Feeding the digital brain: Using AI to turn today's challenges into tomorrow's opportunities

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Content

While the ability to extract and interpret data has many advantages and opportunities, the emphasis is not only on the quality of the data but how quickly and reliably it can be processed and accessed.

In this eBook, we explore the impact AI is having and how it's driving the need for higher speeds and better performance. Along with our Kingston experts, we also get the thoughts of key industry figures to gain insight into how AI is changing how we work and live, and how it is putting the technology that enables it under the microscope.

Contributors

This eBook has been compiled by four experts in IT and emerging technologies.

Rafael Bloom

Rafael has spent his career within senior Technology Product, Marketing Communications and Business Development roles. His advisory practice focuses on the new organisational, product and communications challenges of technological and regulatory changes. This highly diverse work involves subject matter expertise on information governance and compliance by design, data privacy and emerging technologies such as AdTech, Mobile & 5G, AI and Machine Learning.

Simon Besteman

Simon is the CEO of ISPConnect, the Dutch coalition of hosting providers. As a leading representative of the industry he is a frequent blogger on industry and policy matters, a keynote speaker at congresses and conferences, and a participant at Dutch government round tables on telecommunication, data center and internet regulatory matters. He sits on the boards of various industry groups, with a focus on education, employment and governance.

David Clarke

David is recognised as one of the top 10 influencers by Thompson Reuter's "Top 30 most influential thought-leaders and thinkers on social media, in risk management, compliance and reg-tech in the UK" and is in the top 50 list of Global Experts by Kingston Technology. In the past, David held multiple security management positions such as Global Head of Security Service Delivery and Head of Security Infrastructure for Global FTSE 100 companies.

Pasi Siukonen

Pasi is responsible for leading a team of experts supporting Kingston departments such as PR, Marketing, Field Sales, Technical Support and Customer Service on Kingston products. His primary product focus is Flash and SSD product lines. Prior to joining Kingston Technology Europe in 2008, Pasi worked at the company's headquarters in Fountain Valley, California, where he was Test Engineer for Flash products. He also worked in departments of the University of Illinois in Chicago (UIC) and the non-profit organization American Cancer Society.

A few years ago, the term "Big Data" was hot off the press, typically used in reference to the three key concepts of data volume, variety and velocity. Fast forward to today and big data is now associated with advanced methods used to extract value from data, such as predictive and behavioural analytics. As a result of this rapid evolvement and a big data analytics market that's set to reach $103 billion by 2023[1], we are now experiencing an accelerated need for technologies like AI, machine learning and deep learning, that enable organisations to take an increasingly algorithmic approach to high level data analysis.

So when it comes to AI adoption, who are the front runners? The financial[2] industry is amongst the top sectors heavily investing in AI and machine learning algorithms. It's use spans everything from asset price back testing to portfolio optimisation, to high-frequency trading. When it comes to applications, financial institutions are using AI to analyse market trends. Self-learning algorithms can be designed, for example, to optimise profitability in every new iteration such as evaluating loan applications.

❝ The business cases for investing in AI, and deep learning is strongest in this field, and that may explain why they (the financial sector) are somewhat ahead of the curve. The benefit can be made measurable very easily to produce stronger results. ❞

Simon Besteman

Along with impacting the finance sector, the power AI and deep learning has enabled just about every other industry to plan, reason and learn. From better understanding customer behaviour to unlocking phones with a face, in the last decade AI has started solving many of the problems that we once dreamed it could. The machine learning subset of AI further enables this, with the advancement of solutions such as virtual personal assistants, chat bots, marketing automation and speech to text.

❝ According to OECD, AI plays an important role in telemedicine, screening and can help in determining drug interactions as well as helping in creating new drugs. AI brings vast benefits to helping during the Covid-19 pandemic, to parse and analyse patient records, to identify risk groups and predict best methods to help target efforts, whether it's vaccination or behaviour prediction. AI is capable of assisting during high-exposure/risk tasks at hospitals, transportation. We're going to see significant progress in terms of medicine development in the coming years through the use of AI. ❞

Pasi Siukonen

How is AI being used to make a difference?

Healthcare is another sector significantly being impacted by AI, particularly when it comes to enabling care professionals to better understand the day-to-day patterns and ever-evolving needs of their patients. In some cases, the proliferation of consumer wearables and other medical devices is being used to detect diseases. In fact, studies show AI can be used to **review and translate mammograms 30 times faster with 99% accuracy**[3] - vastly reducing the need for unnecessary biopsies.

