

A futuristic white autonomous bus with a robot driver is shown driving on a winding road through a mountainous landscape. The bus has a sleek, modern design with large windows and a solar panel on its roof. The robot driver is white and blue, sitting in the driver's seat. The background features steep, rocky mountains under a blue sky with scattered clouds. The road is paved and has a guardrail on the side.

Künstliche Intelligenz – Auf dem Weg in die Zukunft

4. Juni 2024
Jean Hennebert

iCoSys

Institute of Artificial Intelligence
and Complex Systems

PLAN

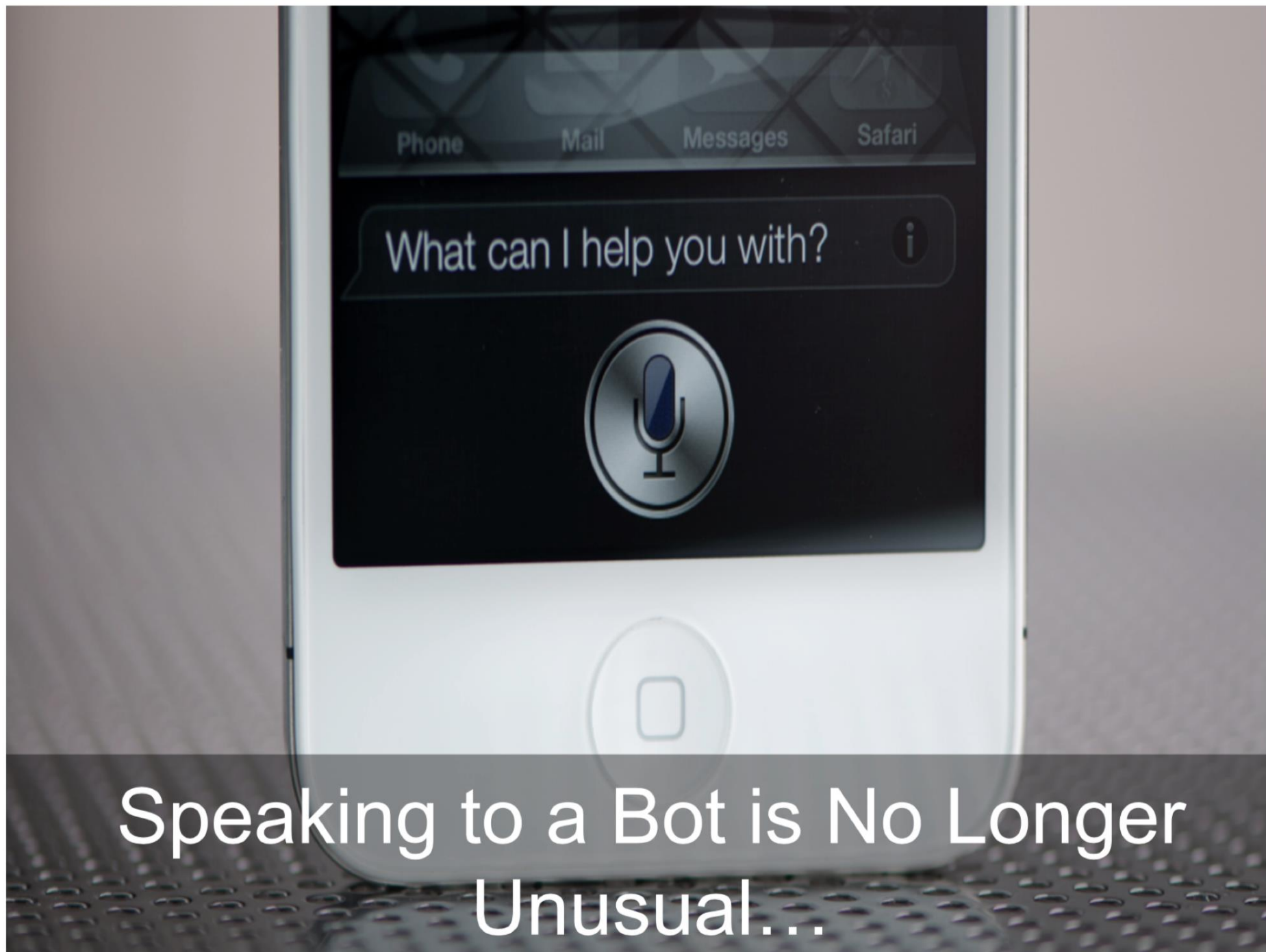
1. Der KI-Boom
2. Machine Learning und Deep Learning
3. Einige Anwendungsbeispiele

iCoSys

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and Complex Systems

And Deep Learning is at the epicenter of this revolution.





Speaking to a Bot is No Longer
Unusual...

DALL·E 2 can create original, realistic images and art from a text description. It can combine concepts, attributes, and styles.

TEXT DESCRIPTION

An astronaut Teddy bears A
bowl of soup

riding a horse lounging in a
tropical resort in
space playing basketball with
cats in space

in a photorealistic style in the
style of Andy Warhol as a
pencil drawing



DALL·E 2



<https://openai.com/dall-e-2/>



OpenAI

<https://chat.openai.com/chat>

gpt-4 ↕

🗑️ Compare ↩️

SYSTEM

Enter system instructions

USER

What could be the next innovations related to public transport and more specifically to bus transport ?

ASSISTANT

1. Autonomous Buses: The technology around self-driving vehicles is evolving rapidly. In the future, one could expect to see autonomous buses as a common mode of public transportation. This would reduce costs, increase safety, and potentially lead to more efficient routes.
2. Smart Bus Stops: The future may see smart bus stops equipped with Wi-Fi, charging ports, real-time scheduling information, and more.
3. Eco-Friendly Buses: As sustainability becomes a greater concern, we can expect to see more energy-efficient, low-emission buses. These might include electric buses, hydrogen fuel cell buses, and more.
4. On-Demand Buses: Similar to ride-sharing apps, there might be on-demand bus services that adjust their routes based on the real-time needs of passengers, reducing wait times and offering more direct routes.
5. In-Transit Entertainment: As connectivity becomes universal, buses may offer in-transit entertainment like movies, music, games, etc., through individual screens or personal devices.
6. Connected Buses: Internet of Things technology can be used to connect buses and provide real-time information to passengers and transportation managers. This will involve the use of sensor-based systems to track vehicle locations, identify maintenance issues, manage traffic, etc.
7. Increased Accessibility



