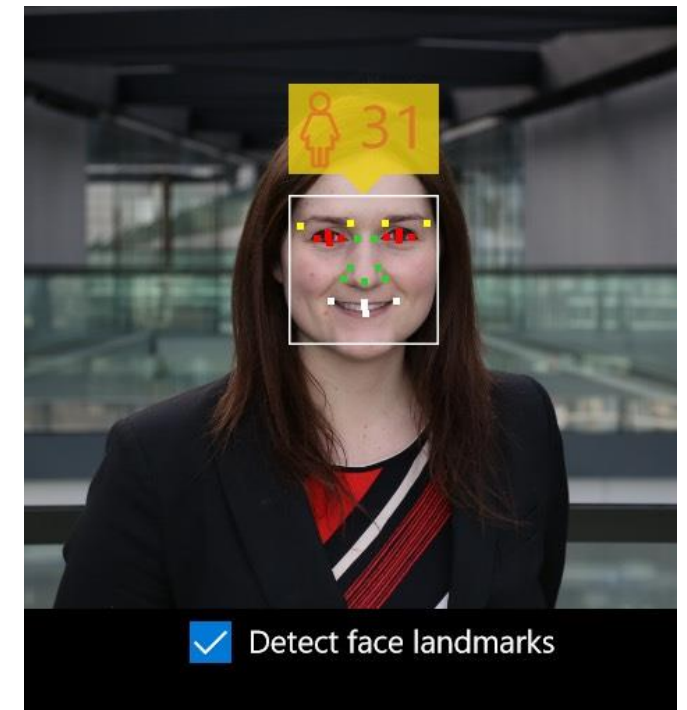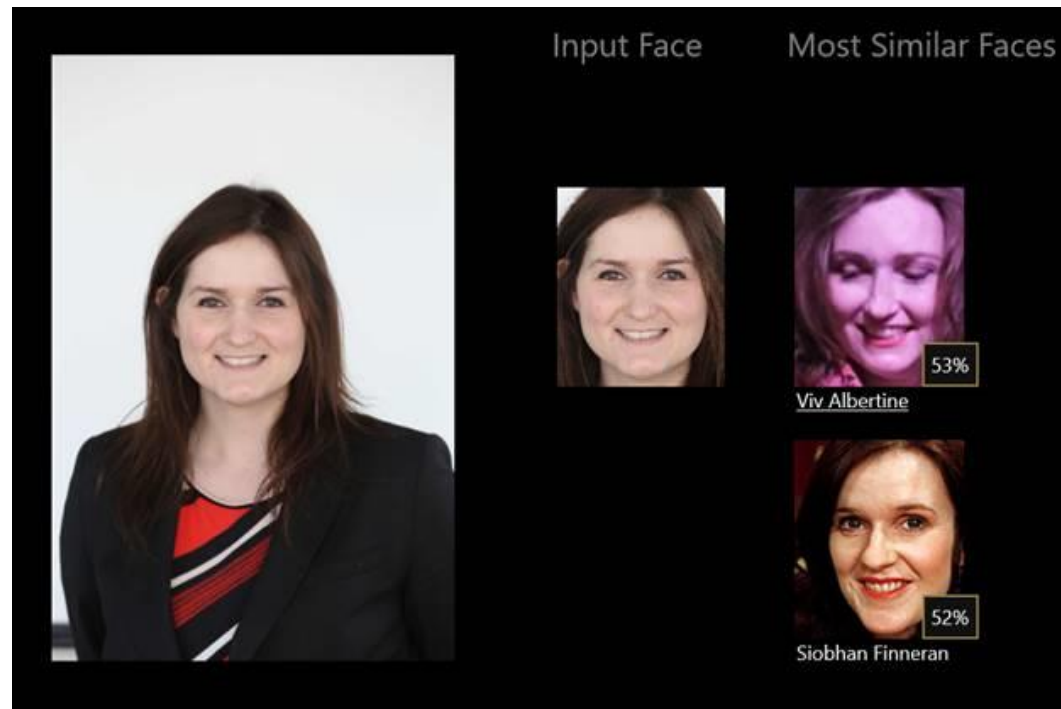# Emerging Technology: Data, AI and Ethics
