

Artificial Intelligence: The Elusive Prize

```
elif _operation == "MIRROR_Y":
    mirror_mod.use_x = False
    mirror_mod.use_y = True
    mirror_mod.use_z = False
elif _operation == "MIRROR_Z":
    mirror_mod.use_x = False
    mirror_mod.use_y = False
    mirror_mod.use_z = True

#selection at the end -add back the deselected mirror modifier object
mirror_ob.select= 1
modifier_ob.select=1
bpy.context.scene.objects.active = modifier_ob
print("Selected" + str(modifier_ob)) # modifier ob is the active ob
#mirror_ob.select = 0
#me = bpy.context.selected_objects[0]
#bpy.data.objects[me.name].select = 1
```

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Introduction

Few topics garner more headlines today than artificial intelligence, and for good reason. Despite the fact tech luminaries can't seem to agree if it's the world's greatest existential threat or saviour, there is little debate about its ability to fundamentally transform everyday life and the business models that support it. As Dr. Anastasia Lauterbach, Board member of Dun & Bradstreet, recently put it, "The internet disrupted 20% of all business models. Artificial intelligence will disrupt the remaining 80%."

Seeing a tectonic opportunity, innovators and investors across the globe have poured unprecedented resources into the sector, a fact highlighted by Softbank's announcement last year of a gargantuan \$100bn tech fund that will focus heavily on AI. To put that number in perspective, the total amount of venture capital invested in the U.S. in 2016 across ALL sectors was "only" \$69bn.

As global markets are now flooded with start-ups and large consulting firms peddling AI, it has never been more important for corporations to have thoughtful answers to a pair of basic questions: **how is AI likely to impact my business and what should I be doing to get in front of it?**



The Foundation of AI

Data

AI is a set of techniques to use information to enable machines to exhibit intelligent action. The starting point for any company's journey into artificial intelligence, therefore, is data.

To differentiate from competitors, companies can therefore either leverage public information in novel ways or, more commonly, use proprietary data.

In a promotional ad for its new AI tools, Google puts forward a pithy, but thought-provoking claim: "Only 1% of data gets analyzed".

Directionally, they're right. Companies make millions of decisions each day with incomplete information:

- Farmers spray pesticides based on the general characteristics of their fields
- Marketers show ads to consumers based on the last websites they visited
- HR departments choose between candidates based primarily on managers' impressions from 60-minute chats

Each of these decisions is being driven by a combination of hard data and human intuition. Crucially, however, a huge amount of relevant information is being neglected. It isn't that these individuals don't value getting it right. It's simply that they haven't yet put in place the mechanisms to leverage all of the data that's out there. And they don't all have the knowledge and imagination to connect the dots between the data they have and the business decisions that can be enhanced.

"ONLY 1% OF DATA GETS ANALYZED."

Identify more insights with AI.

Google Cloud

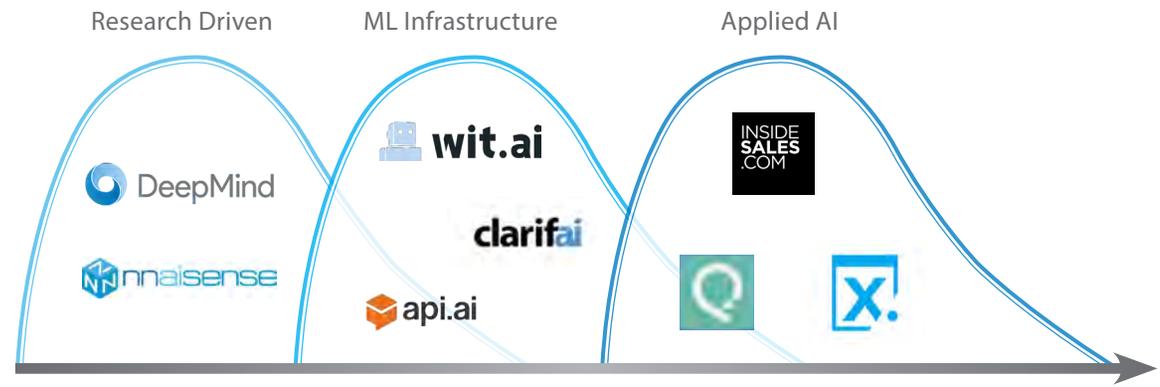


High-Level Trends

The Democratization of AI Tools

As we observe the state of the AI today, we see the industry attempting to address these foundational data challenges by competing, to the public's benefit, for the mantle of powering AI for the masses. Specifically, the firms leading the way in early AI products and research – Google, Facebook, Amazon, etc. – have begun providing valuable infrastructure that can be used by entrepreneurs and businesses to load their data and begin to build intelligent algorithms.

