Artificial Intelligence and the Accounting Profession in 2030

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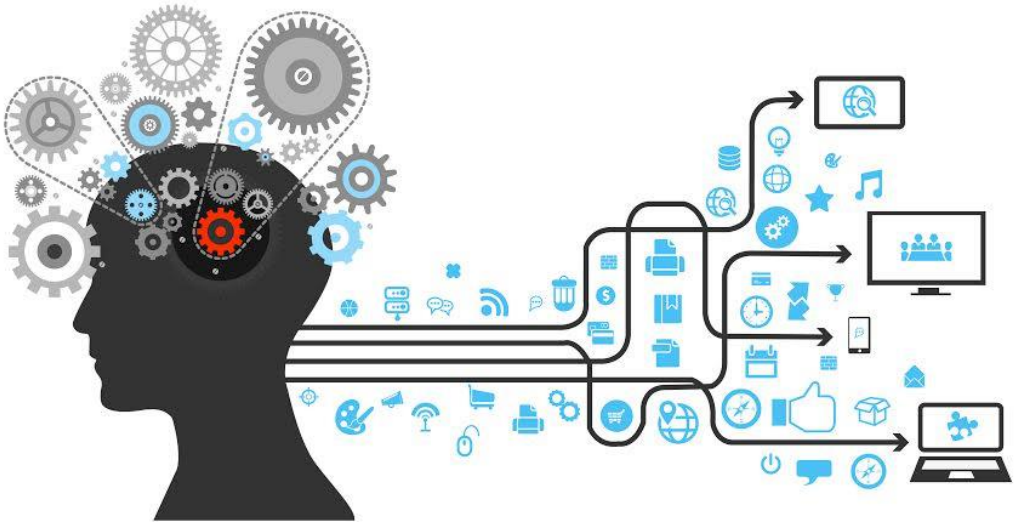


Lifelike 'Sophia' Robot Granted Citizenship to Saudi Arabia

By Mindy Weisberger, Senior Writer | October 30, 2017 03:39pm ET

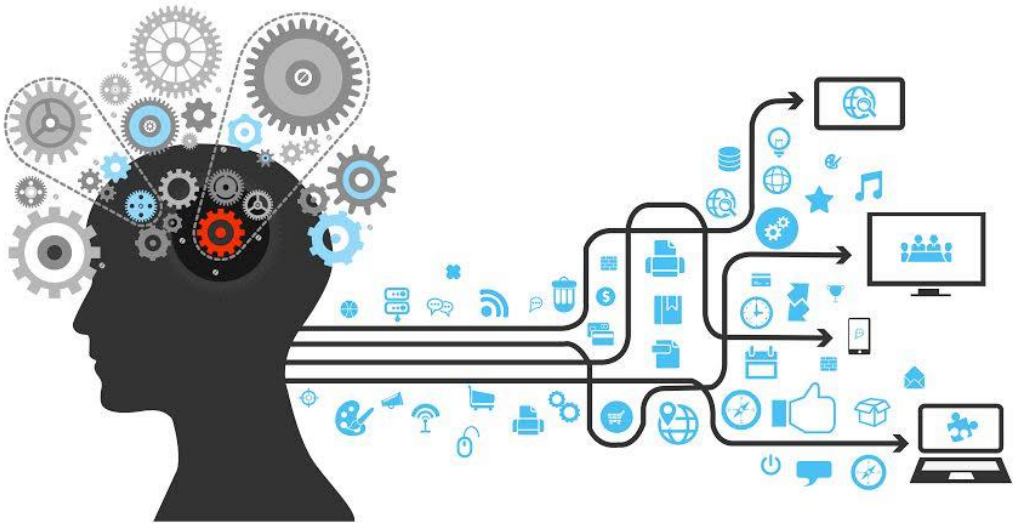
"Sophia," created by Hanson Robotics, attends the RISE Conference at the Hong Kong Convention and Exhibition Centre on July 12, 2017.

