AKTANA

Harnessing the potential of AI in commercial life sciences

Artificial intelligence (AI) has gained significant momentum in life sciences over the past few years. With the promise of making data more consumable and actionable, and providing deep insights into individual customer behaviour, AI technology has the potential to change the life sciences commercial model as we know it. But where do we start and how do we sustain success?

In their report 'Life Science CIOs Can Accelerate Commercial Effectiveness With New Applications of Artificial Intelligence', Gartner notes that: "The designation 'artificial intelligence' is overused to describe myriad technologies, adding confusion and apprehension when life science CIOs are considering which AI investments to make."

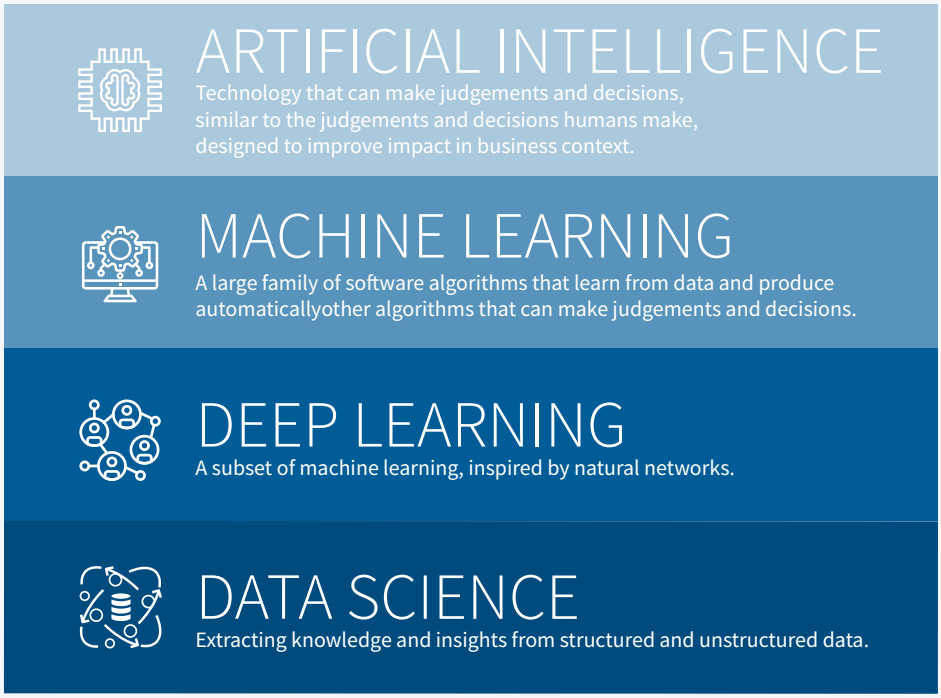
While companies are making significant investments in AI, the technology is evolving rapidly, and there are many bold claims about what value these systems can bring. Interpretations of how exactly AI can help life sciences commercial teams can differ between, or even within, companies.

One of the most common misconceptions is the idea of AI as an all-seeing, all-knowing programme – one that can answer questions it wasn't asked. Although AI technology can answer a lot, teams must first have a clear problem to solve and processes to test.

To effectively use AI in pharma commercial and to continue to be successful with it, companies must understand AI, the value it can bring, and how best to implement it into their organisation.

Understanding AI

Much of the confusion surrounding AI stems from the fact that deep learning, machine learning, and artificial intelligence are often used interchangeably. However, these terms each have critical differences and it is important to understand their true definitions as you begin incorporating AI into your organisation.



At a high level, deep learning is a subset of machine learning, which is a subset of artificial intelligence.

- Artificial intelligence refers to technology (mostly software) that can make judgements and decisions, similar to the judgements and decisions humans make, designed to improve impact in a business context (contrasted with a scientific study of human or animal intelligence)
- Machine learning refers to a large family of software algorithms that learn from data and automatically produce other algorithms that can make judgements and decisions
- Deep learning refers to a subset of machine learning inspired by natural neural networks
- Data science is a multidisciplinary field that uses scientific methods, data, processes and algorithms and systems to extract knowledge and insights from structured and unstructured data.