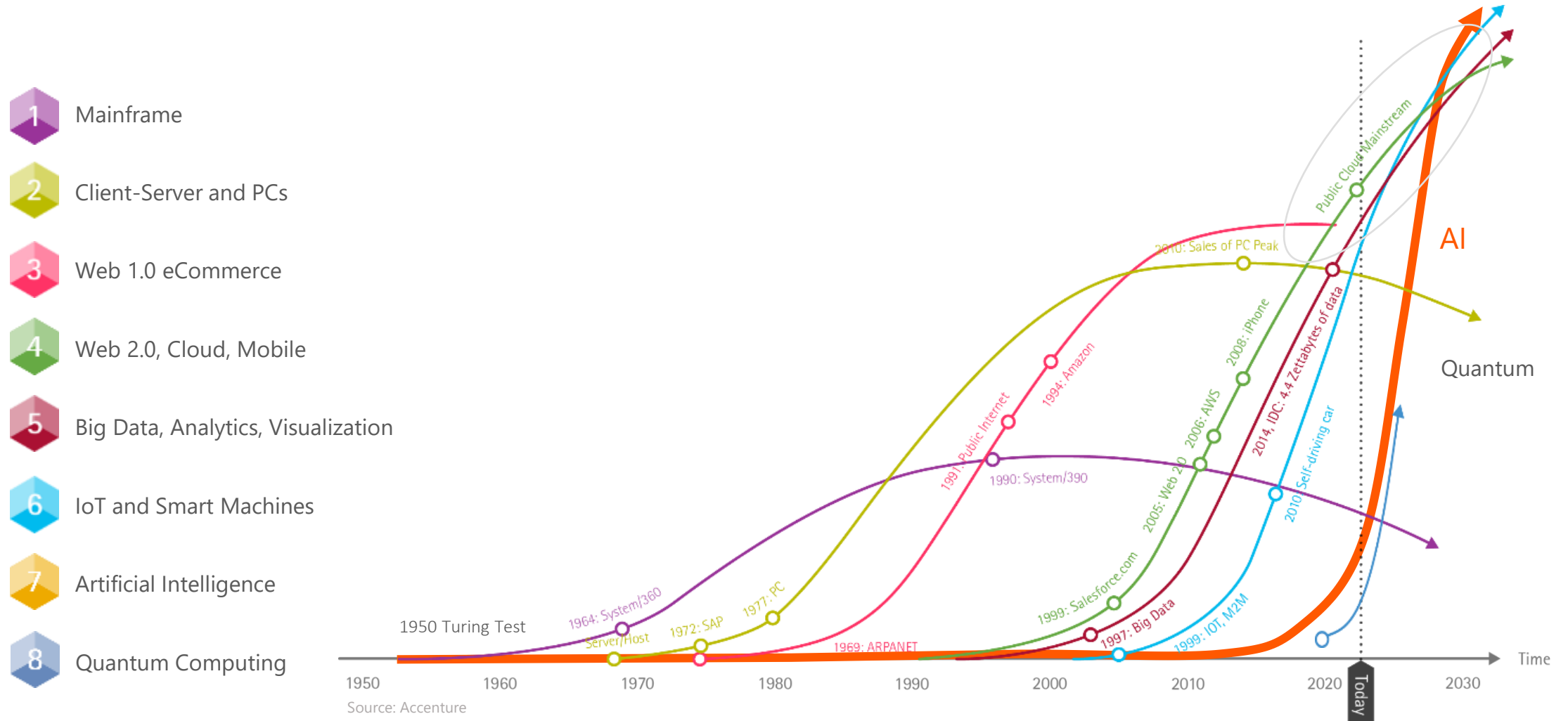
Exploring the use of machine learing and AI technologies and the impact on our everyday lives.