Credit: studioEAST/Getty

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

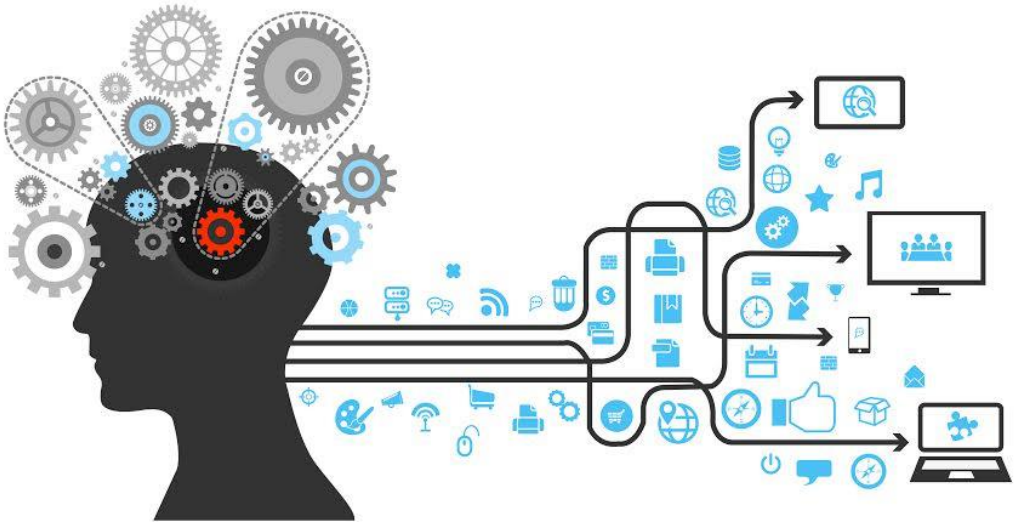
- Desalination
- Tidal power
- Megatall buildings
- 3D printing
- Self-driving vehicles
- Smaller Cars, all electric
- Half of shopping malls in US closed down
- Hypersonic passenger airliners
- Robot Ships
- Commercial delivery drones
- Robotics replaces human jobs. Humans will become hybrids.
- Robots 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?