> I believe the next area that will be entirely revolutionized by the implementation of AI will be patient care. There are still some obstacles holding back the full roll-out of machine learning and AI in health care, not least the need today for a human verification of the algorithm's conclusions. But it's reasonable to expect strong breakthroughs in this field in the coming 24 months.

Simon Besteman

> AI and machine learning are thoroughly embedded in our world. The advances are gathering pace as well, albeit in a fairly unobtrusive way since AI is often embedded within other digital services - so I see AI making a measurable difference throughout pretty much every aspect of our lives.

Rafael Bloom

AI isn't just about efficiency and streamlining laborious tasks. Thanks to machine learning and deep learning, AI applications can learn from data and results in near real time. It offers the ability to analyse new information from multiple sources and adapt accordingly, with a level of accuracy that's invaluable to business and far beyond human capability. This potential to self-optimise and self-learn and means AI can continually compound the business benefits it generates.

AI offers the ability to understand and gain insights – whether that's into customers' existing habits, beliefs and unmet needs or into how well a building is being utilised in terms of energy use, floor space and footfall. This then enables the user to take that data and better predict, plan and prepare. By adding the human touch in terms of creative thinking and empathy where it's needed, this powerful marriage has the potential to make a huge measurable difference for businesses across all sectors.

Efficiency gains are also being realised through the use of AI on smart-freight locomotives. Equipped with sensors that collect data, the trains use an app that feed this information into a machine-learning application. The data is analysed and used to make real-time decisions on how to optimise performance and predict maintenance needs. Freight carrier Deutsche Bahn Cargo have already kitted out 250 locomotives with performance management software that monitors everything from brake performance to engine temperature and are reported to have **reduced locomotive failure rates by 25%**[4] in their pilot project.

❝ AI has the ability to parse vast amounts of data and make associations in a way that no human ever could. ❞

Rafael Bloom

As discussed earlier, AI presents infinite potential when it comes to diagnosis and treatment plans in the world of healthcare. In addition, the use of AI and the Internet of Medical Things (IoMT) in consumer health applications is helping encourage healthier behaviour, putting the consumer more in control of their health and well-being. From a diagnosis perspective, IBM's Watson can review and store vast volumes of medical information exponentially faster than any human. While Google's DeepMind Health is working in partnership with researchers, medical professionals and patients to solve real-world healthcare problems by combining machine learning and systems neuroscience. The result is the ability to build a powerful learning algorithm into neural networks that mimic the human brain.

❝ AI will help push the boundaries of what computing systems are capable of. We'll see the adoption of quantum computing to accelerate improvements in Natural Language Processing (NLP) for example, that paves way to even more impressive tools that we are already used to – live low latency translation or automatic speech recognition on communication devices (phones, chat) will be even more effective in the future. AI will help solve problems that are yet to exist. Intelligent self-learning, self-sufficient functionality will begin to be incorporated on more and more devices and tools that previously were only human-controlled. ❞

Pasi Siukonen

The IDC predicts that the digital data that we create and consume will grow from around 40 zettabytes of data in 2019 to 175 zettabytes in 2025 – that's more than four times the amount of data produced in 2019[5]. By 2022, annual revenue from the global big data and business analytics market is expected to reach $274.3 billion[6].

Without doubt, AI and data growth go hand in hand. And as this next decade will be defined by data, meaning organisations will either succeed or fail depending on how they leverage technology such as AI to collect, use and democratise data analytics. As a result, the need for infrastructure that is both fit for purpose and future-proofed, with the latest CPU/GPUs, next-generation memory and NVMe SSDs, will be critical in realising its true potential.

> For the moment this is the only workable approach we have: collect as much data as we can, store it and then extract gold from it.

Simon Besteman

This is a pivotal point of business transformation, and one in which organisations must embrace change - and invest in it.

Let's take the field of predictive maintenance for example, which is achieved by collecting all relevant data from the entire installed base of a business, storing it in a cloud and crunching the numbers from an immense dataset over and over again. With more data being produced and stored than ever before, the need for such efficient, effective and precise processes has never been more critical.

In the same way, predictive analytics is another powerful process that has propelled the AI market by introducing the ability to go beyond the understanding of the historical data. By producing useful insights that delve into what happened, AI can suggest what can be done to improve a certain scenario. Solutions infused with cutting-edge, innovative algorithms can solve most intractable problems and help users make the best, most informed decisions possible.

The impact of AI on data growth

Of course, as the big data explosion continues, so too does the importance of the role of AI and machine learning. This year it's predicted that every person will generate 1.7 megabytes in just one second[7] – imagine the same for an entire organisation and its customer database. This calls for the inherent need to dive deeper into data and the ability to interpret meaning, especially when it comes to understanding human behaviour. This drives the need for higher and more efficient data processing, whether through CPU/GPU or memory, further enhancing the quality of data interpretation.