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Who am I? According to Microsoft Facial Recognition API and beyond…

- Sarah Rench, Director of AI and Industry Solutions in Financial Service, Avanade
- I build and design 'intelligent automation systems' for financial institutions.
  Avanade is a Microsoft and Accenture tech consultancy company.
- According to Google: 'One of the Top 100 Most Influential Women in Tech 2019 UK and Yahoo
  Finance's Top 5 HERoes Future Leader, TedX speaker',

<Confidential> See Avanade's Data Management Policy

History of AI: We are in an unprecedented period of technology innovation!

1. Mainframe
2. Client-Server and PCs
3. Web 1.0 eCommerce
4. Web 2.0, Cloud, Mobile
5. Big Data, Analytics, Visualization
6. IoT and Smart Machines
7. Artificial Intelligence
8. Quantum Computing

1950 Turing Test
1964: System/360
Server/Host
1972: SAP
1977: PC
1969: ARPANET
1991: Public Internet
1994: Amazon
1990: System/390
1999: Salesforce.com
1997: Big Data
1999: IOT, M2M
2005: Web 2.0
2006: AWS
2008: iPhone
2014, IDC: 4.4 Zettabytes of data
2010: Self-driving car
2010: Sales of PC Peak
Public Cloud Mainstream
AI
Quantum

Source: Accenture

Time
1950 1960 1970 1980 1990 2000 2010 2020 2030
Today

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3

What is Machine Learning?

ML and AI can be used to automate tasks that are tedious, boring, or not feasible for a human to do with the increasing amounts of data.

### 1. Discovery and identification

✓ Data quality issues and rules, and business entity discovery.

✓ Semantic search, pattern identification, and data classification.

✓ Anomaly detection and notification.

2. Predictive analytics.

✓ Exploit patterns found in historical and transactional data to identify risks and opportunities.

Supervised learning

Building predictive models using labelled data and past observations

Spam
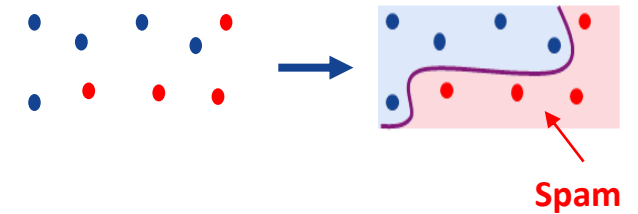
Reinforcement learning

Determining the behaviour to achieve a goal, through interactions with the environment

Unsupervised learning

Build a model that clusters unstructured data. We can then use (supervised) algorithms to derive further value.

What are the challenges of data/AI assets?

| Challenges	Solutions
IP protection	Patent, Password protection
Data privacy	Data Governance, Auditing, Training
Compliance with local and global regulation (regulation update)	Regular reviews, Due diligence
Algorithms accuracy	Creating challenger models to test existing algorithms
Explainability vs Complexity	Ensuring algorithms are explainable
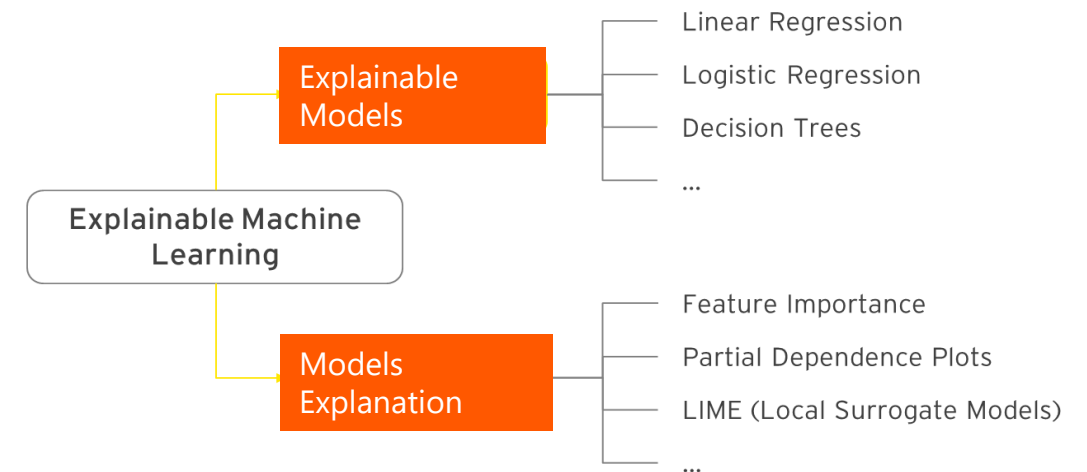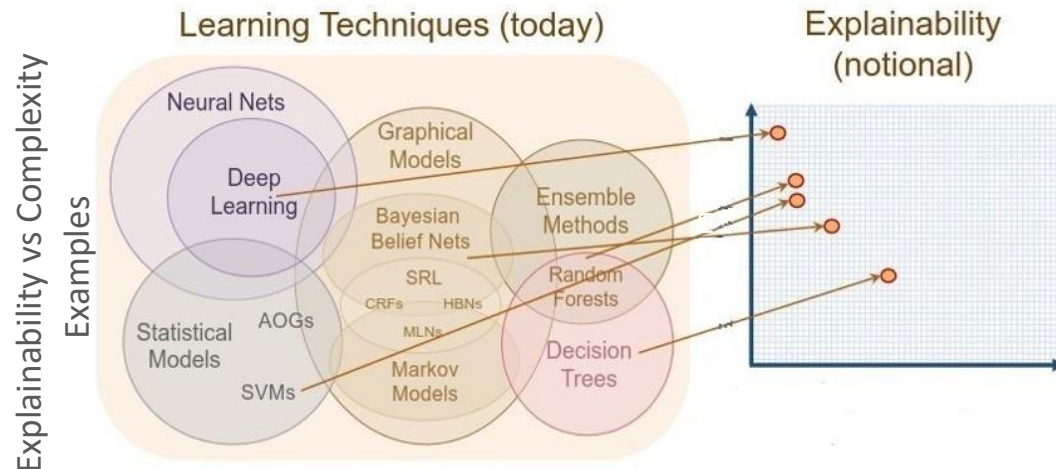
AI Demos