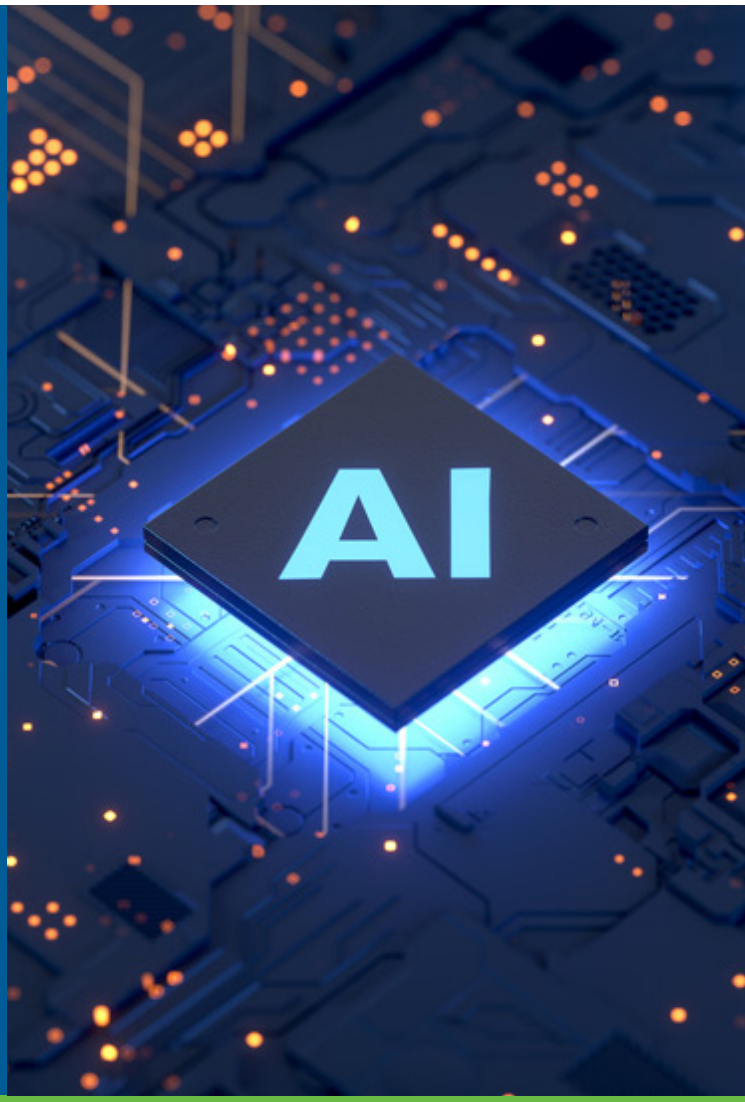
Identifying the distinctions between these terms is an important first step in understanding AI technology. Through these distinctions, you can begin to understand the inner workings of this technology, how to harness it for your benefits, and, more importantly, understand how to adjust your working style to incorporate it.

Eliminating fear to get value out of AI

Different companies will have varying levels of readiness for adoption. The good news, though, is that the technology itself is almost never a barrier for a business. However, there is often a fear that AI will ultimately replace all human jobs. It's important to remember that life sciences marketing and sales is inherently a person-to-person industry with a lot of important analogue, non-digital interactions, and decisions made by humans. It is impossible to do away with those.

Rather than fear AI, companies should understand the balance between human intelligence and artificial intelligence, and structure their teams' tasks to utilise this technology most efficiently.

AI technology follows predefined rules and parameters. With this knowledge, it is easier to shift our mindsets to eliminate that fear. In its current state, to deliver high-impact value, AI requires a human control element which is equally, if not more important. This understanding helps tackle organisational barriers and reassure users that their input remains crucial. For some, a peek behind the curtain can help foster an appreciation for how roles may change when AI is introduced.



