ZAM meets AI: KI erfolgreich und wertschöpfend im Maschinenbau einsetzen

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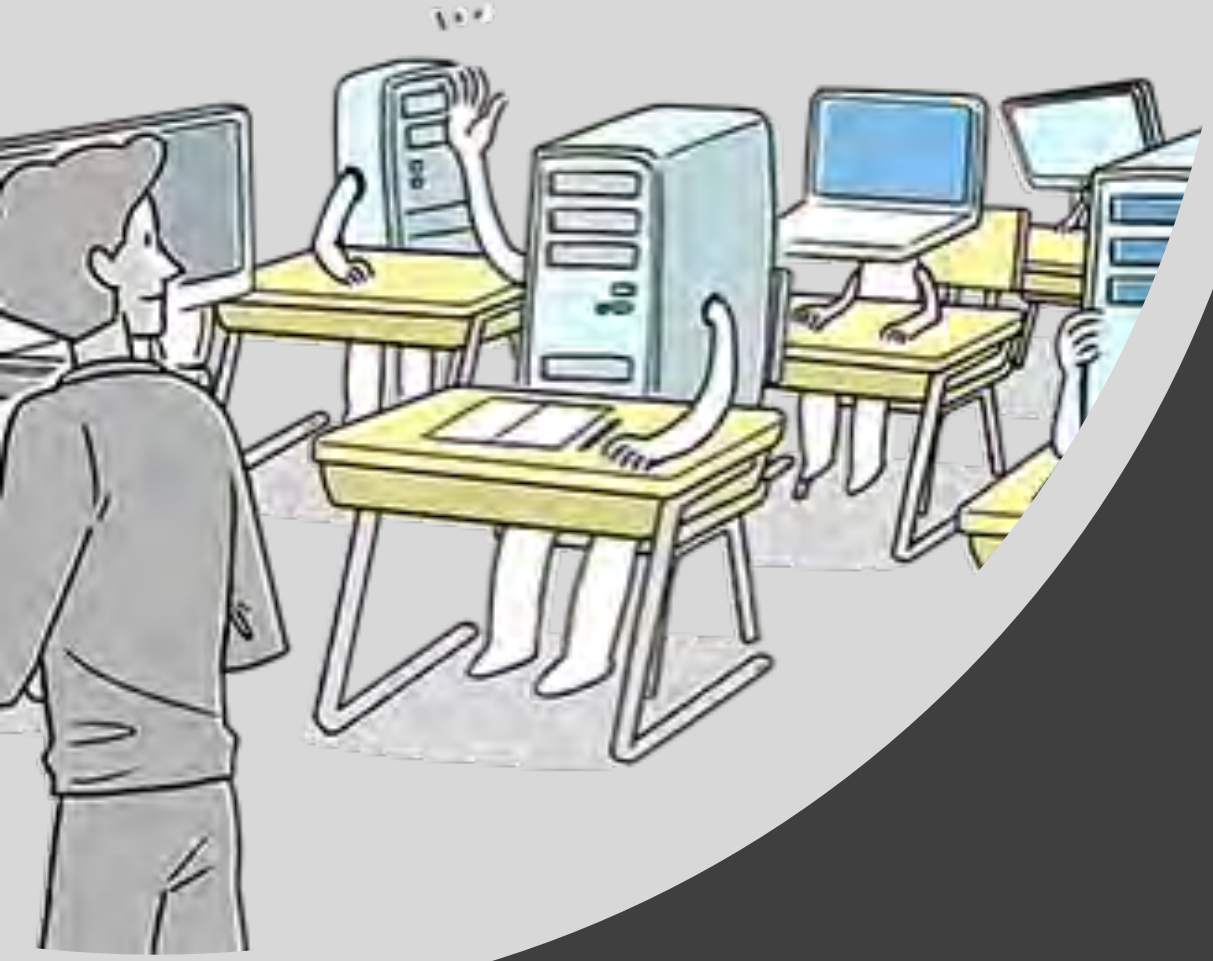
Motivation: Artificial Intelligence allows to automate manual decision making

What is artificial intelligence?

