YSEOP Compose

Beyond the Myth:

Artificial Intelligence for Business

What Can AI Do For Your Business Today?

Contents

ARTIFICIAL INTELLIGENCE

Introduction

The term "Artificial Intelligence" (AI) is one of the most talked about, reported on, and debated technologies in the media today.

The term coined in 1956 by renowned Stanford University computer scientist John McCarthy, one of the founders of the discipline, covers today many fields and subdisciplines, most of them not well known or understood.

As AI capabilities are growing at an ever-faster pace, with new techniques such as Deep Learning and Neural Networks grabbing headlines, it has become a subject of fascination and fear.

The Transformative Impact of AI

This mix of excitement and anxiety is deeply rooted in our cultural background, from Isaac Asimov's novels and famed "Three Laws of Robotics" to the dystopian visions of the future offered by movies like *Terminator*, *The Matrix*, or *I, Robot*. We are conditioned to be wary of Artificial Intelligence and the threats it is supposed to represent.

And yet, for all the progress AI is making, we are still many, many years away from reaching a point where AI represents an existential threat to us. However, a more immediate perceived threat that is extremely common is that AI will destroy our jobs.

As we will discuss below, **it's far more subtle than that, and while we can expect a deep transformation of our economies in the coming decades, AI is a tool to augment human abilities, not replace humans**.

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While this eBook will look critically at common AI myths and address the misconceptions it generates, its true purpose is to look at AI, where it comes from, and what can it do for you and your business today.

All the buzz around AI today is causing confusion in the business world, as **executives are led to believe that AI can solve all their business problems with one overarching supersystem[1]**, just like magic - a misconception that has been nurtured to an extent by some IT companies who spent millions in marketing pushing that idea.
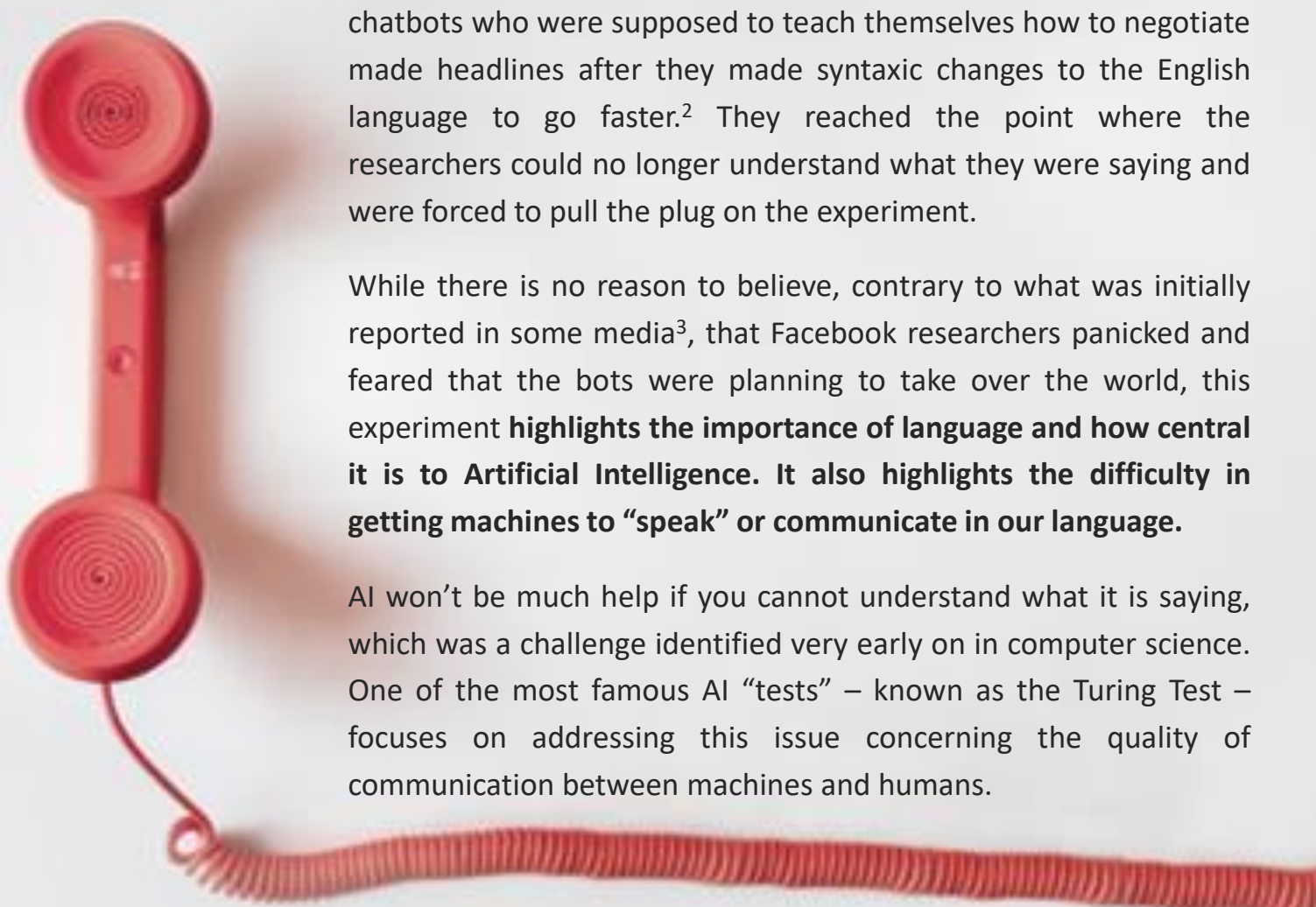
We will look at that and explain what AI can't be expected to do, what it can do, and how it can help your business not in 5 years, not tomorrow, but today.

