

Distinguishing Hype from Reality about the Future of Automated Audits

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Auditors have been put on notice: artificial intelligence (AI) is here and it's here to stay.¹ The possibility of AI-enabled machines replacing human auditors is creating some angst. Are people right to be worried, and if so, what can they do to prepare for an AI takeover?²

Those making predictions about the effects of AI on auditors (let's call them clairvoyants) come from different backgrounds and have diverse views. Most, however, seem to agree that external auditing in some form will be around for a long time. As well, they agree that AI will play an ever-increasing role in the audit. Differences of opinion mostly relate to how much of the audit AI will be able to perform without human input, how long it will take before AI plays a significant (perhaps dominant) role and what the repercussions are likely to be.

Profound Changes Coming

No prediction about the future will be entirely accurate. But how the future unfolds will profoundly affect the lives not only of auditors, but of all those associated with the auditing profession. Many people have a big stake in this game and they have to make important decisions right now. Should I make auditing my career? Should I switch my career from auditing to something else and, if so, to what? What should my university teach students about auditing? What continuing education do I need so that my auditing career survives and even thrives in the face of significant advances in AI? How should standards and audit regulations change to reflect increasing use of AI?

To make better decisions, it is important to distinguish hype from reality. There is a need to be skeptical. All clairvoyants have unintentional or intentional biases. For example, some may be trying to sell AI products and services. Others may see their primary goal as calming fears about what the future holds, and inadvertently understate risks and the need for immediate action.

Arguably, predictions fall into three overall categories:

1. *AI will soon displace human auditors.* Clairvoyants in this category might be referred to as chicken littles, predicting the auditing sky will soon fall on human auditors.

2. *AI will complement the work of human auditors, but never entirely displace them.* These clairvoyants might be referred to as eternal optimists, looking at the future of human auditors through rose-coloured glasses.³
3. *AI will ultimately displace human auditors.* These clairvoyants may be the realists. But, what does “ultimately” mean and what are the implications for decisions that have to be made now?

Let’s briefly assess an example view for each prediction category (shaded boxes) to help illustrate a few key issues regarding AI’s effects on the future of audit.

AI Will Soon Displace Human Auditors

The tipping point: 30% of corporate audits performed by AI by 2025: 75% of respondents expected this tipping point to have occurred. AI is good at matching patterns and automating processes, which makes the technology amenable to many functions in large organizations. An environment can be envisioned in the future where AI replaces a range of functions performed today by people.⁴

This view is based on responses to a 2015 survey by 800 executives and experts from the information and communications technology sector.⁵ These respondents no doubt had expertise in various aspects of IT. They may not, however, have had an adequate appreciation of the complexities of audits. With the benefit of hindsight (five years have passed since the survey was taken), this prediction will not be accurate.

Incredible advances are being made by AI in playing games. Google’s AlphaGo Zero learned the extremely complex game of Go by itself from scratch and trounced the reigning champ (an earlier version of AlphaGo that, in turn, had beaten the best human players).⁶ On the other hand, OpenAI’s natural language AI (named Generative Pretrained Transformer 3 (GPT-3)) often generates grammatically accurate text that is unmoored from reality. It also reproduces racist, misogynistic and homophobic phrases it learns from scaping the Internet. GPT-3, like other AI, has no coherent understanding of the world.⁷

Auditing happens in the messy real world. Auditors have to make many difficult judgments. They have to identify and respond to a myriad of factors affecting risks of material misstatement. These include, for example, complexity, subjectivity, change, uncertainty, management bias and fraud risk factors. Auditors also have to obtain evidence about the many assumptions, methods and the reliability of data underlying management’s accounting estimates, and evaluate management’s assessment of the going concern assumption. AI models of enormous scope and complexity would be needed to properly complete these tasks. Such models are likely many years away from successful development.