"AI is the science of knowing what to do when you don't know what to do.“ (Peter Norvig)

(https://www.youtube.com/watch?v=rtmQ3xlt-4A)



What is machine learning?

Machine learning is the field of study that gives computers the **ability to learn** without being *explicitly* programmed.

Everyday examples of AI

- Optical character recognition (OCR): scans, letters, etc.
- Face recognition
- Spam filtering
- Credit card fraud check
- Recommender systems
- High-frequency trading

Current situation

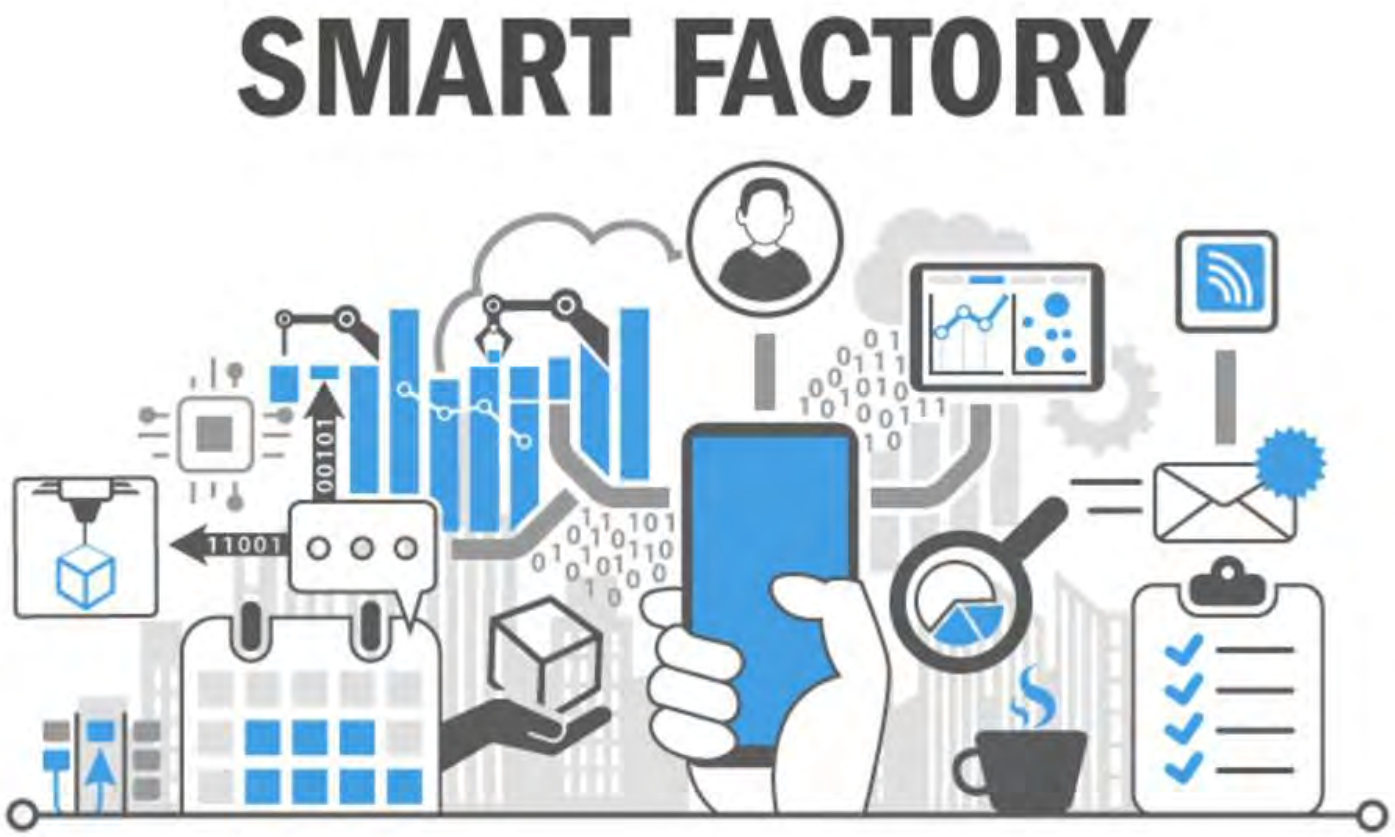
Tech Companies

Vacuum for Digitalization

