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Artificial Intelligence Universe

Every week SwissCognitive - The Global AI Hub - selects nine articles from the Artificial Intelligence Universe to share with our community. Among some other topics, this week's articles focus on how Machine Learning, IoT, and with that, Artificial Intelligence can help the world's poorest, how we can build AI that we can rely on, and in the era of AI what lessons we can learn from the dinosaurs.

Jede Woche wählt SwissCognitive neun internationale Artikel zur Künstlichen Intelligenz aus, um sie einer breiten Öffentlichkeit vorzustellen. Hier stellen wir Artikel vor zu Machine learning, Internet of things, wie KI in armen Ländern helfen kann und was wir von den Dinosauriern lernen können.

Chaque semaine SwissCognitive choisit neuf articles internationaux concernant le thème de l'intelligence artificielle afin de les présenter à un plus large public. Ci-après nous présentons des articles au sujet du machine learning, d'internet des choses, comment l'I.A. peut aider les pays pauvres et ce que nous pouvons apprendre des dinosaures.

Ogni settimana SwissCognitive – The Global AI Hub – seleziona 9 articoli dall'universo dell'intelligenza artificiale da condividere con la nostra comunità. Gli articoli di questa settimana si concentrano, tra l'altro, su Machine Learning, Internet delle cose e su come l'intelligenza artificiale può venire in aiuto dei più poveri nonché cosa possiamo imparare dai dinosauri.

Swiss Cognitive

How machine learning and IoT can help the world's poorest people

Plummeting cost-to-compute is making machine learning, (ML), artificial intelligence (AI) and internet of things (IoT) applications more accessible than ever. Hitachi Vantara vice president for solution engineering – big data analytics & IoT Wael Elrifai argues that if we get it right, these technologies could benefit the poorest members of society.

Elaborating on themes addressed in his keynote address at the Smart IoT summit in London earlier this month, Elrifai told Verdict that while big data and AI are still considered emerging technology, the fundamental ideas behind today's AI were described in the 40s. «A lot of these 'modern' ideas came from the 70s, including the techniques my own research was based on,» he adds. «But we crossed a tipping point in terms of cost to compute, and cloud computing arose, in the early 2000s. Running a neural network is not computationally expensive; what's expensive is training one. You can spend literally millions of dollars on computes to train a good neural network. At the cost has dropped, the utility of neural networks and deep learning has dramatically increased.»

Using machine learning and IoT to help society's poorest

According to industry estimates, in 1960, 1 Gigaflop of processing power cost $1tn. Today, 1 Gigaflop costs three cents, which changes the economics of big data, AI and machine learning. Elrifai realised when studying for a Master's degree in economics that technology could drive logistic efficiencies that could benefit poorer people. «Something between 10 and 12% of global GDT is spent on logistics – moving cars, people, refrigerators, medicine, food from here to there,» he says. «Poor logistics, poor shipping mechanisms, high standard rates on shipping and a lot of downtime could cause the cost of milk to go up by two pence. Living in central London, I'm not going to notice it, and I suspect most of my neighbours wouldn't either.

«But I'm originally from Tripoli in Northern Lebanon, which is generally considered to be the poorest city in the Mediterranean by the World Trade Organisation. When I was growing up, there was a civil war there. If the cost of shipping goes up in places that are at war and racked by poverty and there's a 5% increase to the cost of food what do people do? They