1. Ng, Andrew. (09 Nov 2016). What Artificial Intelligence Can and Can't Do Right Now. *Harvard Business Review*. Retrieved from: link

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AI & Language

Throughout this eBook, we will also zoom in on something we know particularly well at Yseop: the importance of language in AI and why it's important to your business.

Last summer, an experiment at a Facebook lab involving a pair of chatbots who were supposed to teach themselves how to negotiate made headlines after they made syntaxic changes to the English language to go faster.[2] They reached the point where the researchers could no longer understand what they were saying and were forced to pull the plug on the experiment.

While there is no reason to believe, contrary to what was initially reported in some media[3], that Facebook researchers panicked and feared that the bots were planning to take over the world, this experiment **highlights the importance of language and how central it is to Artificial Intelligence. It also highlights the difficulty in getting machines to "speak" or communicate in our language.**

AI won't be much help if you cannot understand what it is saying, which was a challenge identified very early on in computer science. One of the most famous AI "tests" – known as the Turing Test – focuses on addressing this issue concerning the quality of communication between machines and humans.

2. Griffin, Andrew. (31 July 2017). Facebook's Artificial Intelligence Robots Shut Down After They Start Talking to Teach Other in Their Own Language. *Independent*. Retrieved from: link.

3. Simonite, Tom. (01 Aug 2017). No, Facebook's Chatbots Will Not Take Over the World. WIRED. Retrieved from: link.

Common AI Myths Debunked

There's a lot of confusion and anxiety around Artificial Intelligence. Some of it comes from a long history of cultural baggage about AI-run dystopian futures, other from more recent coverage of AI development, what it can do, and how it can impact the workplace. We'll take a look at each of these in turn.

Myth #1:
AI Will Lead to a
Dystopian Future

Myth #2:
AI Can Do
Everything

Myth #3:
AI Will Take
Our Jobs

Common AI Myths Debunked

Myth #1: AI Will Lead to a Dystopian Future

Myth #2: AI Can Do Everything

Myth #3: AI Will Take Our Jobs

There is no shortage of books or movies where some sentient AI takes over the world. So, while most of us would agree that the idea of robot overlords is absurd, the truth is that a significant portion of today's fear about AI stems from what we've read in books or seen on TV and movies. Hollywood mostly demonizes it, as AI is often a key component of a dystopian vision of the future. At the same time, some use this Hollywood narrative to drive clicks on their articles and traffic to their website. Others, including extremely bright minds like Stephen Hawking and Elon Musk, have kept to an extremely dark vision of the future.