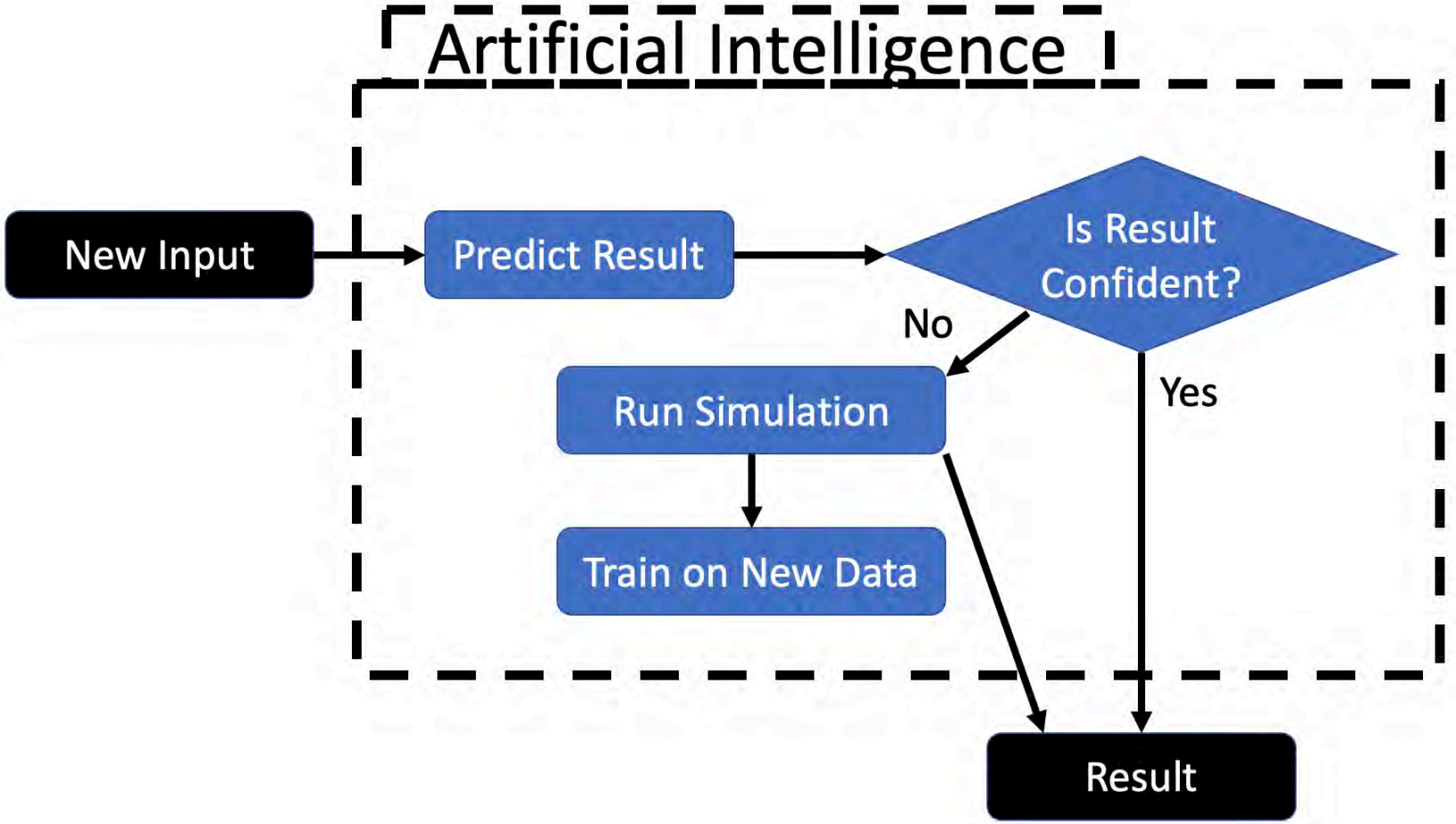
Manufacturers

AI in mechanical engineering?

Goal



Example use case: reduce the number of simulation runs



Artificial Intelligence opportunities in a company

KPIs

Value chain

Products

When you should look into Artificial Intelligence

Why should you invest NOW?

INNOVATION
China has turned from a manufacturer into an innovator

2016

"60% of Data Science projects fail"

-Gartner

2017

"Fail rate on Data Science projects is closer to 85%"

-Gartner

2019

"87% of Data Science & Machine Learning efforts fail and never impact business."

