Big Data, ML, Cloud, AI – for whom it really matters

In today's dynamic business landscape, the convergence of Big Data, Machine Learning (ML), Cloud Computing, and Artificial Intelligence (AI) has led to a new era of transformation.

Alex Karichensky, CEO at _Digicode, Europe_, believes that these technologies have become essential assets for organisations across industries, fundamentally changing how businesses operate, make decisions, and engage with customers.

Data Management

Data management is the process of collecting, storing, organising, and maintaining data created and collected by an organisation. Effective data management is critical to deploying IT systems that run business applications and provide insights to drive operational decisions and strategic planning by business leaders, executives, and other end users. Its processes include a combination of different functions aimed at ensuring that data within enterprise systems is accurate, available, and accessible.

According to _Tableau_, the most vital benefits of efficient data management are the following:

Data visibility makes your business more organised, increases productivity, and empowers your employees to find the data they need to do their jobs

better.

With reliable, up-to-date data, businesses can respond more effectively to market changes and customer needs.

Data management uses authentication and encryption tools to protect businesses and their employees from data loss, theft, and security breaches.

Handling large volumes of data presents various challenges for organisations, despite the immense potential it offers. Some of the key challenges associated with managing massive datasets include:

Data governance: establishing the roles, responsibilities, policies, and standards for data ownership, access, and usage.

All organisations must implement some form of data management to ensure sensitive information does not fall into the wrong hands. Data management is also critical if your company is large or operates in a regulated industry such as healthcare or banking. _Snowflake_ works with some of the industry's most recognised data governance and security tools, including Collibra, Informatica, and Immuta.

Data integration: combining data from different sources and formats into a unified and consistent view.

Foundry offers a highly configurable set of data integration tools that go far beyond typical extract-transform-load (ETL) or extract-load-transform (ELT) solutions. Foundry is designed to reduce data integration costs over time through a comprehensive feature set that acts as a power multiplier for data teams. Standard cloud services provide storage and computing power for basic pipelines and experiments, but many additional layers of functionality are required to manage, deploy, and validate data sets for critical operations.

Data modeling: defining the structure, relationships, and semantics of the data.

Data analysis: applying statistical, mathematical, or computational methods to extract insights and knowledge from the data.

Data visualisation: presenting the data in graphical or interactive forms to facilitate understanding and communication.

To overcome these challenges, enterprises are adopting innovative solutions such as data governance processes, automated validation and integration, and data security measures to maximise the potential of their data investments and improve business outcomes.

An opportunity to get more out of the data business has become a reality with the development of AI and data management technologies over the last decade. In Digicode, we help businesses in their journey towards a data-driven enterprise paradigm to benefit from advanced decision-making.

Machine Learning

IBM defines machine learning as a branch of artificial intelligence (AI) and computer science that focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. With the continued expansion of big data, the need for data scientists is expected to increase. Its responsibilities include helping identify the most relevant business inquiries and the relevant data needed to respond to them.

The research shows that the machine-learning market is expected to grow by USD 11.16 billion in 2024. Machine learning can be used in various ways by a business in any industry to improve workflows and processes. Easy data availability, more affordable and efficient processing, and practical data storage techniques have made it a natural fit for any progressive sector.

When machine learning was a small field, locally owned, and led by divisions and departmental experts, this entire process was manageable. As AI and ML begin to reach the core of business transformation and expectations for large-scale sustainability increase, the need to achieve a fully functional development, operationalisation, and automation cycle has arisen. This is the realm of ML operations (MLOps).

If a company develops only a few models for a limited product line over a project cycle of several months, there is limited value in implementing AI and ML. Sustainable impact is achieved through a portfolio of machine learning models designed, created, automated, operationalised, and embedded into ongoing business functions for use at scale at the enterprise level. MLOps is a process in classic Lean Six Sigma terminology. We don't rely on a few experts, niche applications, bespoke designs, or custom development.

Machine learning has a wide range of applications across the sectors within the business world. Some of the key applications according to the _Columbia Engineering Boot Camps_:

Predictive Analytics. ML algorithms analyse historical data to forecast future

trends, behaviors, or outcomes. In business, this is applied in sales forecasting, demand prediction, financial market analysis, and risk management.

Fraud Detection. ML algorithms can detect anomalies or patterns indicative of fraudulent activities in financial transactions, helping banks and financial institutions prevent fraudulent behavior.

