

Position Paper

Why Artificial Intelligence Is Stupid – And The Case To Use It Smartly

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April 28, 2021



Source: [Canadian Lawyer Magazine](#)

If your company is like most, you're exploring how to integrate AI into your business processes – or you're already implementing it. And for good reason: AI is revolutionizing eCommerce, supply chains and logistics, diagnostics, customer service and risk management, to name just a few examples. AI is also advancing at a dizzying pace, as is its adoption. A 2019 [survey](#) by the research institute O'Reilly found that 85% of respondents were planning AI implementation or already using it, with over 50% identifying as mature adopters.

So should all companies embrace AI on all levels possible or risk being left behind? Not so fast.

A closer look reveals that AI implementation can easily become a money-losing proposition. Misleading findings can result in bad business moves and even ethically questionable decisions. Success in AI adoption belongs to those who fully understand what the technologies can do in the context of their organizations, and which areas of implementation to steer clear of (at least for the foreseeable future). By deploying AI intelligently, you can achieve unprecedented levels of efficiency.

AI: More artificial than intelligent?

To explore AI with the aim of identifying its potential benefits for your organization, you need to begin by unpacking exactly what AI is. According to the [Collins Dictionary](#), AI is “the capability of computers or programs to operate in ways believed to mimic human thought processes, such as reasoning and learning.” But this definition doesn’t begin to do justice to the fact that human intelligence comes in many different shapes and sizes. A machine can mimic only certain aspects of it.

Think back to some of the first amazing things we heard about AI in past decades: in the 1950s, computer scientists used AI software to train a computer to play chess with remarkable skill. This feat was followed in the 60s by a computerized “psychotherapist” named Eliza, which used the reflective questioning psychology method. Users were convinced that the software had feelings.

Let’s focus on AI solutions that use machine learning (ML), a subset of AI that enables computers to learn without human intervention. There are three main ways to train a system to learn from data patterns:

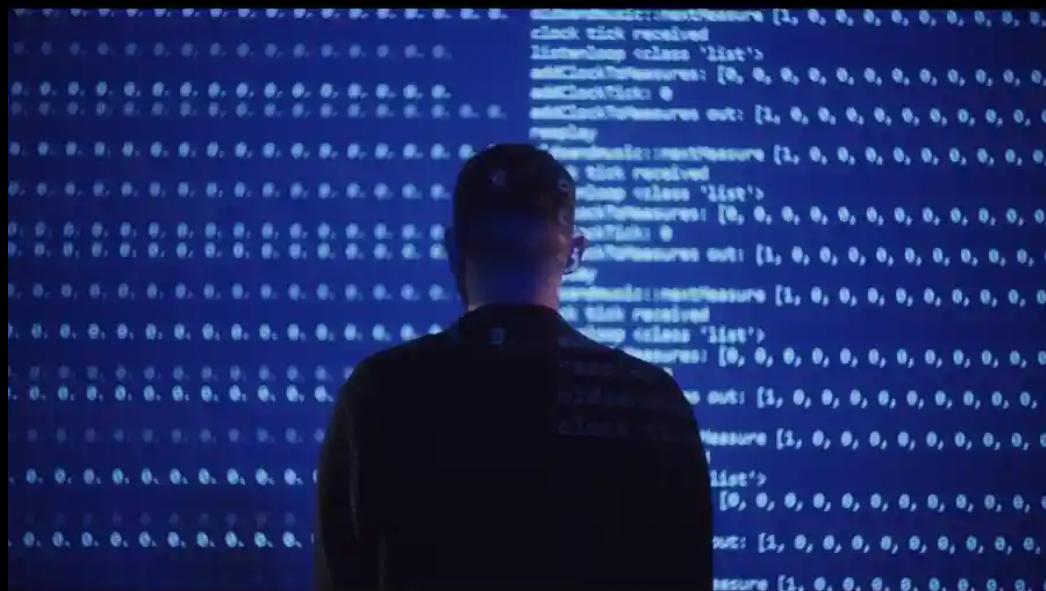
- Supervised learning – the computer learns to classify data and predict where an element belongs using an auto-generated computer program or model
- Unsupervised learning – it seeks to identify and separate elements in the input dataset into clusters or groups
- Reinforced learning – the system learns how to improve its performance of a predefined task by tracking what is correct and what needs correction