-VentureBeat

Why most AI Projects Fail

Searching problems for AI

Inadequate organizational structures

Domain experts are not included

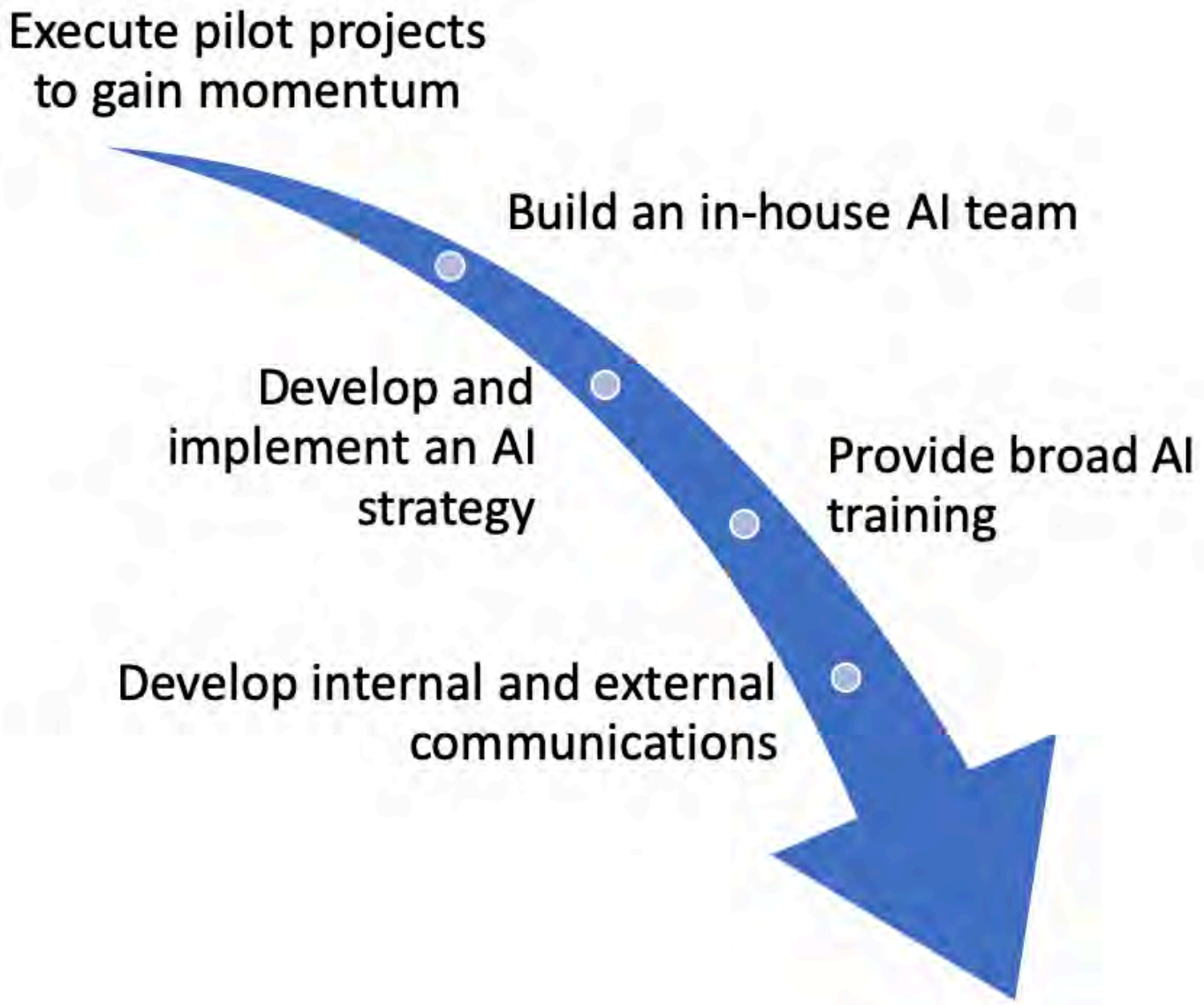