The 3 waves of AI companies



Source: <https://machinelearnings.co>

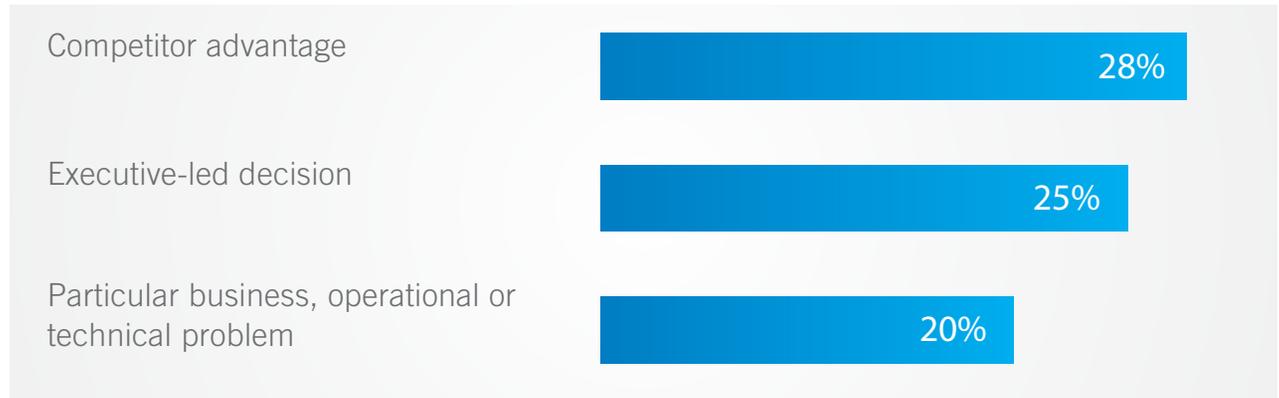
It would be overly generous to call these tools “plug and play”, but for the first time they have started to remove the pre-requisite of having an in-house team of deep learning and cognitive science experts. These tools also allow firms to avoid having to turn their proprietary information (and large sums of cash) over to start-ups who promise “AI via APIs”.

High-Level Trends

Varying Motivations

With barriers to adoption now being removed, we are seeing more and more firms choosing to pursue AI-centric solutions, often spurred to action by changes in their competitive landscape or visionary executives:

Driving forces for AI deployment

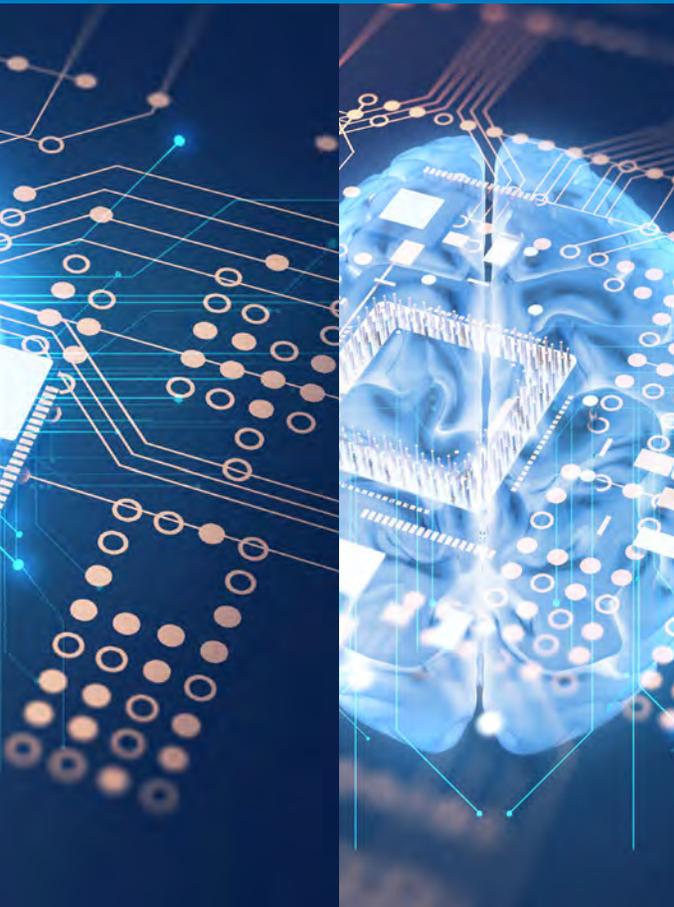


Compelling Returns

When successful, these companies are able to analyze orders of magnitude more information, spotting patterns in the data that were previously hidden and automating certain mundane human tasks.

The benefits from these endeavours can be massive. For example:

- Spraying an entire field for dandelions versus only using costly fertilizer on the spots they were starting to emerge generates significant savings.
- Comparing all facets of a prospective borrower against millions of peers dramatically increases loan officers' ability to accurately calibrate risk, translating into sizeable incremental profit.