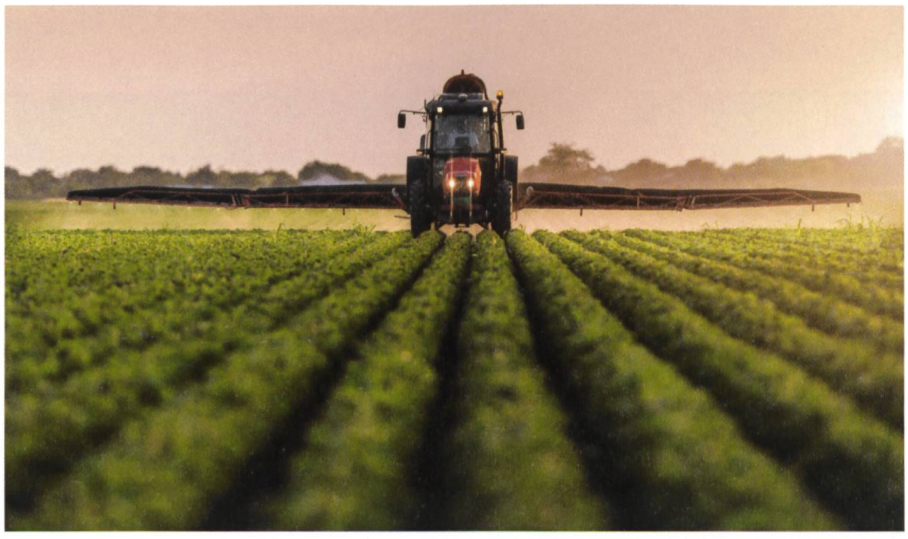


Fig. 1: Machine learning and IoT.

eat 5% less. And food is not something where you eat 5% less and you get just 5% less healthy. «The same is true of medication, textbooks and building materials. These are things where small changes have non-linear impacts, which means they're not a small change any more. It's a small change if you're living in central London; it's not if you're living in Somalia.

«Creating that competition between logistics providers and as a result optimising logistics can have a dramatic impact in parts of the world that are less fortunate. It becomes a moral imperative on us to work on these things.» Elrifai argues that we're at the cusp of a revolution that could have the same impact on food availability as the introduction of the Haber-Bosch nitrogen-fixation process in the early 20th century, which helped solve the challenge of the population explosion.

Three Things That Will Change the World Today

«We're using IoT and ML to optimise water spend, placement of pesticides, dealing with weeds and other pests, so food production costs are dropping,» he says. «The Haber-Bosch process dramatically dropped the cost of food – I think we're on the cusp of another one of those. These are the things that proportionally impact the poorest people in the world.»

Elrifai says these changes are already underway, and there are facilities where ML-optimised means of production have reduced the overall cost of energy used by up to 5%; a dramatic difference in low-margin organisations. And one sector that has benefitted from being an early adopter of ML, and in turn benefitted its customers, is insurance.

«Financial services often comes across as skeezy but the bottom line is the presence of insurance has a dramatic impact on people in poor and rich countries,» says Elrifai. «IoT technology gives a sense of what's going on in the market and the environment, which enables you to processes the predictions that allow you to provide more price-effective insurance

