

cloudflight

Consultant's Day

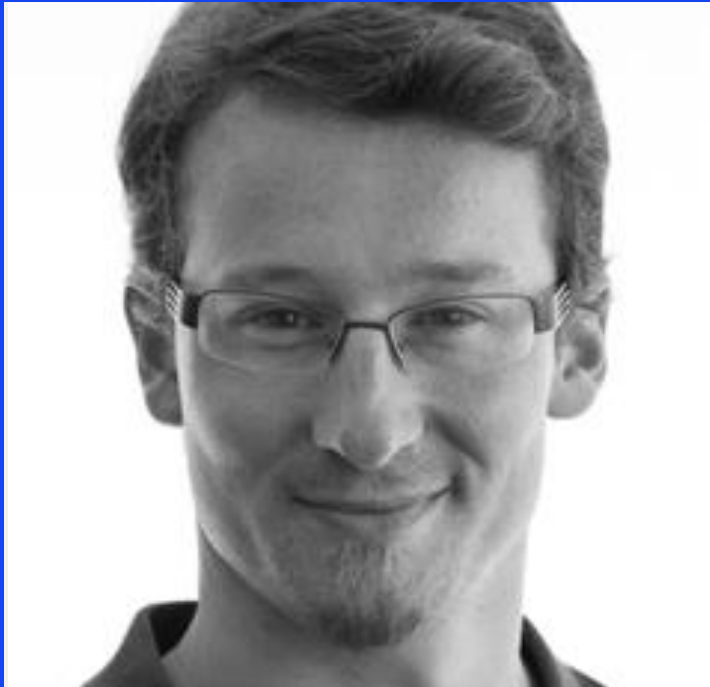
Künstliche Intelligenz wird praktikabel

Praxisbeispiele aus der Beraterbranche, Dienstleistungs- und Industriebetrieben

Design Center Linz, 29.06.2022

Bernhard Niedermayer

Your Speaker



Dr. Bernhard Niedermayer

Head of Emerging Technologies
bernhard.niedermayer@cloudflight.io

15 years in AI and Machine Learning

Built up business segment around Emerging Technologies

Delivered numerous AI solutions from PoC to large enterprise systems

Cloudflight evaluated as one of the Top-5 suppliers of industrial Machine Learning solutions

Who we are?

Cloudflight empowering digital transformation

+950

talented professionals to help
companies to shape their digital
future

+1.000

successful software
projects

18

locations in 5 countries across Europe

+20

years of digitalization experience



High commitment
to Quality



Various awards as an employer,
for technology and design



Your full-service provider for end-to-end industrial
digital transformation – from consulting to
development to operations

Why does Artificial Intelligence (AI) matter?



AI does not only have the potential to **optimize process** but to disrupt entire industries



It is a **base technology** continuously enabling more and more innovations



Mastering AI can become a **competitive edge** for your business

But: Continuous monitoring and keeping up with current developments as well as certain technical as well as organizational requirements are often key challenges for companies in their digital transformation.



Therefore, skilled consultants are required to **steer enterprises towards their digitalization goals.**

How you can benefit from AI experience



Technology screening

Stay up-to-date with the latest AI technologies. Actively invest into those that show high potential.



Get inspired

Show what cutting edge technologies are capable to your stakeholders. Use PoCs, show cases, or references.



Potential Value

Comprehend your situation and see how your business can benefit from new technologies.



Proto-typing

Prototype to verify as soon as possible that you indeed benefit from the planned innovation.



Production Readiness / Scaling

Finally, integrate AI technologies into your IT land-scape and scale it up to your demands.

AI solutions are integral components in various business models



Computer vision (CV)

decisively optimizes processes, such as quality assurance



Natural language processing (NLP)

converts unstructured text information into structured data, accelerating document processing intelligently in your company



Reinforcement learning

optimizes traffic lights as well as automates the bidding process for display advertising – and much more in between



Times series analytics

investigate the influence of temporal variables (e.g. outdoor temperatures) on industry 4.0 production



Explainable AI

based on shared ontological models provides transparent, meaningful rationale in highly regulated industries