> **"** My first digital camera purchased in 2002 was 3.2 Megapixels and could store 90 -100 pictures on its tiny SD Card. Today those numbers seem ridiculously inadequate. Everywhere you look, data volumes have grown exponentially over a short period of time.
>
> The need to be able to store large amounts of data reliably has been a non-stop chase to the horizon, as new applications constantly drive the need for more data and better performance. The maturing of AI technologies is both a product of this and a catalyst for further growth as so many AI tasks are data and memory intensive. **"**

Rafael Bloom

Organisations that aim to differentiate themselves from their competition will firstly need to understand how to properly manage and store their data, and from there how to use AI and machine learning to capture hidden knowledge on their customers, competitors, suppliers and market behaviour that impact performance. As such, the need for fast and reliable SSDs is paramount in facilitating this level of growth as the market brings more and more sophisticated applications.

> **"** While we can argue that the consumption of data will undoubtedly increase, the extent to which we can use it will depend on whether the data has met the right criteria for being useful. In the words of Daniel J. Boorstin, 'The greatest obstacle to discovery is not ignorance – it is the illusion of knowledge. **"**

David Clarke

That said, data consumption is only useful if the data is "good". In this respect it's more about using data to develop knowledge – in other words, if the future can be predicted it becomes knowledge, beyond simply data. As per Deming's criterion of knowledge, it is about whether it helps us to predict and not whether we discover truth[8].

" In many aspects, 2020 has merely accelerated trends that were occurring in any case. I have long believed that less commuting and more working from home are natural extensions of technology's ability to eradicate distance as an impediment to doing business. It took a pandemic to make that happen rather than the fact of the tech's existence. **"**

Rafael Bloom

Whilst we are at the starting block of a new technological revolution, a good deal of the technology is already here. We're working with innovation that will only improve with time and as the results already achieved in some of the fields we've discussed become more visible, implementation will also become more widespread.

Looking ahead, it may seem like a near-impossible task to predict the future after the events of 2020. That said when it comes to technology, there are many instances where it's taken a global pandemic to accelerate plans and initiatives that were already in the pipeline. In order to pivot, adapt and survive, digital transformation has become a necessity. And, of course, with this comes the ability to prepare systems, people and processes for the adoption of technology such as AI, machine learning and deep learning.

" In terms of perception however, I think a lot of people are yet to grasp AI for what it truly is - which is why we need to educate. AI has the ability to make life-changing decisions – will my mortgage be approved, will I be able to get insured - so my concerns are that people will sometimes use AI for a particular purpose because they can, and not because it is a good idea. **"**

Rafael Bloom

Its' widely believed that AI and Big Data will continue to be one of most potentially disruptive combinations in the digital world. As the world's data grows exponentially, AI capabilities will track close behind, with far-reaching implications that are becoming clearer and increasingly adopted by the day. However, there are some technologies like 5G that are set to have a major effect on our ability to leverage AI in meaningful ways. This is largely due to the fact there'll be an abundance of real-time data for ingestion and learning.

And, as more devices become connected and AI is more generally implemented, we may be faced with a glut of data too heavy to be transported easily.

