



POINT OF VIEW | DATA AND INTELLIGENCE

Let Artificial Intelligence Take the Wheel

Enabling a self-driving business

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Just a decade or so ago, the idea of a self-driving car was unimaginable. Now, with autonomous vehicles a reality, artificial intelligence (AI) is poised to revolutionize the workplace next.

At NTT DATA Services, we focus on AI, data and intelligence, and automation to help our clients implement digital transformation and get closer to the self-driving business of the future. Are you ready to let AI take the wheel and drive your business?

Machine intelligence begins with pattern recognition

But first, let's consider how machine learning has become the great imitator. When we can capture the successful completion of a task by a human using data, we're just a step away from enabling a machine capable of performing the same task more reliably, more tirelessly and with even greater accuracy.

So far, such imitation has focused on discrete, isolated tasks of increasing complexity. In healthcare, for example, a machine can scan images of a patient's eyes for evidence of diabetic retinopathy, a leading cause of blindness. It imitates a human's ability to recognize this evidence until it becomes more consistent.

At that point, the machine can do the same scan at low cost all over the world, including places where technology is limited and doctors are scarce.

Eventually, the automated process discovers a relationship between images of our eyes and circulatory issues. The AI has effectively taken us in an unanticipated, creative direction. What began as imitation ends with a breakthrough, a step beyond.

NTT DATA applies cognition to many tasks within the healthcare industry. We've enabled an AI to rank and suggest diagnoses to doctors at the time of consultations, to advise hospital staff on patient re-admission probabilities and to suggest actions that might reduce those risks. All these discrete uses of AI can link, end to end, to create medical systems that are increasingly self-driven.

We've applied similar capabilities in banking — honed when NTT DATA digitized the historical documents within the Vatican archives — digitizing varied sources of publicly available financial information that are presented without consistent structure and often within images.¹ Now, in real time, these financial publications are digitized in new ways, classified by machine learning models, and turned into predictions for stock buying and other forms of investment actions.

Softbank and everis, an NTT DATA Company, have also collaborated to apply the robotic innovation of Pepper to financial services. With seeming human intelligence, Pepper, a cute, toy-like robot, can converse with customers to offer financial product advice. Behind the scenes, we use machine learning to recommend new services and products through not only Pepper but also human agents and the web.

These are all instances of identifying discrete tasks that involve pattern recognition, essentially sense and response activities, and then encapsulating them in an automation that outperforms humans.

Business becomes “take X and add AI”

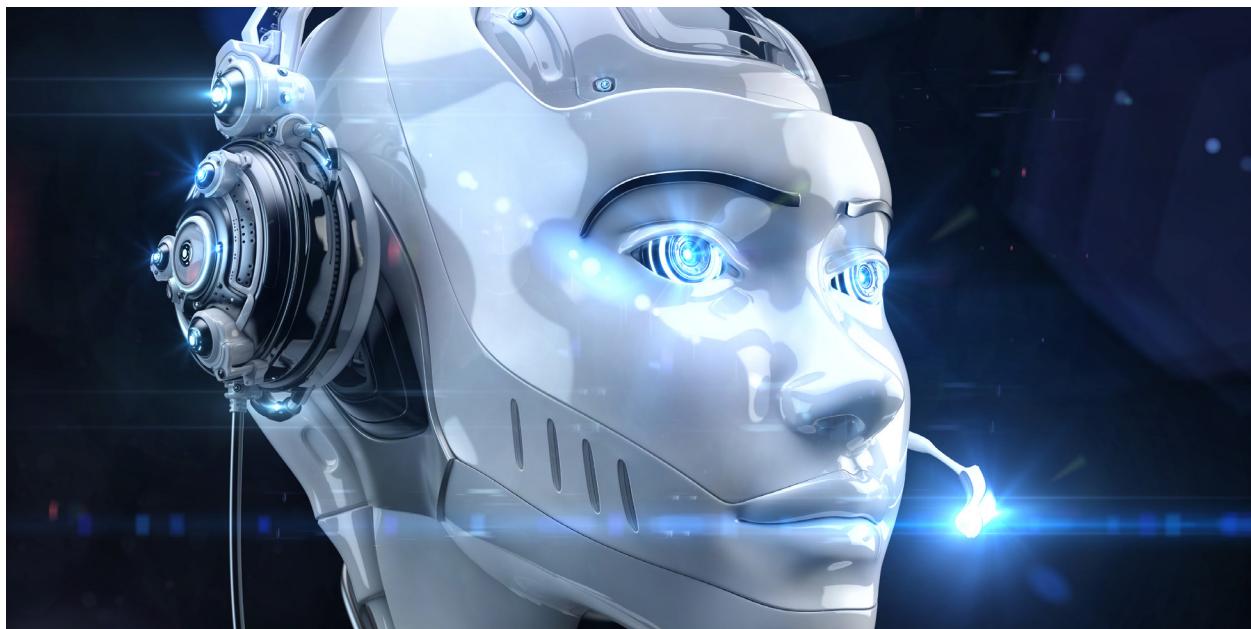
Kevin Kelly, founding executive editor of Wired magazine, once said, “The business plans of the next 10,000 startups are easy to forecast: Take X and add AI.”² In other words, businesses are quickly evolving (and forming) by taking a business process or concept (the “X”) and adding AI. You’re already surrounded by examples of how powerfully this can now be done: Apple’s Siri easily understands and speaks a wide variety of languages, Spotify recommends new music based on artists users have recently listened to, and Google Maps suggests alternate routes when there’s road closures due to construction or accidents.