There are also non-technical barriers to significant use of AI in audits. Websites of large public accounting firms indicate they are making significant investments in AI for consulting and audit

purposes. But auditors are putting up considerable resistance to extensive use of automated analysis tools and techniques, even those that do not involve AI's complex algorithms. For example, auditors have lingering doubts about the efficiency and effectiveness of analytics compared to traditional audit procedures. Auditors still have significant difficulty in obtaining relevant data from clients and other sources and establishing its reliability. These issues will be just as important with increased use of AI. Audit regulators also express concerns about how data analytics are used.⁸



Some IT experts and others maintain that AI is already making significant inroads into audits. Nevertheless, an audit is much more complex than a simplistic analysis of transactions streams and balances that some IT experts seem to envision. They may be referring to increased use of Robotic Process Automation (RPA). RPA is, however, too basic to be considered AI: it does not involve use of machine learning models.⁹ RPA may be readily applied, for example, to search for words or phrases in contracts pertinent to applying a complex accounting standard (e.g., the standard for leases). Also, RPA can be used in analyzing transaction streams, journal entries and general ledger account balances. Yet, even these relatively simple automated analyses are likely to run into significant roadblocks.

For example, very large numbers of unusual items (anomalies) are often identified. These require investigation to determine whether they are false positives or indicators of misstatements. RPA won't help much in making such judgments. AI could eventually be applied, but the required algorithms would likely take significant time to develop. Despite years of research by a combined group of experts knowledgeable in both IT and auditing (representing academia, large firms and accounting bodies) this difficult issue has not yet been resolved. The

nature and extent of audit work to address these anomalies remains a matter of professional judgment for the human auditor.¹⁰

Another matter to consider is whether there would soon be significant demand for audits performed by AI (should such capability exist). Management of some audited entities may have made a business case for extensive use of AI in its operating and financial reporting processes. While such managers may be more receptive to use of AI by their auditors, managers that have not made this leap seem likely to resist auditor use of AI.

A recent survey by McKinsey indicates that, as a result of the COVID-19 pandemic, two-thirds of companies surveyed have moved faster to adopt artificial intelligence and automation.¹¹ For many companies, however, the pandemic is likely to have heightened the hurdles to implementing AI. For example, Davenport and Ronanki cite the results of a 2017 Deloitte survey of business executives. Of those surveyed: 47% said it's hard to integrate cognitive projects with existing processes and systems; 40% said technologies and expertise are too expensive; 37% said managers do not understand cognitive technologies and how they work; 35% said they can't get enough people with the expertise in the technology; 31% said the technologies are immature; and 18% said technologies have been oversold in the marketplace.¹² Of course, there are many surveys, and some may have more positive findings regarding the extent of adoption of AI.

Another issue is that the quality of AI adopted may introduce new risks affecting both financial reporting and the audit. Jeanne Boillet, Global Assurance Innovation leader of EY, has cited the results of Gartner's 2018 CIO Agenda Survey. It indicated that 85% of AI projects through 2020 will deliver erroneous outcomes due to bias in data, algorithms or development teams.¹³ Further, Jeff Lui, Director of Artificial Intelligence at Deloitte Canada, notes that understanding the "black box" (the algorithms behind AI) is critical for auditors.¹⁴ Obtaining such understanding, particularly for algorithms used in deep learning, may be both difficult and costly.

Finally, if AI were to take over most audit functions, fundamental changes would be required to auditing standards and rules of professional conduct. Buy-in from audit and securities regulators would have to be obtained. Laws and regulations governing auditor legal liability might also have to undergo fundamental changes. Even relatively minor changes to standards, rules and laws take years of discussion and debate before they are implemented. Changes to address pervasive use of AI would likely take a very long time indeed.

Given all the above, the view that AI will soon displace auditors seems divorced from reality.

