally altered the online contractual landscape – judges have changed the law, yet judges

are only supposed to interpret the law (for which see p 125).

Professor Kim sets out her stall by indicating that the principles of traditional contract law are no longer sufficient to address online contracting, and that undesirable and harmful decisions by judges have shifted the balance of power from consumers to business (pp 4-5). The use of the label 'wrap' contract illustrates that the new form of contract 'formation' raises new problems, and the judges have not fully grasped that the offer in its classic form is no longer obvious – the case of *Register.com, Inc., v Verio, Inc.*, 126 F.Supp.2d 238 (S.D.N.Y. 2000) affirmed 356 F.3d 393 (2nd Cir. 2004) is, it is suggested, a quasi contract, not a contract (pp 56-57). The physical world is different from the digital world, but the judges tend to ignore the difference to the detriment of the user (p 162).

Advantage has been taken at the propensity of consumers to click on the 'I accept' icon to obtain access to content, buy goods or services, or join a social networking web site. That the owner of a web site might also make life difficult for a person to click on the relevant terms, is an additional burden that users have to deal with, for which see the excellent scenarios in chapter 10 and the discussion of the case of *Major v. McCallister*, 302 S.W.3d 227 (Mo. App. S.D. 2009) on pp 132-135). Allied to the problem of contracting is the significant issue of privacy, dealt with at pp 74-75, and the discussion of free will (p 76), where the author points out that the failure of transparency means unfairness to users – and the judges enforce dubious practices by constructing assent, which is then removed from intent.

Professor Kim makes an important point, on p 89, about the variation of contracts, covered by Stephen Mason in *Electronic Signatures in Law* since the second edition in 2007. Few lawyers have understood this point, and even fewer lawyers responsible for drafting and redrafting precedents have changed relevant boilerplate clauses to take this problem into account, as advised by Mason.

That 'shrinkwrap', 'clickwrap' and 'browsewrap' are valid contract forms was not obvious. Doctrinal changes have been made by judges to accommodate these new forms (for which see the discussion on chapter 8). Unfortunately, the decisions made by judges do not make it clear what is acceptable notice and what is not, and the term used by Professor Kim to describe the emerging problem is 'multiwrapping',

and discusses the case law at pp 93-111. In any event, wrap contract terms are determined by business, and the judges deem them contracts via juridical construction (pp 111-125). The case of *A.V. v. iParadigms, L.L.C.*, 544 F.Supp.2d 473 (E.D. Va. Mar. 11, 2008) reversed in part on other grounds 562 F.3d 630 (4th Cir. 2009) is disturbing. The decision in this case gives young people an important lesson about ownership of copyright: if you are a minor in school, forget it – but if you are the Disney corporation, you can get the law changed to increase the time your copyright remains under your control.

In summary, Professor Kim suggests that judges expect too much from users and consumers – serious issues of notice; constantly changing terms that apparently apply regardless of whether a customer or user is made aware of them or not; unfair contract terms; terms by reference, and the inability to click on apparently endless number of terms while filling out forms are all issues that judges have not dealt with adequately or at all. Judges have not placed much of a burden on businesses – there is a free-for-all that works to the detriment of the user and customer, as the case law indicates (see p 181). The assumptions by judges do not reflect reality (p 195), and the conclusions reached by Professor Kim in chapter 12 illustrate that contract law is now arbitrary, and, in fact, it is the Red Queen's rules that now apply.

Title: **The Cambridge Handbook of Artificial Intelligence**

Editors: **Keith Frankish and William M. Ramsey**

Date and place of publication: **United Kingdom, 2014**

Publisher: **Cambridge University Press**

ISBN: **978 0 521 69191 8** (paperback)

The topic of 'artificial intelligence' is beginning to enter the consciousness of lawyers and judges. It is right that the legal profession begins to educate itself on this topic. This book comprises a number of essays by various commentators working in and around different aspects of artificial intelligence.

It is not for the beginner. Many of the discussions presuppose knowledge of various aspects of artificial intelligence that the person new to the topic will not be familiar with. However, this should not detract

from the knowledge to be gained by perusing this text.

Part I deals with the foundations of artificial intelligence.

Professor Franklin puts the topic into context in chapter 1, although it is hardly accurate to claim that the IBM computer program Deep Blue was an artificial intelligence ‘triumph’ (1.4.2) – and a more nuanced discussion is offered by Professor Boden in chapter 4 (4.5), given the software was specifically written for the purposes of beating a chess grand master, and in the experience of the write of this report, machine translation cannot be said to be 90 per cent accurate (1.5.7).