By use case

Intelligent Automation and Bots

- Intelligent Helpdesk with natural language processes

Employee Experience Bots

- Sales Enablement and Support Bot
- HR Bot (HR type questions)
- Retail Employee Bot with Amazon Echo (scheduling, shift changes)
- Field Force Enablement using Cortana Voice
- Knowledge Finder for employees to find relevant content and have it summarized (partner with AI startup Agolo)
- Connected Mine
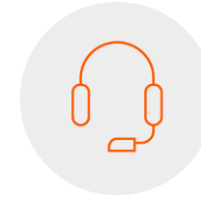
Digital Sales and Service

- Customer Insurance Bot for First Notice of Loss
- Customer and Employee Retail Bot to search for store items, stock questions
- Next Best Action (Digital Marketing)
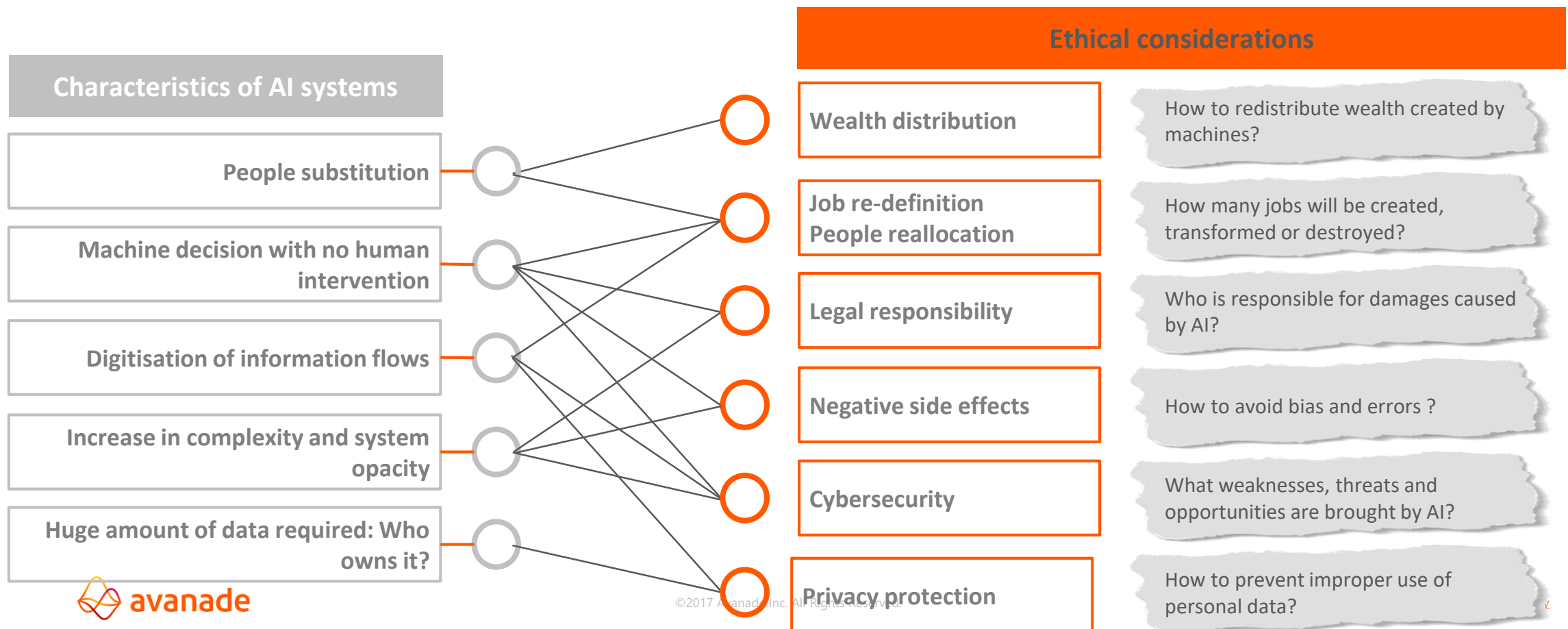- Financial Advisor

