The future
of work

Artificial Intelligence series

KONICA MINOLTA

Cognition and the future of work

We live in an era of unprecedented change. The world's population is expected to reach 7.6 billion in 2020, and the number of connected devices is expected to grow to between 20 and 30 billion[1] by the same year as the Internet of Things (IoT) continues to mature. We are observing an exponential increase in available data and ubiquitous information that together are already causing "information overload or infoxication[2]", which can minimise our capacity for cognitive processing and our ability to make quality decisions.

Better management of this cognitive overload could expand our level of understanding, increase the ease with which we can learn and memorise details and overcome obstacles to deep thinking. It is apparent that we have entered an era in which new human necessities are emerging. We strive to reduce the time spent searching for and memorising reliable information, we struggle with the risks associated with the security of digital information and we battle to manage a plethora of unforeseen events that may result in a loss of control over them.

> "AI is a core part of Konica Minolta's vision for the workplace of the future."

Artificial intelligence (AI) can provide the answer to many of these needs by offering a system of technologies that can help us better manage information, identify reliable data sources, make informed decisions and take advantage of enhanced cognition in a broader sense. Many companies are already making this a reality and have transformed their businesses using AI as a core technology upon which new services and more complex offerings can be defined.

AI is a core part of Konica Minolta's vision for the workplace of the future. We are committed to becoming the glue between cognitive computing, intelligent automation and other disciplines related to AI that deploy services and solutions for a more efficient working environment.

[1] Gartner Inc. , 2015. http://www.gartner.com/newsroom/id/3165317

[2] "How the web distorts reality and impairs our judgement skills", 2014. https://www.theguardian.com/media-network/media-network-blog/2014/may/13/internet-confirmation-bias

AI: from technology to market

In February 2017, a group of researchers at Microsoft and the University of Cambridge developed an AI solution that can write code all by itself[3]; this is evidence of the potential to develop interactive and scalable ways to teach robots. According to the Stanford report on AI[4], in the next 15 years the technology will increasingly focus on the development of human-aware systems. These will be specifically customised according to the characteristics of the people with whom they will interact. Finally, in parallel with the growth of the cloud and IoT-based systems and devices, new perception and object-recognition capabilities and robotic platforms that are human-safe will grow, as will data-driven products and their markets.

"The AI market is expected to grow to $15 billion by 2022."

AI is no longer confined to science fiction movies; it is prevalent in our daily business and throughout our society. According to various research analysts, the AI market is expected to grow to be worth around $15 billion by 2022. In September 2016, some of the most renowned tech companies founded "The partnership on AI to benefit people and society", an ambitious statement declaring the efforts that these companies are dedicating to the development of AI technologies. The AI market is ready to develop standards, protocols, policies and a syntax to use these technologies – this is further

evidence of its maturity. The landscape is clearly being shaped for AI solutions to be reusable, scalable and more cost effective – and they will be commoditised very quickly. The high-value products and services of today will soon become obsolete as newer forms of AI emerge that substitute the existing technologies.

With the spread of AI applications, the public is beginning to recognise the change that is imminent, and appreciate its impact. Together with the hope of fulfilling new needs and improving lives, the old debates resurface around the perceived harm that AI may cause. In common with previous industrial and technological changes throughout history, a shift in the workforce has created unemployment – but also new types of jobs.

The Stanford report on AI[4], however, offers some perspective, describing how, "The new jobs that will emerge are harder to imagine in advance than the existing jobs that will likely be lost." On balance, technological changes to date have not had an overall negative impact on humans. They shifted people from countries to cities, from agricultural work to working in factories, then from factories to white-collar workers and today the change is shifting people's work from more mundane to more creative tasks. Overall, we firmly believe that while technology may tend to disrupt and to displace some people in the short term, usually more work is created in the longer term.