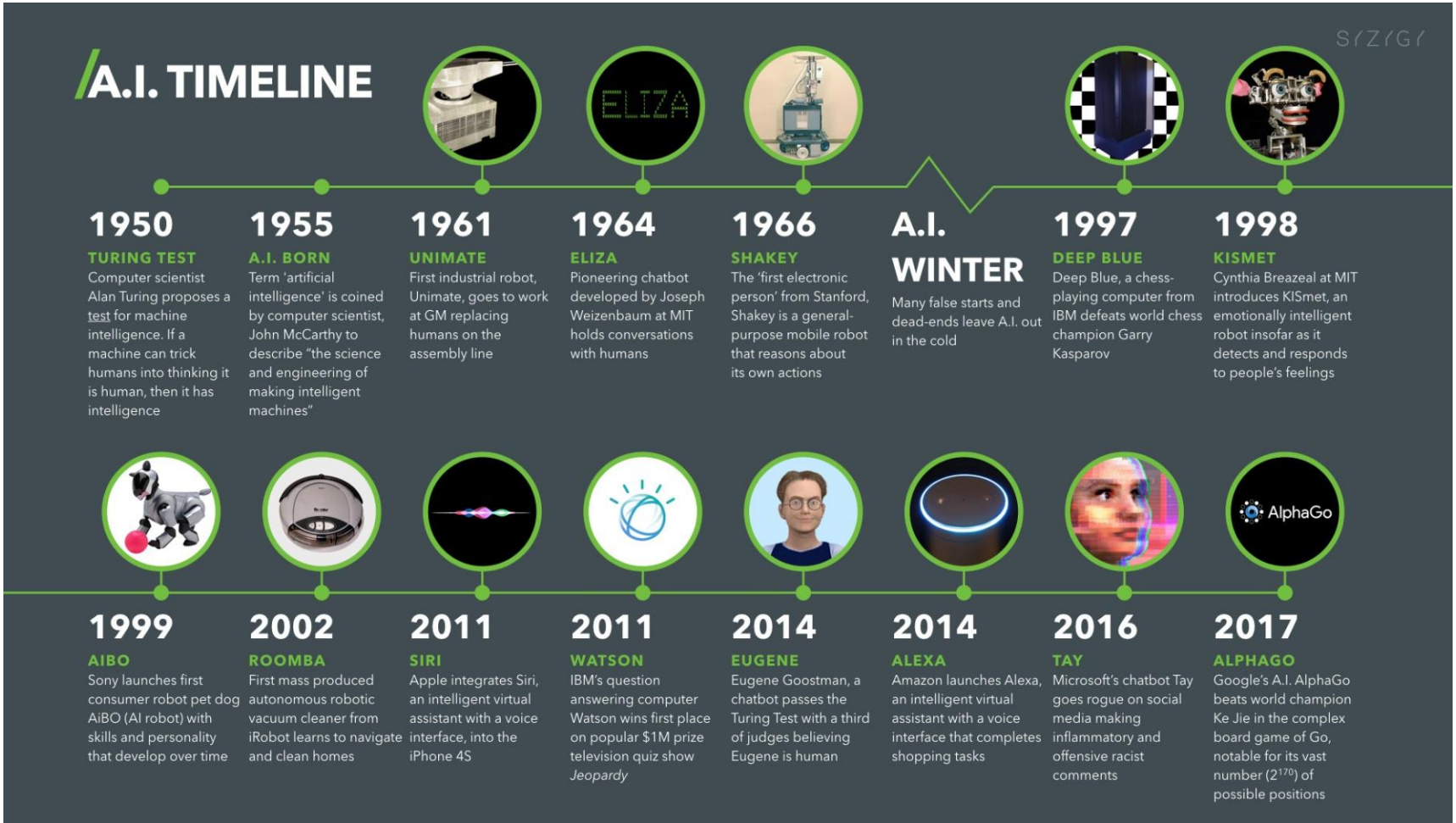
A.I and the Accounting Profession in 2030: Part 2



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



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

From traffic patterns and music downloads to web history and medical records, data is recorded, stored, and analyzed to enable the technology and services that the world relies on every day. But what exactly is big data, and how can these massive amounts of data be used?

As a leader in the sector, IBM data scientists break big data into four dimensions: **Volume, Velocity, Variety and Veracity**

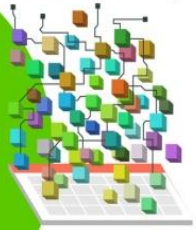
Depending on the industry and organization, big data encompasses information from multiple internal and external sources such as transactions, social media, enterprise content, sensors and mobile devices. Companies can leverage data to adapt their products and services to better meet customer needs, optimize operations and infrastructure, and find new sources of revenue.

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

Volume
SCALE OF DATA

40 ZETTABYTES
[43 TRILLION GIGABYTES]
of data will be created by 2020, an increase of 300 times from 2005

It's estimated that
2.5 QUINTILLION BYTES
[2.3 TRILLION GIGABYTES]
of data are created each day



6 BILLION PEOPLE
have cell phones

Most companies in the U.S. have at least
100 TERABYTES
[100,000 GIGABYTES]
of data stored

Variety
DIFFERENT FORMS OF DATA

As of 2011, the global size of data in healthcare was estimated to be
150 EXABYTES
[161 BILLION GIGABYTES]

By 2014, it's anticipated there will be
420 MILLION WEARABLE, WIRELESS HEALTH MONITORS