In supervised learning, input data are generally pre-labeled to enable the computer program to learn from them, for example, in image classification. These solutions are useful in fraud prevention, marketing and advertising, market forecasting, sales, etc. In unsupervised learning, input datasets are not labelled. The computer is tasked with grouping or clustering elements in a meaningful manner by recognizing patterns not necessarily evident to humans. Examples include product classification, customer segmentation and product recommendations. In reinforced learning, the computer hones its ability to conduct procedures and processes based

on repeated successful attempts at completing the assigned task. This is the technology used in self-driving vehicles.

What the two early examples mentioned above – which, thanks to machine learning, have been further developed to seemingly magical levels of prowess – have in common tells us a lot about what AI is good at: chess rules are well known, and a computer equipped with data on a vast number of different sequences of moves and strategies can learn to recognize patterns and devise effective responses. If there had been any doubt of these extraordinary capabilities, they vanished when IBM's supercomputer Deep Blue beat world chess champion Garry Kasparov in 1997.

Software that conducts reflective questioning, again, matches patterns within the rules of an established psychology method. In other words, feed enough data into an AI system designed to identify patterns within *strictly delineated parameters and task it to solve a clearly defined problem*, and astonishingly impressive results can emerge.



Source: [The Guardian](#) – Photograph of Replicator, by AI music pioneer Rama Allen

And of course, this was just the beginning: Fast-forward to 2016 and you'll find examples of [AI-generated music](#) that mimics the composition style of Johann Sebastian Bach so well that even most professional Bach scholars can't tell the difference. But as great an accomplishment as this is, it's telling to note that the software developers chose to test their algorithms on Bach, a composer who used a highly sophisticated *yet consistent* counterpoint methodology in his compositions. Suffice it to say, we're not going to hear true-to-life imitations of [Giacomo Puccini's](#) style anytime soon.

So what does this mean in terms of implementing AI into your business?

Today's most successful and reliable implementations of AI and ML include voice and handwriting recognition, some areas of radiology and predictions in data-rich contexts like weather forecasting (where constant real-time updates stack the deck in favor of the technology) or translation. Note that these are disciplines in which millions of labelled data examples are available and where causality is practically unambiguous. But again, the good news must be taken with a grain of salt – just think of how often weather forecasts miss the mark.

In other words, AI and ML can deliver actionable results to your business provided you can clearly define what you are looking for and how to interpret those results once you have them. That means you need a good understanding of (1) the overall system and its stability, (2) sufficiency of the model to reflect the reality of the system, (3) clarity of causal relationships and (4) ease of testing accuracy. If these criteria are met, an ML model can adapt and improve to remain useful in the future.

If these criteria are not met, the technology's performance can go dangerously sideways, e.g. when patterns are inconsistent or correlations signal false casualties (spurious correlation).

In the case of [melanoma diagnosis](#) or detection of diabetes-related [disease of the retina](#), ML has proven highly effective. The patterns are consistent. In contrast, ML is unreliable in detection of the neurofibromatosis type 2, because the pattern is inconsistent. Similarly, a recent [study](#) showed that radiologists outperform the technology in breast cancer screening. (It should be noted that experienced medical experts have achieved significantly improved diagnostic accuracy by drawing on deep learning AI/ML technology to augment, but not replace, their own expertise.)