Autos fahren von selbst



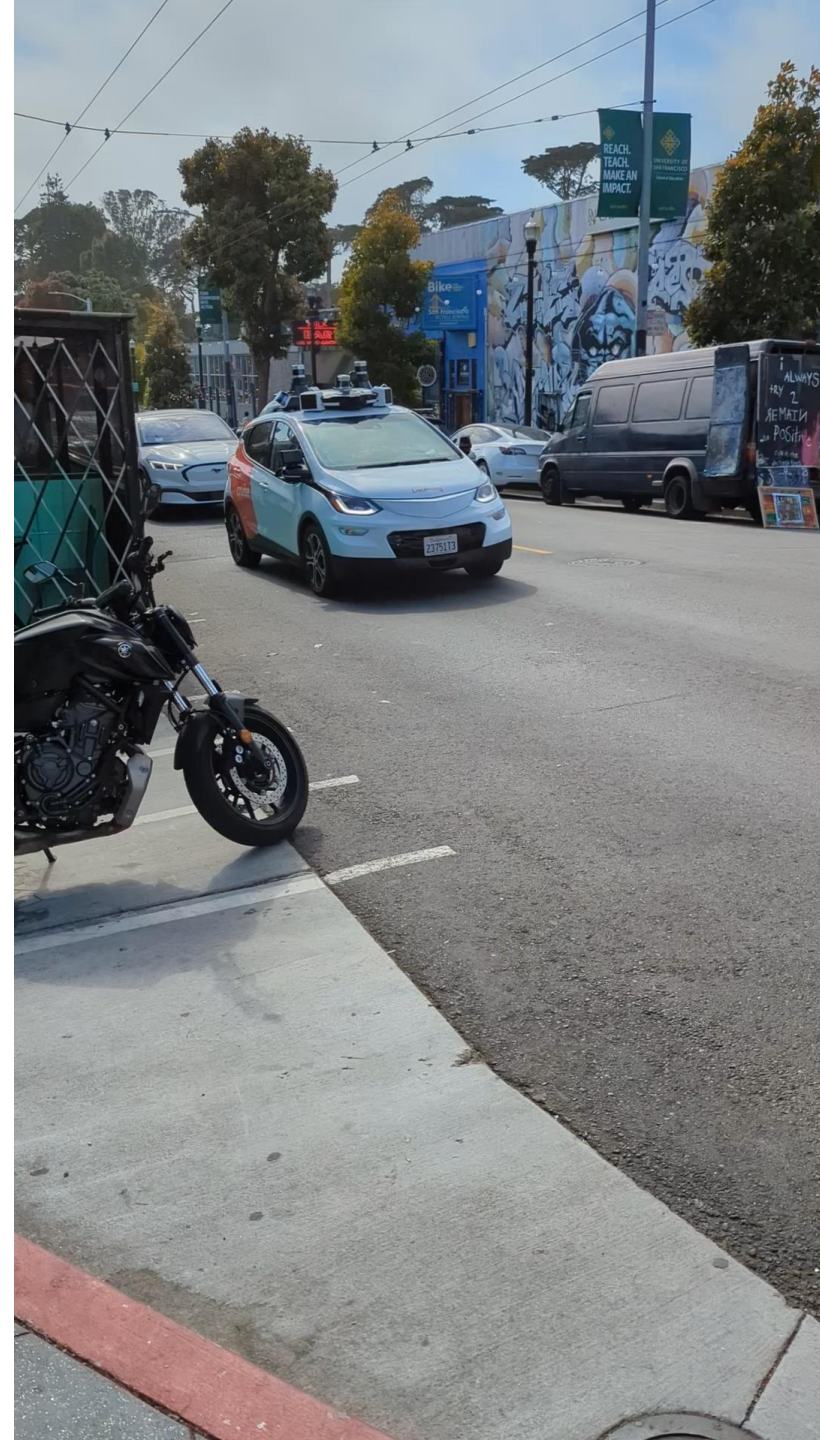
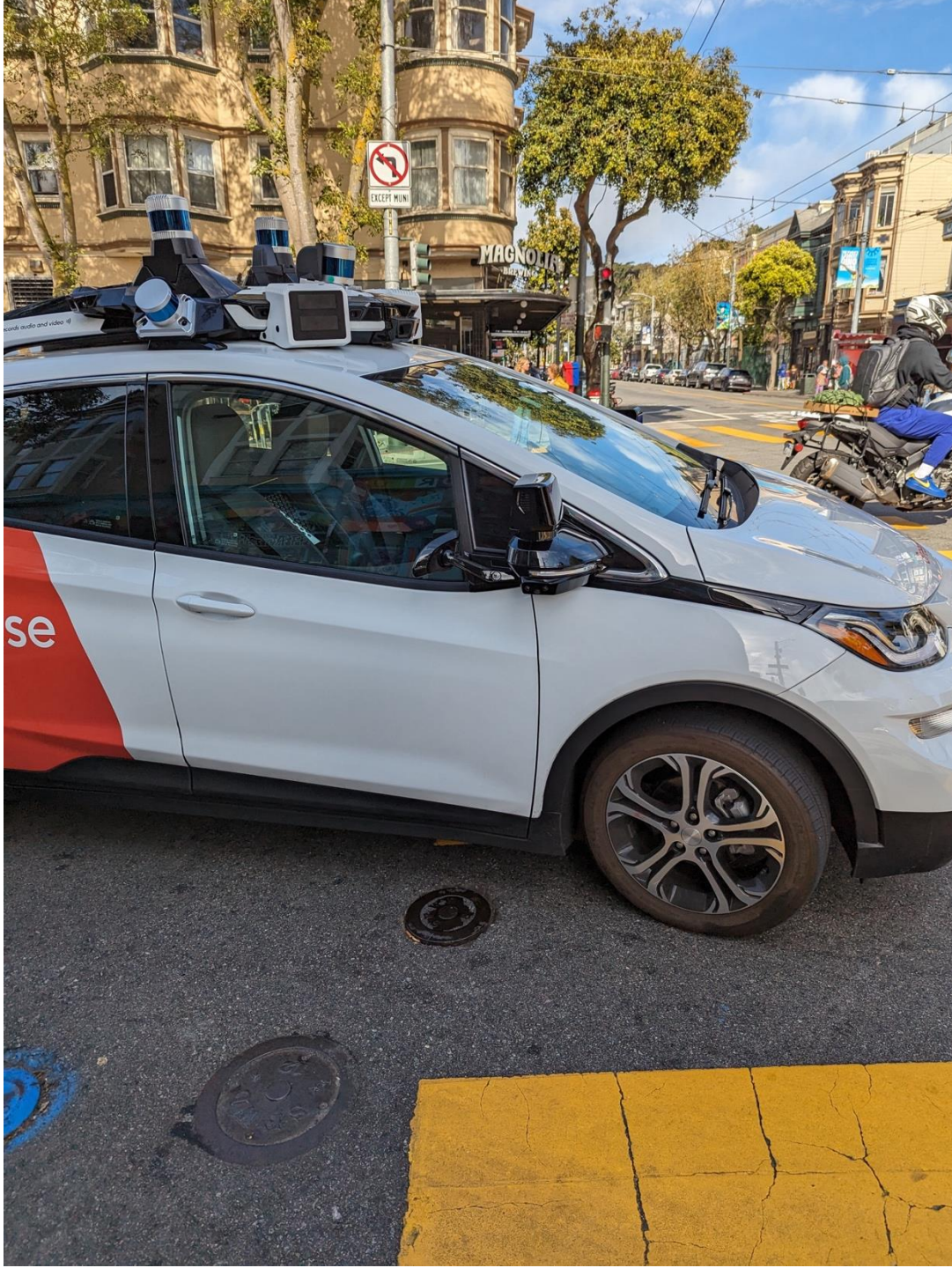
1 minute read · April 26, 2023 9:38 AM GMT+2 · Last Updated 11 days ago

Pony.ai gets permit for driverless robotaxi services in China's Guangzhou

Reuters



A logo of the autonomous driving technology startup Pony.ai is seen on a screen during an event in Beijing, China May 13, 2021. REUTERS/Tingshu Wang



Wie sind wir hierher gekommen?