Konstantine Arkoudas and Professor Selmer Bringsjord set out the philosophical foundation, and Professor Robinson considered the philosophical challenges, including the historical background, considering computational theories of the mind and discussing the various criticisms by Dreyfus, Block and Searle. The authors indicate that there is no agreed definition on artificial intelligence, although participants now refer to ‘strong AI’ and ‘weak AI’, among other labels.

Part II deals with ‘architectures’.

Professor Boden considers ‘good old-fashioned artificial intelligence’ (GOFAI) in chapter 4. This is a fascinating discussion of the concepts, strengths and weaknesses, the basis of the philosophy, and the myth of failure. This is a realistic appraisal that helps the reader understand the nuances of what might be termed the mid-period of artificial intelligence. Professors Sun and Beer follow with technical chapters that consider some of the practical issues relating to the development of programs that attempt to achieve artificial intelligence.

Part III, entitled ‘dimensions’ considers the research into the various sub-fields of artificial intelligence. Machine learning is considered by Professor Danks, who makes an important point that machine learning is not mysterious (7.6; see also Professor Amir at pp 200 – 201 on this topic). Interestingly, the algorithms are written to exploit structural relationships among data, and this structural inference underlies the strengths and weaknesses of machine learning algorithms. There are philosophical concerns about machine learning, but they tend to focus on the ‘machine’ or the ‘learning’ – a more holistic approach might be more pertinent.

Markus Vincze, Sven Wachsmuth and Professor Sagerer set out the methods by which software code deals with images – making the important point that the interpretation of most human behaviour is predicated on the context (8.4.2), and many programs are designed for a highly specific scenario or application, such as industrial robotic arms. In chapter 9, Professor Amir considers reasoning and decision making, and indicates that knowledge representation and reasoning is yet another approach to artificial intelligence. Professor Wilks discusses language and communication in the light of artificial intelligence, setting out the problems associated with how to write a program that is capable of responding the way humans wish the program to respond, including linguistics, representation of language, the use of dictionaries and how to retrieve information. Eduardo Alonso considers a new area of research, namely software that is autonomous, and Professor Scheutz provides an overview of the work on artificial emotions and machine consciousness in chapter 12.

Part IV covers topic that are close to the research associated with artificial intelligence. Professor Husbands takes the reader through the topic of robotics, including a reference to the paper by Alan Turing that started the whole business of artificial intelligence off – by noting that Turing conceded that building a machine might be impossible, but sketched out an alternative: an artificial analogue of biological evolution. Professor Bedau speculates on artificial life in chapter 14, and Professor Bostrom and Eliezer Yudkowsky finish by looking at the ethics of artificial intelligence. Arguably this discussion is predicated on artificial intelligence being achieved – which is highly debatable – but does not preclude the reader from grasping that there are many applications of spin-offs of artificial intelligence being used every day, and it is incumbent on lawyers and judges to understand how much software code controls our daily lives.

Title: Artificial Intelligence The Basics

Author: Kevin Warwick

Date and place of publication: London, 2012

Publisher: Routledge Taylor & Francis Group

ISBN: 978 0 415 56483 0 (paperback)

Professor Warwick provides a useful concise introduction for the person with no knowledge to the

concepts of artificial intelligence in this text.

In considering the attitude of the researchers in this area, it is refreshing to discover that John McCarthy (p 5) concluded that how the brain operates is not relevant for artificial intelligence – because the entire discussion of what intelligence means seems to be irrelevant when discussing a machine made by humans, comprising software code written by human beings, and various items of hardware, all mined, engineered and manufactured by human beings, run by electricity which is in turn created by human beings.

Nevertheless, the author discusses what we might mean by intelligence in chapter 1. The conclusion remains the same: it depends on what you mean by intelligence as to how you define it, and the only conclusion to reach is that we do not really know what we mean by intelligence. Professor Warwick concludes (pp 29 – 30) that humans and machines are the same when it comes to the nature/nurture argument. He asserts that once a machine is built, this is nature – and once the software starts learning, nurture is seen to be having an effect. In this respect, Professor Warwick might find Victor S. Johnston, *Why We Feel The Science of Human Emotions* (Perseus Books, 1999) to be of interest. When the IBM software program named ‘Deep Blue’ beat Garry Kasparov in 1997, did the software ask itself whether it was contented? Even if it did, a human being would have written the program to ask and answer this question.