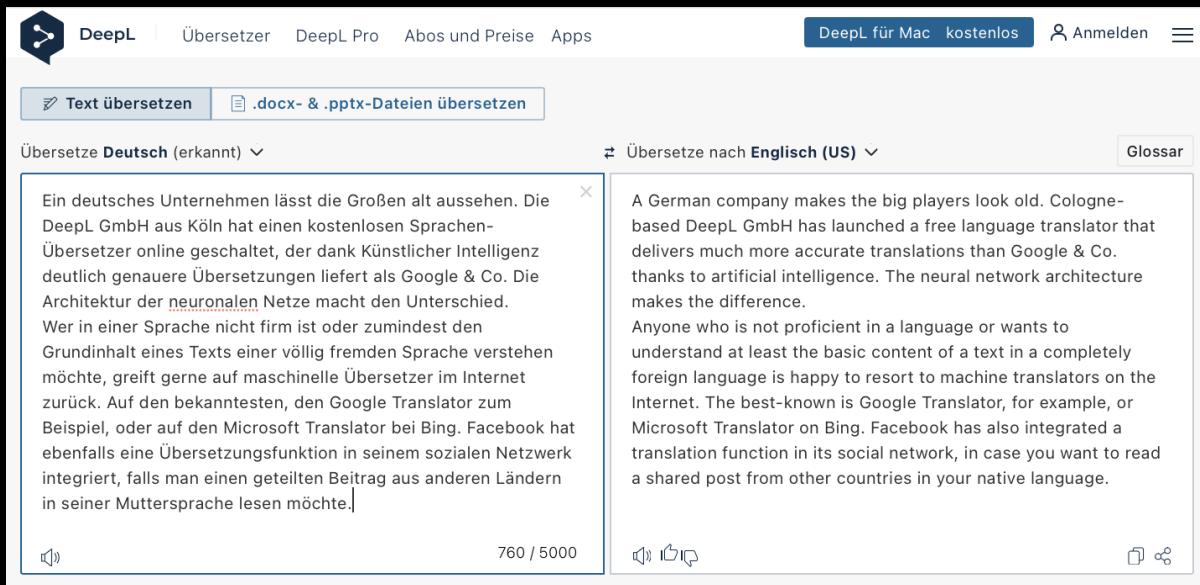


In one example of spurious correlation, the AI/ML software failed to distinguish a wolf from a husky in photos. Researchers wondered what patterns were confusing the algorithm – Snout? Markings? Paws? Only after digging deeply into the math did researchers realize that it was the snow in the background that was confusing the ML. The technology simply couldn't tell the difference between the two animals, so it guessed based on a [correlating feature](#) of both photos.

This last example demonstrates how hazardously stupid AI can be. In practical use, the technology is a black box. Unlike researchers testing its capabilities in identifying different canine species or its effectiveness in medical diagnostics, business decision-makers are more likely to take the AI findings at face value – after all, efficiency is the whole point. In terms of risk assessment, HR-related decisions or market analyses, such correlation errors can have extremely costly fallout – not to mention potential reputational damage.

Consider translation, an indispensable function in a globally interconnected business community. It's an excellent place to experience the good, bad and ugly of AI firsthand. The respected German online publication [Springer Professional](#) wrote in a 2017 article:

"A German company makes the big players look old. Cologne-based [DeepL GmbH](#) has launched a free language translator that delivers much more accurate translations than Google & Co. thanks to artificial intelligence. The neural network architecture makes the difference."