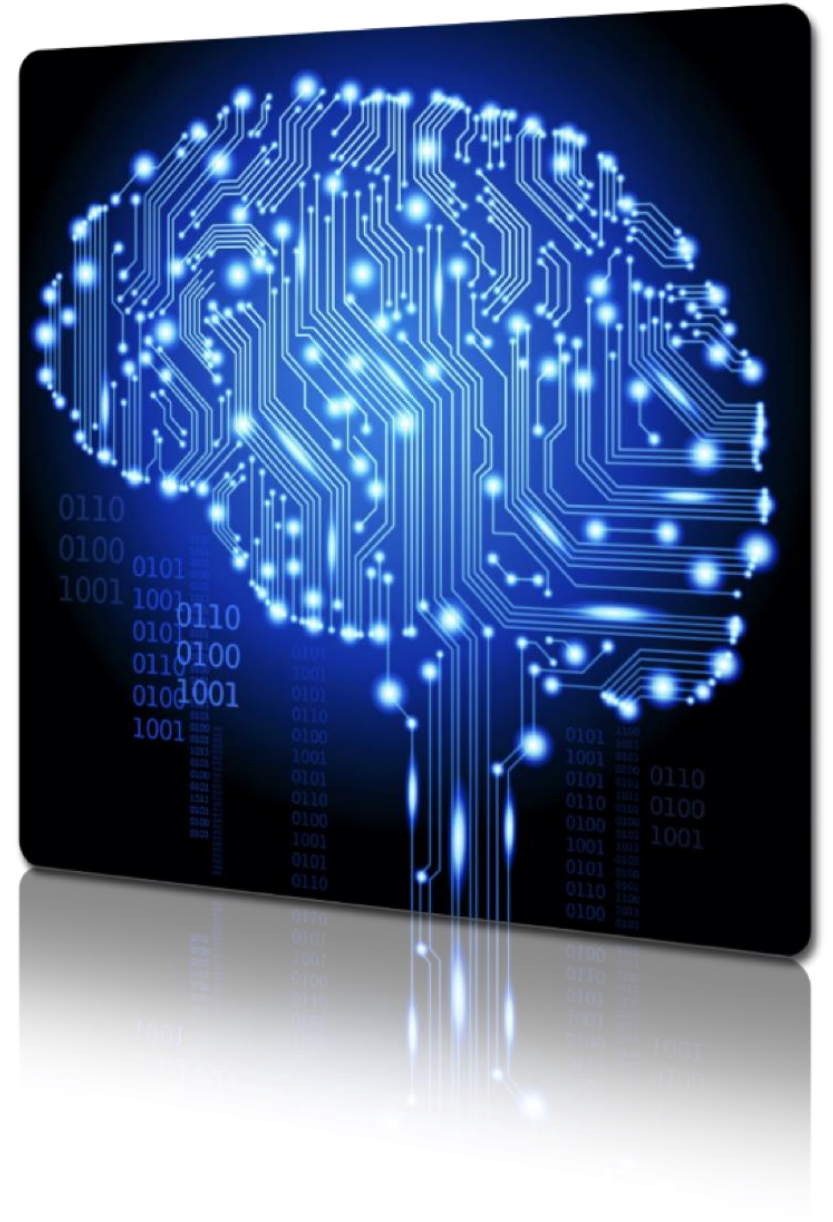
PLAN

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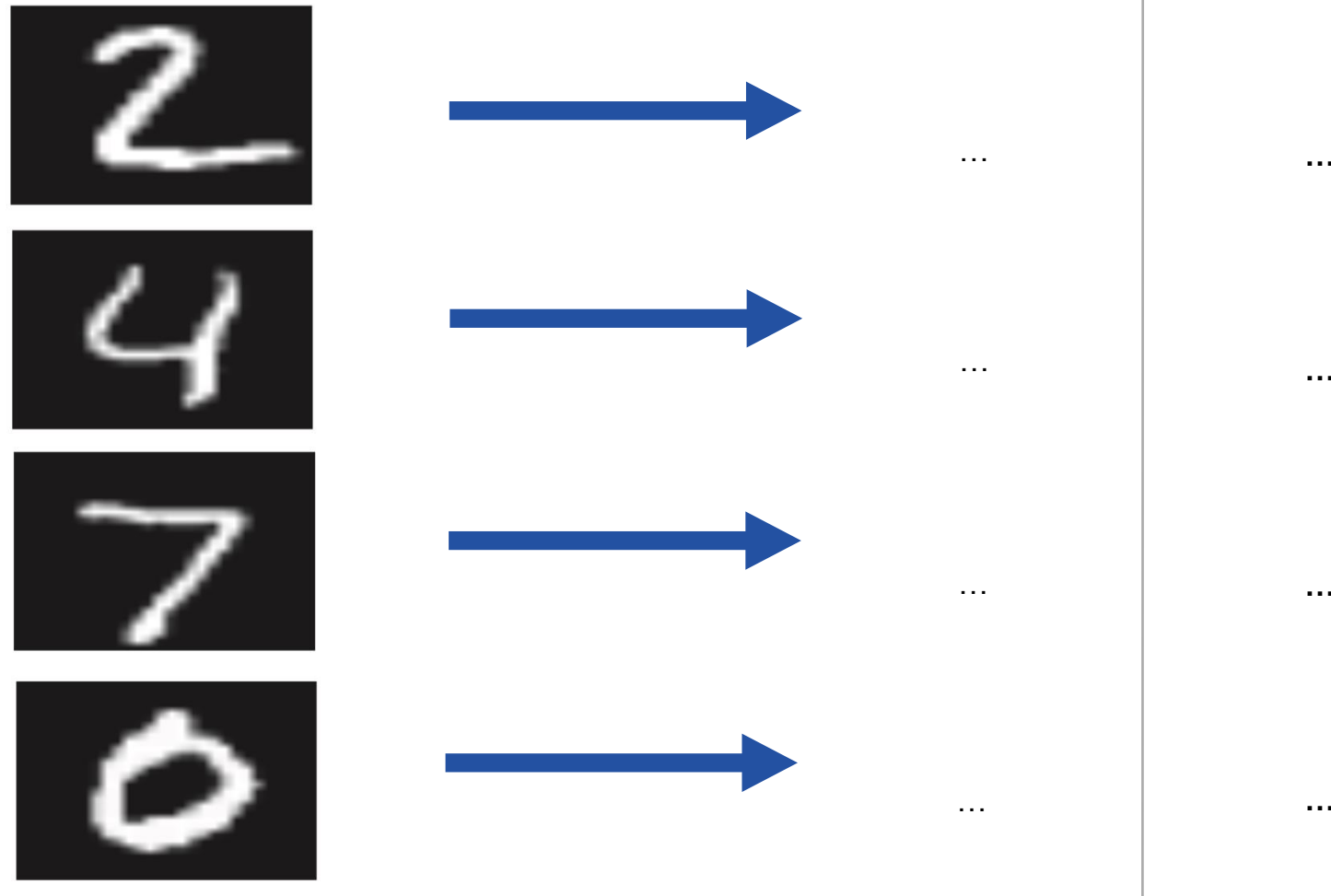
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Was ist Machine Learning ?
Was ist Deep Learning ?
Nehmen wir ein Beispiel: Ziffernerkennung



Nehmen wir für einen Moment den Platz der Maschine ein

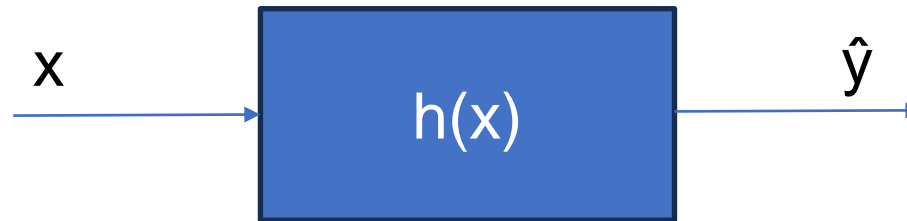


Nehmen wir für einen Moment den Platz der Maschine ein

x Eingang	$h(x)$ Transformations- funktion	\hat{y} Geschätzte Leistung	y Gewünschter Ausgang
		2	2
		4	4
		1	7
		0	0

Die "Wahrheit"

Was passiert im Lernprozess?