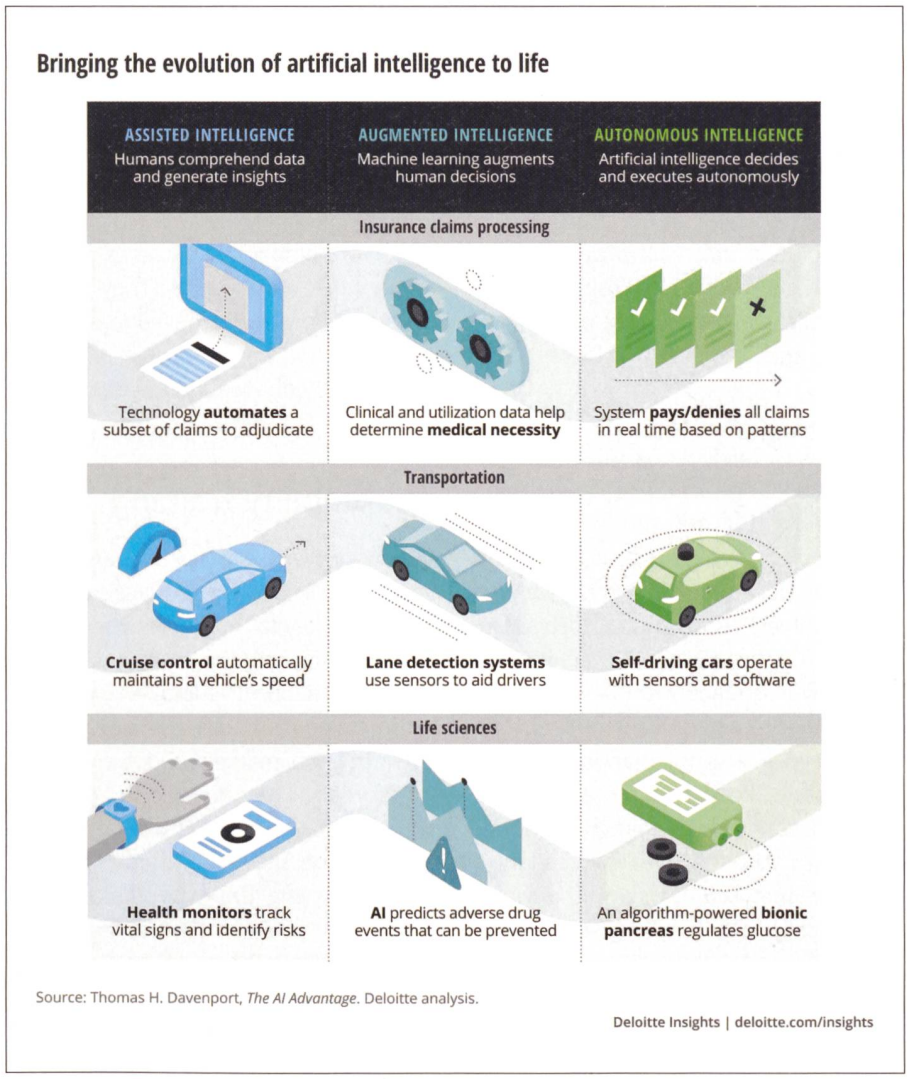


Fig. 2: Bringing the evolution of AI to life.

without the asymmetric information problem that occurs elsewhere. «In the poorest parts of the world, unpredictable odds mean you can't provide insurance. IoT offers better predictions that make it more possible to offer insurance, which can encourage entrepreneurship, enable the purchase of capital assets, and so on because you're not risking your entire life.»

Evolving training methods

However, Elrifai warns that a lot of the methods used to train networks are lacking in academic vigour. «It reminds me of the first flight of the Kittyhawk where the Wright Brothers didn't understand flight but they built something that worked,» he says. «You couldn't have built the Concorde on the same principle. «One of the mistakes companies still make is they hand a bunch of data to a scientist and say 'Find me something interesting.' I can't find you anything interesting if I don't understand your business process and you're not going to be working with me. All I can do is find you what we call descriptive statistics – 16th or 17th mathematics – things like mean and mode and median.»

In an AI era, lessons from dinosaurs help us adapt to the future of work

The ancestors of modern birds were the sole survivors of one of the most severe

mass extinction events in the history of the world. Today, 10,000 known bird species exist, all of them the descendants of dinosaurs. Polar adaptations, seed-based diets and even nest designs may have played roles in determining who lived and who died. In the fourth industrial revolution era, enterprises and human workers are equally at risk of becoming extinct. This time, being proactive is essential and adaptability is the answer.

Adapting to an AI era

The artificial intelligence (AI) revolution has started. The technology is maturing very rapidly. The question is no longer whether we use the technologies or not, but rather how to better collaborate with them. Ambient technologies, such as Siri, Alexa or Cortana, are integrating seamlessly in our interactions. We walk into a room and interact with them to turn on the light, play a song, change the room temperature, keep track of a shopping list, book a ride to the airport or be reminded to take the right medication at the right time. And this is only the beginning. Emotion AI works on teaching robots how to feel empathy. Google AI stories are about how AI is helping people solve problems. Experts race to predict how we will be living with AI in the near future.