Proving the Technology

- Facial Verification to measure accuracy across providers
- Workplace Safety with computer vision

Demo

<Confidential> See Avanade's Data Management Policy

AI applications have significant legal and social implications

- Ethics in general define moral principles that govern a person's behaviour or the conducting of an activity
- In this case of AI ethics is looking at defining moral principles for Artificial intelligence usage such as robots

Characteristics of AI systems

- People substitution
- Machine decision with no human intervention
- Digitisation of information flows
- Increase in complexity and system opacity
- Huge amount of data required: Who owns it?

Ethical considerations

Consideration	Question
Wealth distribution	How to redistribute wealth created by machines?
Job re-definition People reallocation	How many jobs will be created, transformed or destroyed?
Legal responsibility	Who is responsible for damages caused by AI?
Negative side effects	How to avoid bias and errors ?
Cybersecurity	What weaknesses, threats and opportunities are brought by AI?
Privacy protection	How to prevent improper use of personal data?

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Government 'AI Code': Members of the AI APPG help MPs, AI businesses and top universities assess the impact of AI on the UK economy and agree best practice

UK Government "AI Code," could be adopted nationally and even internationally is aiming at providing guidance on ethics and AI.

This code is one of many created by private institutions and governments, and it includes five basic principles:

1. AI should be developed for the common good and benefit of humanity
2. AI should operate on principles of intelligibility and fairness
3. AI should not be used to diminish the data rights or privacy of individuals, families, or communities
4. All citizens should have the right to be educated to enable them to flourish mentally, emotionally, and economically alongside AI.
5. The autonomous power to hurt, destroy, or deceive human beings should never be vested in artificial intelligence.

Importance of Diversity – Currently working on a paper with AI APPG about importance of Diversity in AI.

Importance of 'role models, champions and mentors/ reverse mentoring'.

- Need people from all different backgrounds including;
- LGBTQIA role models,
- Role models with all various (physical, learning and neurological) disabilities,
- and different ages, races and ethnicities…
- to lead to 'diversity of thought,' better problem solving and innovation.

▶ I presented on 'AI and Diversity' at the AI APPG in June 2019 where I explored the opportunities to help improve diversity using AI and technology.