[3] "AI learns to write its own code by stealing from other programs", 2017. https://www.newscientist.com/article/mg23331144-500-ai-learns-to-write-its-own-code-by-stealing-from-other-programs/

[4] "Artificial Intelligence and Life in 2030. One Hundred Year Study on Artificial Intelligence (AI100)", Stanford University, 2016. https://ai100.stanford.edu

From cloud to cortex

"Cloud computing is coming to an end, due to all the sensors and devices out on the edge that are going to deeply transform cloud computing and bring an end to what we know as the cloud", says Peter Levine[5], a general partner at the venture capital firm Andreessen Horowitz.

This is true to an extent; the explosion of data, computer applications and services at the edge will make it impossible for the cloud to manage it all, forcing devices at the edge to become more and more intuitive and intelligent. This will cause another shift from the current centralised cloud architecture towards a future, distributed-edge architecture. However, we do not believe the cloud will die. Rather, we predict that it will diverge and split; evolving into a pervasive layer of connectivity between different edge devices and central storage locations. It will become a cortex-like structure made of complex three-dimensional tree-like substructures, where edge devices and the cloud will become interchangeable, according to users' needs.

> "Cloud computing is coming to an end, due to all the sensors and devices out on the edge."

The set of these distributed cloud-edge devices will be connected in a massive network of collaborating entities that will be able to shift their collaboration rules based on the current needs rather than being constrained to a fixed logic. Learning by example, the cortex-enabled devices will combine to fulfil the users' needs, and they will improve from the knowledge of previous experiences. The good news for users is that the most relevant information for them will reside in the edge within the proximity of people, spaces and devices – all close to the user. Nonetheless, the growing amount of data within a user's proximity will demand adaptable logic from the centre as well an intelligent edge structure to manage the provision of information to support better decisions.

[5] "Return to the edge and the end of cloud computing", 2016.
http://a16z.com/2016/12/16/the-end-of-cloud-computing/

Empowering people in the workplace of the future

At Konica Minolta we are embracing the AI challenge with a focus on the context where most of our skills reside: the workplace of the future. Konica Minolta has launched Workplace Hub, our first step towards delivering systems that intuitively connect people, places and devices into a platform where information flows easily and IT support is accessible and manageable from a single place.

Some of the AI-based tools of Workplace Hub constitutes the first steps of a strategy to connect the dots between different technologies and AI solutions. Natural language processing, classification, analytics, machine and deep learning are disciplines that we are already mastering, together with our partners, to achieve the next stage of development. Rather than focusing on the many and various discrete tasks that AI can solve, the real value of the technology will be found in a unified platform, a Cognitive Hub that will become the next generation of Workplace Hub and define a Workplace Operating System.

"Workplace Hub constitutes the first steps of a strategy to connect the dots between different technologies and AI solutions."

A jump to Cognitive Hub

Whilst existing industry focus is mainly on offerings for individual consumers and large corporations, Konica Minolta focuses on intelligence amplification (IA) applications for a middle ground that is better suited to those working in teams and in collaboration planning in both SMEs and large enterprises. Building upon the spread of cortex-like platforms, we envisage the integration of AI and edge-based IoT solutions to distribute and augment the intelligence within the workplace of the future. We are creating the Cognitive Hub, an integrated platform that can learn, adapt and enable organisations to make more insightful and impactful decisions in areas such as investments, business models, new products and services.

Beginning with the experience garnered from Workplace Hub, Cognitive Hub will apply intelligent edge computing to AI and augment human intelligence to extend the network of human interfaces and enhance collaboration between individuals and teams. Cognitive Hub will become a nexus for clients' information flows within the digital workplace and provide augmented intelligence-based services that are immediately and autonomously actionable. Cognitive Hub, acting both in the cloud and at the intelligent edge, will result in an almost ubiquitous AI that supports end-users in taking better decisions.

"Cognitive Hub will apply intelligent edge computing to AI and augment human intelligence."

Talk to us

Exploiting the long Konica Minolta history of innovation, the research activities in our European laboratories concentrate on IoT, data analytics, AI, machine learning, human-machine interfaces and decision support systems to improve and develop new products and services for AI applications. Join us as we move towards Cognitive Hub for the future of the workplace.

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