AI Platforms and commoditization



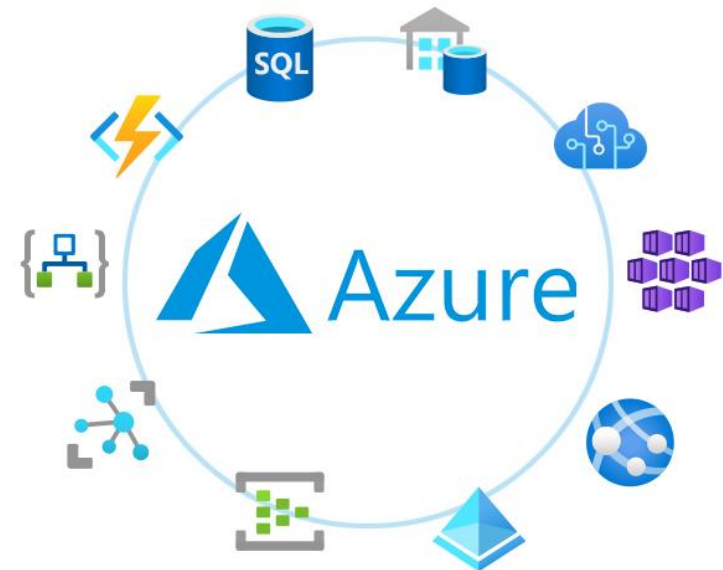
Public Cloud



Google Cloud Platform



Grafik-Quelle: allcode.com

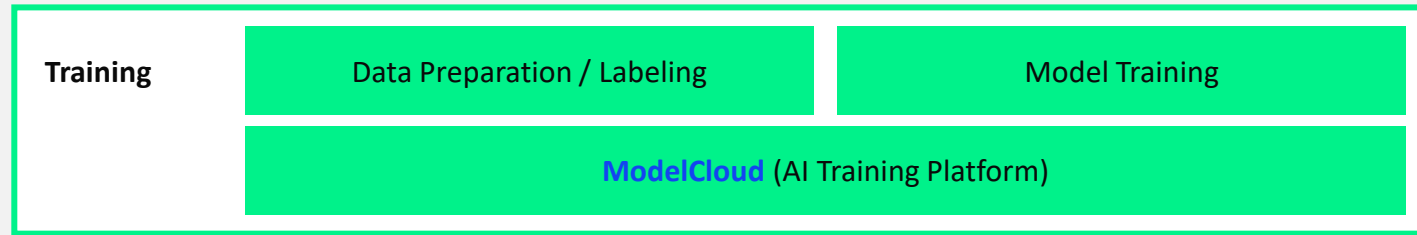


Grafik-Quelle: greatstep.se

Proprietary: ModelCloud

The Software Platform for AI Model Development

Developed by Cloudflight, the **ModelCloud** software platform provides a fully integrated machine learning workflow system for data scientists, software developers, and professionals.



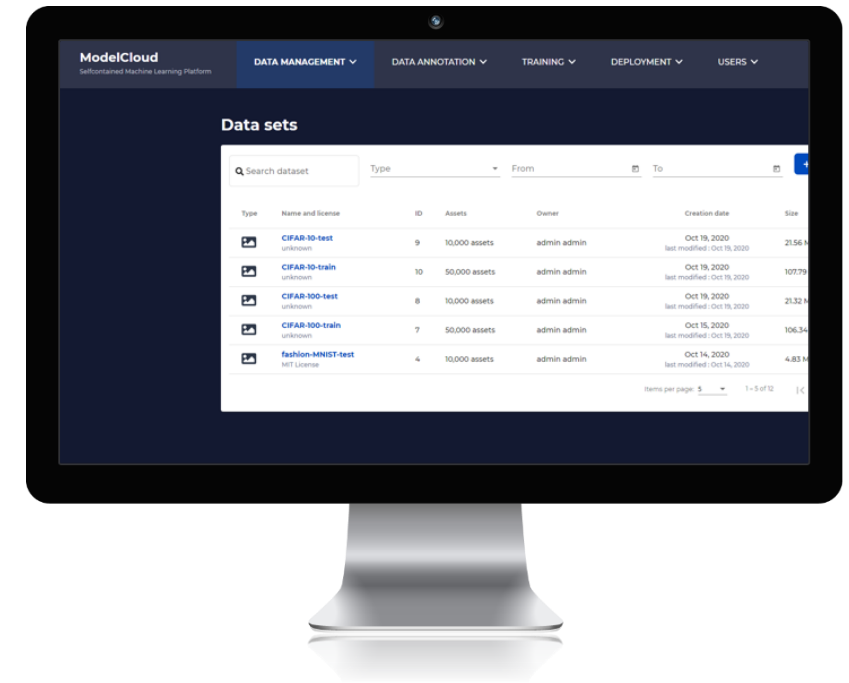
Core functions:

Annotation service: accelerated and team-distributable annotation service to enable fast, straightforward training of AI models.

Cloud-based or on-premise: Operation of the AI platform as a service in the cloud or as individual hosting in your own data center.

User rights management: Since potentially sensitive data is involved, individual user rights management is possible.

Train-Test-Improve-Repeat: With ModelCloud, AI models can be trained, tested, and optimized quickly and easily.



