



Ready for take-off

Expert article

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SMART insights

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No trend is currently being discussed as widely and with such indiscriminate enthusiasm as artificial intelligence (AI) but what a lot of people don't know is that a large proportion of AI development is open and accessible to everyone. Michael Schröder and Wilhelm Kleiminger describe how companies can make an agile and scalable start to their AI journey with the right approach and data science in the cloud.

Although the AI conversation is dominated by the big players, there are plenty of opportunities for virtually every firm to deploy AI to improve and transform their business activities. Below, the authors present the two principal approaches to AI and address individual methods and success factors.

“Practically every company can benefit from AI.”

AI in practice: applied AI and custom AI

Aside from AI research, there are fundamentally two approaches through which companies may benefit from AI:

Applied AI

This is where AI products, such as image or text recognition, are used “out of the box” to automate specific processing steps and/or to make these smart at an application level.

Custom AI

This is where companies use AI to analyse data, recognise patterns, make predictions and, ultimately, deliver customised AI solutions based on their specific business practices.

Applied AI: quick-wins with existing AI products

Public cloud providers such as Google, Microsoft and Amazon already offer out-of-the-box AI products that can easily be incorporated into existing projects. These include speech and image recognition, machine translation and modular systems for conversational interfaces, for example. The advantages of these products are obvious: they allow major improvements to be made in specific areas without requiring extensive changes to existing system infrastructure – image recognition can thus be used to optimise workflows while a chatbot can lighten the load in a service centre. This low barrier to entry is simultaneously the greatest drawback of applied AI approaches, however – they can easily be mimicked by the competition and hence do not provide a sound basis for unique competitive advantage.

Custom AI: competitive advantage thanks to individualised approach

If companies wish to create additional commercial benefits and elicit fundamental competitive advantage from AI, relying on the standard range of products available is longer adequate. Instead, they must identify at what points in their business processes data suitable for custom AI is being generated and analyse how they can improve, or even fundamentally redefine, their competitive position using AI and any newly captured data.

Use cases for custom AI can be directly derived from a company's business architecture and priorities: what problems within individual business processes produce sufficient data for AI-based solutions to be worthwhile? How might a company monetise existing data or leverage such information more effectively by combining it with new data? What data-based products or business models might be envisioned?

Approaches such as combining the IoT and AI for predictive maintenance, within production, or smart things, for the end user, that utilise fundamentally new concepts and technologies are of particular interest here. In combination with changed customer and/or partner relationships, such cases harbour potential for long-lasting competitive advantage or even the disruption of entire sectors.

From idea to operational AI solution

Combining structured understanding and consolidation with an iterative and agile implementation methodology, the following approach has proved its worth as a way of progressing from the identification of ideas to an up-and-running AI solution.

The concrete steps are:

1. *Potential analysis*

The important thing at the beginning is to investigate ideas for their technical and data-related potential. Simultaneously, this is when the first, brief data analysis takes place – ideally, at this point, in the correct AI pipeline, which can be scaled later (cf. box).

2. *Data engineering*

Data is the bedrock for training AI algorithms and differences in data quality and/or data from disparate silos that cannot be combined for technical reasons are typical hurdles here. Data engineering addresses these deficits in conjunction with technical/data-related and functional/organisational obstacles. In such cases, there will often be a “loop-back” to the potential analysis.

3. *Data science*

A central plank, data science subsumes suitable techniques and approaches for extracting specific technical information for the AI models from the data available. New potential or shortcomings in the information base may only become apparent at this stage and, here too, the process may have to go back a step or two.

