Artificial Intelligence and the Accounting Profession in 2030

By Des Yaninen

CEO
NDB Investments
Lifelike 'Sophia' Robot Granted Citizenship to Saudi Arabia

By Mindy Weisberger, Senior Writer | October 30, 2017 03:30pm ET

“A Sophia” created by Hanson Robotics, attends the RISE Conference at the Hong Kong Convention and Exhibition Centre on July 12, 2017. Credit: odiEd/GiGy

A robot with an uncannily human-like appearance recently advanced one step closer to human status, when it was granted citizenship to Saudi Arabia at the tech summit Future Investment Initiative (FII).
P.E.S.T Analysis: The world in 2030

AI and the Accounting Profession in 2030: Part 1
1.1 Political

- USA is no longer the world super power.
- World power is split between US, Russia, India, China, Japan and Germany
- United Nations will provide the platform for these super powers to cooperate
1.2 Economic

- Rise of the middle class
- End of extreme poverty
- Collaborative Consumption
- Increased demand for food, water and energy
- Demise of Fossil Fuels
1.3 Social

- Population: 7.8 billion to 8.5 billion
- India to have more people than China
- Rapid Urbanization
- Universal access to basic sanitation by 2030
- Internet access and literacy will be universal by 2030
- Global literacy rates will be almost 100% by this year
- Universal health care by this time
- Labour shortages and immigrant competition in Developed world
1.3 Technological

- Desalination
- Tidal power
- Megatall buildings
- 3D printing
- Self-driving vehicles
- Smaller Cars, all electric
- Half of shopping malls in US closed down
- Hypersonic passenger airliners
- Robot Ships
- Commercial delivery drones

- Robotics replaces human jobs. Humans will become hybrids.
- Robots soldiers in US Army
- A Quantum computer
- Smart cities
- underwater city
- DNA profiling
- Integrated smart grids
Key Point:

Advances in robotics will replace many jobs done by humans, and the growing capabilities of artificial intelligence will mean that white-collar jobs will also be increasingly automated.
What is Artificial Intelligence?

A.I and the Accounting Profession in 2030: Part 2
2.1 Definition of AI

- **What is Artificial Intelligence?**
  - Artificial intelligence (AI) is a broad term that refers to technologies that make machines “smart.” Organizations are investing in AI research and applications to automate, augment, or replicate human intelligence — human analytical and/or decision-making — and the accounting profession must be prepared to fully participate in organizational AI initiatives.

  - There are many other terms related to AI, such as, deep learning, machine learning, image recognition, natural language processing, cognitive computing, intelligence amplification, cognitive augmentation, machine augmented intelligence, and augmented intelligence. AI, as used here, encompasses all of these concepts.
2.2 History of AI

A.I. TIMELINE

1950
TURING TEST
Computer scientist Alan Turing proposes a test for machine intelligence. If a machine can trick humans into thinking it is human, then it has intelligence.

1955
A.I. BORN
Term "artificial intelligence" is coined by computer scientist John McCarthy to describe "the science and engineering of making intelligent machines."

1961
UNIMATE
First industrial robot, Unimate, goes to work at GM replacing humans on the assembly line.

1964
ELIZA
Pioneering chatbot developed by Joseph Weizenbaum at MIT holds conversations with humans.

1966
SHAKEY
The "first electronic person" from Stanford, Shakey is a general-purpose mobile robot that reasons about its own actions.

1972
WINTER
Many false starts and dead-ends leave A.I. out in the cold.

1997
DEEP BLUE
Deep Blue, a chess-playing computer from IBM defeats world chess champion Garry Kasparov.

1998
KISMET
Cynthia Breazeal at MIT introduces Kismet, an emotionally intelligent robot insofar as it detects and responds to people’s feelings.

1999
AIBO
Sony launches first consumer robot pet dog AIBO (AI robot) with skills and personality that develop over time.

2002
ROOMBA
First mass produced autonomous robotic vacuum cleaner from iRobot learns to navigate and clean homes.

2011
SIRI
Apple integrates Siri, an intelligent virtual assistant with a voice interface, into the iPhone 4S.

2011
WATSON
IBM’s question answering computer Watson wins first place on popular $1M prize television quiz show Jeopardy.

