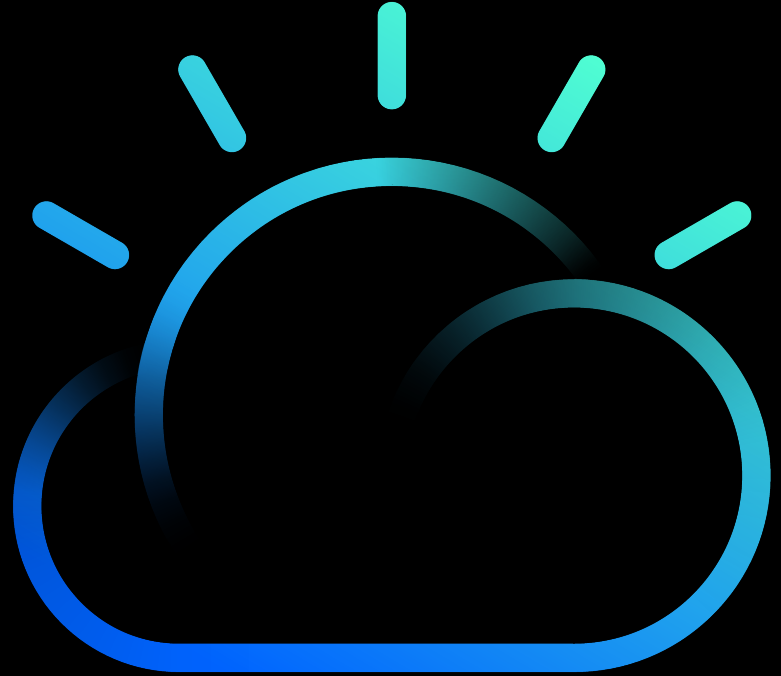


Data Science / Machine Learning

12.05.2020

*Kim Dressendörfer
Matthias Biniok
Alexander Richthammer
Sebastian Fink*



Agenda

- **Allgemeine Einführung in Artificial Intelligence & Machine Learning**
- Vorstellung der AI-Ladder und IBMs Portfolio
- Anwendungsfälle:
 - Kommunikation mit Chat- und Voicebots
 - CIMON
 - Image Recognition
 - Forecasting von Absatzmengen
 - Optimierung
- Q&A

IBM's Deep Blue chess computer defeats the reigning world champion Gary Kasparov

1997



IBM's Watson defeats the two champions Ken Jennings and Brad Rutter in *Jeopardy!*

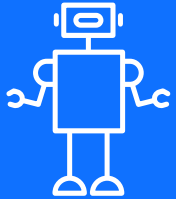
2011



Deep Learning as a main component of Machine Learning is a part of Artificial Intelligence. It provides the basis for Cognitive Computing.

Artificial Intelligence

Entire research area
(Learn + NLP + Expert systems + ...)



Machine Learning

Learning computer systems
unsupervised vs. supervised



Deep Learning

Algorithms in neural networks with multiple levels
that automatically recognize concepts and
similarities



Watson has become a set of cognitive services available on IBM Cloud for clients to enable in their apps.

