

Artificial Intelligence as fuel for business value

Deep dive

July 2020

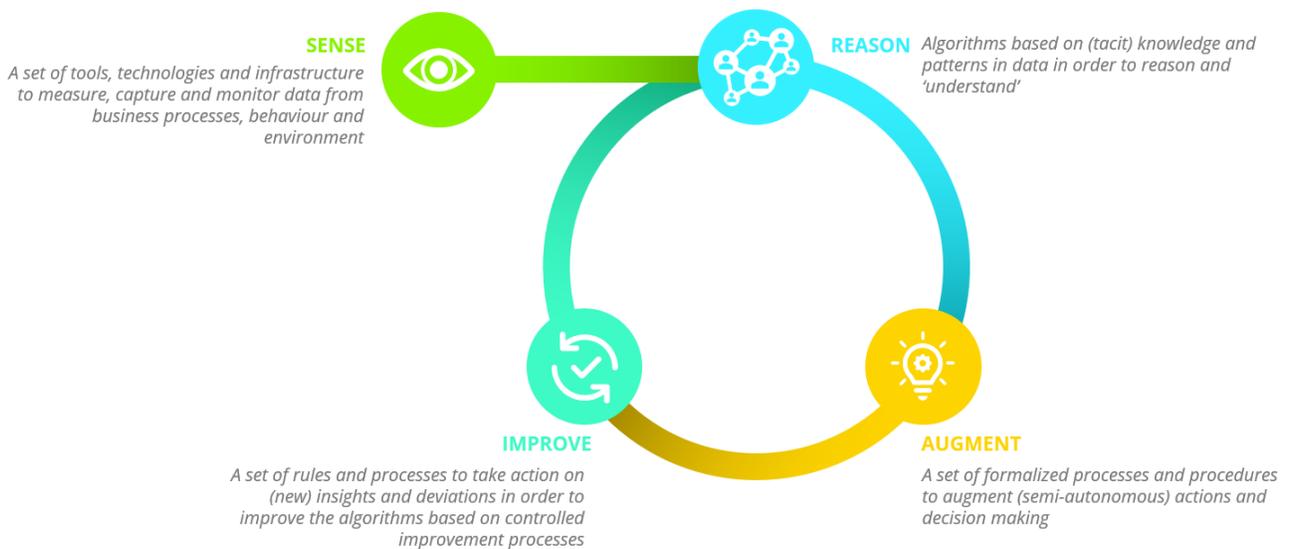
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Introduction

In this deep dive we provide more details of each part of the so-called DAIL loop. After detailing SENSE, REASON, AUGMENT and IMPROVE, we will also elaborate upon the three enablers that are critical to a successful cognitive solution: Privacy, Security & Ethics, Change Management and the Technology Stack.

Sense

As a decade old saying goes, is ever more true in the cognitive era: Garbage In means Garbage Out. If we provide a computer with nonsense input, the output is likely to show the same flaws. It is therefore no surprise that a large amount of effort in any AI project goes into collecting and preparing data before it is fed into an algorithm. We therefore see SENSE as a fundamental first step in the DAIL loop. Perhaps it's also the most challenging one as 39% of executives name data issues a top 3 challenge in applying AI in their organization. The tools and methods that are employ to prepare data for usage in AI applications fall under the SENSE category. Examples of such methods are digitizing PDFs and extracting images and text from them, but also the cleansing and validating data as well as data management (e.g. cataloging) are part of the SENSE process. Be aware that this does not mean that AI solutions can only accept a single stand-alone dataset. They can be intertwined into the organization with live connections to various resources, leveraging the scalability as well as the generalizability of today's AI models.



Looking back at the example that we described, SENSE is about gathering and making a large collection of potentially relevant information available in cloud storage. This requires extracting internal and external data and preparing it to be fed into cognitive models.

Reason

Speaking of models, this is what is encapsulated in the reason pillar. This is basically the logic part in which, based on learnings from the past (both patterns in the data and human expertise encapsulated in some form of data) an algorithm is constructed. This algorithm (or brain) drives the decision process. Extensive expertise and vast computing resources are typically required to compete in the academic domain of the cognitive space. However, organizations that may lack either, can nowadays leverage pre-trained resources to reason about their application and tailor it to their specific needs. Examples of these are the large language models such as BERT and GPT-2 developed by the Google and OpenAI. Such models can be finetuned for business applications at a fraction of the computing power used for training it in the first place.

Looking back at the example we gave, REASON is about selecting, developing and implementing an algorithm that assists in the search for relevant information. Starting with a default algorithm, you may want to capture domain expertise to reason about input like an expert. This requires encapsulating domain knowledge in for instance knowledge graphs and using those to enhance the search algorithm.