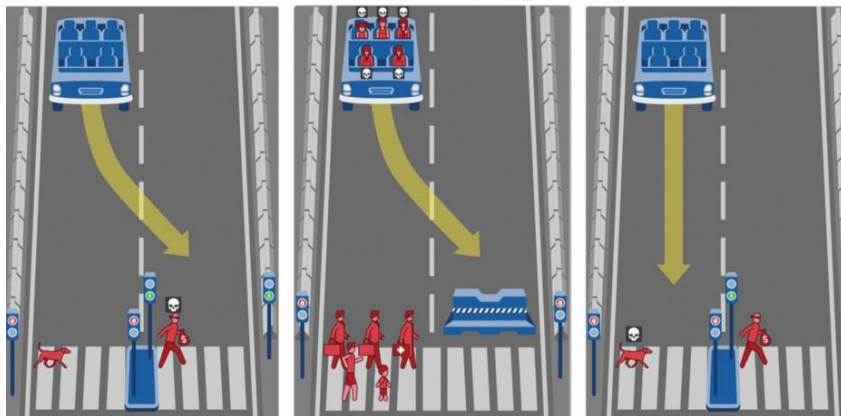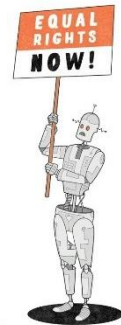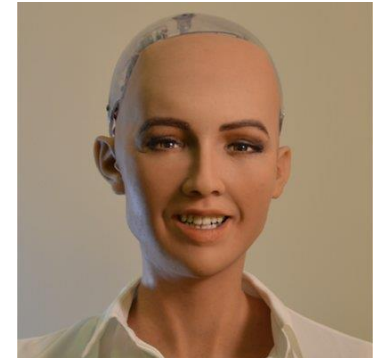▶ E.g. video conferencing/ voice recognition can mean a digital and more accessible workplace.

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Ethical considerations and AI misuses examples
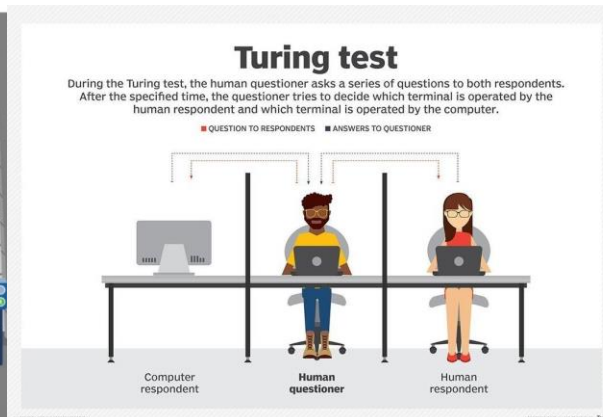
Examples of ethical consideration

► Rights of robots e.g. Sophia.

► Autonomous vehicles e.g. decisions of self-driving cars

► Machines with moral status

► Disclosure of AI / Transparency e.g. Google Duplex

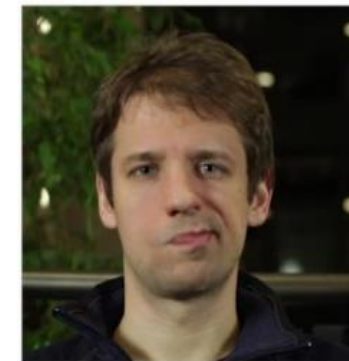► AI in Medicine / Health

► Bias

Examples of AI misuse

► Artificial Intelligence use in weapons (autonomous weapons)

► Deepfakes, AI misused by creating an artificial version of a person's face and creating fake content

► Unknown surveillance and monitoring (continuous monitoring, data collection and analysis on GPS location through mobiles, Siri/ Alexa voice and sentiment analysis, emails and online content reviewed without permission).

Turing test

During the Turing test, the human questioner asks a series of questions to both respondents. After the specified time, the questioner tries to decide which terminal is operated by the human respondent and which terminal is operated by the computer.

■ QUESTION TO RESPONDENTS   ■ ANSWERS TO QUESTIONER

Computer respondent   Human questioner   Human respondent

Source Sequence   Reenactment

How do you prepare organisations and their future workforce?

1. How will organisations respond to AI implementation?

2. How will AI impact employees day to day activities?

3. How to ensure that legal, ethic and social considerations are not overlooked before implementing AI within your organisation?

Ethics and legal issues should be dealt with at the start of any AI project

- Implement a group-level approach to address the legal and ethical issues related to AI in a homogeneous way,

- Apply this approach from the start of any AI projects

Evaluate the consequences on jobs

- Evaluate the impact of AI on current jobs and consider the future skills needed by the business.

- Put in place HR measures (e.g. additional training) for the most affected jobs

Communicate to win employee approval

- Exchange proactively with employees and their representatives to demystify AI, concretely illustrate employee benefits and mitigate potential concerns

How do you prepare or your colleagues?