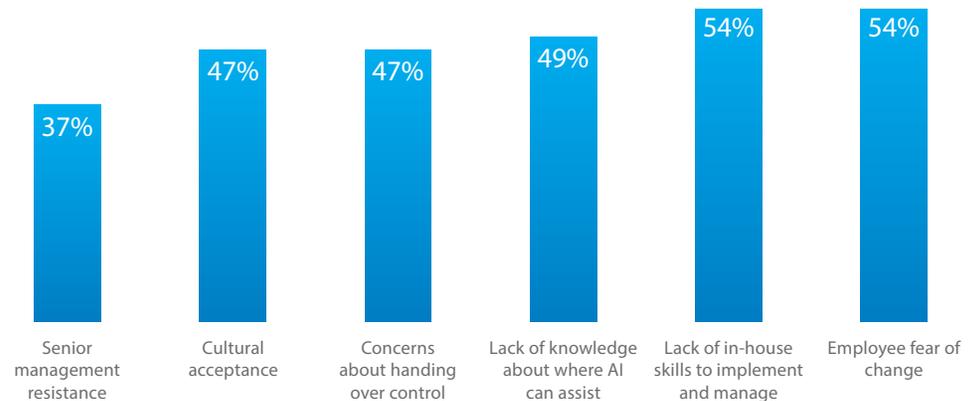
Barriers to Adoption

Challenges That Must Be Overcome When Considering AI

Despite these recent advances, which do indeed represent a substantial step forward, AI remains early stage from a corporate-wide adoption perspective. To better gauge actual AI penetration, Infosys recently put together an AI Maturity Index by interviewing over 1,600 IT and business executives from global corporations with > 1,000 employees and \$500m in turnover. Tellingly, despite a majority of executives seeing AI as a long-term imperative, only 10% believe their organizations are fully maximizing the current available benefits and capabilities of the current opportunity.



So what, exactly, is holding the remaining firms back? Interestingly, as we see in the chart below, the obstacles organizations face are not limited to technology. Playing a key role in corporate reticence are the impacts these technologies will have on humans.



Barriers to Adoption

Employees Fear Being Displaced

One reason for this fear is simple: people are worried about losing their jobs to computers. While this concern is entirely reasonable, and should be a topic of continued dialogue, the reality is that, at companies where we've seen AI implemented well, machine learning algorithms have successfully replaced mundane, data-driven tasks while freeing employees up to do more value-added activities.

To give an example, when machine learning recommends optimized solutions to customer problems and suggests winning communications strategies to customer service reps, they can spend more time talking with customers about how they can improve their overall product experience and build more enriching, enduring relationships.

We Have A Hard Time Trusting Machines

Adding to the concerns about AI is a deep-rooted fear of losing control (or at least the semblance of control). Ironically, one reason machine learning is so powerful – and that neural networks are so vital – is that humans are not very good at stating what they implicitly know, a dynamic known as Polanyi's Paradox. This makes it very difficult to code clear, comprehensive instructions for doing repeatable tasks, therefore introducing the need for algorithms that can learn through observation.



Environmental Control

You overcome Polanyi's Paradox by manipulating the environment in such a way that is easier for machines to perform the task

Machine Learning

You try to get the machine to mimic expert human judgement (which often relies on tacit knowledge and heuristics), You do this by getting the computer to infer its own rules from a series of trials on a large dataset.

Source: <http://hplusmagazine.com/>

Intriguingly, the flip side is also true. Machine-learning algorithms are much better at making complex decisions than in telling us why they made them. This leaves us with a stark choice: either make human decisions that we control or allow algorithms to make them for us, despite the fact they often can't tell us why they did what they did. As technology continues to mature, it is fair to assume algorithm "storytelling" will advance in step. But for the time being, we are left to trust AI's decisions in isolation and validate their effectiveness through thoughtful KPIs.

Barriers to Adoption

Algorithms Need to Be Trained With Lots Of Data

From a technical perspective, another important barrier to AI adoption is the interaction that's required with algorithms before they are able to deliver value. After neural networks are built and algorithms are written or connected via API, they need to be trained.

To explain this, it is instructive to look at the human experience. As we move through life, people conduct on-going unsupervised learning by observing millions of interactions. Each of these is logged in our subconscious and plays a role in our ability to contextualize unstructured data and arrive at a clean decision.

Just like a child born into the world, for algorithms to work effectively, they need time to learn. The difference is that while humans learn via their voyage through life, algorithms must be explicitly fed data in a controlled fashion. To put it in AI parlance, algorithms need supervised learning.

AI Is Not Flexible

One of the most powerful aspects of the human mind is its flexibility. In an instant, humans can shift the context they are operating in, seamlessly moving between driving a car, choosing a restaurant and answering kids' questions. This general awareness of our surroundings – and the ability to solve a diverse set of problems based on a complex set of environmental conditions – is one of our greatest gifts. Unfortunately, this is also one of AI's greatest blind spots.

There is a massive jump in complexity between solving a specific, predefined problem and solving whatever problem appears. The latter is a two part issue:

1. **Correctly diagnosing the right problem to solve**
2. **Having the data to solve it**

AI might get there someday, but for now, this remains elusive. A fact that frustrates AI's practitioners yet likely comforts those that wonder about mankind's future relevance.

In a following e-book, we will explore how companies can overcome these challenges and build scalable AI competency within their organization.



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