4 BILLION+ HOURS OF VIDEO
are watched on YouTube each month

30 BILLION PIECES OF CONTENT
are shared on Facebook every month

400 MILLION TWEETS
are sent per day by about 200 million monthly active users

Velocity
ANALYSIS OF STREAMING DATA

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

By 2016, it is projected there will be
18.9 BILLION NETWORK CONNECTIONS
– almost 2.5 connections per person on earth

Veracity
UNCERTAINTY OF DATA

1 IN 3 BUSINESS LEADERS
don't trust the information they use to make decisions

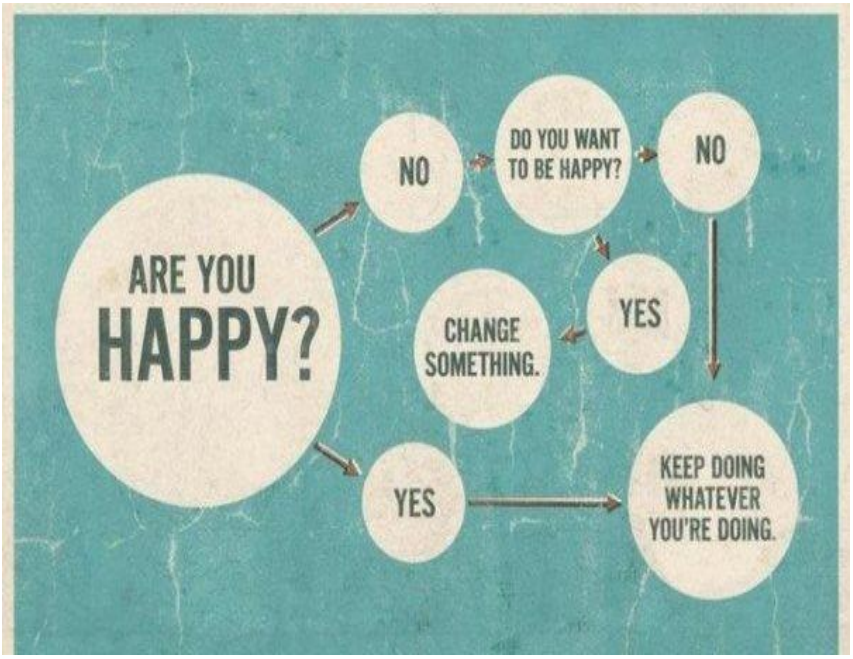
in one survey were unsure of how much of their data was inaccurate

Poor data quality costs the US economy around
$3.1 TRILLION A YEAR

Sources: McKinsey Global Institute, Twitter, Cisco, Gartner, EMC, SAS, IBM, MEPTEC, QAS