Live-Demos of pre-trained AI Models at modelfly.io

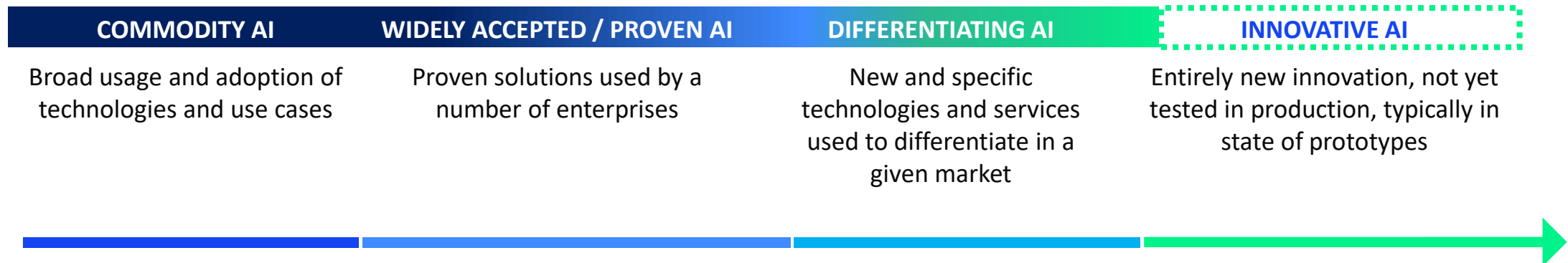
Benefits of AI becoming commodity

...and its challenges

- ✓ Easy to adopt
- ✓ Affordable
- No competitive advantage

- Complex, but specific
- (Very) Expensive
- Unclear Business Value

- Complex / not proven
- Potentially expensive
- ✓ High Business Value / ROI



Benefits of AI becoming commodity

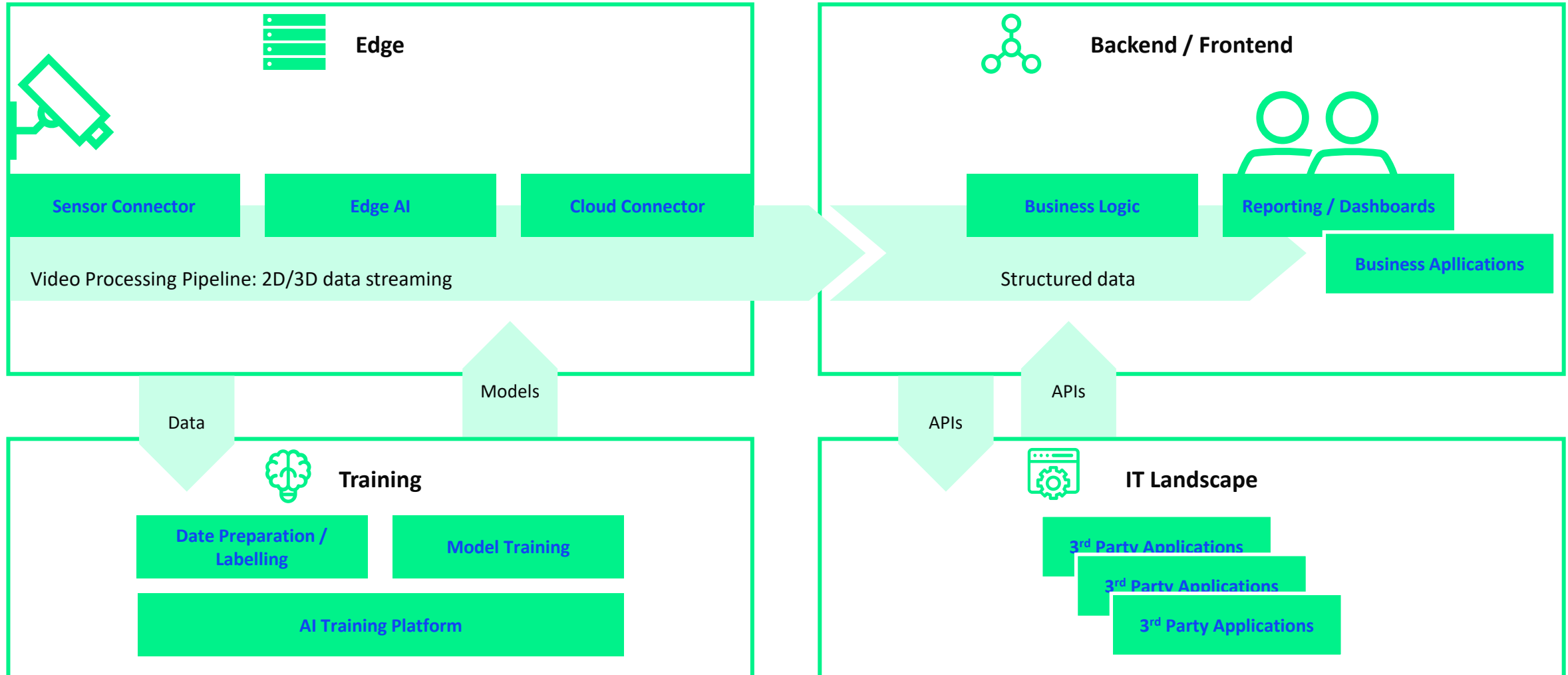
...and its challenges

- AI projects need to be conducted programmatically, but agile and flexible
- Enterprises will use and adopt standards
- At the same time, they will target competitive advantages on the process- as well as product level
- Consortia will arise, pushing AI projects and platforms together
- AI projects are conducted in “Co-Creation” to ensure technical success and business value at the same time
- AI is finally becoming part of the digital tech stack of enterprises

Applications – Computer Vision



Video Processing Architecture



Computer-aided quality assurance (QA) in production process and control automation

Challenge

Surface imperfections will most likely result in customer dissatisfaction. Foreign objects can even create serious damage to any machine.