But by all accounts, we are still decades, perhaps centuries away from a "general artificial intelligence" capable of thinking like a human being, and showing the same level of ambition and taste for power.

At the heart of AI development today is "vertical" AI: Artificial Intelligence software that aims at fixing very specific types of problems better than humans. AI is currently positioning itself as a tool to "amplify human abilities," to paraphrase Steve Jobs in his visionary 1990 interview.[8]

As AI develops and grows more capable, ethical questions will be raised. For example as with genetics research, we are still far away from an existential threat to the human race. However, for the foreseeable future, AI will remain shackled to a certain tasks or objectives.

4. Kozlowski, Lori. (30 Jun 2013). Steve Jobs on How to Build The World. *Forbes*. Retrieved from: link

Myth #1:
AI Will Lead to a Dystopian Future

Myth #2:
AI Can Do Everything

Myth #3:
AI Will Take Our Jobs

AI is often depicted as this magical technology, able to complete any and all tasks with just the click of a button.

Simplifying AI in this way is very misleading because it gives the impression that AI is a simple fix to any problem. As described above, we are still decades away, potentially centuries, from a "general artificial intelligence." So, while AI is a very powerful solution, it definitely has its limitations. Highly creative, unique tasks are very hard for AI to complete mostly because it takes time to train an AI for a particular situation.

In the same vein, another common misunderstanding about AI is that it is very easy to use and to implement - basically, AI today is "plug-and-play." Nothing could be further from the truth: **AI, regardless of its approach, requires a certain amount of work to develop and integrate it in your processes, even if it opts for a machine learning or deep learning approach**.

While companies commercialize "packaged AI" that is meant to cut down on development time, you will need to plan ahead how you want to integrate AI into your business workflows, both conceptually and technically.

Common AI Myths Debunked

Myth #1:
AI Will Lead to a Dystopian Future

Myth #2:
AI Can Do Everything

Myth #3:
AI Will Take Our Jobs

Relating to aspects of Myth #1 and #2, one of the most pressing fears stemming from the development of Artificial Intelligence in the past few years is the idea that computers will take over everyone's jobs.[5] This modern-day resurgence of Luddism is not unexpected, as there is little question that we are on the eve of a Fourth Industrial Revolution that will deeply change the way our economy works. However, the idea that AI will replace humans at work is not grounded in facts any more than it was when machines were introduced in factories over the course of the 19th century.

As we've previously explained, **today's AI has a vertical approach - it automates tasks, not entire jobs.** Humans are and will still be required in the foreseeable future for complex, creative, and unique tasks that no machine knows how to automate.

The truth of the matter is that in the coming years, Artificial Intelligence will be a tool at our disposal like other tools. It will help us accomplish specific tasks a lot more efficiently than without it - effectively "augmenting", but not replacing, human capabilities. As Daniela Rus, director of the prestigious MIT Computer Science and Artificial Intelligence Lab (CSAIL) aptly put it: "I believe people and machines should not be competitors, they should be collaborators."[6]

5. Atkinson, Robert D.. (19 Sept 2017). Artificial Intelligence, Robotics, and the Future of Work: Myths and Facts. *Information Technology & Innovation Foundation* Retrieved from: link

6. Knight, Will. (8 Nov 2017) More Evidence That Humans and Machines Are Better When They Team Up. *MIT Tech Review*. Retrieved from: link.

AI: The Beginning to Today

As we've gone over and addressed common myths and misconceptions about AI, it is clear that there needs to be an adult conversation about AI and the future of work. We need to understand the capabilities of AI as well as the limitations. **The truth is, AI is neither a panacea nor a plague. AI is a tool**. At its core, AI is a computer science dedicated to the automation of repetitive tasks, like a robot in a car factory or a computer understanding the spoken word.