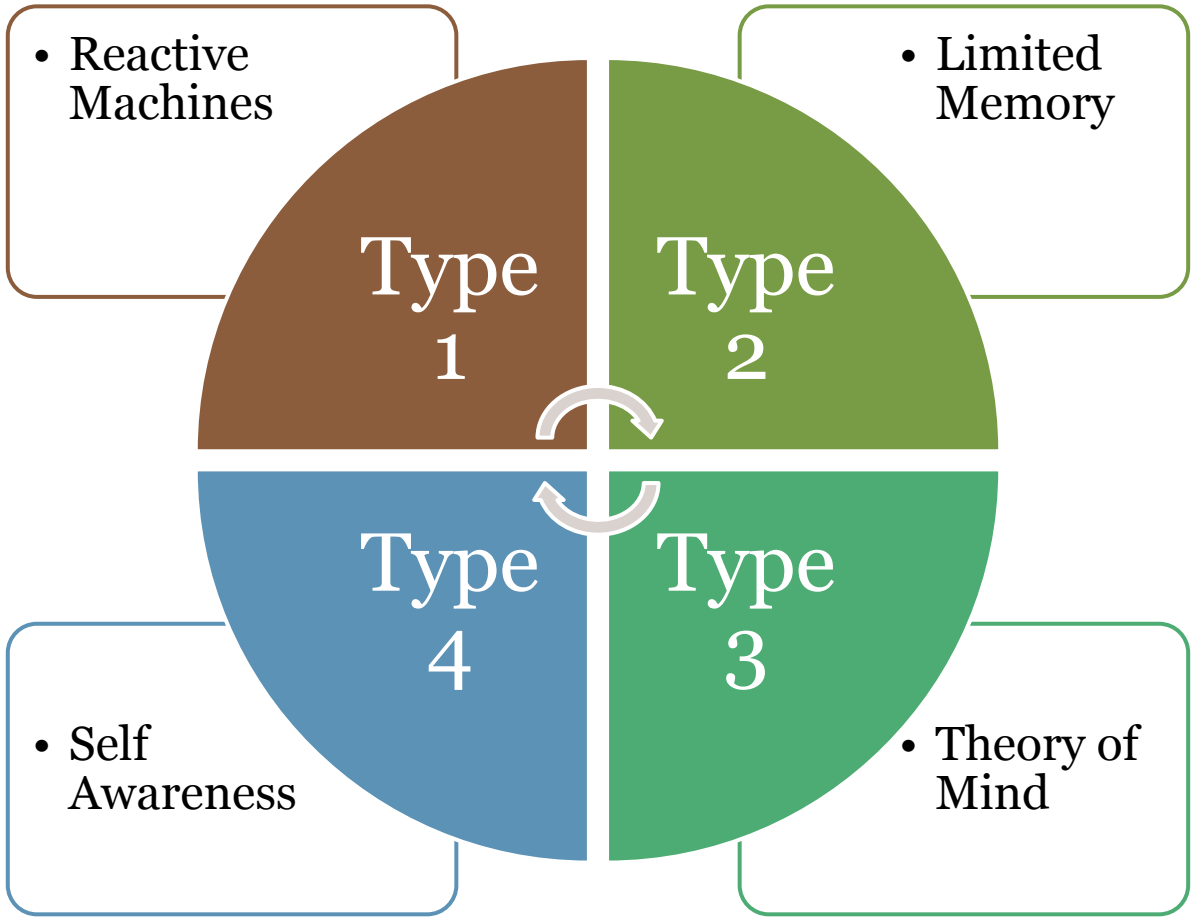
IBM

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 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:

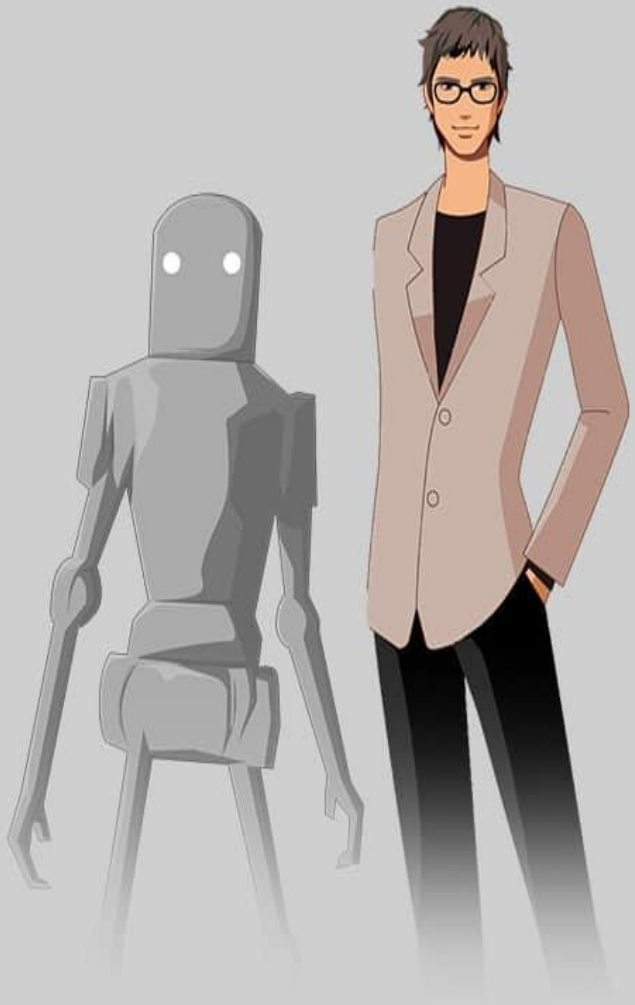
- Self-driving vehicles
- Chatbots, personal digital assistants