It is important to set realistic expectations for AI so that people have a clear understanding of what they can do with the technology. Educating teams to ensure they are clear about the problem they are looking to solve and to provide the correct input before implementation gives organisations the crucial tools to use AI technology efficiently. We will expand on this point in the next section of this paper.

As with any new technology, implementation will create ripple effects that businesses should be prepared for. Rather than replacing humans, AI encourages a more advanced role by automating the lower hanging fruit of the job. Therefore, to be successful, users need to think through how moving one part of their business to operate with AI technology changes the rest of the organisation.

At the end of the day, AI is just another technology, and success will come if you're cognisant of how to incorporate this into workflows, organisational structures, or roles that are not quite optimised for it yet.

Implementing AI in pharma commercial operations

Once we understand some of the nuances of AI, it's important to understand that to be successful with intelligent technology, it must be married with a business problem.

The business problem in commercial pharma is easy to state: how do we optimally and continuously coordinate all marketing and sales activity? By expanding on the various elements of this objective and adding a few observations about the subject matter, the complexity and magnitude of the challenge become apparent.

First, we recognise that the problem involves making decisions in a coordinated way about many channels – digital and non-digital. All channels involve communications with healthcare providers (HCPs), some involve the actions of sales representatives, and all indirectly affect patients. In comparison with common marketing systems, in pharma there are two or three customers, not a single 'target' customer.

Additionally, the communications involved are complex in terms of their content: they are about drug characteristics, treatment options, and challenges. This is especially difficult for a firm with many and often unrelated brands, treatments, and indications. Finally, the notion of optimality calls for understanding subtle economic impacts of contacts and other actions vis-à-vis customers in multiple channels over time. To optimally coordinate such communications streams requires understanding the dynamic interactions between all the events taking place in the course of the commercial operations.

Of course a large base of data is needed to support such optimisation, including historical marketing and sales interaction data, data about HCPs, and data about patients.

Large data sets can answer very precise, complicated questions. In fact, with AI, machine learning, and data science, the more difficult your question, the more helpful the systems potentially are. But to bring the most value, we must ask the questions that are most important for a business. To ask the right questions, we must first identify a clear business problem to solve **that is well-suited to what AI does well**. This often means understanding your own business problems in more detail than you have had to consider before.

Using well-rounded AI to optimise implementation

To solve any business problem, it is best to have AI applications that function as a well-rounded set of technologies working together to achieve your goals. While AI has shown remarkable results at simple tasks like recognising human faces or translating languages, those are very narrow problems. Business problems tend to be much more complex.

For example, when it comes to commercial pharma, Intelligent technology can help sift through data to bring to surface only the most relevant information through next best action for a sales rep. Machine learning then uses the feedback data from the rep to deliver guidance to brand teams on how to best optimise commercial strategy moving forward.

Managing this communication path across multiple channels is a much more nuanced problem than identifying a face or translating something from Chinese to English.

To be truly 'well-rounded', an AI platform must include several different kinds of technology that work well together to cover different aspects of the problem.

These can include:

- Machine learning models – A mathematical representation of a real-world process fuelled by data for the machine to learn. For example, Aktana's platform uses machine learning components to predict the results or impact of recommendations and takes into account location so that it doesn't recommend visits too far from where the rep is going to be. These decision systems should be based on clear rules
- Expert models – Emulating the decision-making ability of a human expert
- Expert-based feature engineering – Using expert knowledge to create features that make machine learning algorithms work
- Constrained optimisation – Optimising an objective function to find a best assignment that satisfies hard constraints. For example, the decision support optimisation engine can determine what suggestions should go to where or what action should be taken in what channel
- Feedback loop – AI constantly learns from the data it is gathering and analysing
- Natural language processing (NLP) – Allows AI to easily explain itself in human-relative terms, which is particularly important in sectors like commercial pharma that still involve a lot of human interactions. This is often referred to as 'explainable AI'. When Aktana's programme makes a recommendation to a sales rep, for example, it needs to be able to tell them why it thinks it's a good idea.