However, it’s not yet easy. The technologies are complex, and limitations do exist. AI researchers highlight the limitations of today’s deep learning, our most advanced form of AI, by comparing it to the “old brain” concept of intelligence. As the highest form of intelligence found in nature up until about 65 million years ago, it’s highly effective at instinctual, as well as stimulus- and response-based forms of intelligence. However, old brains have only a limited ability to generalize or create a model of the world. Geese, for example, will effectively care for anything that sounds like a gosling. So, if you attach that same sound to your pet cat’s collar, a female goose will become impressively devoted to your cat’s care.

Today’s deep learning, also called narrow AI, has a similar limitation. Take AlphaGo, a deep learning application that has defeated Go masters at one of the world’s most complex games. This AI can easily be defeated by changing the colors and shape of the game board or pieces. Adjusting to such subtle changes would require retraining, as AlphaGo has little ability to generalize and apply an overall model of the world.

Awareness of this limitation could lead companies away from the goal of self-driving businesses. Who wants their business to be run by old brain intellect, with little ability to adapt and adjust to changes? At NTT DATA, however, we actually see great potential. It comes from two dynamics.

First, the aggregation of narrow intelligence systems can be assembled into a super intelligence. Self-driving automobiles demonstrate this point. Each of the different components involved in this challenge taps into deep learning capabilities and, when combined, the resulting system rivals human performance.



The total intelligent system — the self-driving car, or an automated supply chain or a virtual assistant — becomes an aggregation of each process that can be enhanced with machine learning.

Second, the human shouldn't completely leave the equation. Instead, we must think in terms of augmentation — after all, even a self-driving car must be told a destination. The evolution of the old brain into a "new brain" 65 million years ago involved a cognitive overlay known as the neocortex. The neocortex innovation in our evolution enabled creatures, such as whales and other mammals, to reason. Reasoning then went beyond pattern recognition and instinct, developing into the ability to generalize and apply a causal model of the world as well as to observe "if/then" scenarios and consider "what if." This evolution hasn't occurred in AI just yet. While we work on that, there's no reason to abandon the cognitive overlay currently available to us by keeping humans involved in the process.

These two dynamics form the basis of our strategy.

How AI fueled by data and intelligence can drive your business

NTT DATA provides our clients with a set of end-to-end data and analytics capabilities called Intelligent Data Services. These are the enablers for creating and aggregating systems of intelligence. We begin with an advanced data ecosystem that's capable of ingesting

data from varied sources. Then we integrate, blend and visualize that information. Finally, we provide an AI studio, where the industry's most advanced AI technologies can be creatively applied to varying use cases until the optimal machine learning innovation is discovered. All this is architected in a way that provides a foundation for the continuous enhancement and aggregation of a business' intelligence — ultimately extending to the goal of building a self-driving business.

We also address another key dynamic: ensuring that humans are effectively integrated within our applications of AI, forming a human/machine team. Building on our foundation of in-depth industry knowledge and technological expertise. This business-centric, technology-grounded approach helps us develop automation solutions in which humans, autonomics and virtual agents collaborate to ensure enterprise innovation and growth.

We call this digital decisioning.³ It begins with business analysts who identify the critical decisions humans make within a business process that, alternatively, can be made more effective through AI.

These analysts work with business leaders to drive digital decisioning initiatives iteratively. This approach continuously enhances the overall intelligence of the business, from human analysis and instinctive response to data sensing, pattern recognition and automated results from machines.