The screenshot shows the DeepL website interface. At the top, there are navigation links: DeepL, Übersetzer, DeepL Pro, Abos und Preise, Apps, DeepL für Mac kostenlos, Anmelden, and a menu icon. Below the header, there are two input fields: "Text übersetzen" and ".docx- & .pptx-Dateien übersetzen". The source text in German is: "Ein deutsches Unternehmen lässt die Großen alt aussehen. Die DeepL GmbH aus Köln hat einen kostenlosen Sprachen-Übersetzer online geschaltet, der dank Künstlicher Intelligenz deutlich genauere Übersetzungen liefert als Google & Co. Die Architektur der neuronalen Netze macht den Unterschied. Wer in einer Sprache nicht firm ist oder zumindest den Grundinhalt eines Texts einer völlig fremden Sprache verstehen möchte, greift gerne auf maschinelle Übersetzer im Internet zurück. Auf den bekanntesten, den Google Translator zum Beispiel, oder auf den Microsoft Translator bei Bing. Facebook hat ebenfalls eine Übersetzungsfunktion in seinem sozialen Netzwerk integriert, falls man einen geteilten Beitrag aus anderen Ländern in seiner Muttersprache lesen möchte." The target text in English is: "A German company makes the big players look old. Cologne-based DeepL GmbH has launched a free language translator that delivers much more accurate translations than Google & Co. thanks to artificial intelligence. The neural network architecture makes the difference. Anyone who is not proficient in a language or wants to understand at least the basic content of a text in a completely foreign language is happy to resort to machine translators on the Internet. The best-known is Google Translator, for example, or Microsoft Translator on Bing. Facebook has also integrated a translation function in its social network, in case you want to read a shared post from other countries in your native language." There are also icons for audio playback, a glossary, and sharing options.

Source: [DeepL](#)

Agreed – DeepL is amazing. But the above opening paragraph, which was translated using the tool, raises a red flag. The first sentence alone contains two stylistic flaws: it uses the present simple tense, which is fine in German, but goes against all style guides for English-language

journalism. It's followed by a sentence in present perfect. Worse, the phrase "makes the big players look old" is a word-for-word translation of the German idiom "lässt die Großen alt aussehen." More appropriate would be something like "puts the big players to shame" or "makes the big players pale by comparison," but these were not among the options the tool offered. DeepL has been widely recognized as the best AI translation tool available. We'd hate to see the worst.

The hazards of overreliance on AI also raise ethical issues. In recruitment, an area where the technology is already widely in use, AI can create the illusion of impartiality while in fact further reinforcing bias. A 2019 article by the World Economic Forum reports: "For example, the algorithm that Amazon employed between 2014 and 2017 to screen job applicants reportedly penalised words such as 'women' or the names of women's colleges on applicants' CVs."

As in the case of breast cancer screening, these examples illustrate where AI can be a useful tool, but is not a standalone solution.

AI hazard avoidance – Mind the gap

To bridge the gap between what AI can and can't do as well as to identify what applications are simply too unreliable and risky, an AI hazard avoidance assessment should be carried out before committing to any AI implementation project. The process, designed to evaluate a proposed or existing AI project against a set of criteria, helps you avoid wasting time and money or – worse yet – making detrimental decisions based on flawed AI-generated findings.

To be clear, an AI application for business can deliver value if – and only if – the description of the system is encapsulated (free of incalculable external variables) and its purpose well defined and understood. Systems like stock prices, fraud or user preferences in music and films may display certain patterns and trends, but external factors – not least, human behavior – can drastically alter predicted trajectories.

Ideally, a cross-disciplinary team of stakeholders who own and know the dataset(s) should be assembled. This makes it possible to gather a good understanding of the system and its behavior. Together, you need to ask:

- How well have we defined the real problem we want to solve?
- Are we asking the right questions?
- What findings do we need the solution to deliver so that we can confidently answer those questions?

This should be followed by a product-data gap analysis to build on the findings and flesh out the benefits that can be realistically expected from the project based on the proven track record of

data science. With these pieces in place, the AI/ML solution itself can be developed at an accelerated pace and with a high level of confidence.

Stay tuned: Moore to come

Considering the dynamics of Moore's Law, we will see AI vastly improve and overcome many of its shortcomings within the not-too-distant future. But for those wishing to profit from its capabilities in whatever way possible and feasible now – which is by any measure a good idea – it's important to see through the hype and proceed systematically. Don't let your first step into the brave new world of AI be your last.

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