What is now called ‘classical AI’ is discussed in chapter 2, which, in essence, refers to the idea that human intelligence can be replicated in software programs. Interestingly, the MYCIN working system is described as ‘successful’ (p 32), yet it did not endure, for which see Derek Partridge, *What makes you clever the puzzle of intelligence* (Singapore: World Scientific, 2014), p 228 and Keith Frankish and William M. Ramsey, eds, *The Cambridge Handbook of Artificial Intelligence* (Cambridge University Press, 2014), p 20, although it appears that there were other systems that followed, for which see Stuart J. Russell and Peter Norvig, *Artificial Intelligence A Modern Approach* (3rd edn, Pearson, 2016), p 557.

Artificial intelligence is now roughly split into ‘strong’ AI (the possibility that software code can think in the same way as a human, as opposed to appearing to simulate human thinking), ‘weak’ AI (software code can act intelligently as a human, or act as if they were

as intelligent as a human) and ‘Rational’ AI (where the software code can act intelligently and think in its own right, and it is not relevant that it is the same as a human). All of this is discussed in chapter 3, which also reviews the Chinese Room problem posited by John Searle (pp 72 – 76), the Turing test (no software has ever passed this test) (pp 76 – 79), the Loebner competition (pp 97 – 80), and whether software can tell a joke (pp 80 – 81). A Loebner competition was held in Reading in 2008, and Professor Warwick illustrated some of the conversations (pp 82 – 84).

The following chapters, ‘Modern AI’, ‘Robots’ and ‘Sensing the world’ put the topic into a wider context, illustrating the research that is taking place at present, including experiments with mixing organic matter with inert machinery.

The sorts of question that arise in relation to this topic include, but are not limited to:

Does it matter that we cannot define intelligence?

Are the debates about intelligence and consciousness relevant?

Why do people insist on trying to establish whether inert machinery and software code written by humans can ‘think’ and have ‘consciousness’?

Why does Professor Warwick justify artificial intelligence by trying to assert that inert machinery can be ‘intelligent’?

Why does this matter?

In legal terms, one has to consider causation, so the software writer will ought to be called to account, providing judges understand this very important issue, and to compel parties that rely on software code in litigation to have their code studied for causation, and to stop accepting the absurd notion that computers are ‘reliable’.

Can the work undertaken in artificial intelligence be useful to humans? Yes. The examples abound, especially where the software code can help humans with disabilities, lost limbs, and other problems such as the loss of speech or the loss of sight. However, will the researchers go too far and insist on adding yet more software code to inert things, such as motor vehicles and ‘smart’ meters? Yes. Why? Because they can. Will politicians put a stop to it? No. Why? Because they do not understand the problems that

will be caused, and only want to look good for the next election.

Software code can be good, but nobody wants to control it. Therein lies the rub.

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Chapter 6 Sensing the world

Title: Risks of Artificial Intelligence

Editor: Vincent C. Muller

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It is useful that the editor, in his editorial, points out that the ‘important thing between “existential risks” and “normal ethics” is to realize that both sides could be wrong’ (p 6). Also, the editor points out that discussions about artificial intelligence being friendly or unfriendly make assumptions about the nature of the topic: ‘that superintelligence takes the form of an *agent* with goals, rather like us’ (p 6). This does not follow. Stuart Armstrong and colleagues highlight this point in discussing the complexity of language and the danger of using informal concepts in the field of artificial intelligence in respect of the Dartmouth group – they thought they informally understood certain concepts, and began to record this in a formal model – leading to the assumption that it is possible to capture all of the understanding into a formal model (p 49). They were wrong: as pointed out, similarities of features do not make the models similar to reality, and using such terms as ‘culture’ and ‘informal’ concealed complexity and gave the illusion of understanding.

An early attempt at a modest implementing a form of

artificial intelligence was attempted in Chile between 1970 and 1973. It was a project to collect up-to-date information on production, supplies and other variables to help managers of factories. It failed, partly because the *Guardian* newspaper (7 January 1973) published an inaccurate story about the project, and the project was stopped after the military coup. As Ted Goertzel points out in chapter 4, ‘Path to More General Intelligence’, the information system envisaged in 1973 has now come to fruition (pp 72 – 73), and for those that think that software code applied to the medical profession will resolve many human failings, the problems set out at 4.7 are an instructive counter point. For this reasons, his conclusions are realistic (at 4.8): in that apparently separate artificial intelligence systems will interact with each other, rather than the development of some overwhelming super-intelligent system.