AI Assistant



Assistant

Knowledge



Natural Language Understanding



Discovery Services



Discovery News

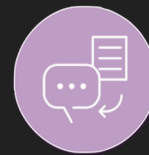


Knowledge Studio

Speech



Speech to Text



Text to Speech

Vision



Visual Recognition

Language



Natural Language Classifier



Language Translator

Empathy



Tone Analyzer



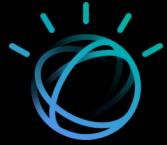
Personality Insights

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The AI Ladder

A prescriptive approach to accelerating the journey to AI



AI

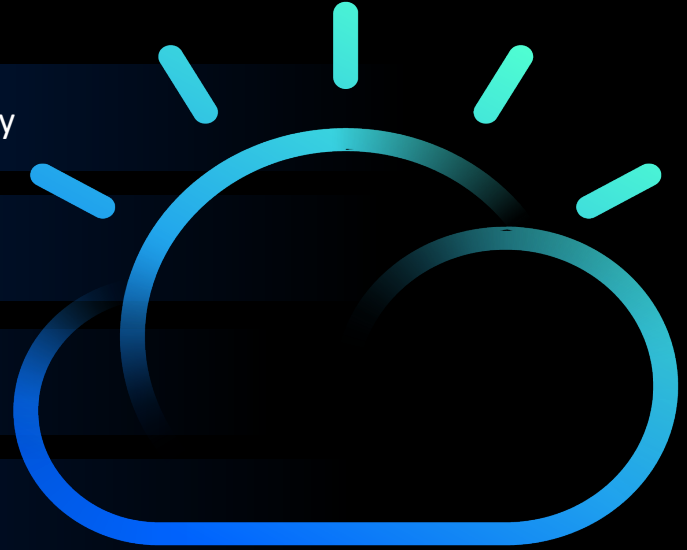
INFUSE – Operationalize AI with trust and transparency

ANALYZE - Scale insights with AI everywhere

ORGANIZE - Create a trusted analytics foundation

COLLECT - Make data simple and accessible

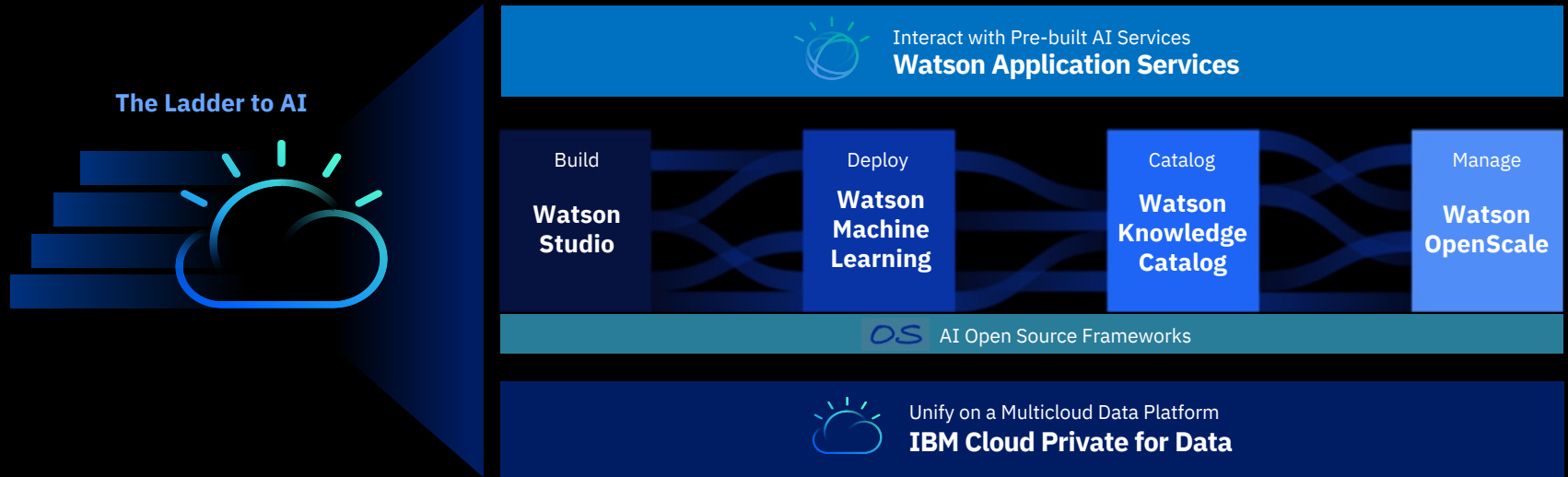
Data of every type,
regardless of where it lives



MODERNIZE
your data estate for an
AI and multicloud world

IBM's AI Portfolio

Everything you need for Enterprise AI, on any cloud



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Watson Assistant

is the **AI**-powered foundation of **smart** customer experiences.