Augment

Now why are we taking the SENSE and REASON steps in the first place? Well, in the end, all cognitive processes are initialized with the aim of bringing value to an organization. Typically, the AI solution augments current business processes, allowing for improvements in e.g. efficiency and customer experience, while it may also be used to develop new business processes. These are they key factors in which companies can obtain an important edge over their competitors, as companies are only starting to unravel cognitive capabilities. There are a number of important steps to take in order to get the most value out of AI applications, such as change management and scaling and rolling out the solution within the organization.

Looking back at our example, AUGMENT is about improving efficiency and effectivity of the existing business process of developing new products, as well as providing means to foster the creation of novel processes.

Improve

Adding value is not the end for a proper cognitive solution: we can also incorporate data on users interacting with the cognitive solution to improve it. This is the very type of data that enables Spotify and Netflix to serve you with recommendations and allows Google to outperform Bing in terms of search. Wouldn't it be a tremendous waste of value if

we don't utilize this resource to optimize the cognitive process? This underlines the importance of the Improve pillar which revolves around continuous feedback loops. Making sure this feedback loop is set up in a structured way through proper MLOps is pivotal. This means bringing the DevOps principles advocating for automation and monitoring to all steps of the ML model construction.

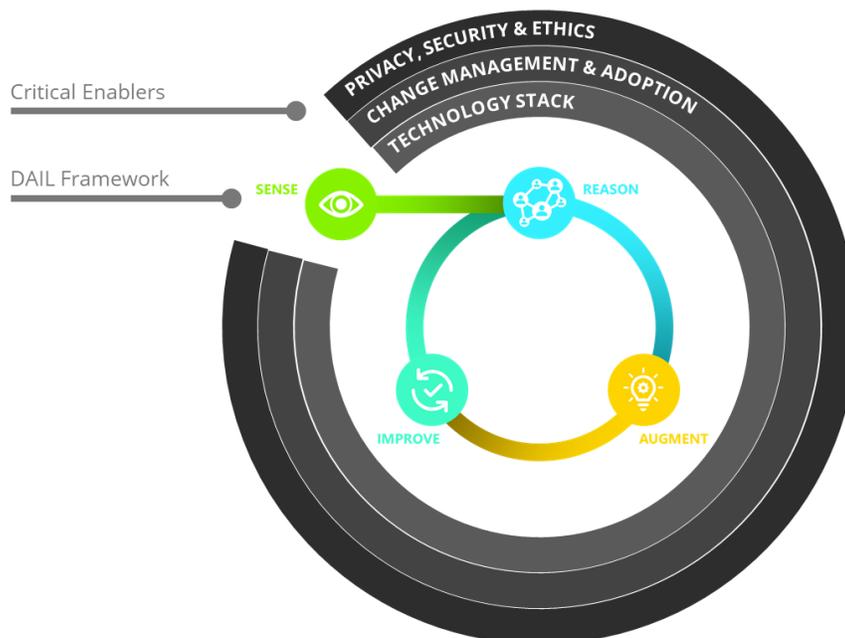
Looking back at the example, we can incorporate a feedback mechanism that enables users to provide feedback on their results as to further optimize the search results in the next iteration.

DAIL can thus be used as a framework to anchor cognitive capabilities within organizations. Let us now detail the domains in which DAIL can operate and the critical enablers that are required to steer cognitive solutions to a success.

Critical enablers

In addition to the phases within the DAIL loop, the development of an enduring cognitive solution requires effort to be put into three critical enablers: Privacy & Ethics, Change Management & Adoption and the Technology Stack.

One of the top concerns with AI nowadays is that it can harm our privacy and is vulnerable to ethical biases in data that was used to train the system. To address these grounded fears, it is critical to devote effort to privacy controls – thinking about who will have access to what information, security measures – preparing for different types of threats and ethics – what will be the impact of the solution and to what extent is this solution fair?



Secondly, a cognitive solution is only as valuable as the extent to which it is used. We cannot simply assume users to adopt the solution without any guidance nor without taking them aboard the cognitive journey from the very start. Making people acquainted to AI and enabling them to use it in their daily work is something that for most organizations won't come immediately, but is something that requires a slow but steady change in culture, and therefore a long term investment.

Finally, a cognitive solution can only be maintained if it is built on a proper technology stack. This means that you have to build with upscaling in mind, which typically sends you to the cloud. Beyond hosting your solution, you need to put quality control measures in place that will ensure the solution will be maintainable over time, so that it remains relevant over time.

Endnotes

Beyond Neurons: Five Cognitive Functions of the Human Brain that we are Trying to Recreate with Artificial Intelligence – Jesus Rodriguez, Intotheblock, 2019

Is This the First Time Anyone Printed, 'Garbage In, Garbage Out'? - Rob Stenson, Atlas Obscura, 2016

AI-fueled organizations, Reaching AI's full potential in the enterprise - Nitin Mittal, Dave Kuder, Samir Hans, Deloitte Tech Trends, 2019

About the authors

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