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A Brief History of AI

Before we get into too much detail about the history of AI and use cases, let's define the term Artificial Intelligence. While there are a few definitions, one of the most popular comes from Professor John McCarthy. In the 1956 Dartmouth Conference, McCarthy defines AI as:

the "science and engineering of making intelligent machines, especially intelligent computer programs."[7]

McCarthy's definition leaves the term "intelligence" open to interpretation. Over the years, the meaning of machine intelligence has changed. Looking at a brief history following the seminal Dartmouth Conference, we start to get a clearer idea of what machine intelligence means and how it is used in technology today.

7. AISB. What is Artificial Intelligence. *The Society for the Study of Artificial Intelligence and SImulation* Retrieved from: link

1950's: The Foundation of AI

Alan Turing
(Source: New Yorker)

The 1950's are viewed as the point at which intelligent machines started to become a reality. Two interesting papers that came out during this decade were pivotal to designing the framework of machine intelligence and AI. First was Alan Turing's paper, released in 1950, titled *Computing Machinery and Intelligence*. It detailed what became known as the Turing Test – a test that assessed whether or not a human could tell they were conversing with a computer – providing one way for how to define machine intelligence centered around language.

The second paper, written by McCarthy and his colleagues, focused on how one would go about choosing or defining tasks for AI. They hypothesized "that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it."[8]

While this was still the early stages for AI, this was a turning point when intelligent machines left fiction and became a focus for academics.
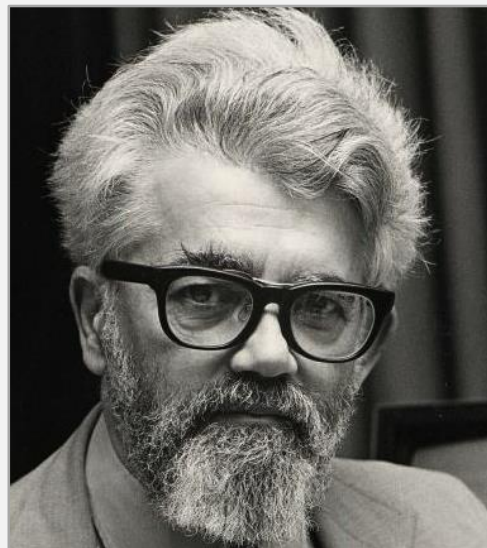
John McCarthy
(Source: Wired)

8. McCarthy, J., Minsky, M., et al. (Aug 1955). A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence. *AI Magazine*. Retrieved from: link

1980's: Expert Systems

AI then slowly began to evolve beyond academia and into useful applications for business. What came about in the 1980's was something known as expert systems: "programs that mimic the thinking of the human experts who would otherwise have to perform the analysis, design, or monitoring."[9]

One of the first and most popular business examples of an expert system was R1/XCON (eXpert CONfigurer). Developed in the 1970's, it was designed to analyze sales orders of computer parts, accurately identifying and modifying parts to fit the order. Ultimately, R1/XCON helped to improve processing times and order accuracy.[10]

Other similar programs were developed for different uses and industries. This idea of accurately applying rules to scale became very appealing in areas like finance and computing, where mistakes could be costly. This marked the beginning of automating knowledge work.

9. Leonard-Barton, Dortothy and Sviokla, John. (March 1988). Putting Expert Systems to Work. *Harvard Business Review*. Retrieved from: link.
10. Association for the Advancement of Artificial Intelligence (AAAI). AAAI Classic Paper Award. Retrieved from: link.

The 2000's to Today: Leveraging Big Data

Due to the success of expert systems, the use of AI in businesses continued to expand into other industries.