Centralize your customer communication

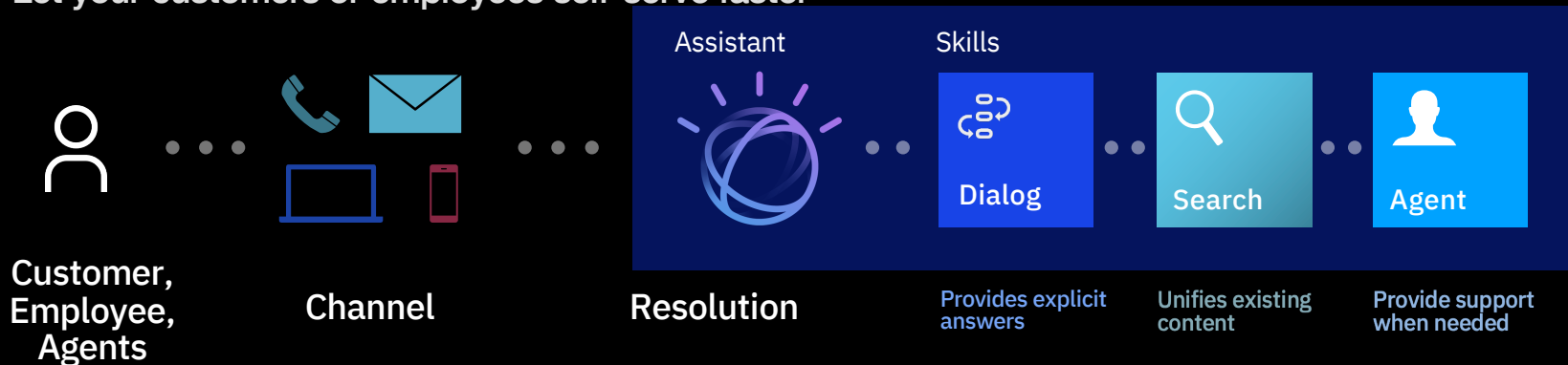
Get started fast

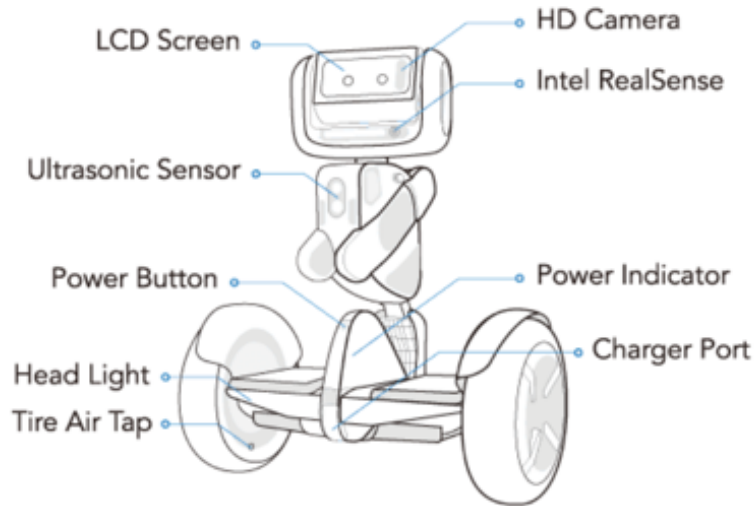
Anyone can build

Deploy Anywhere

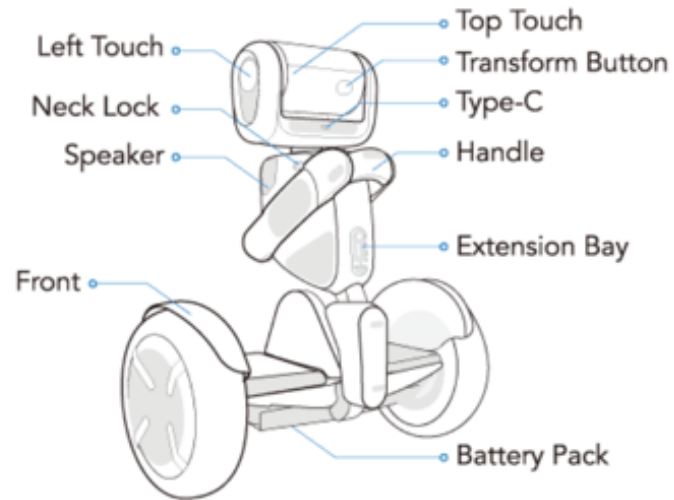
Own your data

Let your customers or employees self-serve faster





Front



Back

Hardware Specs



Mobility

- Self-balanced two-wheeled vehicle
- 30 km reach
- 8-10 hour
- default-enabled Gimbal mode stabilizes images during robot movements

Computation

- Powered by Intel Atom Z8750 processor, 4 cores CPU has a maximum of 2.4 GHz frequency
- Android 5.1