Supply Chain Optimisation. ML algorithms optimise inventory management, logistics, and supply chain operations by predicting demand changes, controlling inventory levels, and improving delivery routes.

As technology continues to evolve, the applications of ML in business are expected to expand further, driving advancements and offering new opportunities for growth and optimisation.

Cloud

"Cloud" refers to servers accessed via the Internet, and the software and databases running on servers located in data centers around the world. Cloud computing eliminates the need for users and businesses to manage physical servers or run software applications on their computers.

Since the early days of cloud computing, the world has seen an explosion and continued growth in cloud-based applications and services in the IT field. Cloud storage has become one of the most convenient and efficient methods to store data online. As of 2023, the cloud applications market is _valued_ at approximately $153.6 billion.

Cloud computing offers multiple benefits that have changed the ways businesses operate and scale technology. Some key advantages include:

Cloud helps businesses avoid costly investments in the infrastructure and instead scale resources up or down as needed.

Business migration to the cloud brings unparalleled flexibility to businesses.

Cost efficiency. The financial advantages of cloud technology are expected to increase further, making it a compelling choice for improving the bottom line and achieving long-term cost savings.

Despite that there are a lot of clients who benefit from cloud-based solutions, there are many who may consider cloud migrations in the coming years. In some cases, a decision to migrate is postponed because of security- or

regulation-related concerns or the necessity to deal with legacy solutions (e.g., in sectors like healthcare, public sector, military, etc.).

Supporting all main cloud providers, in Digicode we help our clients with cloud migrations, and legacy software modernisation, optimise cloud-related costs, improve security, and ensure the level of redundancy required by the business.

AI Revolution

Artificial Intelligence (AI) is a transformative force across various industries, revolutionising business operations, customer experiences, and innovation. Here's how AI is reshaping different sectors:

Finance. In the financial sector, AI algorithms enhance *fraud detection*, risk management, algorithmic trading, and credit scoring.

Education. AI facilitates *personalised* learning experiences, adaptive tutoring, and automated grading systems.

Retail. AI-driven recommendation engines personalise customer experiences, suggesting products based on past behaviour and preferences.

As AI technologies evolve, their integration into various sectors is expected to bring about further advancements and efficiencies, unlocking new possibilities for industries worldwide.

In the last few years, AI has become more accessible to the customer. The crucial role of technological giants like Microsoft and Facebook cannot be overstated. In 2020, Facebook introduced chatbots that can converse about a wide range of topics, not just a prescribed set of topics, as is the case with many customer service chatbots. The bot, called Blender, was "first trained on his 1. 5 billion publicly available Reddit conversations," according to MIT Technology Review. It has since evolved to focus on emotional conversations, information-rich conversations, and conversations between users with different and diverse personalities.

It is important to mention that AI is an automated machine that mimics human cognitive abilities to solve problems and make decisions. Machine learning and deep learning are subdomains of AI. Machine learning is AI that can make predictions with minimal human intervention.

AI and ML offer tremendous benefits to businesses of all shapes and sizes, and new opportunities are emerging all the time. The importance of automated, intelligent systems to help businesses automate tasks, unlock value, and generate actionable insights to achieve better results, especially as data

volumes grow in size and complexity, is increasing.

A new wave of generative AI systems like ChatGPT could transform entire industries. To be an industry leader in five years, you need a clear and compelling generative AI strategy now.

To gain a competitive advantage, business leaders must first understand what generative AI is. Generative AI is a set of algorithms that can generate seemingly new and realistic content, such as text, images, and audio, from training data. The most powerful generative AI algorithms are based on basic models trained in a self-supervised manner on large amounts of unlabeled data to identify underlying patterns for various tasks.

Generative AI is having a significant impact on business leaders, with many companies already implementing generative AI initiatives. In some cases, companies develop customised generative AI model applications by using and refining their data.

The rapid integration of Big Data, Machine Learning, Cloud Computing, and Artificial Intelligence has led to a transformative era for businesses, redefining their operational landscape, decision-making dynamics, and customer interactions. From harnessing extensive data volumes to extracting actionable insights, automating processes, and achieving unprecedented levels of efficiency and personalisation, businesses can discover applications suited to their unique needs. Whether in finance, education, retail, or beyond, these technologies offer adaptable solutions.

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