TYPE III
THEORY OF MIND

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

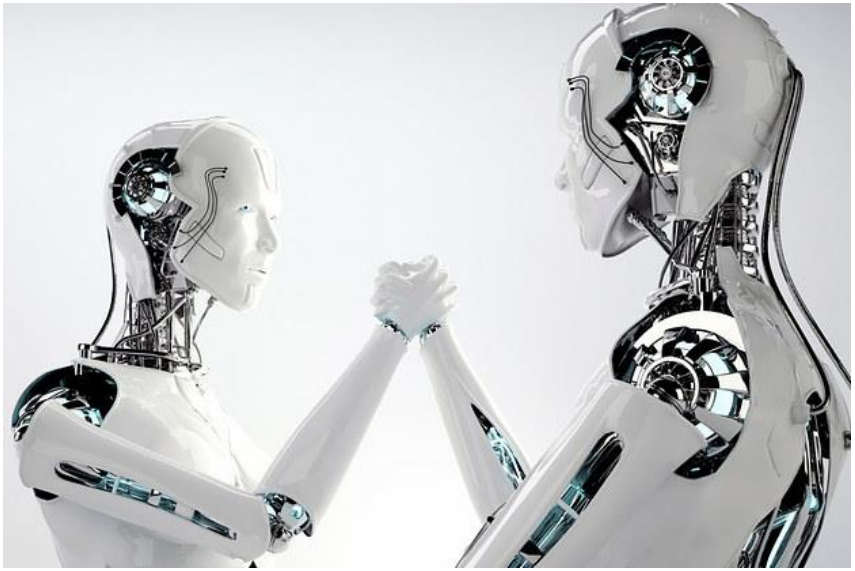
These types of AI can form representations about themselves. An extension of the theory of mind, they are aware of their internal states, can predict the feelings of others, and can make abstractions and inferences. They are the future generation of machines: super intelligent, sentient, and conscious.

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”