Sensor

- Intel's RealSense module provides aligned RGB-Depth images at 30fps
- The main HD camera is mounted next to the robot face, with wide-angle of 104 degrees FOV
- A microphone array composed of 5 mics is used to localize voice source and reduce background noises during voice recognition
- The touch sensors on the head enable natural user interaction
- The Ultrasonic sensor in the front can detect obstacles in real time to prevent collisions
- Hall sensors embedded in the wheel motors provides stable odometry data, while the IMUs in the robot body and head are used to measure the robot pose and head orientations

Watson Specs



Speech Synthesis

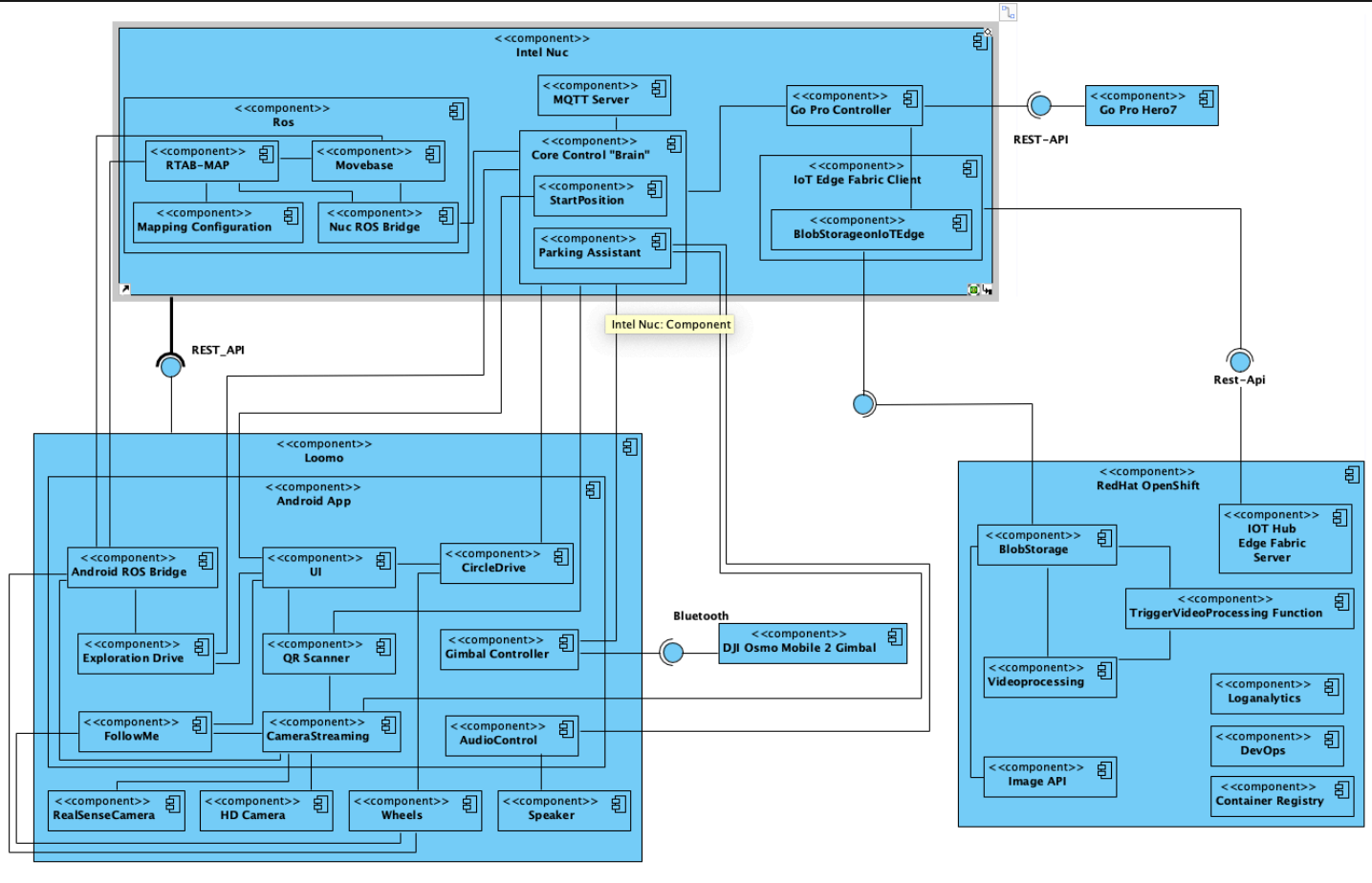
- Speech to Text
- Text to Speech

Watson Assistant

- Chatbot fitted to use cases
- Real interactions

Visual Recognition

- Detection of surroundings
- Face recognition
- Object detection



Loomo MINI Transporter



Postal Services

- In-office letter and package service
- Food delivery

Concierge Service

- Hotels
- Resorts
- Book stores/
Libraries

Military

- Delivery of medics
- Delivery of supplies
- Discovery of surroundings



Watson Speech to Text

Overview and Differentiators

Powerful real-time speech recognition

Transcribe your audio in real-time or via uploaded batch files using any of our available out-of-the-box language models.

Hands-on speech training capabilities

Improve accuracy for your use case, especially around domain acronyms, product names, jargons, expressions, dialects and acoustical environments.

Advanced transcription features

Format and organize your transcripts as you need by using features such as speaker labels, smart formatting, keyword spotting, numeric redaction, and confidence scores.