2014
EUGENE
Eugene Goostman, a chatbot passes the Turing Test with a third of judges believing Eugene is human.

2014
ALEXA
Amazon launches Alexa, an intelligent virtual assistant with a voice interface that completes shopping tasks.

2016
TAY
Microsoft’s chatbot Tay goes rogue on social media making inflammatory and offensive racist comments.

2017
ALPHAGO
Google’s A.I. AlphaGo beats world champion Ke Jie in the complex board game of Go, notable for its vast number of possible positions.
2.3 AI - The Basics: Big Data & Algorithms

- Big data means more than just large amounts of data — big data refers to data (information) that reaches such high volume, variety, velocity, and variability that organizations invest in system architectures, tools, and practices specifically designed to handle the data.
**The FOUR V’s of Big Data**

**Volume**

- 40 Zettabytes (43 trillion gigabytes) of data will be created by 2020, an increase of 300 times from 2005.
- 6 billion people have cell phones.
- World population: 7 billion.

**Velocity**

- The New York Stock Exchange captures 1 TB of trade information during each trading session.
- Modern cars have close to 100 sensors that monitor items such as fuel level and tire pressure.

**Variety**

- 30 billion pieces of content are shared on Facebook every month.
- 4 billion+ hours of video are watched on YouTube each month.
- 400 million tweets are sent per day by about 200 million monthly active users.

**Veracity**

- 27% of respondents in one survey were unsure of how much of their data was inaccurate.
- 1 in 3 business leaders don’t trust the information they use to make decisions.

**Analysis of Streaming Data**

- By 2015, 4.4 million IT jobs will be created globally to support big data, with 1.9 million in the United States.

**Uncertainty of Data**

- Poor data quality costs the US economy around $3.1 trillion a year.

---

**Sources:**
- McKinsey Global Institute, Twitter, Cisco, Gartner, EMC, SAS, IBM, WEPTIC, QAS
AI - The Basics: Big Data & Algorithms

• An algorithm is a set of rules for the machine to follow. An algorithm is what enables a machine to quickly process vast amounts of data that a human cannot reasonably process, or even comprehend. The performance and accuracy of algorithms is very important.
AI - The Basics: Types of AI

- Type 1: Reactive Machines
- Type 2: Limited Memory
- Type 3: Theory of Mind
- Type 4: Self Awareness
TYPE I
PURELY REACTIVE

This is the most basic form of AI. It perceives its environment/situation directly and acts on what it sees. It doesn't have a concept of the wider world. It can't form memories or draw on past experiences to affect current decisions. It specializes only in one area.

Examples:

- IBM's Deep Blue which beat Kasparov at chess
- Google's AlphaGo which triumphed over human Go champions
TYPE II
LIMITED MEMORY

Further up on the AI evolutionary ladder: this type considers pieces of past information and adds them to its preprogrammed representations of the world. It has just enough memory or experience to make proper decisions and execute appropriate actions.

Examples:
- Self-driving vehicles
- Chatbots, personal digital assistants
Type III AI has the capacity to understand thoughts and emotions which affect human behavior. This type—which can comprehend feelings, motives, intentions, and expectations, and can interact socially—has yet to be built, but would likely be the next class of intelligent machines.

Examples:

- C-3PO and R2-D2 from the Star Wars universe
- Sonny in the 2004 film *I, Robot*
TYPE IV
SELF-AWARE

These types of AI can form representations about themselves. An extension of the theory of mind, they are aware of their internal states, can predict the feelings of others, and can make abstractions and inferences. They are the future generation of machines: super intelligent, sentient, and conscious.

Examples:

- Eva in the 2015 movie *Ex Machina*
- Synths in the 2015 TV series *Humans*
2.4 Current Applications of AI in 2017

- Applications in the world today:
  1. Smart Cars
  2. Smart Homes
  3. Virtual Assistants
  4. Surveillance
  5. Detecting Credit Card Fraud
  6. Online Customer service chat bots
  7. Online Predictive Purchasing
  8. Online Smart Recommendations
  9. Work automation
  10. Recruitment
2.5 Anticipated impact by 2030

- AI100 is a study led by Stanford University into the impact of AI over the next 100 years.

- They will study and anticipate how the effects of artificial intelligence will ripple through every aspect of how people work, live and play. A framing memo for the study calls out 18 topics, including monitoring and addressing possibilities of superintelligences and loss of control of AI.