1. How do YOU personally develop the necessary AI skills?
2. Importance of Emotional Intelligence?

Develop Internal AI Skills

▶ Individual: 'Knowledge is Power': Consider online coding courses or training to understand data science, Python or R.

▶ Class room training, conferences and networking events to gain insight.

Networking & Partnerships

▶ Take adventure of any opportunities to meet new people

▶ Build connections and partnerships with key individuals

▶ Networking can help build emotional intelligence

Emotional Intelligence

▶ Emotional Intelligence is important not just in humans but for AI le.g. Virtual Agents dealing with customer services and HR issues (to give just two examples),

▶ EQ Includes:
   ▶ Empathy
   ▶ Self Awareness
   ▶ Social Awareness
   ▶ Self-Management
   ▶ Motivation

Developing your EQ & Tech skills leads to AMAZING opportunities!

Emerging Technologies and AI courses you can try!

Technical Learning	Courses
Various AI courses on 'Udemy' or 'Coursera'	**Search for 'Udemy' or Coursera**
Emerging Technology and AI	Emerging Technology – Artificial Intelligence
Data Science and Artificial Intelligence in the Actuarial Work	Analytics – Data Science
Intelligent Automation - Intermediate	Emerging Technology – Artificial Intelligence
Intelligent Automation - Advanced	Emerging Technology – Artificial Intelligence
Data Visualisation and Analytics	Analytics – Data Visualisation
Intro to Pro vision	Analytics – Data Visualisation
Using Provision	Analytics – Data Visualisation
Adding Value with Pro Vision	Analytics – Data Visualisation
Python	Just search on Udemy or Coursera for Python!
Deep Learning/ Neural Networks.	https://www.deeplearning.ai/

Thank your for listening and please contact me for further information!

Sarah Rench, MSc, MBA

Director of Data, AI and Industry Solutions in Financial Services, Global AI Centre of Excellence.

Sarah has experience implementing IT and AI solutions including; financial trading platforms, risk and regulatory systems, virtual agents with NLP, RPA, cloud and data management systems, advanced analytics and data visualisation for Financial Services. She is also experienced in organisational change management, operational resilience and setting up 'Data and AI Centre of Excellences'.