- Die Maschine wird versuchen, eine Funktion $h(x)$ zu finden, die die Differenz zwischen dem geschätzten Wert \hat{y} und dem gewünschten Wert y verringer
 - Die Qualität der Trainingsdaten ist von größter Bedeutung
 - Mehrdeutigkeiten in den Trainingsdaten machen das System unvollkommen
 - Was nicht im Trainingssatz enthalten ist, wird von der Maschine nicht gelernt
 - Verzerrungen in Trainingsdaten machen die Maschine voreingenommen

Wir geben der Maschine Beispiele für alle gewünschten Kategorien



Die Maschine muss allen **Variabilitäten** ausgesetzt sein, um richtig zu lernen

Wir werden der Maschine viele Beispiele
geben

"[Machine Learning is the] field of study that gives computers the ability to learn without being explicitly programmed."

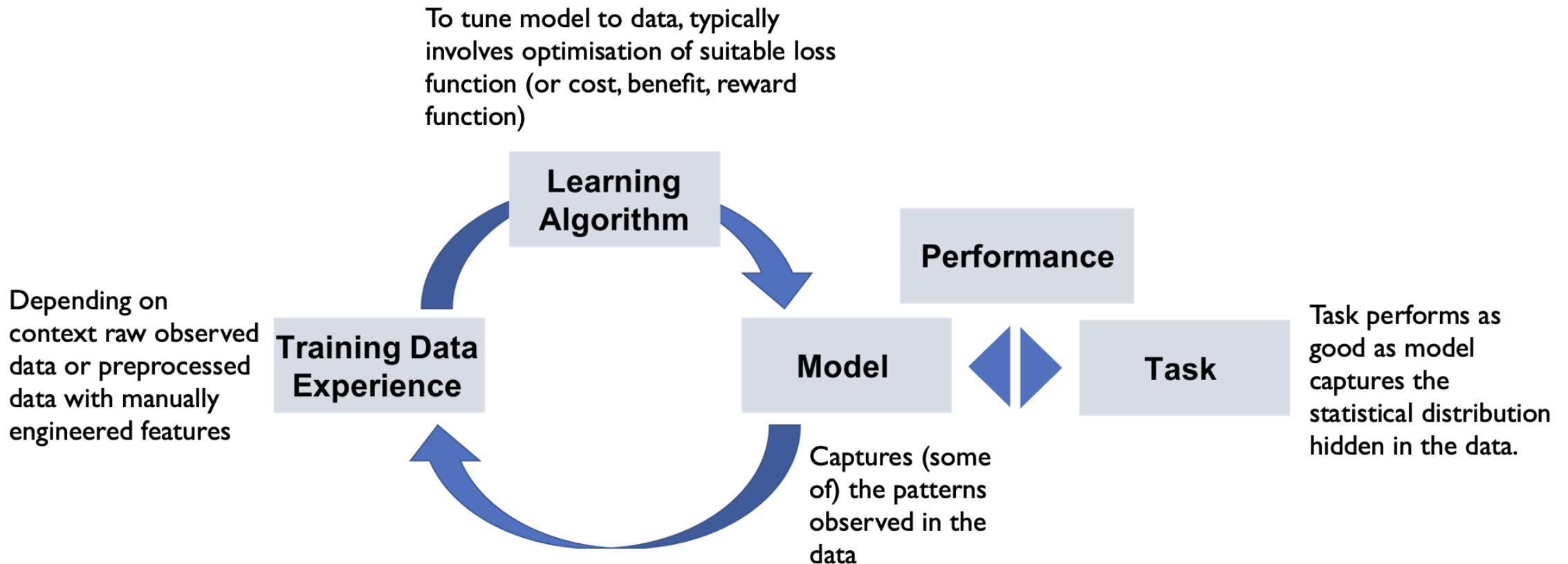
Arthur Samuel, 1959

What we want is a machine that
can learn from experience

Alan Turing



Learning involves shaping a model (hypothesis function) that can capture the structure seen in the data.

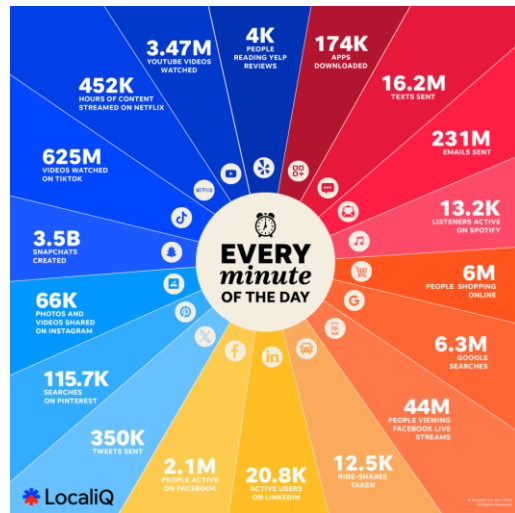


Was ist Deep Learning?

- Ein neuer Trend im Bereich des maschinellen Lernens
Bei der Konvergenz von 3 Elementen:

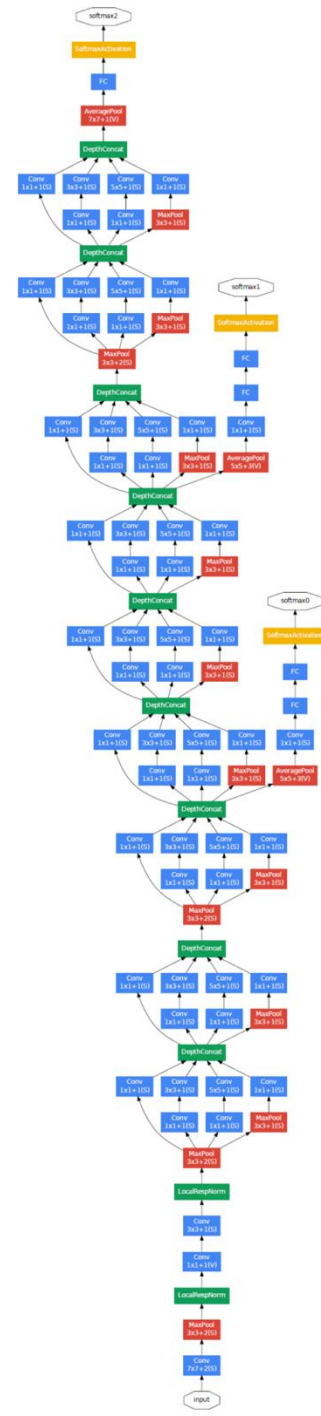
Larger quantities of data
text, audio, images, videos, ...

New algorithms
CNN, RNN, Transformers ...



Deep Learning

Better computer performance
GPU, distributed computing ...