AI Will Complement the Work of Human Auditors, Never Entirely Displace Them

This view reflects the Autor-Levy-Murnane (ALM) hypothesis. It emphasizes that every job is made up of many tasks, some of which are far easier to automate than others. There is a "substitution force": new technologies do, in some respects, substitute for workers. There is

also, however, an offsetting “complementary force”: new technologies also tend to increase the demand for human beings to perform tasks that cannot be automated.¹⁵

AI will enable us to work better, smarter and faster, enhancing the work that can be done and the value that can be added by human members of the team. It also seems likely that, with more of the transactional and process work completed for them, auditors will be able to move further up the value chain, dedicating more time to delivering strategic insight and more complex problem solving.¹⁶

So, will the substitution force win out, with all auditing tasks eventually being taken over by AI? The answer is likely “yes.” Yuval Harari notes that the threat of job loss results from the confluence of infotech with biotech. Research shows that human choices of everything result from billions of neurons in our brains calculating probabilities within a split second. If thoughts, emotions and desires are, in fact, no more than biochemical algorithms, there is no reason computers cannot decipher these algorithms, and do so far better than any human. In addition, unlike humans, computers aren’t individuals. It is easy to integrate them into a single flexible integrated network with which humans are unlikely to be able to compete.¹⁷

There is also a possibility that what replaces individual humans may be powerful human-machine networks. In that event, the complementary force would have won. Work has already begun on human-machine connectivity. Elon Musk’s Neuralink is developing a brain-computer interface (BCI) with a robot to implant it in brains with relative ease.¹⁸ If such human-machine networks were ever to exist, hopefully they would not result in a dystopia where only a few powerful elites would be members of a network. Alternatively, everyone might be connected to the machine-human network, like the evil Borg of Star Trek fame. In either case, it is not clear that auditing would be high on the agenda for anybody/anything.

Human auditors are likely to be primarily responsible for complex problem solving for quite awhile. Under any of the above scenarios, however, AI will eventually be the dominant force in auditing, given advances in both infotech and biotech.

AI Will Ultimately Displace Human Auditors

Attempts to deny the potential of computers to surpass many human capabilities, and simply to protect current models and ways of doing things, are likely to end in failure.¹⁹

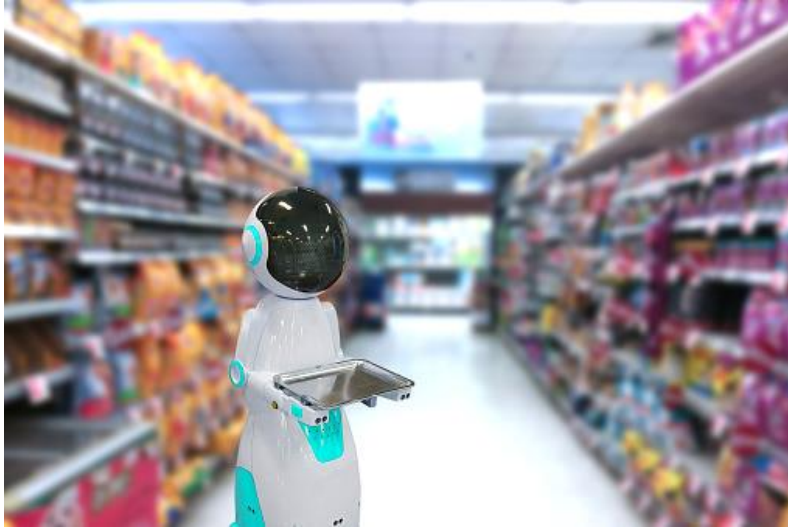
This last prediction category seems to best reflect reality. It is hard to challenge since the word “ultimately” makes the timeline for change open ended. Trying to pick a specific year for human auditor displacement is a mug’s game. Career choices and decisions on the time and effort to be spent on training are being made now. Therefore, an estimated broad time range may be useful. Susskind suggests that, if progress in IT over the next eight decades even faintly resembles that over the last eight, then systems and machines will be a further trillion times more powerful by 2100.²⁰ He does, acknowledge, however, factors other than technological

advances may significantly affect how AI displaces humans. Just because a machine can perform a task does not mean that this will be acceptable. The recent rebellion against how AI was used in the British exam system in response to COVID-19 comes to mind.²¹

Let's assume that displacement of human auditors by AI will take decades. What are some examples of issues that we need to start addressing now to help human auditors successfully adapt to this inevitable transition?