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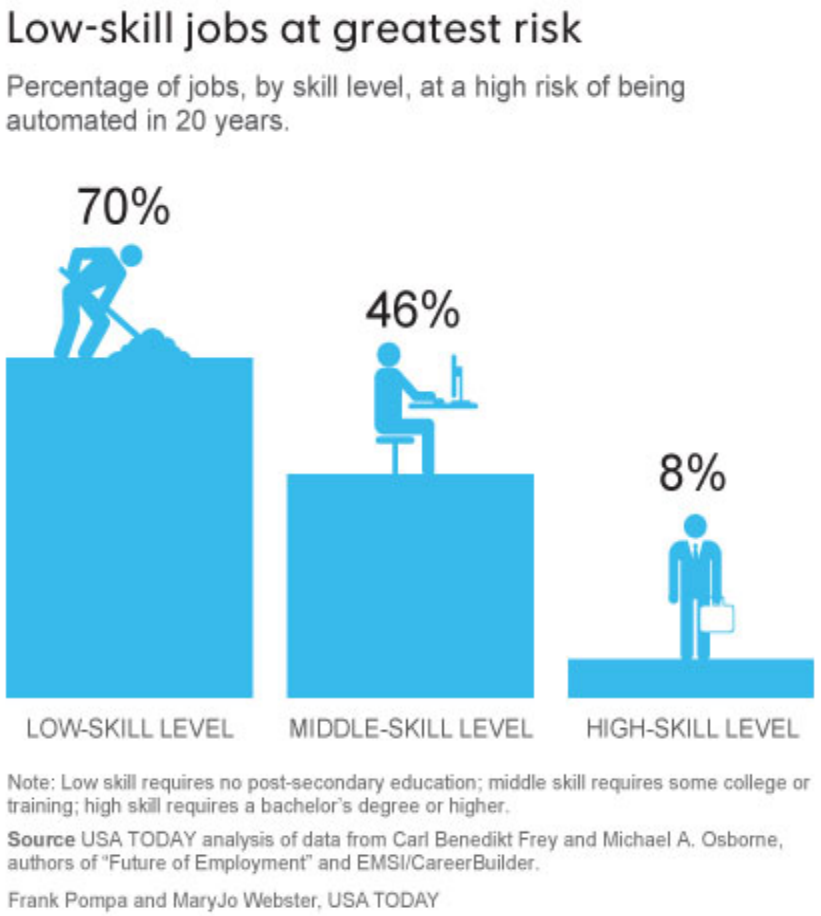
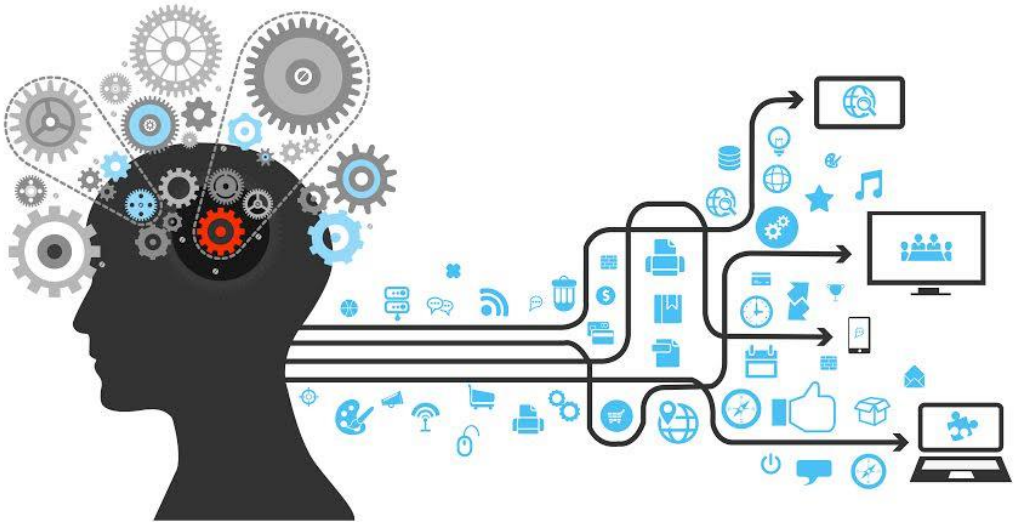
2.6 Human Replacement

- 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.
      - https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html#overview
  - 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.
      - http://www.ey.com/in/en/newsroom/news-releases/news-ey-to-launch-first-ai-center-in-india
    - Leading AI expert in Silicon Valley, Dr. Nigel Duffy has joined EY as Global Innovation Artificial Intelligence Leader.
      - http://www.ey.com/gl/en/newsroom/news-releases/news-artificial-intelligence-authority-nigel-duffy-joins-ey

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.