More-than-human work

Disruptive technologies are advancing, demographics are shifting, customers are gaining power and the gig economy and global talent markets are rising. This is shaping the future of work in all fields including education, cybersecurity, delivery, coaching, management, marketing and sales, health care, music and agriculture. Human+ workers are individuals who work alongside machines to reach collaborative intelligence. They consolidate their individual knowledge, skills and experience with a set of tech-driven capabilities to enhance their performance.

Adaptability training

«Adapt or die» is a business mantra, and the adaptability of a workplace's employees is their key to the future where many of the tasks cannot be imagined yet. The next generation of employees will need to be trained as humans+ before they enter the job market, and the existing workforce will require continuous reskilling and upskilling. Little has been done to reimagine the training and reskilling needed for the future workplace. This said, similar to creativity (another in-demand soft skill) there is more to adaptability than meets the eye. To adapt is a performance that goes beyond knowledge and skills. It requires an attitudinal change that will only happen if we revise our constructs, consider new perspectives and start to perceive technology as augmenting our own capabilities instead of replacing them.

Fig. 3: Artificial intelligence.

Human vs. machine

Many associate AI with science fiction stories such as the Terminator franchise or Isaac Asimov's Robot series, where technology's prime goal is to control or even exterminate human existence. Others are influenced by worldwide experts who relentlessly warn against AI and technological domination. Tesla founder Elon Musk has said on several occasions that AI is more dangerous than nuclear weapons and that it can become an immortal dictator. Technology has eliminated jobs in the past and will eliminate others in the near future. New jobs will require the current workforce to commit to lifelong learning. Besides, AI's ethical problems are yet to be addressed, and establishing an AI code of ethics is complicated. Since its inception in 2017, 1,130 citizens and 28 organizations have signed the Montréal Declaration for a Responsible Development of Artificial Intelligence, a commitment to the socially responsible development and implementation of AI that serves and benefits society.

Empathetic evolution

So can dinosaurs adapt? I say they can, but it will take an empathetic village. Enterprises that expect their workforce to be ready for the future of work must learn fast. They must adopt a proactive mindset and support their employees in their quest to belong to the future workplace. Mostly, they need to understand where resistance to change comes from in order to address it. At the same time, enterprises need to close the digital divide between themselves and their workforces. Most importantly, they need to find ways to keep their people employed. The fear of being replaced can reinforce human dinosaurs' unwillingness to change. Team dynamics should function in an empathetic way to facilitate human/human and human/machine collaborations and to support individual members in their adaptation process.

On an individual level, we need to develop our mental and emotional capacity and our knowledge and skills to embrace the human+ identity and attitude. And

last, we need to want to adapt, which requires a change in how we view the world. Once we identify, analyze and address the core of our resistance to change, we can move to strategies to equip and empower us to deal with uncertainties and actively experiment with new possibilities. To adapt, training to develop knowledge and skills are necessary but will not be enough. An empathetic and supportive environment and learning about oneself are also important.

Relevance of Blockchain for Democratizing Artificial Intelligence

There exists a huge opportunity to use free computing space in the world more efficiently. According to a rough estimate, around 90% of the total 4 billion computers across the globe has a free capacity at any moment in time. This figure does not include free capacities available across other devices like smartphone and tablets. In effect, all these excess capacities are wasted and turned out to be unproductive. Sensing the opportunity, many start-ups today are exploring new and innovative ways to use this excess capacity for the various applications of the blockchain. As blockchain works on the principle of distributed ledger technology, it provides the infrastructure for idle capacity to provide support for transactions and other blockchain processes. Some of the solutions provided by the blockchain developers in this regard include data storage and web hosting. However, the more exciting area which can be specifically leveraged by the idle capacity solution is the field of artificial intelligence.

Artificial Intelligence

Undoubtedly, artificial intelligence has caught the attention of every stakeholder in the technology development and adoption ecosystem. Many experts argue that using blockchain solutions in the area of data storage and web hosting, one can speed up wider distribution of algorithm and data which, in turn, will have a direct positive impact on the development of artificial intelligence. That said, many technology experts are apprehensive about the fact that big guns in the technology industry such as Facebook, IBM, Google have already started dominating the artificial intelligence field which could possibly lead to the monopoly of these big firms in this emerging technology area. These organizations control a major chunk of digital data which is necessary to promote the machine learning program, and there is a compelling need to democratic data if we want to have a development of artificial intelligence for the greater good of the community.