Despite wishful thinking by some AI service providers, auditors will still need to perform effective, high-quality audits, complying with standards and rules of professional conduct (even if the role of AI becomes dominant). These include rules related to independence, confidentiality and competence. There will be high, but not insurmountable, hurdles to jump. For example, effective audits in the future may require frequent (perhaps continuous) connectivity of auditor and client AI systems. Clear rules will be needed regarding when, for example, such connectivity (perhaps even integration) can be established to enable effective auditing without violating actual or perceived auditor independence. Far into the future, it may be interesting to see battles between the respective AIs of the audited entity, the auditor, audit regulator and maybe the standard setters if their models arrive at different conclusions on the proper application GAAP and GAAS. Might such battles be televised (a high ratings replacement to the current TV show Battlebots)?

For some time, human auditors will continue to play a vital role by helping to establish the validity of AI models. Criteria for evaluating the transparency of models are urgently needed. These criteria would be used by developers of models (machine or human), their users, auditors and audit regulators (the latter to evaluate auditors' AI models). There are encouraging developments in this area. A working group of the US Advanced Technology Academic Research Center (ATARC) is developing a "radar chart" that would provide a transparency rating based on weightings assigned to each of five factors: the algorithm explainability; identification of data set source; methods of data selection; reduction of data set bias; and model versioning method. This model could be contributed as a standard to the International Standards Organization (ISO).²²



If you are trying to decide whether to become an auditor, the CPA Competency Map's Task Force is updating the specific and extensive list of what you will need to learn. This is directly linked to determining what universities will need to teach you. Irene Wiecek, a task force member, has a clear vision of what the fundamental goal should be: "When the need to adapt to unpredictable change becomes a core competency,

we'll have prepared the young people drawn to this profession to meet that future with confidence."²³

If you are already an auditor, you will not be expected to become a data scientist but you will need to upgrade your skill sets in IT (particularly AI), statistics and analytics. You will need to know at least enough to be able to ask the right questions of specialists on the engagement team and client management. This includes being able to appropriately evaluate the quality of audit evidence that is significantly affected by use of AI and the application of analytics. You will also need to know how to strike the right balance in human and machine interaction to avoid both overreliance or underreliance on IT. The CPA profession has started the ball rolling to address what career-long training is needed. This is being done in the context of the overall direction provided by CPA Canada's *Foresight Initiative – The Way Forward*.²⁴ This initiative understandably considers the future of the accountancy profession as a whole. It does not focus on matters particular to the auditing segment of the profession that need to be addressed. But that will come.

Skepticism is useful in considering the various views about the future of audit. That should not degrade into cynicism. While there are huge hurdles to be addressed, effective action can be taken by all those associated with auditing, both individuals and groups, to address the inevitable significant advancements of AI.

¹ CPA Ontario Thought Leadership Series, *Evolving Alongside Artificial Intelligence*, pg. 1.

<https://www.cpaontario.ca/insights/thought-leadership/evolving-alongside-artificial-intelligence>.

² Throughout the rest of this article, "AI" is used to refer to machines enabled by AI and other advanced technologies.

³ My apologies to younger readers who may never have heard of chicken little or rose-coloured glasses, which surprisingly may have been worn by chickens.

⁴ Klaus Schwab, *The Fourth Industrial Revolution* (World Economic Forum, 2016), pg. 139.

⁵ *Ibid.*, pg. 28.