PLAN

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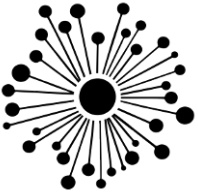
Institute of Artificial Intelligence
and Complex Systems

Die Forschungsachsen von iCoSys



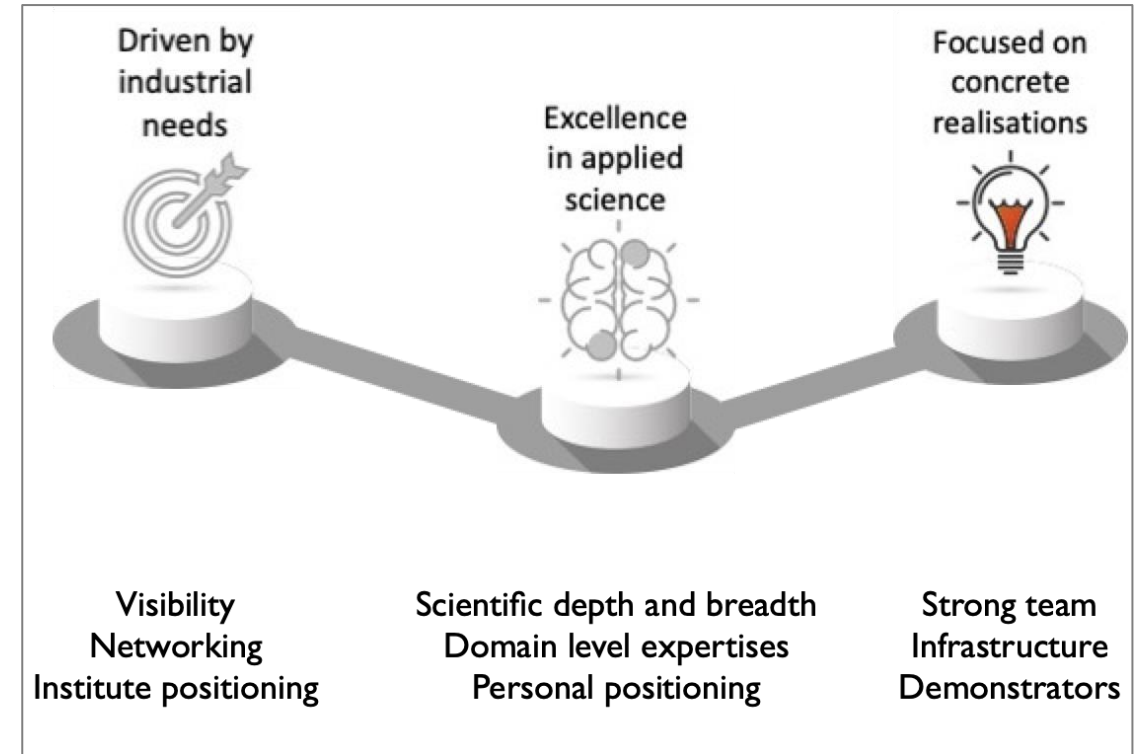
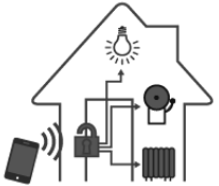
- **Technologische Schwerpunkte**

- Deep learning
- Verteiltes Rechnen



- **Anwendungsorientierte Schwerpunkte**

- Analyse von Dokumenten
- Industrie 4.0
- Smart Living



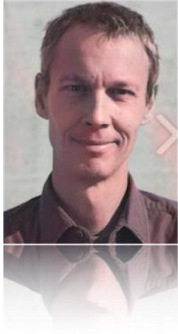
<https://icosys.ch/>

Team iCoSys

Bapst Frédéric



Bruegger Pascal



Chabbi Houda



Fischer Andreas



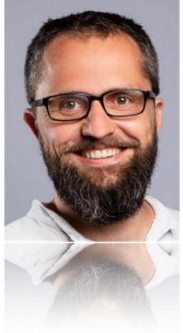
Hennebert Jean



Janka Ales



Sébastien Rumley



Beat Wolf



- 40 Personen, x3 in 10 Jahren
- 4 Startups in 2 Jahren
- Auswirkungen auf die Bachelor- (Data Engineering) und Master-Ausbildung (Data Science)

Projekte rund um Digitalisierung und Industrie 4.0

Innosuisse - Swiss Innovation Agency



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

LIEBHERR

IMMOMIG 



MORPHEAN



NEUR.ON

UNIVO 

TRANSLAT



ETAT DE FRIBOURG
STAAT FREIBURG
STATE OF FRIBOURG

Promotion économique PromFR
Wirtschaftsförderung WIF
Development Agency FDA

FRIBOURG, THE PLACE TO GROW!



npr
Nouvelle
politique régionale

INNO SQUARE

groupe 

celsius
groupe 

WAGO

starrag 

RICHEMONT

word 

asyril

grade
sens

HFR
hôpital fribourgeois
freiburger spital

ALSTOM

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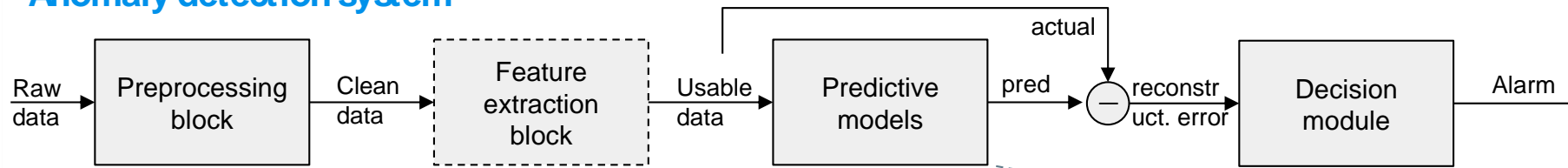
YSR

SoftDesign OFY Srl

Hes·SO

Prädiktive Wartung durch KI

Anomaly detection system

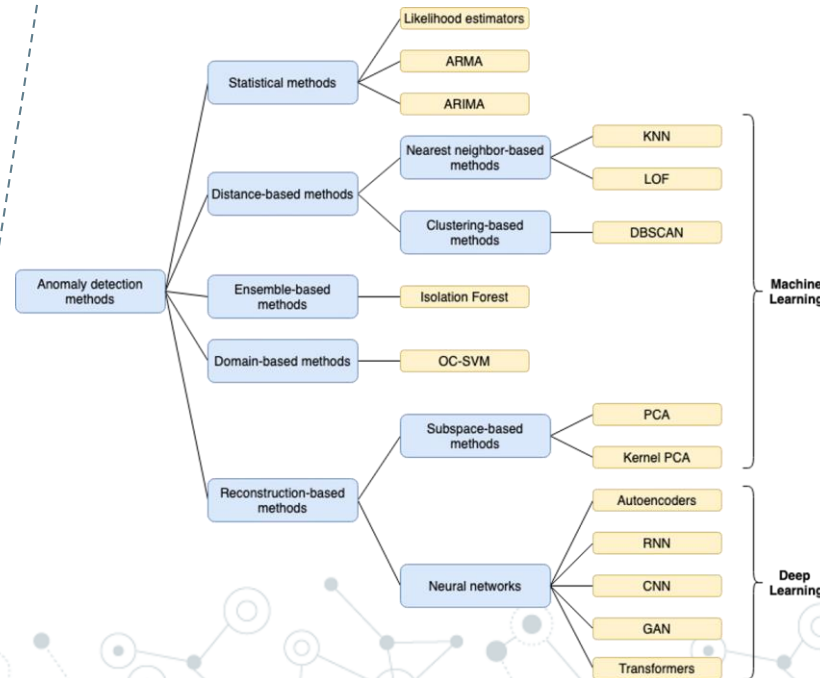


Advantages of AI:

- Adapt to many contexts
- Less hypothesis
- Good performances
- Incremental learning

Disadvantages of AI:

- Costly - data storage, CPU/GPU
- Expertise needed



LIEBHERR

groupe 

celsius
groupe e

ALSTOM

asyrîl

TRANSLAT

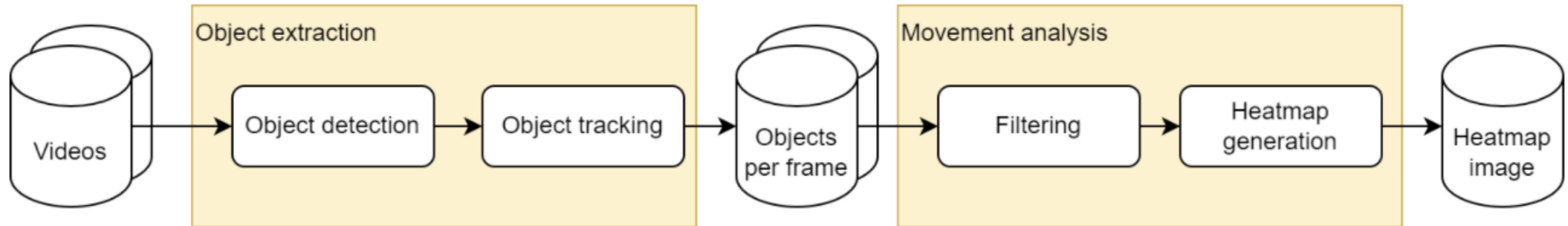
LYSR



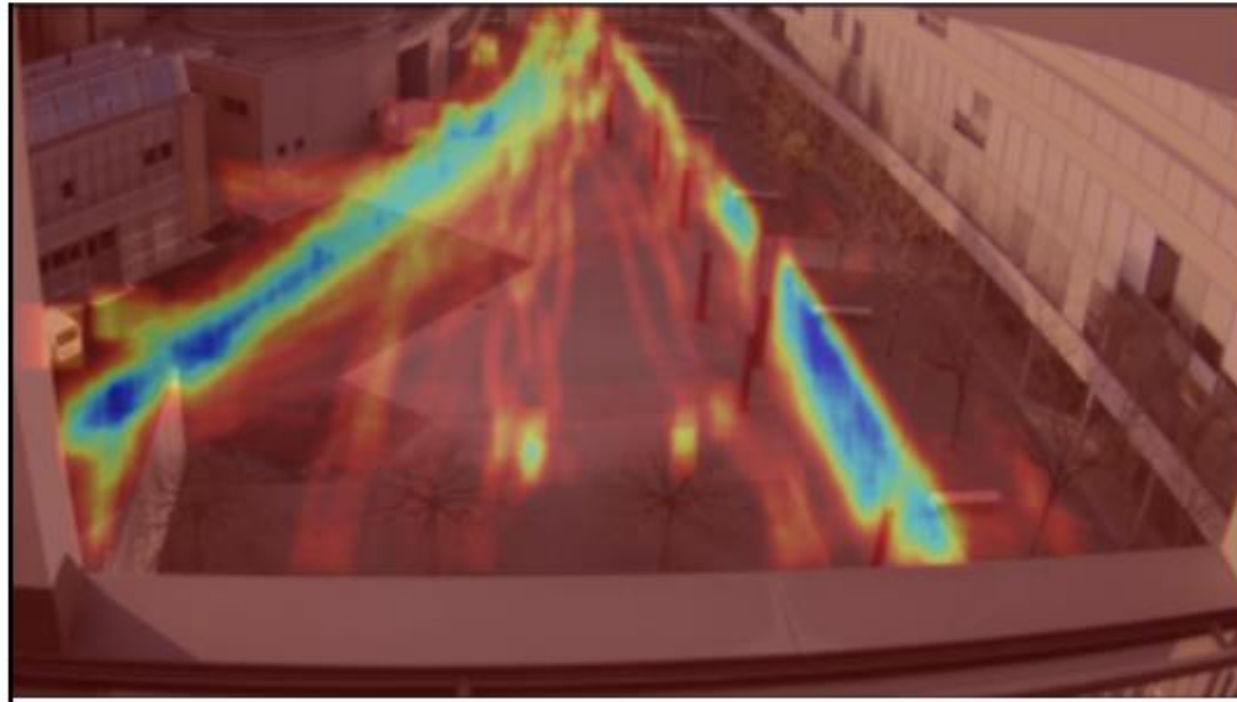
Einsatz von KI zur
Priorisierung der
vorausschauenden
Wartung

Abnormaler
Verbrauch von
Warmwasser.

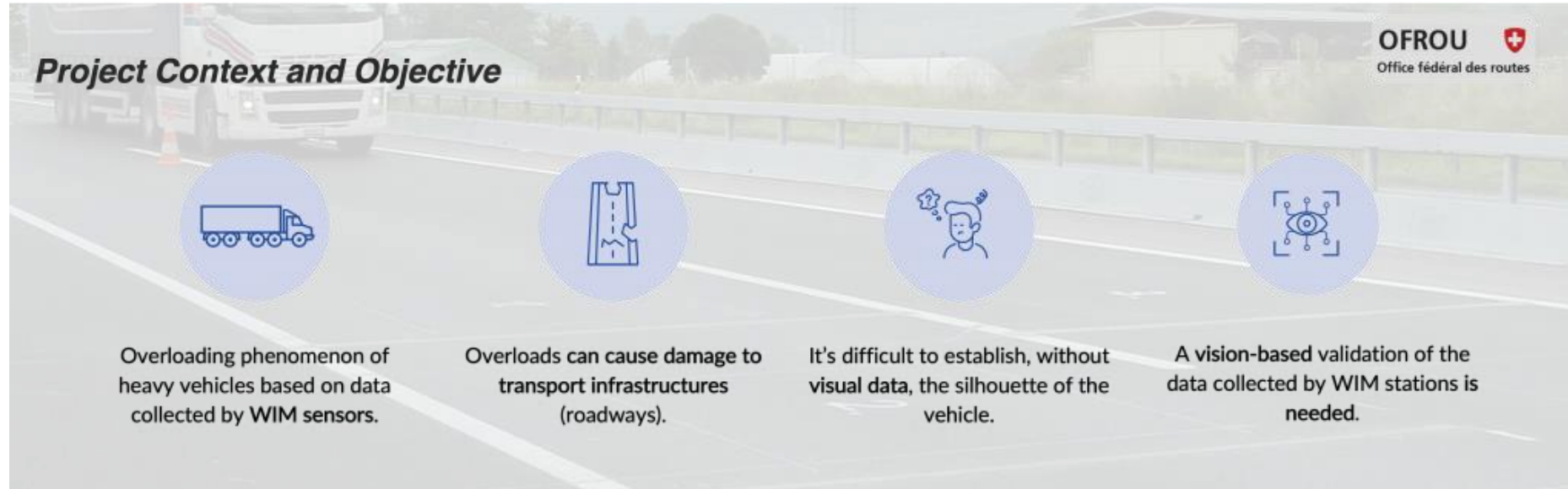
GreenNum – Analyse von Bewegungsströmen im öffentlichen Raum