Avoiding damages requires extensive quality assurance. Manual inspection is a repetitive task that requires a high focus. And it comes with high costs.

Idea

To perform such QA tasks, apply **Computer Vision** methods.

Look at images showing flawless manufactured items as well as at images of different types of defects.

For foreign object detection, identify unexpected objects in the production line to avoid damage to machines.

Solution

Read in pixel data and compute a decision if the content meets the acceptance criteria or not.

Several tools are supporting this process, from annotating test and training data, to managing Machine Learning pipelines including evaluation and hyper parameter optimization. In the end, optimize the learned models for efficient use in production.



< 1 year

ROI

50-100k

Euro PoC



Detection Cases



Solutions: Natural Language Processing

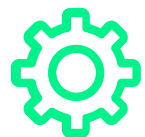
Intelligent Document Processing



Time savings for repetitive manual tasks through automation



Improved **customer service** through reduced backlog and shorter waiting times



Increased **efficiency of processes** by eliminating media discontinuities (analog/digital)



Increase of the **possible processing rate** in document processing

Smart document processing reduces and accelerates monotonous workflows

Challenge

Previously, Austrian health insurance companies had to process reimbursements to privately insured **persons manually in repetitive steps**. With cases increasing by 8% annually, a growing backlog had built up.

Idea

Using a target-oriented combination of **AI, Computer Vision, Automated Data Processing and Natural Language Processing**, the time-consuming manual capture of paper invoices is partially automated and integrated into the existing software landscape.

Solution

Thanks to the highly scalable system for processing these large amounts of data, the employees only have to check and confirm the results in a user-friendly web interface.



8%

more invoices per year
are processed

90%

time saved per case
during data entry

1.000

cases processed
per day

Fall 61366156

1 Dokument Bearbeiter: (nicht zugewiesen)

VERMERKE

Behandler

Senden	Name	VPNR	Fachgebiet	Fachgebiet Name	Adresse
<input checked="" type="checkbox"/>	██████ Moser	4████7	1	Allgemeinmedizin	4040 Linz

Patienten

Senden	VSNR	Name	Adresse
<input checked="" type="checkbox"/>	██████2512	Katrin Strasser	4040 Linz

Leistungen

Senden	Code	Leistung	Anzahl	Behandlung von	Behandlung bis
<input checked="" type="checkbox"/>	7300	Grundleistungsvergütung 2/5	1	27.11.2018	27.11.2018
<input checked="" type="checkbox"/>	10A	Ausführliche therapeutische Aussprache	1	27.11.2018	27.11.2018

Diagnosen

Senden	Code	Diagnose
<input checked="" type="checkbox"/>	J31.0	Chronische Rhinitis

Rechnungsbeträge

Senden	Rechnungsbetrag	Währung	Rechnungsbetrag EUR	Bezahlt
<input checked="" type="checkbox"/>	75,00	EUR	75,00	nicht bezahlt

Einstellungen

Behandler | Behandler
1 / 1

Dr. med. █████ Moser
Arzt für Allgemeinmedizin

██████straße 11
4040 Linz

T: 01234-56789
www.dr-a-huber.com

Abs: Dr. med. █████ Moser, █████ Straße, 4040 Linz

Katrin Strasser
Straße 1
4040 Linz

Patientenname: Katrin Strasser
Geburtsdatum: 25.12.██████
Versicherungsnr: █████ 2512

Honorarnote

Ich erlaube mir, folgende von mir erbrachte Leistungen in Rechnung zu stellen:

Datum	Pos.Nr	Leistung	Betrag
27.11.2018	P50	Erste Ordination	25,00
27.11.2018	10A	Ausführliche diagn.-therap. Aussprache	50,00

Rechnungsnummer: 165218 Rechnungsbetrag: 75,00€

Diagnose: Schnupfen

Invoice Processing

Extracting custom structured information from images or pdf-documents.

- Recognize information such as invoice lines, due dates, and bank account numbers.
- Check plausibility
- Trigger actions



Output:

Machine readable text
Document type
Structured entities

6. Verification and handover

5. Unification

4. Post-Processing

3. Named Entity Recognition

2. Optical Character Recognition (OCR)

1. Preprocessing

0. Paper

Input:

Scan, Image, Text

Visualization of corporate knowledge for R&D powerhouse

Challenge

Businesses are increasingly unable to rely on legacy systems to manage and store vital corporate knowledge and expertise. Traditional solutions often failed to provide a clear **overview of the available knowledge and skills within the organization.**