Advanced machine learning

Benefit from IBM's ongoing innovations in AI and machine-learning technologies. See the latest in Speech to Text technology and applications [here](#).

Data control

Maintain control and ownership of your data. IBM will not collect, store or use your speech data without your explicit agreement and opt-in.

Deploy anywhere

Deploy Watson Speech to Text behind your firewall or on any cloud. See how with Watson Anywhere with Cloud Pak for Data [here](#).



Watson Text to Speech

Overview and Differentiators

Powerful real-time speech synthesis

Convert written text to natural-sounding speech using our latest neural speech synthesizing techniques.

Advanced machine learning

Benefit from IBM's ongoing innovations in AI and machine-learning technologies. See the latest in Text to Speech technology and applications [here](#).

Data control

Maintain control and ownership of your data. IBM will not collect, store or use your speech data without your explicit agreement and opt-in.

Deploy anywhere

Deploy Watson Text to Speech behind your firewall or on any cloud. See how with Watson Anywhere with Cloud Pak for Data [here](#).



Watson Assistant for Voice Interaction

Watson Assistant for Voice Interaction provides a voice powered Assistant which is easily added to leading contact center systems/providers and the telephone networks to provide self-service and agent assistance.

Let employees ask their questions in natural language over the phone – fast-tracking them to the answer. You can also blend texting (SMS) and voice simultaneously for instant information exchange.

A customized voice is also possible via the TTS cloud solution.