Miles Brundage points out in chapter 5, ‘Limitations and Risks of Machine Ethics’ that artificial intelligence systems will not necessarily lead to positive social outcomes, and in passing, he mentioned the ‘software problem’ that needs a solution – which highlights the real issues when discussing this topic – that software code is notoriously full of errors. Such errors, of course, easy to manipulate by those that wish us ill (p 107).

Andras Kornai, in chapter 9, ‘Bounding the Impact of Artificial General Intelligence’, writes on the assumption that humans have created the possibility of an existential threat – an interesting consideration that is widely in the news, but few seem to grasp that humans have the ability to by-pass the problems in ways that have yet to be considered. Just as the burglar looks at properties with a different intent to the owner, so people will devise ways of by-passing machines invented by other people to undertake tasks that we do not want. For instance, nobody in power (government or industry) have ever asked the rest of us if they want to drive a motor vehicle that can take over the driving and kill us – yet this is what has already happened. Motor cars now have far more software code than any aircraft, and there have been numerous instances where the driver has lost control of the vehicle to the software, resulting in deaths and injuries. When ‘artificial intelligence’ is demonstrated to kill and injure, many people might decide they will prefer to take their chances with their own skills. However, at least Kornai makes it clear that free will is the *sine qua non* of agency – and this is something that no machine will ever have (p 199) – including the

lack of a consciousness and genuine understanding, as noted by J. Mark Bishop in chapter 12, 'Singularity, of How I Learned to Stop Worrying and Love Artificial Intelligence' (12.2.1 and 12.2.2).

An interesting read at times.

Title: The Future of the Professions How Technology Will Transform the Work of Human Experts

Authors: Richard Susskind and Daniel Susskind

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Father and son have offered an interesting and highly pertinent analysis of the state of the 'professions' today – including, for the purposes of this journal – that of the lawyers. While the text covered in Chapter 1 'The Grand Bargain', Chapter 2 'From the Vanguard', and Chapter 3 'Patterns across the Professions' will appear pretty obvious to readers of this journal, nevertheless that the authors have considered the topics in some detail will be of great benefit to those lawyers that fail to understand the shifts taking place in the age of software code (people working in factories knew what it was like to work with machines a long time ago).

One can only urge those that do not know, to follow the implications of two lines from the text of the poem by D. H. Lawrence, *New Heaven and Earth*:

'now here was I, new-awakened, with my
hand stretching out

and touching the unknown, the real unknown,
the unknown unknown'

It can be said with reasonable certainty that most judges, lawyers and legal academics know 'the known knows' – that is, they know what they know. However, there are the 'known unknowns' – this is what they do not know, such as a risk that we are aware of, but we do not know if it will occur – to a certain extent, Messrs Susskind are dealing with this in their text. Then we have the 'unknown unknowns' – that is what we cannot know – by way of example, the manufacturer of the muzzle-loading rifle might not have imagined that it was possible to invent a breech-loading firearm, and the same goes for the way the

professions are developing at present. Following on, we have the 'unknown known' – this is what we do not like to know, such as where a person intentionally refuses to acknowledge that we (or they) know – and this applies to the topic of this journal.

The central issue that the authors point to is unmet need or latent demand (p 133 – more references in the index, of course). This, it is suggested, goes hand-in-hand with the question of how we share practical experience in society (p 270). One could argue that, with all the reference to open source materials and comments about the control of intellectual property, that the authors might have seen fit to offer the text as open source. On a side issue, one can only agree wholeheartedly with the observation that the use of specialist language does not help, and even more excruciatingly, sociologists do not seem to be aware of the irony of their use of obfuscating jargon when criticizing the terminology of the professions (p 141).