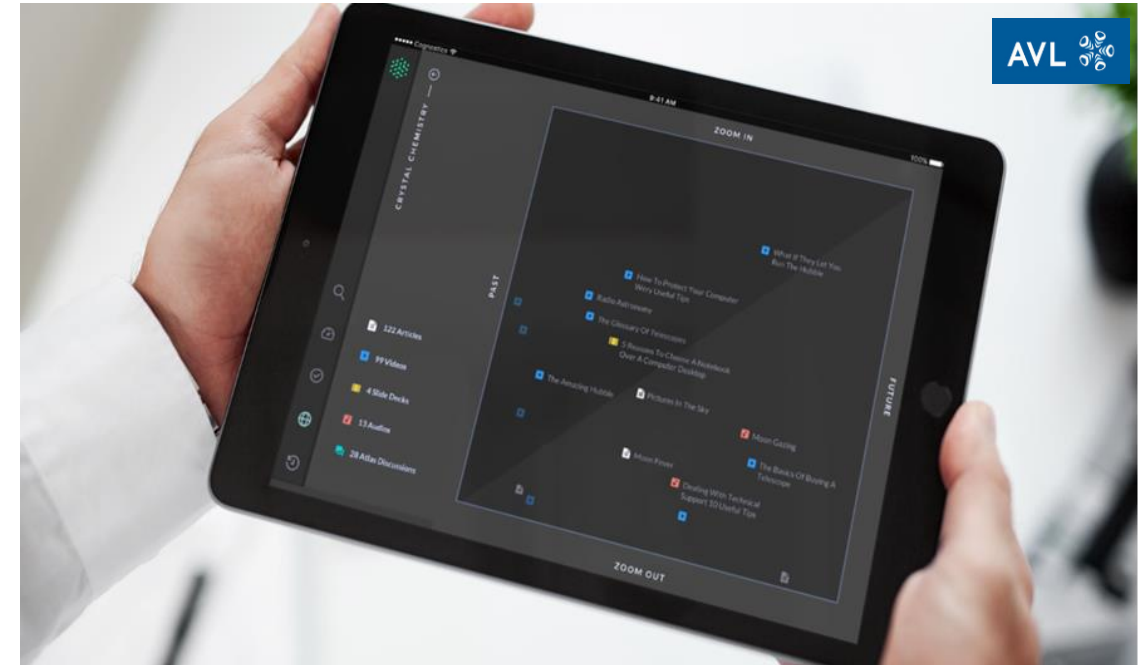
Idea

Unifying all company data from the corporate file storages into a single **navigable knowledge graph using natural language processing and machine learning:**

- Extraction of key concepts from otherwise unstructured documents such as Word and PowerPoint files
- Visualization in an immersive 3D space to encourage exploration and fascination.

Solution

Dynamically visualize the entirety of their corporate knowledge space. Employees can plot individual learning pathways through the corporate knowledge space and familiarize themselves with new technologies. Corporate leadership can compare the knowledge graph to the overall industry development allowing them to detect corporate blind spots.



>10tb

unstructured data unified in one knowledge graph



Solutions: Recommendation

AI-supported goal achievement

Challenge

In 2019, 86% of all deaths within the EU were attributable to non-communicable chronic diseases such as diabetes, cardio-vascular disease, cancer and chronic respiratory diseases. Lifestyle changes could prevent or delay the onset of these diseases significantly, yet conventional prevention efforts have so far failed to **reach some of the most at-risk populations.**

Idea

Bringing together an interdisciplinary team of psychologists, designers, AI specialists and developers to create a sophisticated psychological model that induces rather than presupposes a **positive motivational posture.**

Solution

As a **daily companion** to the user, a mobile application adapts stimuli over time to support and challenge users to become aware of and change harmful habits.