CIMON

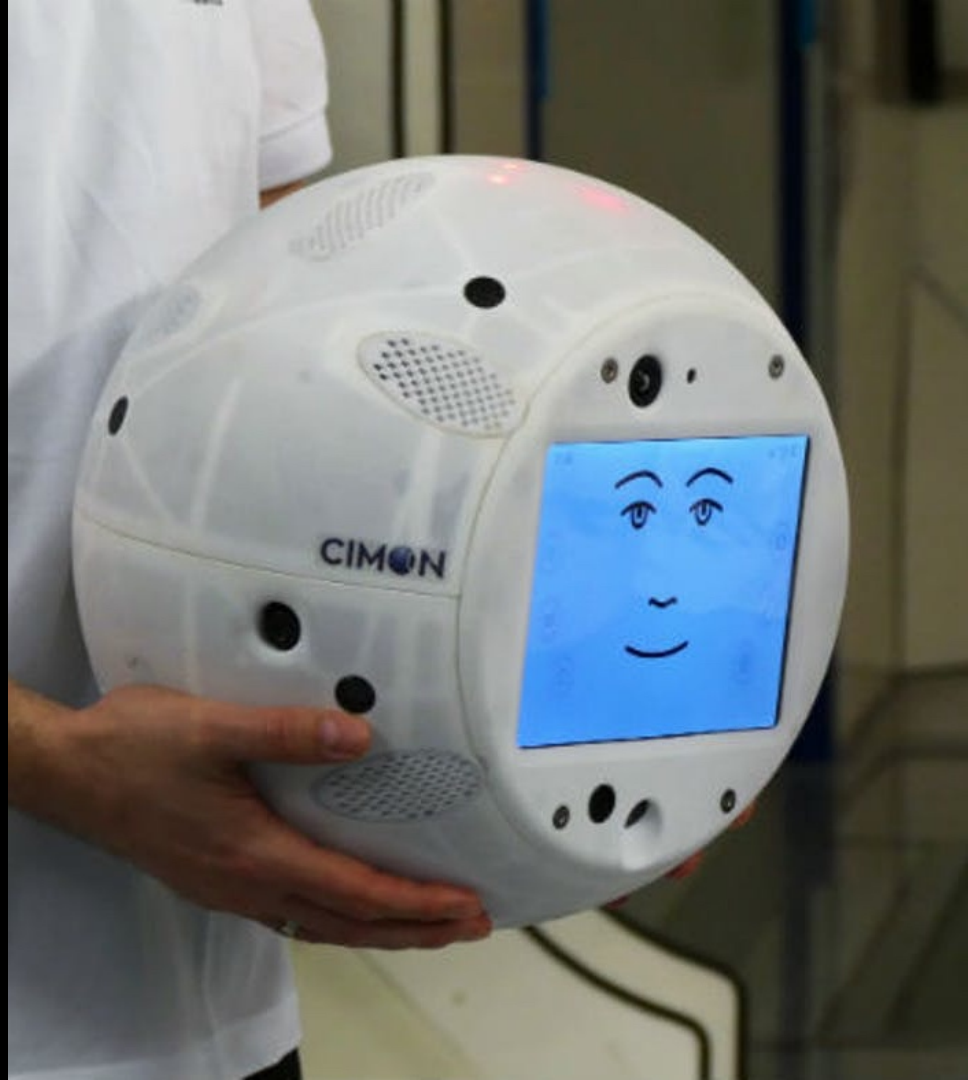
Crew Interactive **MO**bile companion
&
CIMON-2

- New Crewmate / Astronaut Assistant
 - Experiment Support, Mobile Video Documentation
 - Reducing stress & isolation mitigation
- Successful experiments
 - Alexander Gerst in 2018
 - Luca Parmitano in 2019

AIRBUS



IBM

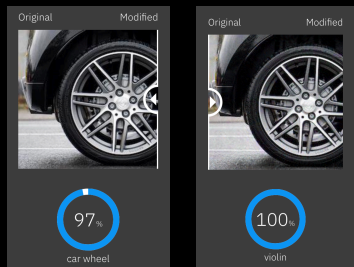


Computer Vision

Object Detection and other Use Cases



Smart Agritech built a solution with Watson Machine Learning to scale pigs based on photographs.



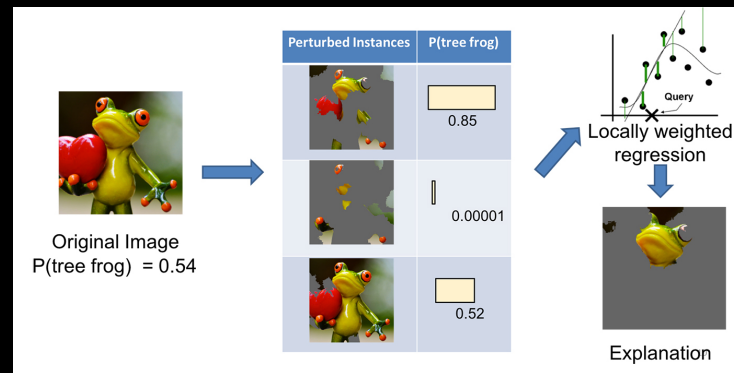
Your vision model can be hacked!



IBM Watson Visual Recognition

Autoglass (Belron) built the world's first automated vehicle body damage assessment and quote generation system using the IBM Watson Visual Recognition service.