⁶ David Silver and Demise Hassabis, *Alpha Go Zero, Starting from Scratch*, DeepMind Blog (October 18, 2017). <https://deepmind.com/blog/article/alphago-zero-starting-scratch>.

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- ⁷ “Artificial Intelligence – Bit Lit” (*The Economist*, August 8, 2020).
- ⁸ *An Inside Look at How Auditors in Canada Are Using Data Analytics* (Toronto: CPA Canada, April 2019), pgs. 36-39. <https://www.cpacanada.ca/en/business-and-accounting-resources/audit-and-assurance/blog/2019/may/auditors-using-data-analytics-inside-look>.
- ⁹ *A CPA’s Introduction to AI: From Algorithms to Deep Learning, What You Need to Know* (Toronto: CPA Canada, 2019). <https://www.cpacanada.ca/en/business-and-accounting-resources/other-general-business-topics/information-management-and-technology/publications/ai-automation-for-cpas>.
- ¹⁰ *Rutgers AICPA Data Analytics Research Initiative (RADAR) Multidimensional Audit Data Selection (MADS) Research Project* (Rutgers Business School, February 26, 2020). <https://www.aicpa.org/content/dam/aicpa/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/radar/radar-key-learnings-document.pdf>.
- ¹¹ Briefing Note #25 - *COVID-19 and the Great Reset* (McKinsey & Company, September 30, 2020). <https://www.mckinsey.com/business-functions/risk/our-insights/covid-19-implications-for-business>.
- ¹² Thomas C. Davenport, and Rajeev Ronanki, *Artificial intelligence in the Real World* (*Harvard Business Review*, January-February 2018 issue). <https://hbr.org/2018/01/artificial-intelligence-for-the-real-world>.
- ¹³ Joint ACCA (Association of Chartered Certified Accountants) EY event, *The Impact of Digital and Artificial Intelligence on Audit and Finance Professionals: Harnessing the Opportunities of Disruptive Technologies*, January 30, 2019. <https://www.accaglobal.com/gb/en/technical-activities/technical-resources-search/2018/december/impact-of-digital-and-ai-on-audit-.html>.
- ¹⁴ CPA Ontario, Thought Leadership Series: *Evolving Alongside Artificial Intelligence*. <https://www.cpaontario.ca/insights/thought-leadership/evolving-alongside-artificial-intelligence>.
- ¹⁵ Daniel Susskind, *A World Without Work* (New York: Metropolitan Books, January, 2020).
- ¹⁶ “What Impact Will AI Have on the Audit?” (*FEI Daily*, September 9, 2017). <https://daily.financialexecutives.org/impact-will-ai-audit/>.
- ¹⁷ Yuval Noah Harari, *21 Lessons for the 21st Century* (Penguin Random House, 2018), Chapter 2, pg. 30.
- ¹⁸ “Rule by Algorithm” (*The Economist*, August 22, 2020).
- ¹⁹ *Artificial Intelligence and the Future of Accountancy* (London: Institute of Chartered Accountants in England and Wales (ICAEW), 2018), pg. 4. <https://www.icaew.com/technical/technology/artificial-intelligence/artificial-intelligence-the-future-of-accountancy>.
- ²⁰ Susskind, Daniel, *op. cit.*, pg. 126.
- ²¹ “Brain Computer Interfaces – And Pigs May Drive” (*The Economist*, September 5, 2020).
- ²² Ron Schmelzer, “Towards a More Transparent AI” (*Forbes*, May 23, 2020). <https://www.forbes.com/sites/cognitiveworld/2020/05/23/towards-a-more-transparent-ai/?sh=746cd1213d93>.
- ²³ Irene Wiecek, *A Competency Map for Changing Times*, <https://www.cpacanada.ca/en/news/pivot-magazine/2020-08-24-competency-map>.
- ²⁴ CPA Canada, *Foresight – Reimagining the Profession – The Way Forward*, <https://www.cpacanada.ca/foresight-report/en/index.html#page=1>.