87%

of Beta-Testers felt supported in finding their goals

3

years of close cooperation

3

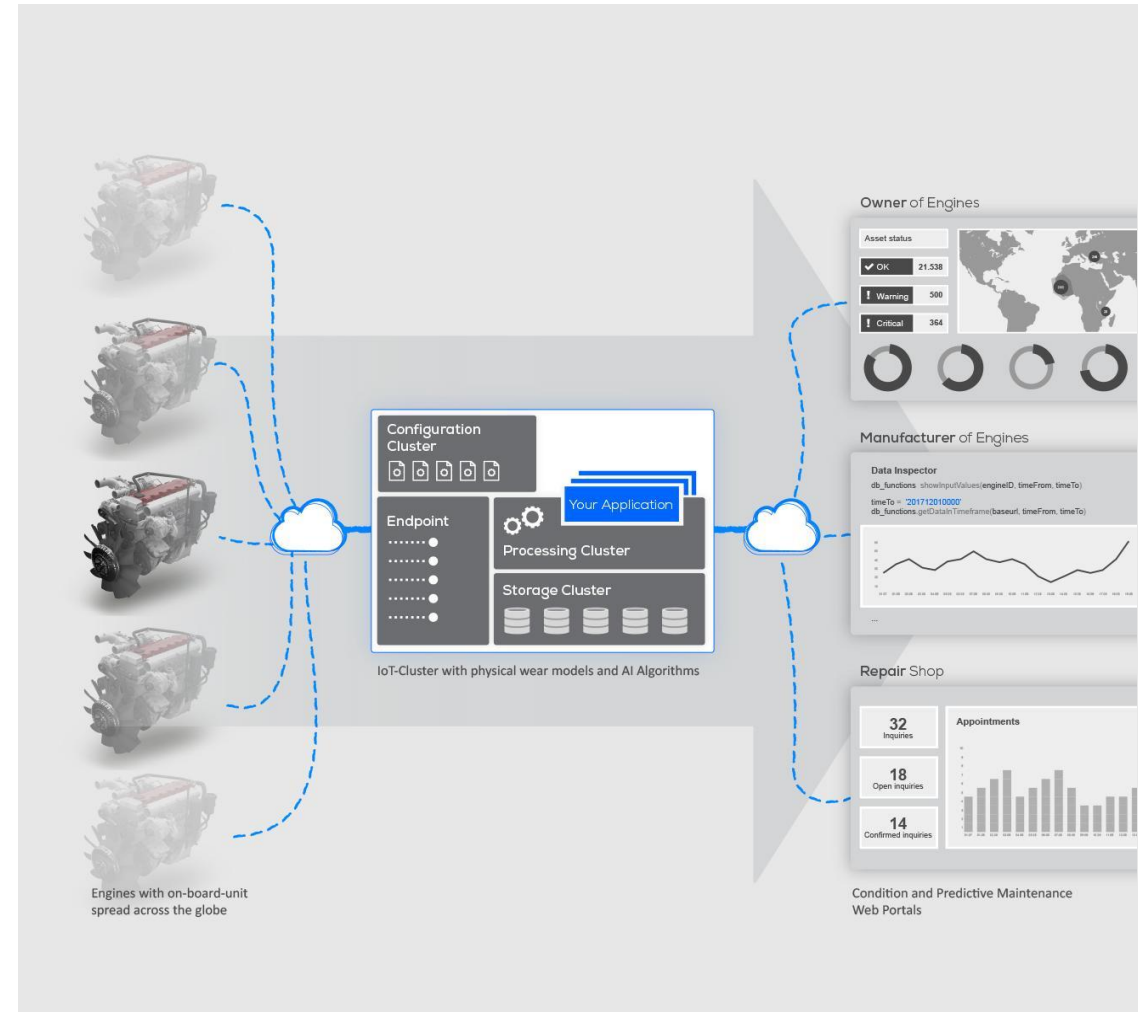
follow-on projects

Solutions: Industry 4.0

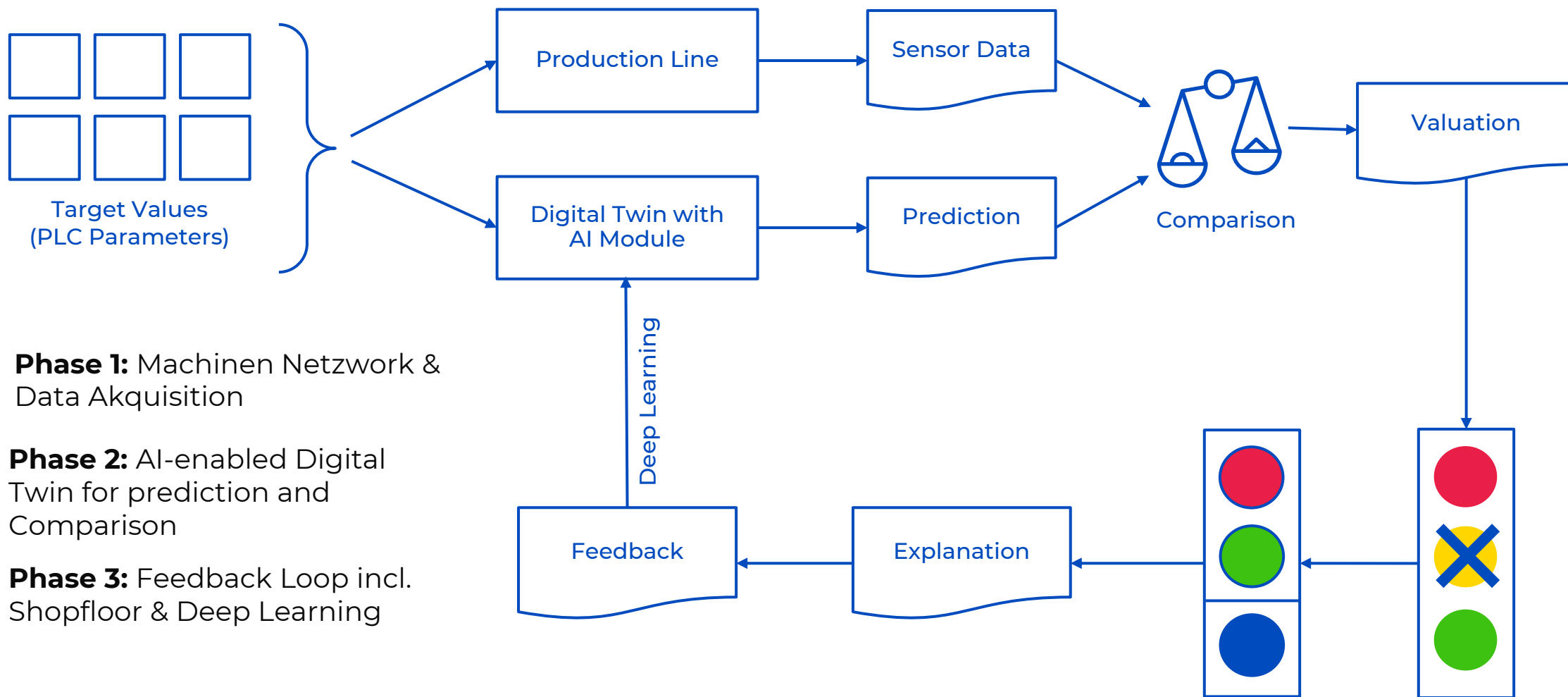


Predictive Maintenance & Condition Monitoring

Challenge	For intelligent automation, complex systems and processes must learn to adapt to various situations in addition to following a limited set of deterministic rules, which would be sufficient for mechanic automation.
Idea	Successful predictive maintenance means to find the sweet spot between avoiding wear-related damages or risks and avoiding the costs of overly frequent maintenance. It is technically built upon time series analytics and forecasting.