<https://icosys.ch/greennum>



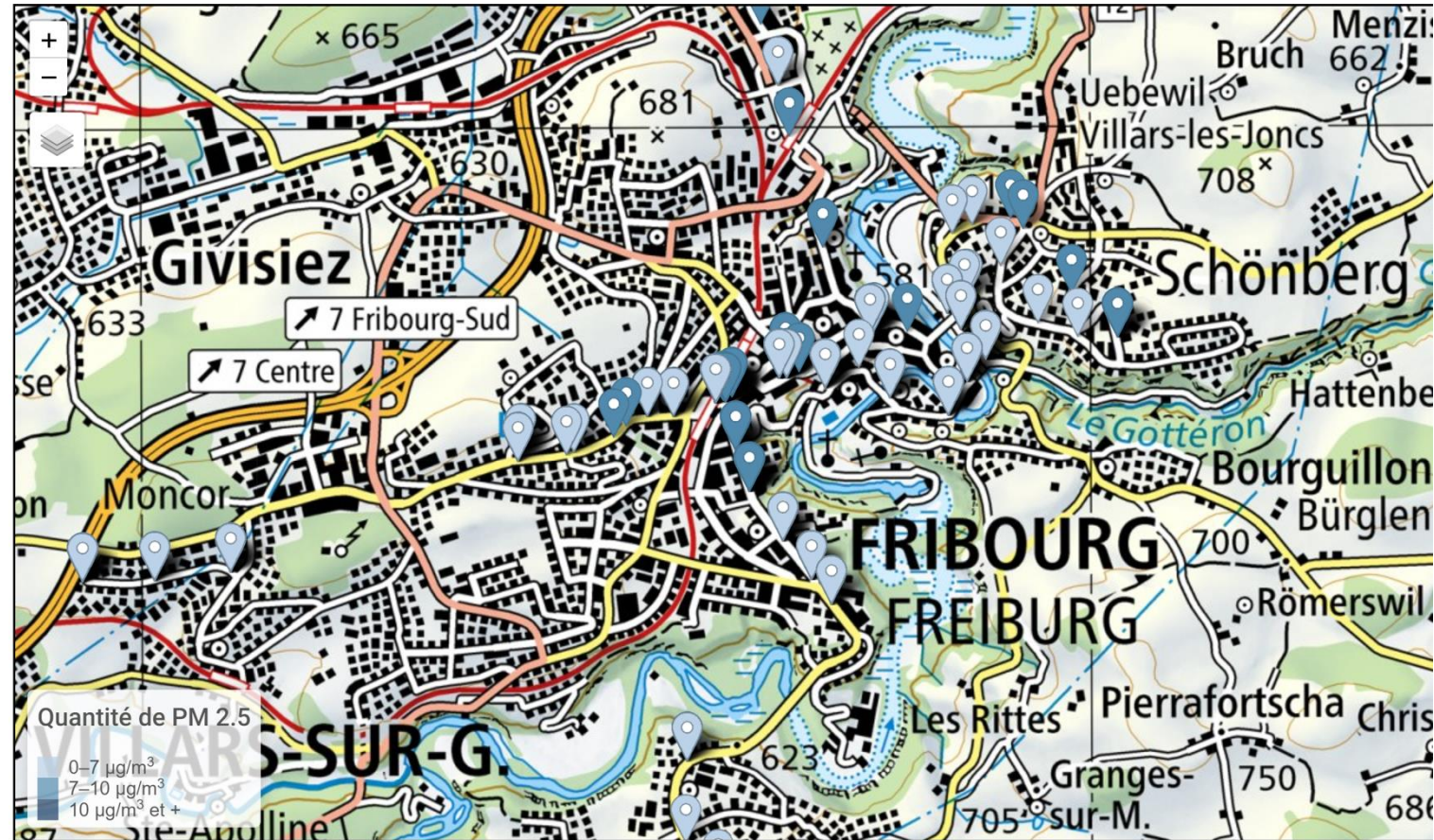
WIM – LKW-Analyse für das ASTRA



Projekt “MoDus SAIN” (ASTRA – OFROU)

- TPF-Bus zur Messung der Dichte von Feinstaub in der Stadt Freiburg
Zusammenarbeit: HEIA-FR, Stadt Freiburg, Kantonaler Umweltdienst, Decentlab, Franic SA, iav, TPF

capteur de particules fines
et gps



Feinstaubbelastung an jeder Bushaltestelle – 11.11.2023

A lean **green way** to deliver the goods

→ [View product details and specifications](#)



Reliably cost-effective ×

Cut package-delivery costs by an average of two-thirds and boost the profit margins of your online delivery business. Your customers, too, enjoy lower shipping expenses. **LOXO** also solves the growing problem of a lack of delivery staff. It is easy to load and always ready for deliveries, with a best-in-class package capacity.

Autonomy made safe and compliant +

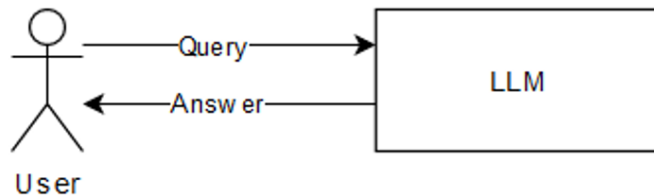
Emission-free and sustainable +

Convenient on-demand delivery +

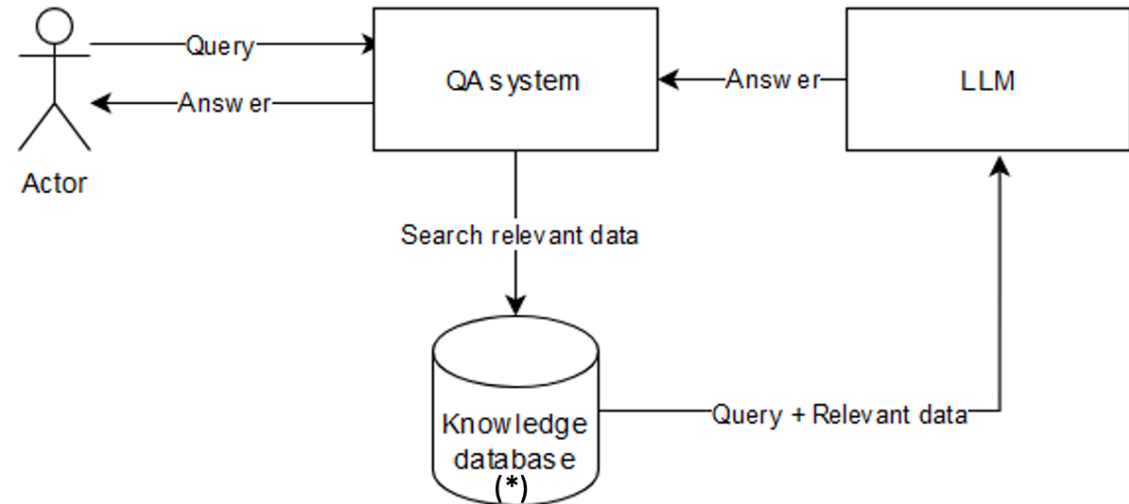
Private ChatBot

Large Language Models + RAG

Without RAG



With RAG



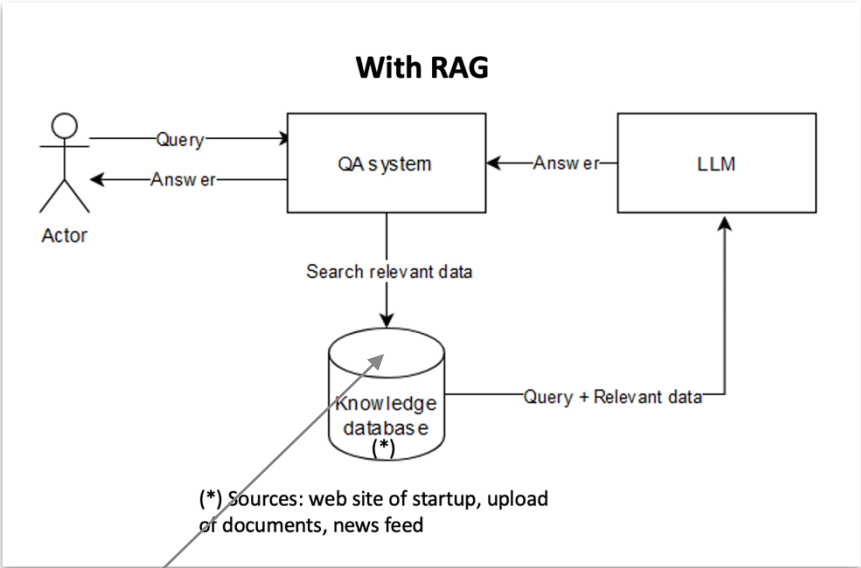
(*) Sources: web site of startup, upload of documents, news feed

Vorteile der RAG

- Anpassung des LLM an einen gegebenen Kontext
- Dynamisches Wissen einbeziehen
- Verwendung von "kleinen" LLMs

- Halluzinationen vermeiden
Arbeiten mit proprietären Dokumenten
Ermöglichen Sie die Bereitstellung vor Ort

Demo zu VÖV-Dokumenten



Chatbot

Before using this chatbot go to the Swiss AI Center's [App](#) and vectorize your document with the **Document Vectorizer service**.