For example, the wealth of data from online shoppers coupled with the power of AI led to improvements in personalized marketing. Large e-commerce conglomerates like Amazon began employing AI to optimize logistics, using intelligent machines to decide how to distribute their goods in more efficient ways. A new "Golden Era" of Artificial Intelligence truly took off in the 2010's, as new groundbreaking research in the field of Deep Learning - software not only able to learn (Machine Learning) but to learn how to learn - by giants like Google, Facebook, and IBM, grabbed the attention of the media and investors.

The 2000's to Today: Leveraging Big Data

There are many applications and use cases beyond the two briefly mentioned above. There are use cases in finance with algorithmic trading, medical diagnostics, and IoT sensor diagnostics.

Today, AI is effectively being used to identify important information and trends in the data. As businesses move towards making data insights accessible to a wide variety of end users, the focus then shifts to language and facilitating conversations between human and machines.

Language and AI: The Turing Test

Alan Turing was the brilliant English codebreaker of the infamous Nazi Enigma encryption method and inventor of modern computing and Artificial Intelligence (AI). He famously argued that AI will have reached maturity the day a human being couldn't tell, in a conversation, whether the other party was a computer or another human.[11] This has come to be known as the Turing test.

Turing's test was seen as a milestone in the history of computer science and AI.

Over the years, many computers have failed and a few have claimed success.[12] So why is Turing's test proving so difficult to pass? One recent critique from British author and journalist, David Boyle, provides a particularly provocative answer: artificial intelligence (AI) programs fail the Turing test because they're too perfect.[13]
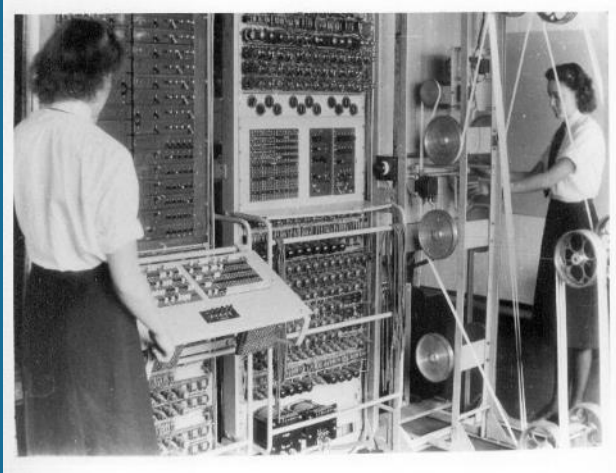
Colossus, the famous codebreaking computer Turing helped to build in WWII.
(Source: Bletchley Park Trust)

11. Turing, A. M. (1950) Computing Machinery and Intelligence. *Mind* 49: 433-460. Retrieved from: link.
12. Kurzweil, Ray. (10 June 2014) Response to Announcement of Chatbot Eugene Goostman Passing the Turing Test. *Kurzweil Accelerating Intelligence.* Retrieved from: link
13. Boyle, David. (22 Sept 2016) What's the Difference Between Robots and Humans? It's my Newt. *The Guardian.* Retrieved from: link

As Boyle writes, "It isn't the infallibility of people that makes them human, after all. Quite the reverse; it is their sheer fallibility – their ability to make mistakes, be quirky, make relationships, love, and care. It is more unnerving, not more reassuring, to be phoned by a robot that is nearly human than it is to be phoned by an obvious machine."

So far, no software has consistently beaten the Turing Test, despite some claims to the contrary.[14]

14. Naro, Maki. (11 June 2014) Did a Chatbot Really Pass the Turing Test? *Popular Science*. Retrieved from: link.

AI Reality: What Can AI Do for You Today?

Part of the problem of addressing AI and what it can do is the idea that "intelligence is whatever machines haven't done yet" – known in some circles as the **Tesler's Theorem**.[15] It is also referred to at times as the **AI Effect.**

This idea relates to a perception that whenever Artificial Intelligence solves a particular problem, the result is dismissed as computational, not *real* intelligence. This can be quite problematic because AI then is framed as an unobtainable, magical solution.

However, there are solutions using AI technology that businesses are using today. Generally speaking, there are two main schools of thought in AI today: the statistic approach, sometimes called probabilistic, and the deterministic approach. Without knowing it, you most likely have interacted with both types of approaches, even if you've never heard of these terms.