By way of the main discussion, Chapter 4 'Information and Technology' and Chapter 5 'Production and Distribution of Knowledge' offer an interesting view of how knowledge is affected by technological changes (for which also see Donald MacKenzie and Judy Wajcman, eds, *The Social Shaping of Technology* (2nd edn, Open University Press, 2010)), but the content of real interest is contained in Chapter 6 'Objections and Anxieties' and Chapter 7 'After the Professions'. These chapters are a delight to read. The authors challenge the reader. This is what a book should be about. The authors consider the counter arguments that have been made in response to their points of view, and offer responses that dismantle any opposition. The discussion of empathy in section 6.5 is of particular interest. Comparison is made to humans and machines. The authors have won this reviewer over. It is clear that some humans are capable of empathy, but unless you know the other person well, you do not know whether they are lying when they say they understand. Software programs have been developed to such an extent that the code can tell you what emotional state you are in. Even though the software program is acting as a mirror to your feelings, at least the software code is not lying. (That is, unless it is programmed to lie – note the VW debacle in which it transpired that the software code in the motor vehicles the company manufactured was designed to deceive).

Being the other reader (p 271), this book is of great interest. There is some analysis that is missing: by way

of example, the negative effect that technology has had in the medical profession (systems that take too much time to complete information – everybody sharing the same log in – standard terms that become meaningless – confusing interfaces that defeat the purpose of preventing mistakes – automation bias and so on – for which see Harold Thimbleby, Alexis Lewis and John Williams, ‘Making healthcare safer by understanding, designing and buying better IT’, *Clinical Medicine*, 2015 Vol 15, No 3: 258–262 as an initial foray into the extent of the problem), and where architects abandon expensive technology because it has stopped their creativity in the early stages of developing a concept – although it can be said that *some* of these problems are capable of being solved to a certain extent by working practices and accepting that the technology enables, but does not take away.

The high costs of professional fees reflect a number of issues: the cost of becoming a professional; the scarcity of professionals; the fact that a single individual has to pay the full costs of the services of a lawyer, unlike a musician (for instance), where many people pay a relatively small sum to attend a concert, and the musician can reap a significant financial reward – although this example might be considered to be relatively simplistic, because it is acknowledged that many musicians struggle to earn living. In addition, lawyers have to pay significant sums of money to knowledge accumulators to obtain access to case law, journal articles (most if not all of which are written at no cost to the journal by lawyers and legal academics – who are in turn paid by the tax payer) and other important information that is crucial to the working of a lawyer. Perhaps these organizations can be persuaded to reduce prices in the interests of ‘more for less’ (a popular maxim used in the book that is a euphemism for ‘you are not worth it’), or perhaps because what they do is of some social use? That some massive corporations might have succeeded in reducing the fees of lawyers, possibly leading to increasing the bonus of the CEO, may be the link to the sale of 14 yachts by Princess Yachts at the Cannes Yachting Festival this year (Simon Osborne, ‘Whatever floats your boat’, *Financial Times, FT Weekend*, September 17/September 18, 2016, p 6).

Thoughts that arise from the book: How should universities develop? Should universities start charging journals for articles? Should the professions break down amassing knowledge incrementally? Should different levels of expertise and knowledge be

developed in line with the universities to enable people to develop knowledge and understanding at a slower rate, with less cost while on the job? The apprentice system seems far from archaic.

Technology changes the way we do things and the way we live. The authors have written an interesting polemic that ought to be read by those that do not know. Maybe it is time to expand the possible readership by offering it as an open source resource, bearing in mind the radical discussions about the retention of intellectual property between the covers?

Title: **Electronic Signatures in Law**

Author: **Stephen Mason**

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Electronic signatures are ubiquitous. Every person that uses e-mail, uses an electronic signature. Every person that uses a cash card, debit card or credit card uses a form of electronic signature. The fourth edition of this book provides an up-date on the European Union Regulation that repeals the EU Directive in electronic signatures, together with an up-date of the case law across the world. It provides a practical guide to understanding electronic signatures, setting out an analysis of what constitutes an electronic signature, the form an electronic signature can take, the forgery of electronic signatures, and issues relating to evidence, formation of contract and negligence.

The case law on electronic signatures covers a vast range of law, including: employment, family, divorce proceedings, formation of contracts, insurance, e-wills, public administration, judicial use, Statute of Frauds, property transactions, local government planning, criminal procedure, and corporations.

The text includes case law from 38 jurisdictions: Argentina, Australia, Brazil, Canada, China, Colombia, Czech Republic, Denmark, England & Wales, Estonia, European Patent Office, Finland, France, Germany, Greece, Hong Kong, Hungary, Ireland, Israel, Italy, Japan, Lithuania, Netherlands, New Zealand, Norway, Papua New Guinea, Poland, Portugal, Russian Federation, Scotland, Singapore, Slovenia, South Africa, Sweden, Switzerland, Turkey, the United States of America and Zimbabwe.

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