Previously, Sarah worked for EY and IPsoft leading in delivering 'intelligent automation' solutions and was EY's advisory board member of All-Party Parliamentary Group on AI (AI APPG). She actively encourages women and other minority groups to get into Fintech/STEM through her work on the executive boards of DevelopHer, Cass Global Women's Leaders Programme and through running events and training through Avanade's Women's ERG, Prism (LGBTQ) and BAME and multicultural network.
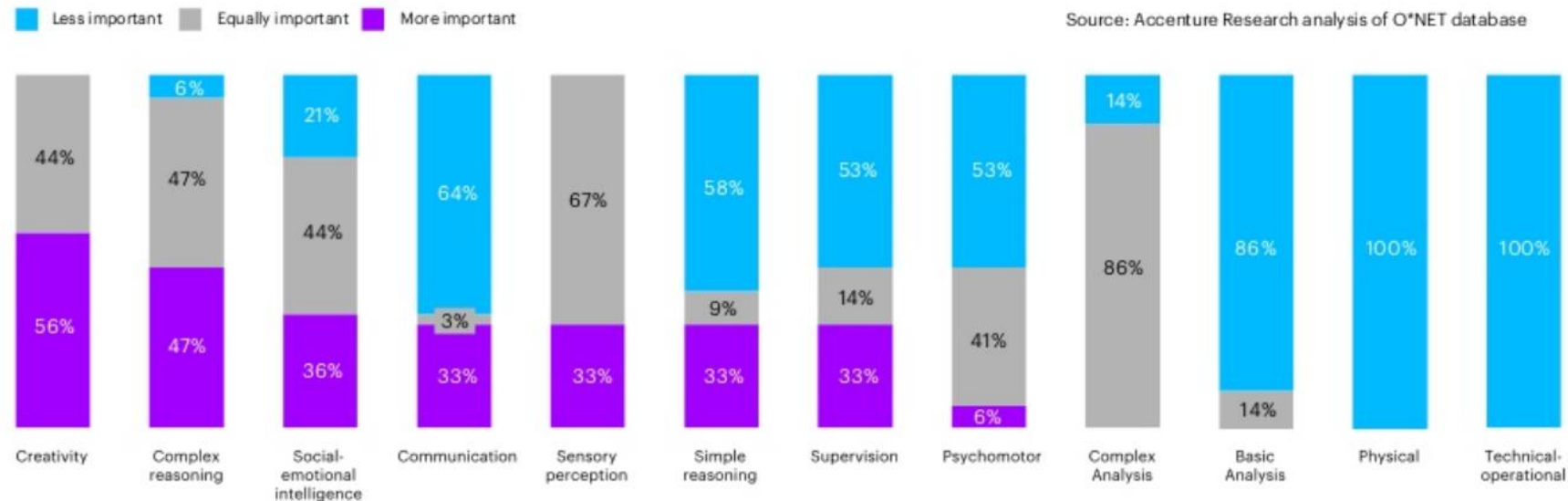
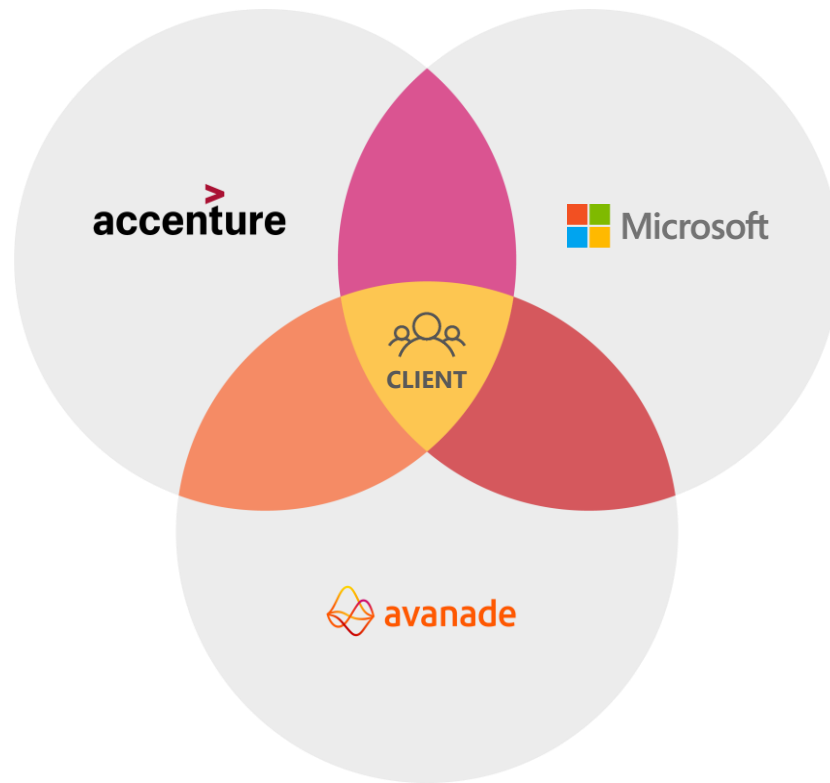## Contact details: Please add me on LinkedIn!

Appendix

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Skills of the future

The importance of creativity, complex reasoning and social-emotional intelligence is rising. Specifically, more than half of U.S. jobs need higher-level creativity, more than 45% require more complex reasoning, and nearly one-third need more socio-emotional skills than in the past.

Change in the importance of skill type in U.S. from 2004 to 2016
(100% = 151M jobs in U.S. as of 2016)

Less important Equally important More important

Source: Accenture Research analysis of O*NET database

Skill	Less important	Equally important	More important
Creativity		44%	56%
Complex reasoning	6%	47%	47%
Social-emotional intelligence	21%	44%	36%
Communication	64%	3%	33%
Sensory perception		67%	33%
Simple reasoning	58%	9%	33%
Supervision	53%	14%	33%
Psychomotor	53%	41%	6%
Complex Analysis	14%	86%	
Basic Analysis	86%	14%	
Physical	100%		
Technical-operational	100%		

Accelerate AI success with three leaders working as one

- Proven delivery with repeatable processes, powerful IP and deep technology resources

- Ability to push the boundaries of technology to differentiate and deliver competitive wins

- Design-led thinking with people at the center