Data disclaimer : The data you upload to this chatbot is temporarily stored on the Swiss AI Center's server and deleted after the end of the session.

The content of the conversation you have with the chatbot is not stored.

Usage disclaimer: This chatbot is for testing and demo purposes. It does not provide service delivery guarantee.

Extra info

Reset



Qu'est-ce que le swisstrolley?



Le SwissTrolley plus est un trolleybus efficace, fiable et flexible, permettant l'exploitation entièrement électrique sur des lignes à contact partielle. Il offre 100% de récupération d'énergie pendant le freinage et consomme jusqu'à 15% lessive d'énergie par rapport à un trolleybus standard. Il contribue à smoother les pics de courant du réseau électrique.

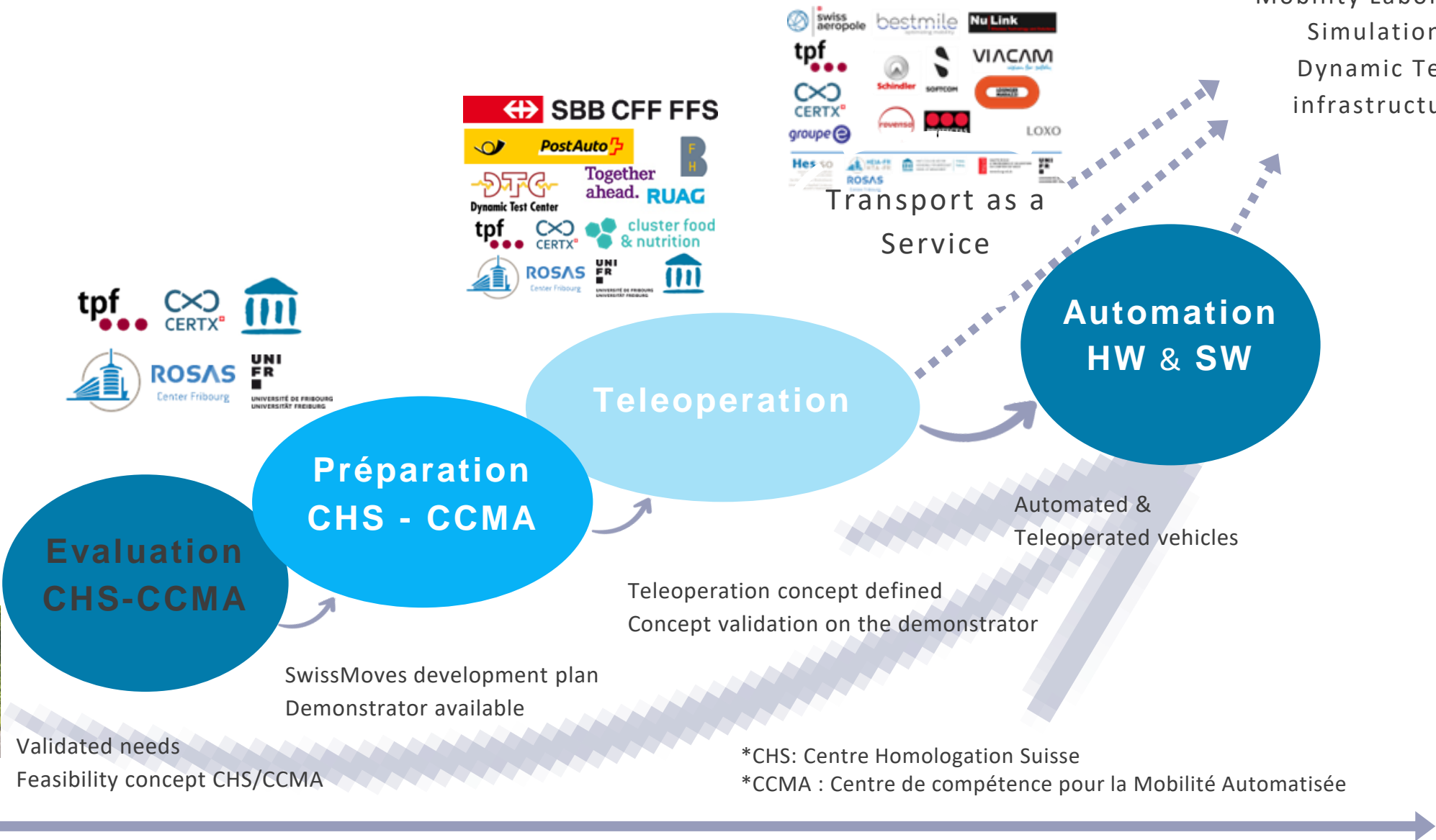
Transports publics en Suisse représentent environ 5,5% de la consommation totale d'énergie, malgré qu'ils assument 24% du transport de personnes et 37% du trafic de marchandises. Les mesures courtes et moyennes sont prises pour améliorer leur part modale, mais des efforts importants doivent être faits pour assurer l'approvisionnement en énergie durable à long terme en Suisse, particulièrement pour les transports publics, et surtout leur secteur routier.



Besuchen Sie mich für eine Live-Demo.



Mandates and Services
Mobility Laboratory
Simulations
Dynamic Test
infrastructure



*CHS: Centre Homologation Suisse
*CCMA : Centre de compétence pour la Mobilité Automatisée

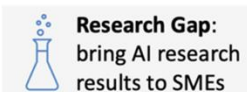
Swiss AI Center for SMEs

Beschleunigung der Einführung von KI durch KMU

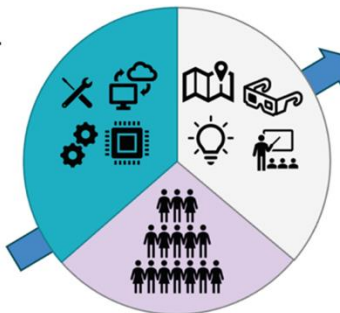
- **Berichterstattung:** 7 Kantone, 5 Ingenieur- und 2 Wirtschaftsschulen der HES-SO
- **Animationsteam:** 18 Professoren-Ingenieure-Forscher
- **Einstiegspunkt zu:** lokale Expertise von 150+ KI-Ingenieuren und -Forschern

APPLIED RESEARCH

Accelerate AI prototyping for business driven use cases.



Research Gap:
bring AI research results to SMEs



SME Gap:
boost AI & instill data mindset

SERVICES FOR SMEs

Support methodology based on needs mapping, use-cases and workshops

SWISS AI CENTER DEVELOPMENT

Access to 150+ AI engineers, close to your location, develop your network.

Les hautes écoles

La HES-SO réunit 28 hautes écoles qui proposent dans les sept cantons de Suisse occidentale 43 formations Bachelors et 25 Masters dans les domaines Design et Arts visuels, Economie et Services, Ingénierie et Architecture, Santé, Musique et Arts de la scène, Travail social.





Lassen Sie uns zusammenarbeiten



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