Solution	The current wear of some parts is directly observed from near real-time data. Examples are the relation between certain pressures and speeds within a machine. If, at the same applied pressure (and a temperature), the speed of a compactor machine increases or decreases over time, this is a good indicator.



Digital Twin in Industry 4.0



Phase 1: Maschinen Netzwerk & Data Akquisition

Phase 2: AI-enabled Digital Twin for prediction and Comparison

Phase 3: Feedback Loop incl. Shopfloor & Deep Learning

Targeted Quality Assurance

for increased efficiency

Laboratory tests

Traditional:

Periodic or random samples.

Geringe Fehlerhäufigkeit ⇒
Viele Prüfungen.

AI supported:

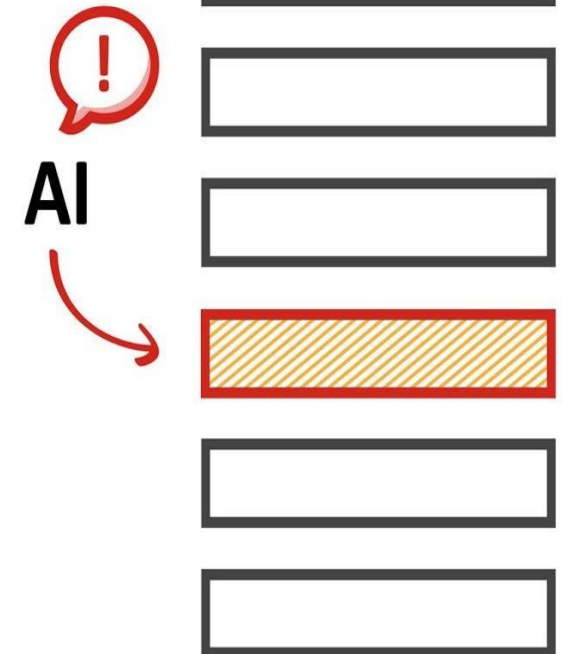
Anomaly-Detection based. Allows for
targeted sampling.

Higher hit rate at lower test
rate

Periodisch:



Zielgerichtete Prüfung:



