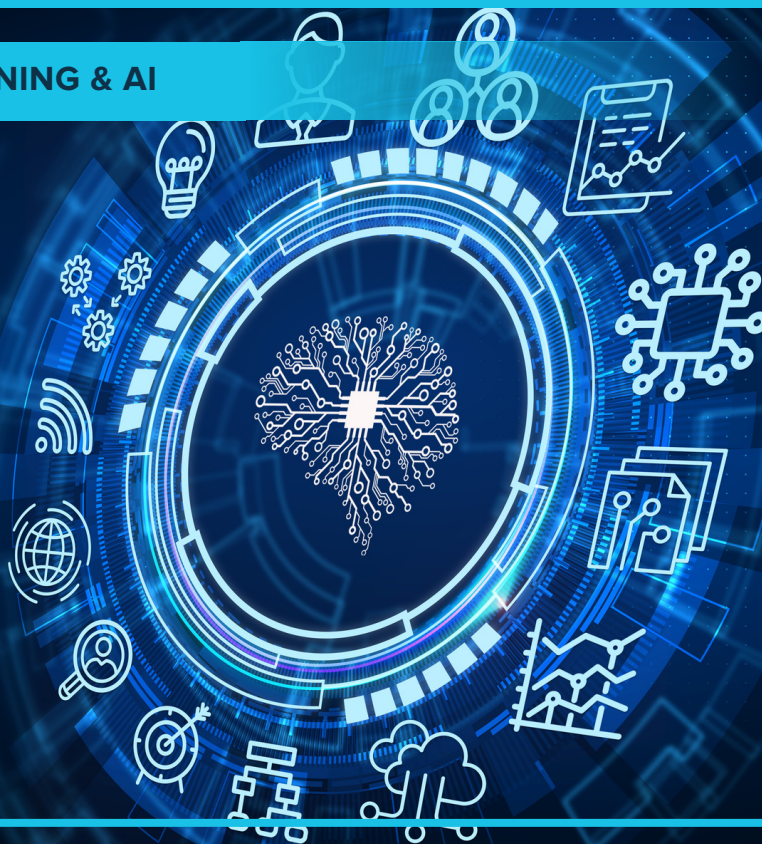


# MAKING YOUR MACHINE LEARNING MODELS SCALE: WHY GETTING TO PRODUCTION IS HARDER THAN IT LOOKS

MACHINE LEARNING & AI



In 2020, Gartner found just 53% of AI prototypes made it into production. And when McKinsey surveyed companies a year later, only 15% had successfully scaled ML-based automation projects across multiple parts of their enterprise.

## WHAT'S GOING ON?

CIOs and IT leaders lack the tools and expertise to create and precisely manage this new pipeline. And it's therefore become the worst kept secret that artificial intelligence (AI) and machine learning (ML) projects continue to have a high failure rate in production.

For clarification, please note both AI and ML can be considered umbrella terms that have been hijacked by sales and marketing, to a degree — which means it's especially important to work with a partner who won't "AI-wash" you (i.e., DON'T work with a company whose offering's actual connection to AI is very minimal, despite more prominent claims).

ML actually refers to a specific set of techniques that build systems capable of learning — instead of being explicitly programmed. Applications of these techniques range from natural language processing (NLP), from which many search and predictive text applications arise, to computer vision, featuring streams of images enabling facial recognition and autonomous vehicle applications, among many, many others.



## TECHNICAL SKILLS ALONE AREN'T ENOUGH

It's tempting to think that so long as you can find data scientists and engineers with a strong base in Python and R, and experience with packages such as NumPy, TensorFlow and PyTorch, along with Apache Spark, then that is all you need. Yet the Gartner and McKinsey statistics show technical implementation in designing AI/ML algorithms alone is not enough.

Understanding business needs alongside the ML objectives is frequently where misalignment can occur.

Sometimes, technical brilliance and business needs are simply not compatible. Netflix famously awarded a \$1 million prize to a developer team for an algorithm that made its recommendation engine 10% better — **but never productionized it** because the engineering costs were too high.

Yet if there is an issue causing an ML project to fail, there are a few potential reasons, such as a problem with training data or model fit, or too narrow a scope. The overriding sentiment is:



**PRODUCTIONIZING  
MACHINE LEARNING  
MODELS IS REALLY HARD.**

Maintaining model accuracy and data quality over time is key, as well as setting up a repeatable development process.

## AI AND ML MADE EASY

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The good news is through the likes of AutoML (automated machine learning) and MLOps (machine learning operations), there are some ways life can be made easier. The former provides processes to machine learning that are more accessible to non-experts. The latter is a paradigm that aims to deploy and maintain machine learning models in production reliably and efficiently. Working with a trusted technology solutions partner such as [GAP](#) can help ensure your MLOps is managed correctly, as well as making sure your data is a match-fit for AI.

For productionizing an ML project, the technical lead therefore has one of two options open to them, depending on the infrastructure and business needs. They can either do everything in a single Python or R environment, or use it as an orchestrator between different services, meaning specialized services are used in different parts of the process.



**GAP HELPS  
CUSTOMERS WITH ML  
INITIATIVES TO SCALE**

To give an example of a typical stack, for the latter, a current [GAP](#) project with an Arkansas-based database marketing company has a Python environment as the orchestrator. The assets are generated and uploaded, and the training is done in Azure Machine Learning, [which is integrated with H2O.ai](#) to enable the building of models with AutoML and productionizes it.

Another project GAP worked on for that same client shows how a greater maturity, both in terms of the client's outlook and GAP's understanding of their needs, enabled more value to come from the eventual solution. For the first build, the client's business need was to make specific models using the data provider's secure environments to do development.

Both the quality of the data and the limited access to development resources and tools — just a Jupyter notebook environment connected to AWS Athena — had the client dissatisfied. And while GAP was able to build several hundred models (as GAP designed, implemented, maintained and executed the entire process), the opportunities to evolve the product were scarce. This led to the second version of the product.

Here GAP's client purchased the data instead of partnering with a provider, which gave GAP the flexibility to design and implement the entire process without external restrictions. This, along with the maturity of the project and new understanding of it, led to a much more sophisticated, capable and coordinated tool that leverages more cutting-edge technologies like Snowflake and H2O AutoML.

The result was productionization. On this second development, the client set up a proprietary data processing platform that included a machine learning module. GAP was tasked with building a general-purpose Python client for that proprietary internal platform, and then set up and automated the entire healthcare model building process.



The client had developed a machine learning service that was a GUI (graphical user interface) — and the solution was to build a Python client to interact with the API of the proprietary client service. The API was built in order to make commands as easy as possible for the end user. So don't be one of those companies who can't get their ML initiatives to scale.

Working with GAP's pool of data scientists and engineering talent can help generate products and systems that create long-lasting value in a rapidly-moving ecosystem — and lower the lifetime cost of AI/ML in the process.

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