The oft-spoken Machine Learning belongs to the statistic approach, while expert systems, which have been around since the 1980s, are deterministic. Neither one of these approaches is "superior" to the other, they are just each suited better to different use cases.

Here are some use cases for each approach and how they can help your business.

15. Note: This is often misquoted as "Artificial Intelligence is whatever hasn't been done yet." See Larry Tesler's CV for his remarks: link.

The Statistic Approach:
What Can Machine Learning Bring to the Table?

Statistic AI, such as Machine Learning and deep learning, is based on – you guessed it – statistics. It is a process where the AI system looks at the average and then codifies the average as the best approach.

These are very useful tools in certain fields. The main feature of statistic AI and it's great strength is the software's ability to "learn" from data, by processing information and identifying patterns. Once trained, the AI the can apply the relationships it learned to new situations, striving for perpetual - and automatic - self-perfection. Or at least that's the idea. These tools are helpful because they can find patterns that a human could miss, and trigger appropriate actions when required.

Machine Learning and other statistical approaches have use cases in our daily lives. Spam filters, for starters, keeping our inboxes clean, constantly improve based on different elements, not least of which user input.

Data discovery is arguably the most well-known, using AI software to go through vast volumes of data and identifying patterns, trends, relationships, and anomalies while formulating rules and other types of insights based on that data. Data security is another use case, where Machine Learning software is used to assist humans in identifying malware software.

The field of language often relies on machine learning algorithms to improve its understanding of language. Take for example, Natural Language Understanding (NLU) software, which converts language into data a computer can process. The software learns as it processes unstructured data, like text, to recognize frequent typos, mistakes, different ways of saying things. Over time, the performance continually improves.

While Machine Learning and Deep Learning can be very powerful in certain scenarios, that does not mean that they can be useful in all scenarios. Indeed, that type of AI software also has its share of limits:

It requires a vast amount of input data.

In order to do a reliable job, you'll need a lot of data to feed the software in order to make the rules statistically significant. The problem is that not all companies have access to vast amounts of data. Deep Learning has become something of a reserved domain for company giants like Google and Facebook. This is because they're the only actors on the market with access to sufficient data, time, and computing power necessary to be able to work on that type of technology.

It relies on statistics.

As mentioned earlier, software that uses the statistic approach reasons based on the average. However, the average is not always good enough for automation purposes: one of your goals with AI technology should be to apply your best expertise and your best practices, not "Average Joe's."

It isn't plug-and-play.

Contrary to popular belief, statistic AI does require work and hand-holding to get it to work properly. Just because it can "learn" on its own does not mean that it is plug-and-play – far from it. Deployment of Machine Learning systems is time and resource intensive, the level of which of course depends on the use case.

The Deterministic Approach:
A Proven Track Record

Deterministic AI is founded on a relatively older technology called inference engines, also known as expert systems, which first started to appear in the 1970s and 1980s. While expert systems get considerably less media coverage these days to the point that some question whether they can still be considered AI (they can!), they have a proven track record and can help automate your best practices on repetitive tasks.

Example of Deterministic Approach: Autopilot Technology

The most well-known expert system in the world is probably one you didn't even know was an expert system: the autopilot software in airplanes. Autopilot serves not as a replacement for the human crew, but to assist the pilots in controlling the trajectory of the aircraft without having to keep their hands on the flight stick at all time.

Modern autopilots rely on computer software that is able to apply pre-determined rules to the volume of data the aircraft collects, whether from the pilot's inputs or from the many sensors onboard.

In the event that the autopilot encounters information it cannot process, a signal is sent to the pilots - a blinking red light, for example - asking them to take over.

While many will see this as a limit, it is, in fact, a strength of deterministic AI: when it doesn't know, it doesn't approximate - it escalates to a human actor.

The entire purpose of expert systems and deterministic AI is to automate repetitive and redundant tasks. This frees up time and resources for humans focus on the more creative, complex aspects of their job.