Excessive use of Deep Learning

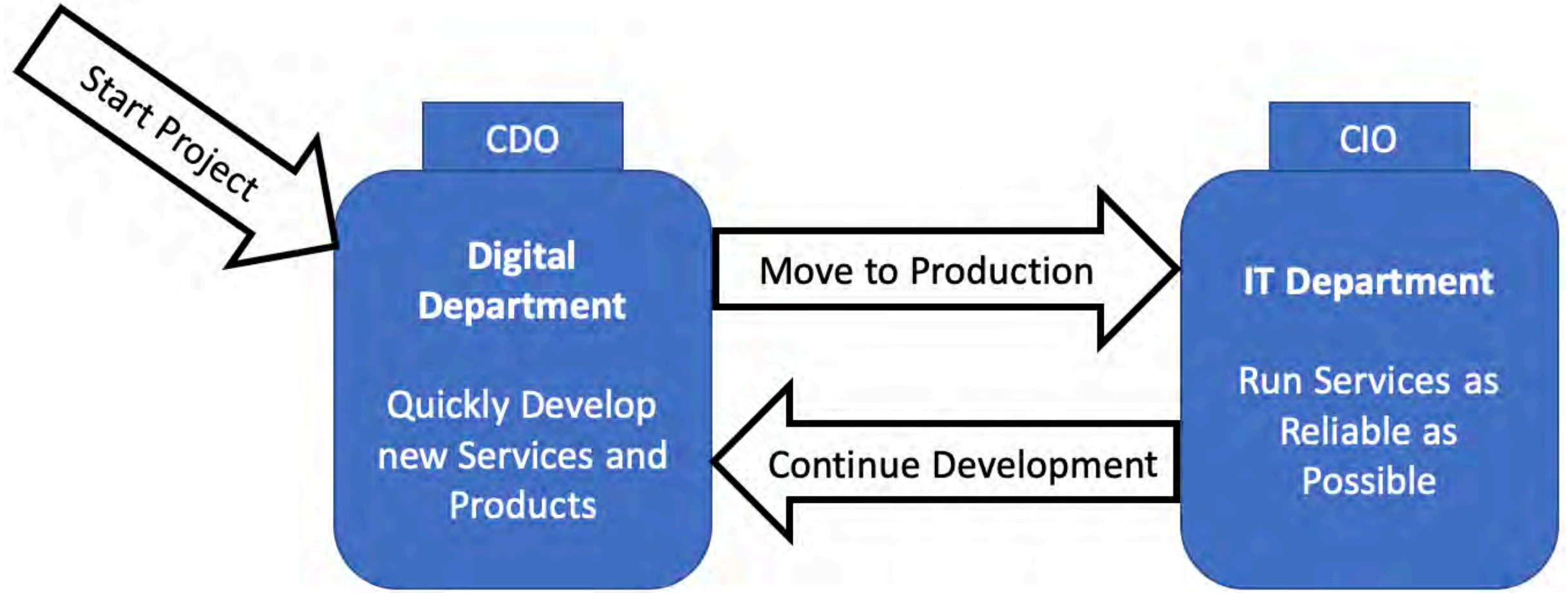
Table 1 Proportional time investment of a machine learning project.