To make well-rounded AI practical, it must be built for efficiency and scalability. This includes the automation of machine learning model retraining and rescoring, and configurable processes that can run on a large scale. In other words, to go beyond simply being a prototype, an AI programme needs to be able to be industrialised and commercialised, and able to solve more than just one problem.

Well-rounded AI systems do not necessarily need to have every single one of these elements, but a system with several of these technologies working together will be much more useful for commercial teams – and several other areas of the life sciences industry – than simpler programmes.

Harnessing the potential of AI

Finally, to be successful when using AI in commercial pharma buy-in is needed from key stakeholders and leadership team members. Helping with organisational change is where a partner like Aktana can come into play to provide teams with the tools and best practices they need to begin change management. However, companies should also ensure that leadership understands the technology to encourage and endorse this change.

Educating your leadership team about AI technology, how it all works, and how to define the problem correctly is a crucial step in forging a successful path forward. Ensuring key stakeholders understand how the organisation needs to adapt to handle a new, intelligent technology will empower others to drive the adoption from start to finish.

This process will become easier as AI continues to develop. The industry is heading more towards explainable AI than deep learning tech, where the machine understands more than its users. Once explainable AI becomes more common, we will be able to break down many organisational barriers that currently exist. At that point, it will become intuitively obvious how to use AI, even for people who have little experience with it.

For now, it's important for companies to get started by understanding the basics, recognising the value this technology can bring, and where to best implement it to enable sustainable success. By ensuring your leadership and key stakeholders are both educated and bought in to the value this technology can bring, organisations will have the top-down support to successfully harness the potential of AI in pharma commercial operations.

About the Authors

Matthew Van Wingerden, VP analytical services, Aktana

Matthew Van Wingerden is VP of analytical services for Aktana, which offers products that use AI and machine learning to help life sciences commercial teams make data-driven decisions for more personalised customer engagement. In his role, Matthew works with customers to develop, test and deploy new machine learning features, in addition to providing oversight of the company's machine learning and data science vision.

Before joining Aktana in October 2017, Matthew spent five years at global management consulting firm McKinsey & Company, where he worked on commercial analytics and strategy development for pharmaceutical marketing and sales teams. Matthew holds a PhD in Organic Chemistry and lives in San Francisco.

Pini Ben-Or, chief science officer, Aktana

Pini is an experienced technology leader who oversees artificial intelligence (AI) and analytic innovation at Aktana. He has spent much of his career focused on improving business decisions using advanced analytics, optimisation, business intelligence, and machine learning. In addition to being a data science expert, Pini enjoys and excels at building highly capable teams and nurturing a culture of innovation.

Prior to Aktana, Pini served as global head of analytics at Actimize where he helped transform the company from reliance on rule systems and expert models to deploying fully agile machine-learning-based models for financial crime detection. Throughout his career Pini has introduced analytics innovations in the applications of machine learning, data management, operations optimisation, marketing channel optimisation, and business intelligence. He has multiple patents and patents pending, most recently in the area of machine-learning on network graph data.

Pini has a BSc in Physics, Mathematics, and Philosophy from The Hebrew University in Jerusalem, and a MA and MPhil in Philosophy from Columbia University in New York, where his research areas were Decision Theory, AI, and Philosophy of Physics.

About Aktana

Aktana is a pioneer in intelligent engagement for the global life sciences industry. Its proprietary platform harnesses machine learning algorithms to enable commercial teams to seamlessly coordinate and optimise multichannel engagement with healthcare providers. Committed to customer success and innovation, Aktana supports 150+ brands worldwide to capitalise on data investments, drive productivity, and continually enhance campaign performance. More than half of the top 20 global pharmaceutical companies are Aktana customers. Headquartered in San Francisco, Aktana also has offices in Philadelphia, London, Barcelona, Tokyo, Osaka, Shanghai, Beijing, Sydney, and Sao Paulo.