Conventional Natural Language Generation

A relatively recent addition to the deterministic branch of Artificial Intelligence is Natural Language Generation, commonly called by its acronym, "NLG." The fundamental value of NLG is that it lets expert systems express their reasoning and conclusions in natural language, letting the human decision maker understand the AI's reasoning process.

There is no shortage of conventional NLG systems on the market today. In fact, NLG has existed since the 1980s. These systems work from a series of templates. For example, "The weather in <INSERT LOCATION> will be <INSERT TEMPERATURE>."

Some companies have enhanced these systems to create slightly less generic sentences. For the purposes of clarity, we will call these more advanced systems next-generation NLG systems.

Next-Generation NLG

The next generation of NLG, pioneered by Yseop, unifies two divergent aspects of Artificial Intelligence technology: automation of repetitive tasks – through an inference engine – and Natural Language Generation. For the first time in history, machines can analyze data, extract insights, and explain what these insights mean - in plain language - so that anyone can understand.

However, this new software can go even deeper: it can explain the drivers behind a dataset as well as recommend next-steps actions.

From thousands of pieces of data, an example of enterprise Next-Generation NLG text in real time could look something like this:

" *By the end of January 2016, the net-positive growth in total deposits (+4.9%) mainly stemmed from the rise of deposits made towards certificates of deposit, checking accounts, and savings accounts.* "

Analysis from Data + **The Drivers Behind the Analysis**
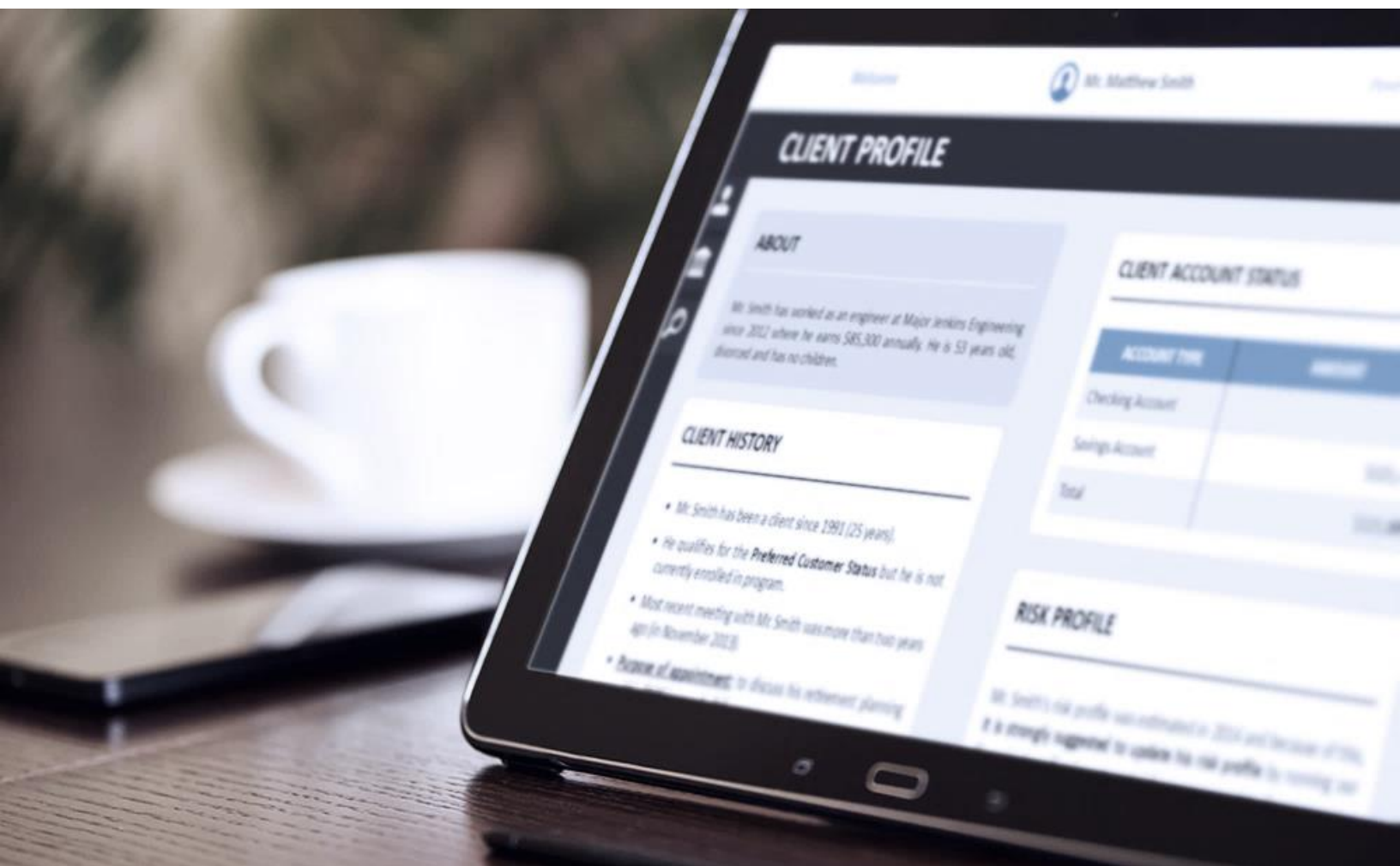
There are many applications and use cases beyond the two briefly mentioned above. One of the key markets where the value of NLG truly shines is Business Intelligence (BI).