Succeeding with Business Intelligence (BI)

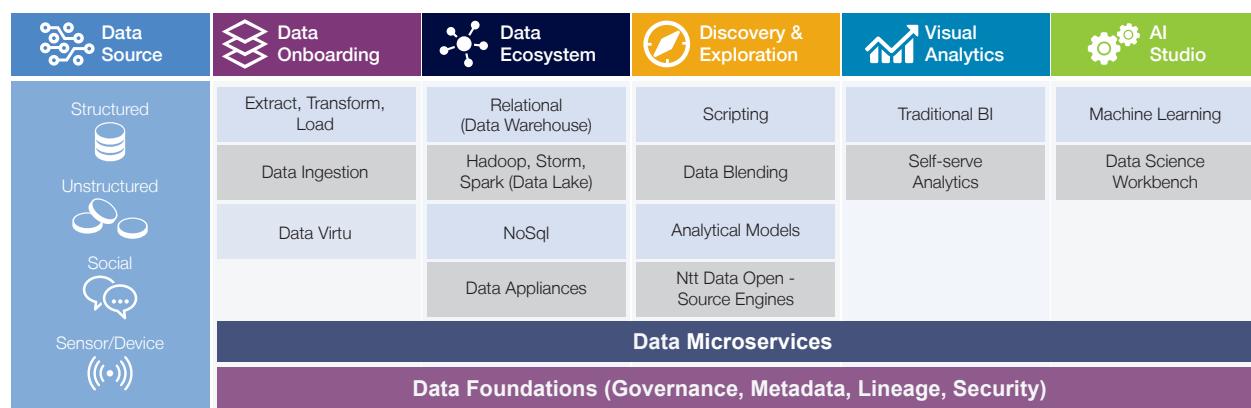


Figure 1: NTT DATA Intelligent Data Services: Succeeding with business intelligence (BI), big data, fast data, internet of things and AI

How to build a self-driving business

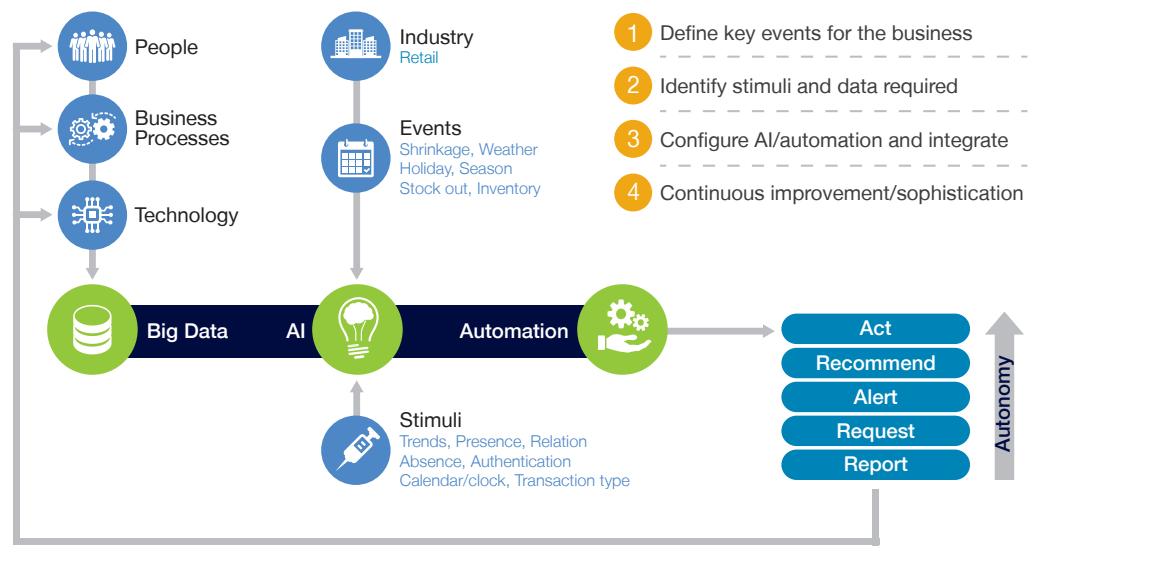


Figure 2: How to build a self-driving business

Conclusion

The achievable outcome of these strategies is a business that's far more self-driven and, subsequently, able to compete in a crowded, evolving digital market. Humans, however, remain integral to guiding business decisions. While AI might be behind the wheel, we will still need to chart the journey, innovating and imagining the dramatically different future on the road ahead.

About the author

Scott Boettcher is vice president, data and intelligence, at NTT DATA Services. He currently leads NTT DATA's Analytics practice, an innovative organization that enables clients to gain new business insights by applying machine learning to petabytes of streaming, cloud-based information.

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