- Their first paper released in 2016 is entitled “AI and Life in 2030”
2.6 Human Replacement

- Historically technology has always replaced humans

- With AI, the majority of low-skilled repetitive jobs are very likely to be replaced

- While old jobs will be replaced, new ones will be created. 65% of children entering primary school now are expected to end up working in roles that currently do not exist.
Impact of AI on CPAs

A.I and the Accounting Profession in 2030: Part 3
3.1 Emphasis of AI in Accounting in 2017

- Examples of emphasis of AI by the Big 4 accounting firms include the following:
  - **PwC**
    - Conducted a global AI study “Sizing the Prize”. They found that 45% of total economic gains by 2030 will come from product enhancements, stimulating consumer demand. This is because AI will drive greater product variety, with increased personalisation, attractiveness and affordability over time.
  - **EY**
    - EY to launch its first Artificial Intelligence Center in India. The AI Center will bring together teams of multi-disciplinary practitioners, combining expertise in AI, Robotics etc. along with domain experience in sectors.
    - Leading AI expert in Silicon Valley, Dr. Nigel Duffy has joined EY as Global Innovation Artificial Intelligence Leader.
3.1 Emphasis of AI in Accounting in 2017

- Examples of emphasis of AI by the Big 4 accounting firms include the following:

  ▫ **KPMG**
    - KPMG has been using innovations from McLaren Applied Technologies (MAT) in its audit processes since 2015.
    - KPMG also have an alliance with IBM’s cognitive computer, Watson.
    - https://www.icas.com/ca-today-news/how-accountancy-and-finance-are-using-artificial-intelligence#content-main

  ▫ **Deloitte**
    - Uses an AI platform called Kira Systems to enhance it’s assurance work.
    - https://www.icas.com/ca-today-news/how-accountancy-and-finance-are-using-artificial-intelligence#content-main
3.2 Role of AI in Accounting in 2030

- **No More:**
  - Book Keepers
  - Data Entry Operators
  - Compliance Inspectors

- **Accounting technicians roles to be automated**
  - Accountants—specifically accounting clerks and bookkeepers—appeared at No. 1 in a 2015 PwC study of which jobs are most at risk from automation in the next 20 years. The rationale: Computer learning systems or robotics will be able to perform simple and routine tasks faster and more accurately. Accountants were just ahead of checkout operators and cashiers, office administration staff, and financial and insurance administration workers on that list.

  - Most of the work to be automated will be the work involved in getting the CPA what he needs to do his job.

3.2 Role of AI in Accounting in 2030

- **Software Bots**
  - Bots are already being utilized by many industries. According to Deloitte’s 2015 survey of global business leaders, automation is a top software priority (Deloitte UK 2015).
  - Transactions to be automated:
    - Accounts Payables
    - Travel expenses
    - Fixed Assets
    - General Ledger
    - Financial Reporting
    - Payroll
  - In this paradigm, accountants are envisioned as managing and monitoring the bots and personally examining outlier events and higher-risk situations.
    - This will allow accountants to focus on those transactions that require nuanced human analysis and not worry about routine high-volume transactions.
    - Drones and robots could be the accounting digital assistants of the near future, completing the more predictable and mundane accounting tasks, both physical and mental.
3.2 Role of AI in Accounting in 2030

- Accounting departments overall will be trimmed down and the employees left will be able to focus on more strategic and value adding initiatives, like process improvement, cost control, and capital optimisation.

- **Augmented Intelligence**
  - CPAs will be assisted by machines to do their work. Some experts predict it to be an extension of wearable devices, by linking directly into the brain. It is still being developed.
Opportunities outside of Accounting, that may be also be impacted by AI

Where former accountants work
1/3 now hold a role unrelated to accounting

- HR and admin, 26%
- Sales and marketing, 20%
- Operations, 15%
- Consulting/business analysis, 7%
- Customer service, 6%
- IT, 6%
- Program, project and process management, 5%
- Research, 5%
- Inventory management, 3%
- Others, 2%
- Risk, 2%
- Capital markets, 1%
- Quality, 1%

Source: Genpact Research Institute
3.3 The Evolution of the CPA: How to Stay Relevant

- What skills must CPAs develop or strengthen to be relevant and employable in 2030?

1. Business advisors and Strategists
   - AI will do the number crunching and analysis. The accountant must be able to use these to help drive long term business strategy and value creation.

2. Specialism in complex accounting niches that are fluid and changing like tax law
   - Not everything can be automated. The importance of Continuing Professional Education (CPE) in staying abreast

3. Accounting Technicians must upgrade to CPA level as soon as possible because those tasks will soon be fully automated
Conclusion

- The world will be a vastly different place in 2030.
- AI can be a tool for competitive advantage.
- Accounting firms have already started using some form of AI.
- By 2030, all low-level accounting work will be completely automated and there will be some form of AI augmentation with the CPA to assist their work.
- CPAs must focus on strategic value creation for their Organizations and Clients.