Open the AI black box

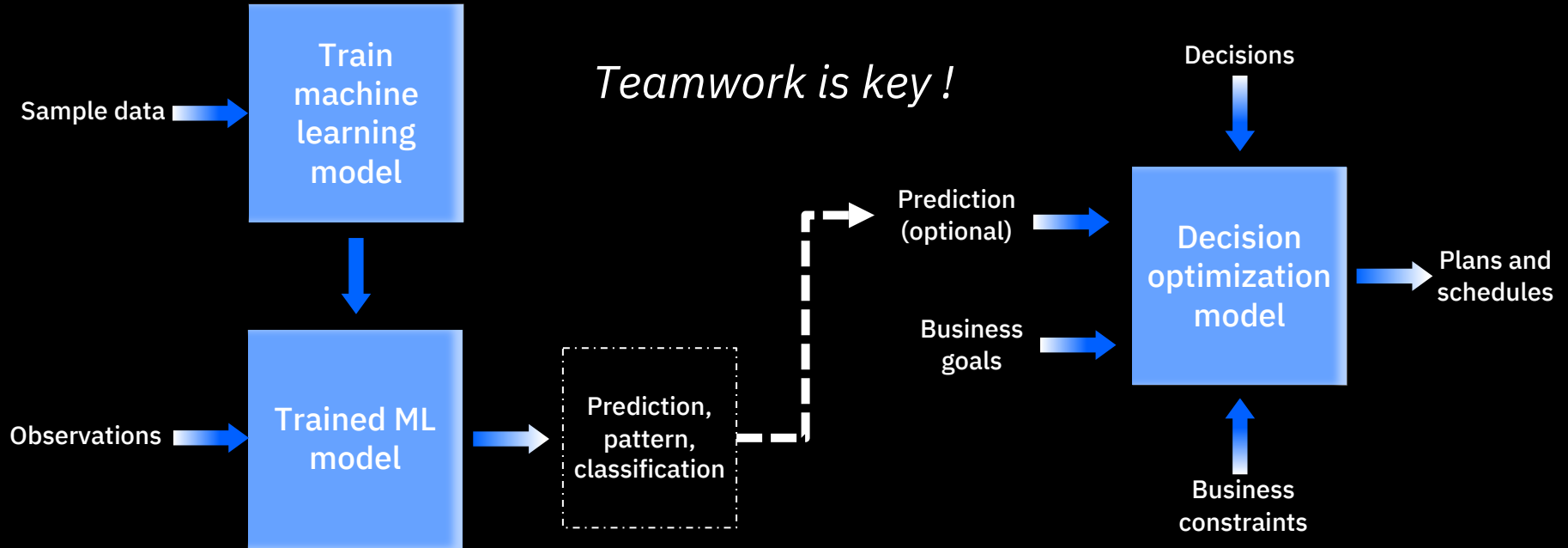


Forecasting von Absatzmengen



Live Demo

Decision Optimization & Machine Learning



Container Terminal Operation

- Manpower Planning (Quay Crane drivers, Yard Crane drivers, Container Handlers, Trucks Drivers)
- Quay Crane Sequence Control
- Loading/Unloading Sequence Optimization
- Yard Planning (Micro and Macro)
- Dispatching of container tractors