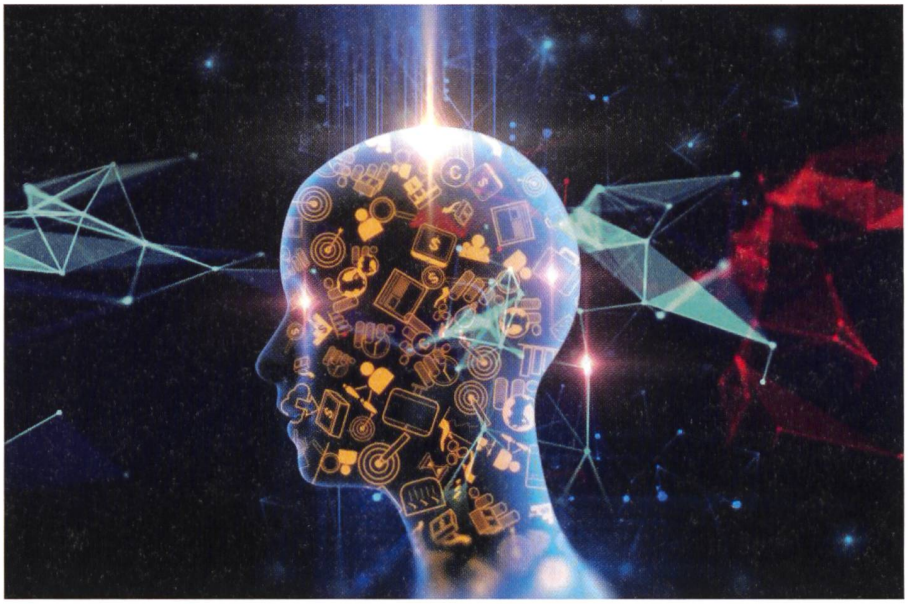


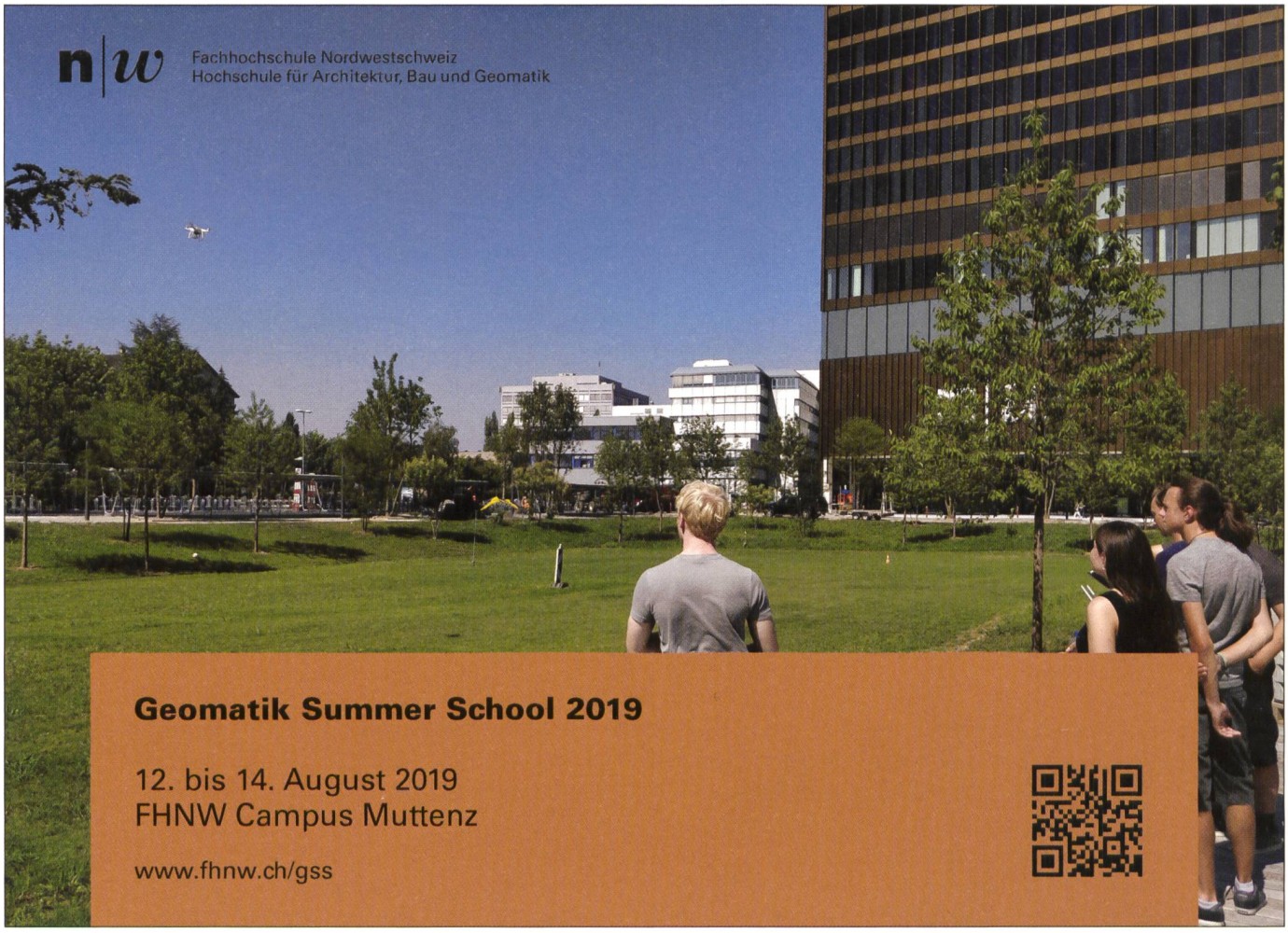
Fig. 4: Blockchain.

Blockchain use in Artificial Intelligence

Experts pin their hope on the blockchain technology to democratic artificial intelligence data. As the application of blockchain allows the financial transactions to happen without any middlemen, its use in artificial intelligence can help a large number of stakeholders to access the data and idle computing power without any intervening centralized authority. Efforts have already started, and many companies have established marketplaces based on the blockchain allowing for buying and selling of the data. The primary motive behind this move is to make the data available democratically, and people with impressive academic and professional credential are backing such enterprises. Kaasy and Skynet are examples of organizations involved in the sale and purchase of data. However, Hardon network seems to have taken the lead in providing solutions to the real-life problems using the concept of shared computing power. Hardon uses the marketplace it has created to get solutions regarding artificial intelligence. The network categorizes the sounds and images in a manner that can be processed for some different applications including the classification of images and face detection. People on this network bid for various tasks and applications and Hardon assign these tasks to the connected devices and pays a part of the bid which is aligned with the demand. This means if there is a high demand for computation, the prices for the bid will be higher and in case of low demand, the bid prices will be lower. This distributed model for the computing used by the Hardon offers many advantages over the traditional network; the most prominent one being is its capability to scale up computational resources. With the increase in demand, prices will rise, and that will attract more existing and new users to offer their

computational capacity, thereby helping the scaling process. The network has recently announced that Aikon will launch it as the first dService which will allow the users to use its Vision API for recognizing and categorization of images.

Prospects of Blockchain for Artificial Intelligence

The use of blockchain technology in the field of artificial intelligence has just now started, and it will take a long time for the distributed ledger to gain a strong footing in this specialized technology area. However, the most important contribution of blockchain technology in artificial intelligence is to make data available to all the stakeholders without any kind of centralized and corporate control. This means all the benefits and advantages of artificial intelligence can be shared democratically without any undue interference or domination of a few big companies.

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