" The growth of the volumes of data we use are such that we are on track to use most of the power generated on the planet to power IT equipment. We'll have to find smarter ways of achieving the desired outcome with smaller datasets, closer to the end user, in order to keep it manageable. **"**
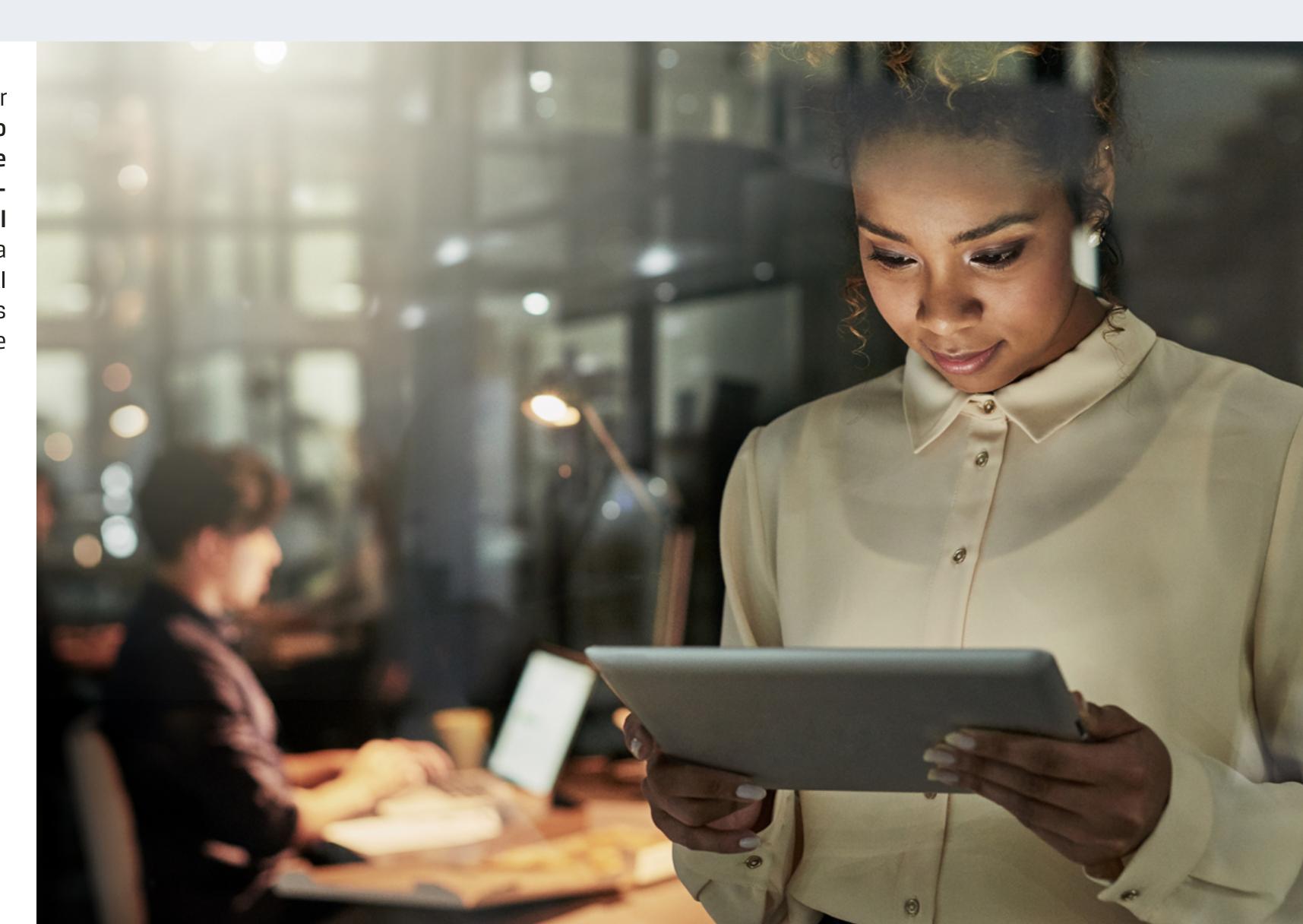
Simon Besteman

There's no denying we've entered an exciting decade for AI, machine learning and enterprise data analytics. **But to meet these challenges, your organisation must prepare its processing power and data storage technology - by anticipating the growth of consumption that AI will inevitably bring.** In doing so you'll be paving the way for a workplace of the future, ready to leverage the power of AI and help your business adapt at speed, access insights that drive innovation, and achieve competitive advantage in a world of constant disruption.

1. Techjury - https://techjury.net/blog/big-data-statistics/#gref

2. O'Reilly - https://www.oreilly.com/radar/ai-adoption-in-the-enterprise-2020

3. Wired - https://www.wired.co.uk/article/cancer-risk-ai-mammograms

4. IFC - https://www.ifc.org/wps/wcm/connect/7c21eaf5-7d18-43b7-bce1-864e3e42de2b/EMCompass-Note-75-AI-making-transport-safer-in-Emerging-Markets.pdf?MOD=AJPERES&CVID=mV7VCeN

5. ItProPortal - https://www.itproportal.com/features/ai-digital-skills-and-data-growth-dominate-the-analytics-agenda-in-2020/

6. Statista - https://www.statista.com/topics/1464/big-data/

7. Techjury - https://techjury.net/blog/big-data-statistics/#gref

8. The Deming Institute - https://deming.org/management-is-prediction

About Kingston

With over 30 years of experience manufacturing award-winning data storage and memory solutions for enterprise environments, Kingston offers consistent and reliable product performance. We have the knowledge, agility, longevity and products to enable both data centers and enterprises to respond to the challenges and opportunities presented by the emergence of AI, 5G, IoT and edge computing.

Find out how to prepare your data center and optimise your storage with Kingston Technology, a trusted partner integral to the IT backbone of today's Fortune 500 companies.

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