The business problem in BI is clear: too much data and the inability to express insights in real time. Companies either rely on dashboards or manually written reports.

Next-Generation NLG software addresses that need with easy to use software that **explains data analysis results in language that anyone can understand**.

Conclusion

If you look past all the hype and media coverage of revolutionary Artificial Intelligence technology that will either transform human society or, according to some, destroy it, you will find AI solutions that address specific business needs today, and not in a near-but-remote future.

If you're looking at implementing AI in your internal processes, Whit Andrews, Gartner Vice President and analyst, phrased the first question to ask yourself:

> "what matters the most to you and the business is where you should use AI. If you're exploring AI for your business, pursue something that is critical to your organization."[16]

Once your priorities are set, you need to start looking at what type of AI technology can address your needs. We hope that this eBook has helped you see clearer in the myriad of AI terms and technologies.

Keep in mind, however, that AI won't fix every problem for you, and that to make the most of AI, humans and machines need to work together. That means that they must be able to communicate effectively and intuitively.

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16. Pemberton, Chris. (6 Nov 2017). Use Artificial Intelligence Where It Matters. *Smarter with Gartner*. Retrieved from: link.

Conclusion

In that regard, NLG is key: being able to express the computer's reasoning and conclusion in plain English makes it the last mile in the data-to-insights process. It's the link between the man and the machine, helping you get more value out of the entire data value chain, and whatever software, whether AI or not, that comes before it.

To that end, it's not that much of a surprise that NLG is regularly named by advisory firms like Gartner or Forrester or by news organizations like Forbes as one of the hottest trends in AI.[17]

17. Press, Gil. (23 Jan 2017). Top 10 Hot Artificial Intelligence (AI) Technologies. *Forbes*. Retrieved from: link.

About US

Yseop offers a powerful artificial intelligence software that automates knowledge work, dialog, and generation of written content in multiple languages. We believe the next industrial revolution will be the automation of the service sector. Just like robots in manufacturing boost productivity and enhance capacity, Yseop's software suite automates expert customer interaction, either as a guide for employees or directly to the customer. **Our software also generates written reports, analysis, and advice automatically using a client's best practices.** Now, companies can use their data in real time and guarantee expert customer service for all, no matter the account size or channel.

Secure
Install securely on your server or personal cloud

Tried & True
50,000 Users in production in Fortune 1000

Global
Multilingual software with offices in EMEA, US, and APAC.

Autonomous
Only enterprise, self-service, language generation software

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