Step	Books and Courses	Reality
Defining KPIs	Small	Large
Collecting Data	Small	Large
Exploratory Data Analysis	Small	Large
Building Infrastructure	Small	Large
Optimizing ML Algorithms	Large	Medium
Integration	Small	Large

Why do >80% of AI projects never make it into production?

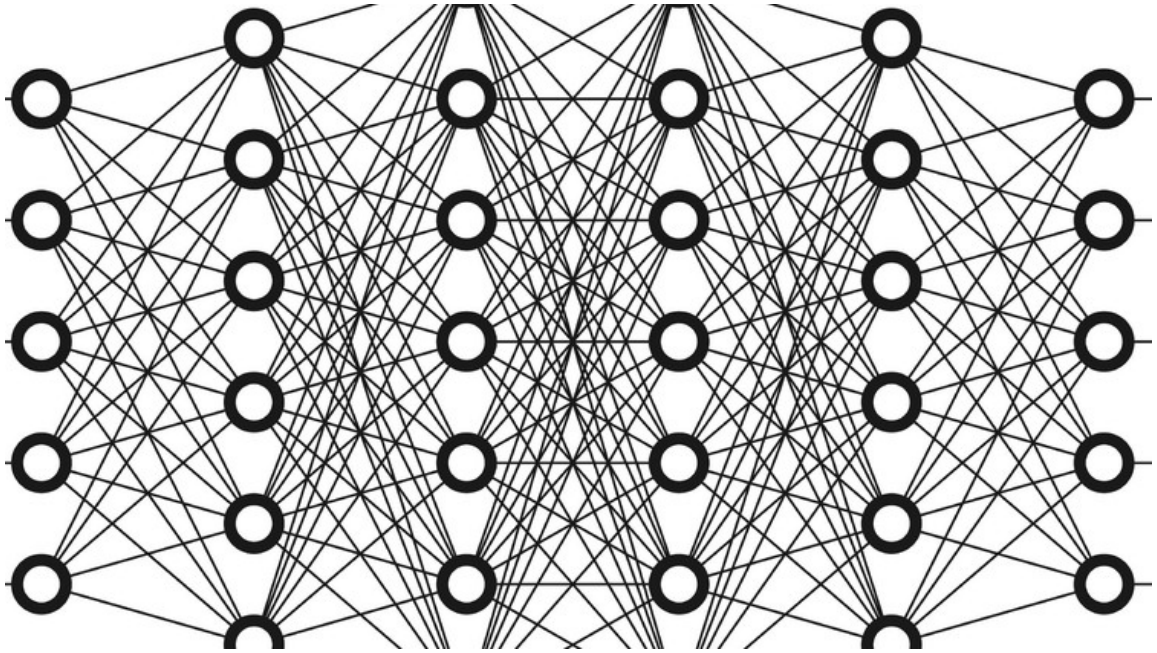
Steps of a successful AI transformation

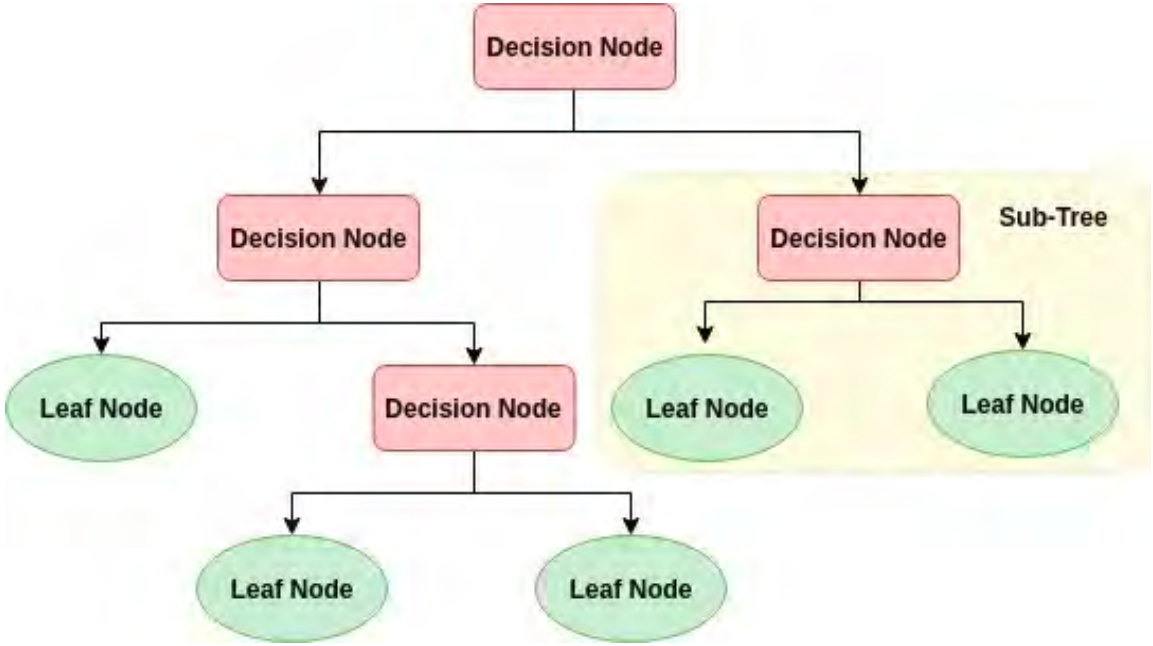




Hire a Chief Digital Officer (CDO)

Deep Learning is not a silver bullet





```
>>> import autosklearn.classification
>>> import sklearn.model_selection
>>> import sklearn.datasets
>>> import sklearn.metrics
>>> X, y = sklearn.datasets.load_digits(return_X_y=True)
>>> X_train, X_test, y_train, y_test = \
        sklearn.model_selection.train_test_split(X, y, random_state=1)
>>> automl = autosklearn.classification.AutoSklearnClassifier()
>>> automl.fit(X_train, y_train)
>>> y_hat = automl.predict(X_test)
>>> print("Accuracy score", sklearn.metrics.accuracy_score(y_test, y_hat))
```

Use automated machine learning (AutoML)

Learn more in my new book!

Available at: http://springer.com/book/9783030413088

Digitalization in Mechanical Engineering

Michael Thurner and Patrick Glauner

Abstract

A high level of industrial automation of repetitive tasks allows companies to efficiently produce products at large scale. Digitalization is the subsequent step of industrial automation and aims to further reduce costs and waiting times. Digitalization also aims to automate individual decision making. Key to both goals is to transform business processes from the analog to the digital world and then to analyze and thus to take advantage of digitized information. In this chapter, we provide an intuitive introduction to digitalization in mechanical engineering. We then present various business opportunities and discuss the related challenges. Next, we propose how mechanical engineering companies need to align their mindset with the digital transformation. Last, we present some of our works on digitalization in mechanical engineering and share a number of best practices. As an outcome, you will be able to employ digitalization in order to create real value in your business. That increase of efficiency will allow you to remain competitive in an environment that keeps becoming more and more competitive.

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