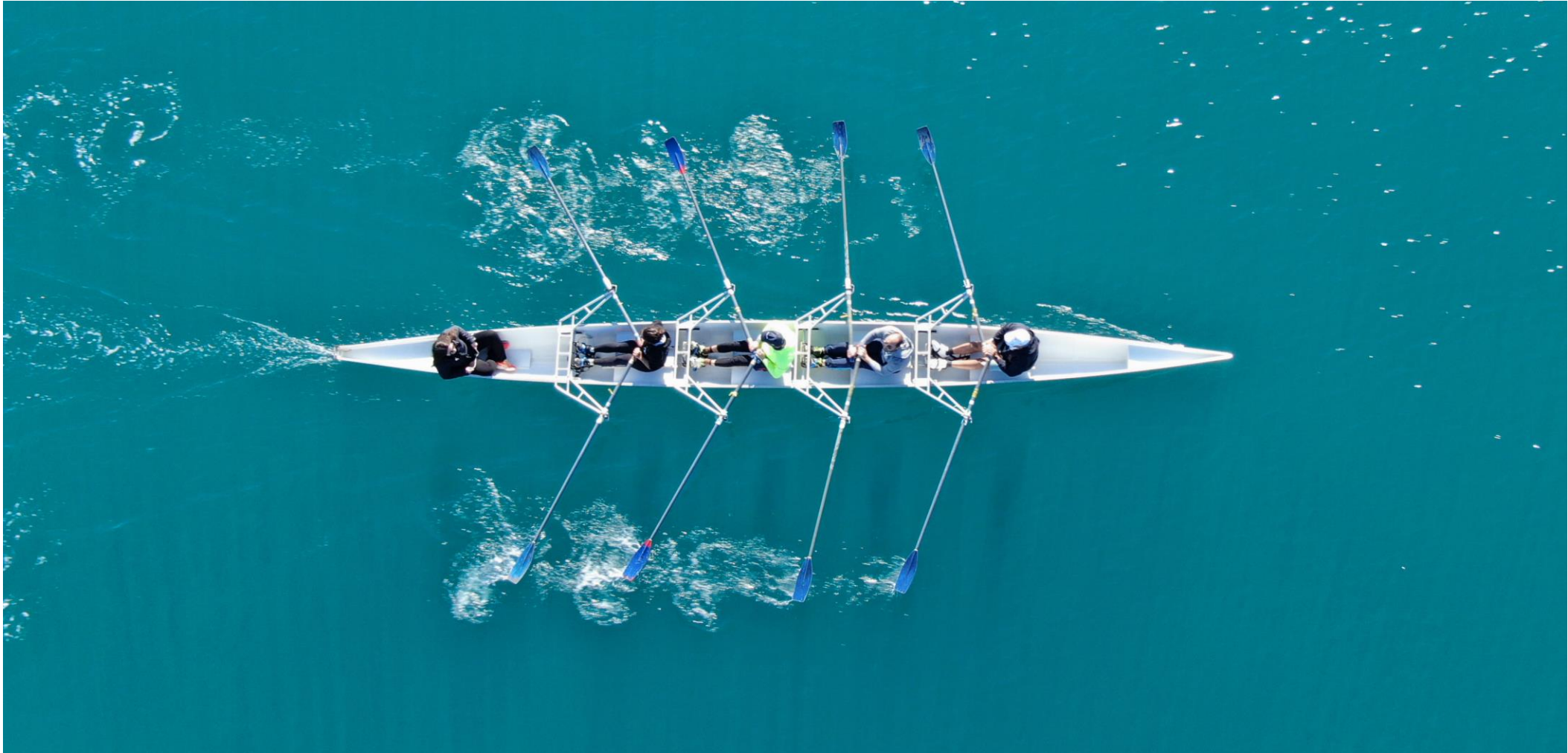


Success factors for AI projects

Set budgets and expectations right



Have the right team



Have good data



Be aware of bias

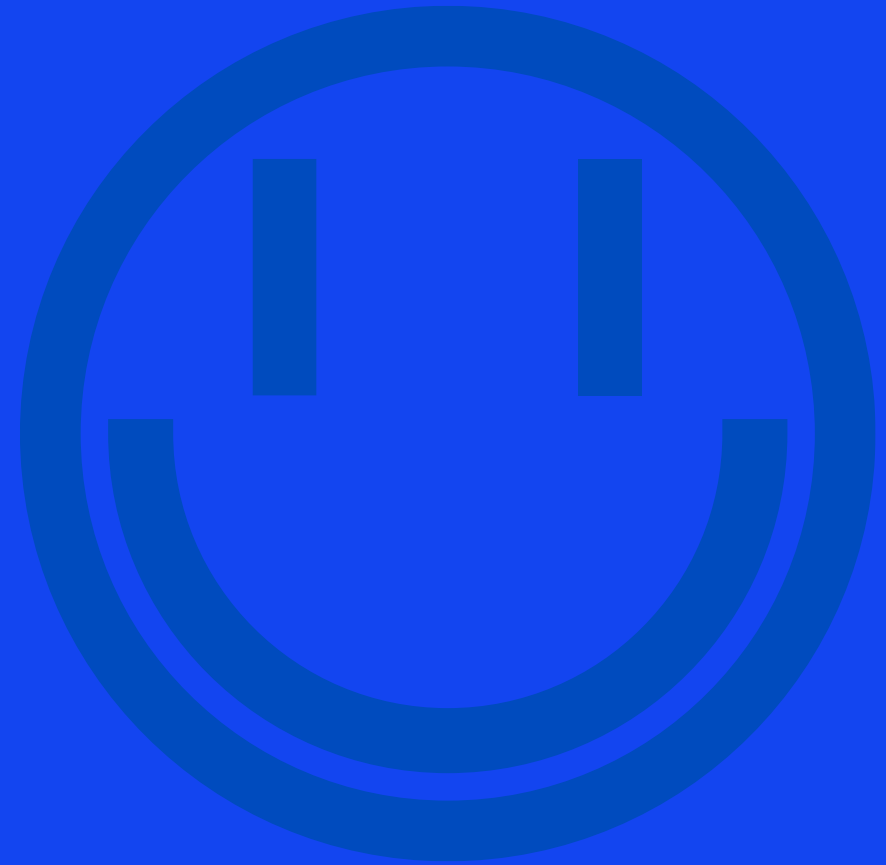


Tackle the right problem



AI Patterns Approach (Miro)

[cloudflight](https://www.cloudflare.com)



Thank you.

[www.cloudflare.io](https://www.cloudflare.com)
www.modelfly.io

bernhard.niedermayer@cloudflight.io
www.linkedin.com/in/bernhard-niedermayer/