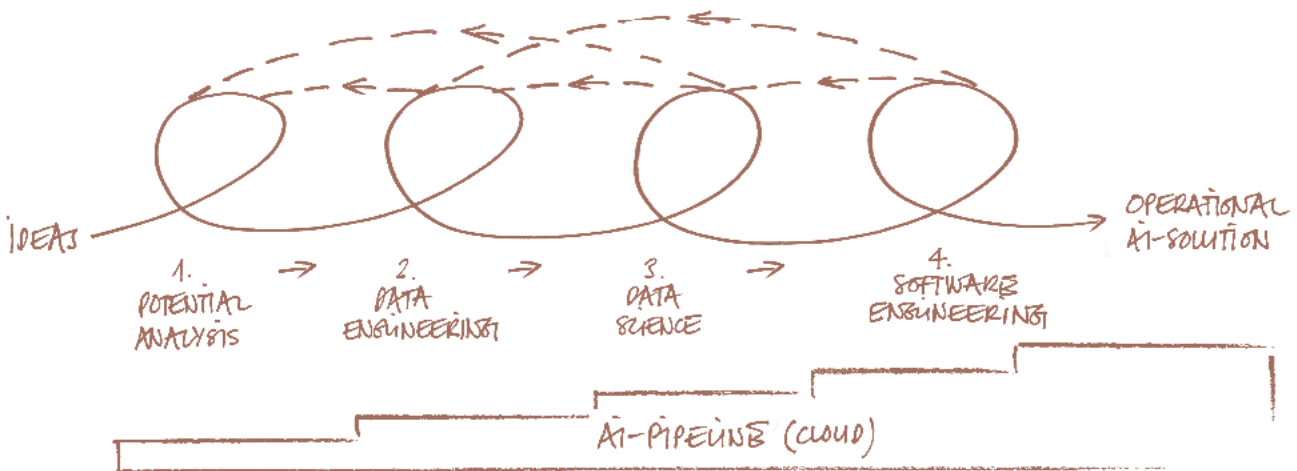
4. *Software engineering*

The final step is to transpose the successful AI algorithms from the data science stage into a scalable and robust solution. Given that there will be no shortage of productive data, further fine-tuning and loop-backs to earlier stages may take place. Here is where it pays off for the company to have chosen a suitable, scalable AI pipeline from the get-go, so it can be highly agile in hopping back and forth between the individual stages.

The journey can begin

Practically every company can benefit from applying AI to its business activities. Although applied AI can be brought online speedily and efficiently, while promising only narrowly focused benefits, truly transformative value can be generated with custom AI. Firms with a claim to market leadership in their sector, in particular, can cement and enhance their position with custom AI solutions.

When it comes to choosing a path, companies should opt for an approach that enables speedy and cost-effective potential analysis as well as direct and systematic data engineering and data science – potentially to be followed by the professional and secure implementation of a productive AI solution. With the “data science in the cloud” approaches now available, there are generally accessible, low-threshold and yet sustainable entry points for a successful start to a custom AI journey.



Applied AI

Summary and applications

Image recognition, text analysis, translation, sentiment analysis and speech recognition – the big cloud service providers, such as Google, Microsoft and Amazon, generally offer everything as one-stop shops, benefiting from the vast amounts of data generated in and around cloud-related business. Smaller providers such as DeepL should also be considered for specialist applications such as the translation of technical articles, however. Development and use of applied AI services in productive operations has become very easy via clearly defined interfaces, known as APIs.

Custom AI

Data and software engineering – getting it right from the start

Identifying the correct technological foundation for data capture, management and analysis is key to any successful AI project. As a first step, a data pipeline must be laid to a central data lake and attention must be paid during “ingestion” that the data is properly processed – for example, the timestamps are cleaned up and faulty data is rejected.

Once the data has been collected, machine learning (ML), such as neural networks, can be used to create what are known as “models”. These are functions that generate a particular output from a given input, such as returning a “faulty” reading from collated measurement data. The parameters of the function, in such cases, are learnt autonomously by the machine, using a large volume of predefined input/output pairs.

Like all other software, AI models have to be developed and further versions created. The ML algorithms are constantly being put through their paces with new data, even after the first models have been signed off for production, so that the models can be continuously refined. As the creation and use of new models, in particular, need to be very highly scalable, implementation on a public cloud is almost a prerequisite for an economically viable and successful AI project.



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