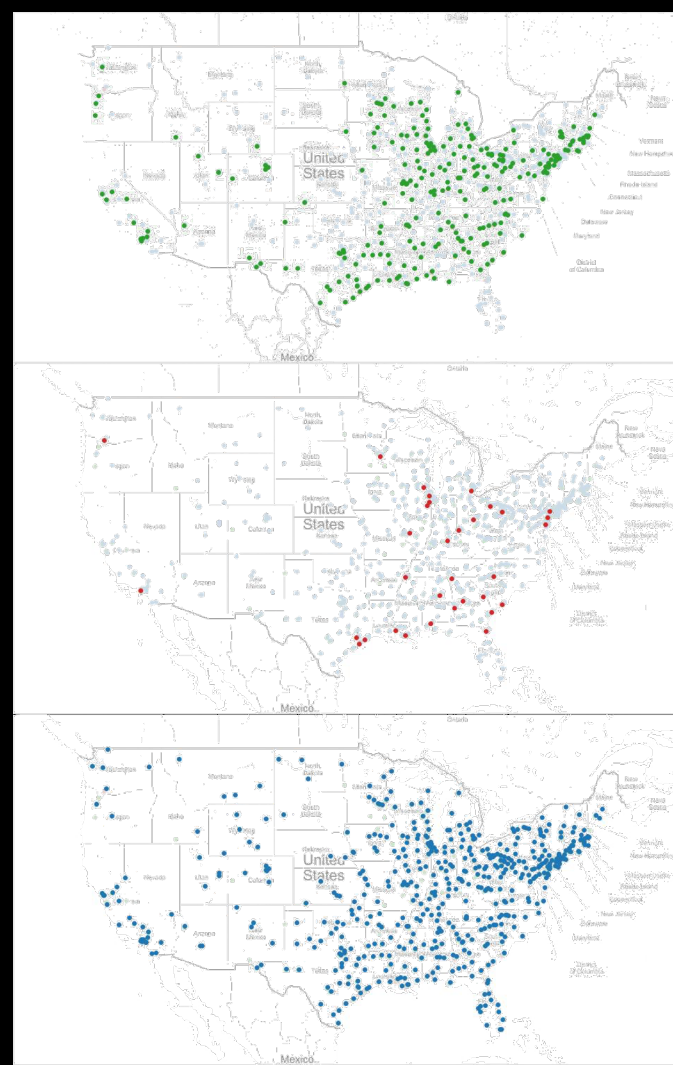
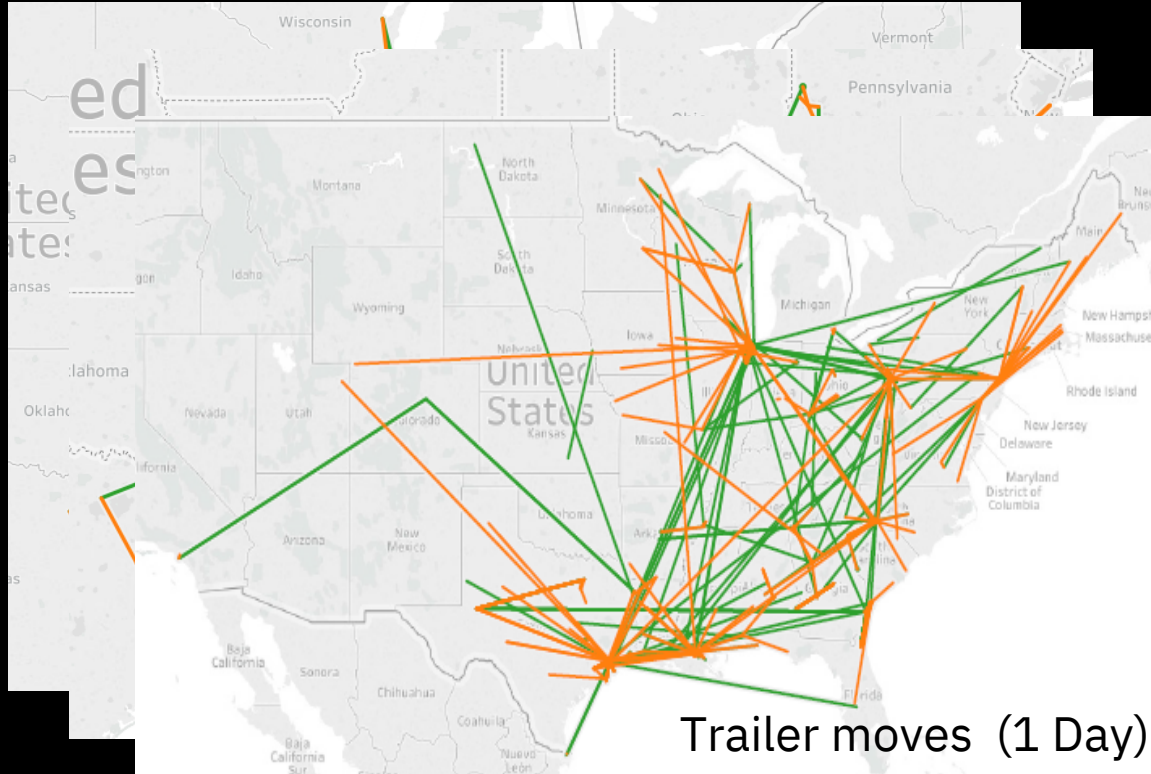


Tanker Planning / Dispatching

- 350 Orders
- 10,000 unique commodities
- 1,600 Tanker trailers
- 100 Tank/Wash Facilities
- 1000 Tractors / Drivers



Tanker Planning / Dispatching



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- **Q&A**

Thank you for your attention!



Alexander Richthammer
Technical Specialist Data Science



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Cognitive Solution Architect



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Client Technical Professional - Decision Optimization

IBM