    - https://www.journalofaccountancy.com/newsletters/2017/jun/survive-automation-revolution.html

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.
      - https://www.cpajournal.com/2017/07/03/coming-disruption-drones-robots-bots/

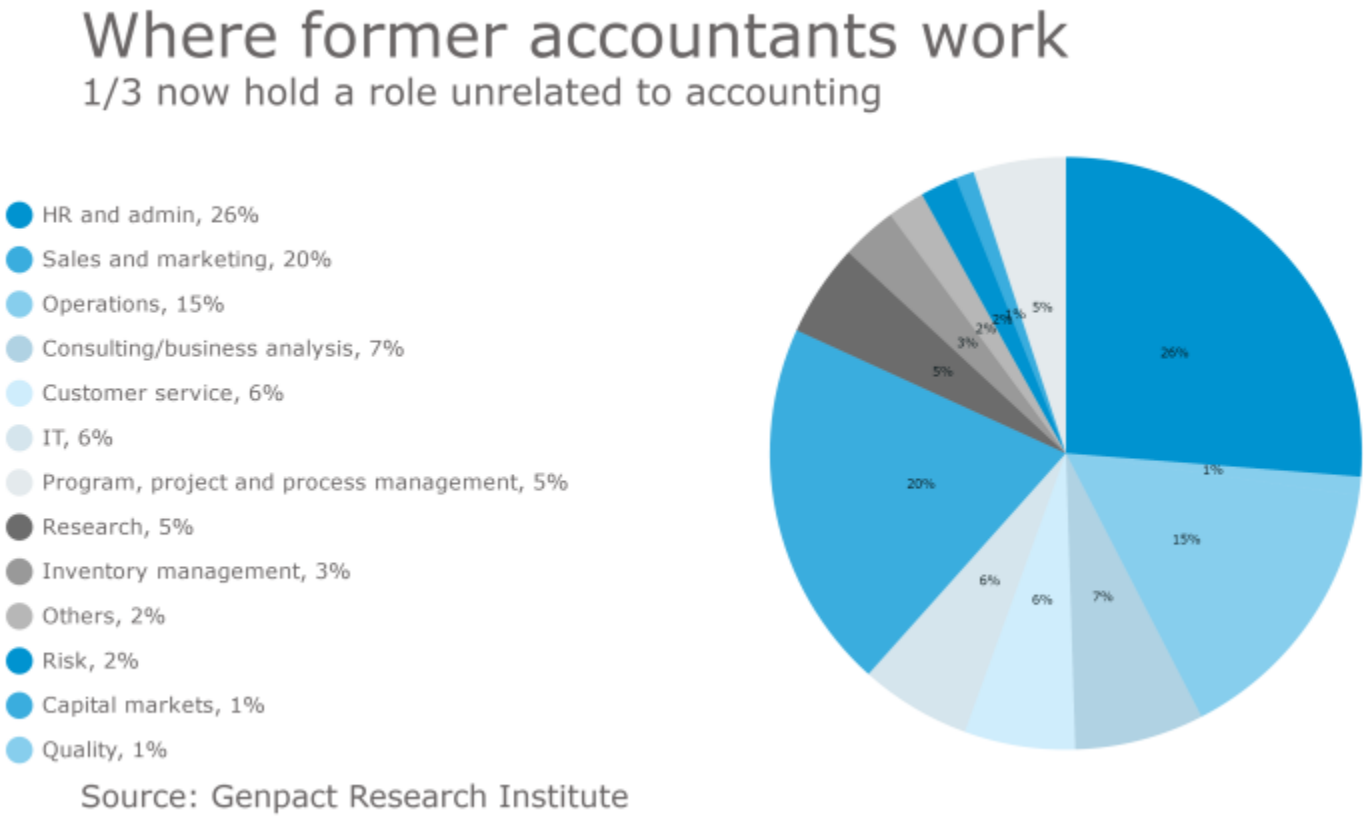
3.2 Role of AI in Accounting in 2030

- 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.
  - http://economia.icaew.com/features/october-2016/how-artificial-intelligence-will-impact-accounting

- **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.

  - https://www.journalofaccountancy.com/newsletters/2017/jun/survive-automation-revolution.html

Opportunities outside of Accounting, that may be also be impacted by AI



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
   - https://www.forbes.com/sites/forbestechcouncil/2017/04/10/how-accounts-can-future-proof-their-careers-in-the-era-of-artificial-intelligence/#cb50c003c6db

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.