

WELKOM BIJ



DIEPDUIKEN IN VERGEZICHTEN





PROGRAMMA

13.00 - 14.45: Lezingen – Remise zaal

15.00 - 16.45: Werksessies in de trams – Remise hal

17.00 - 17.30: Terugkoppeling en afsluiting – Remise zaal

17.30 - 18.30: Netwerkborrel – Horecaplein

DEEL 02:

SPREKERS & ABSTRACTS

14 NOVEMBER NAE



Scan de QR-code voor details
over sprekers en abstracts

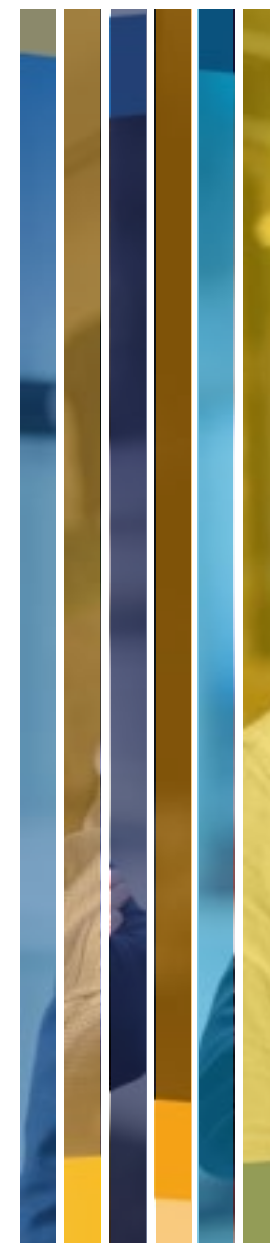








INGE DIEPMAN

DAGVOORZITTER



The image features decorative curved lines in the top right and bottom left corners. These lines are composed of multiple overlapping, semi-transparent bands in shades of light blue and green, creating a sense of depth and movement. The text is centered on the page in a black, italicized font.

“Als AI zie ik ‘Diepduiken in vergezichten’ als het balanceren tussen nauwkeurigheid en ambitie. AI in Engineering vereist zowel een scherpe focus op de details, als het vermogen om trends en kansen aan de horizon te zien”.



“De combinatie ‘Diepduiken in vergezichten’ vind ik bijzonder interessant, omdat het twee schijnbaar tegengestelde bewegingen combineert: de diepe, gerichte focus van het duiken met de brede, verre blik van vergezichten.

Dit weerspiegelt precies hoe AI werkt. We hebben zowel diepgaande analyse nodig, als het vermogen om patronen te zien en toekomstmogelijkheden te voorspellen”.











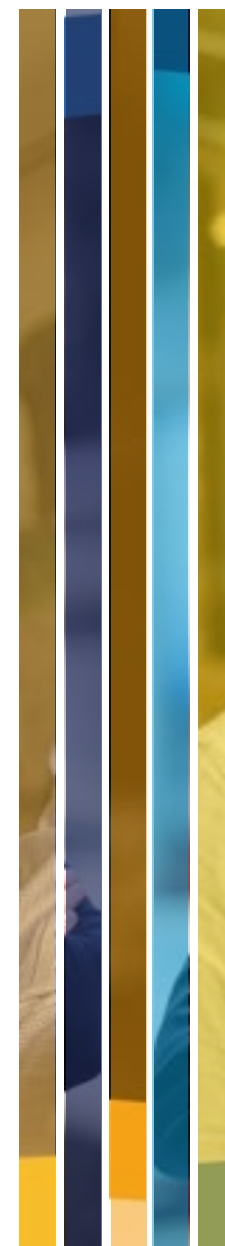


INLEIDING:

ENGINEERING SYSTEM SOLUTIONS FOR SOCIETY

HENK VAN HOUTEN

VOORZITTER NAE



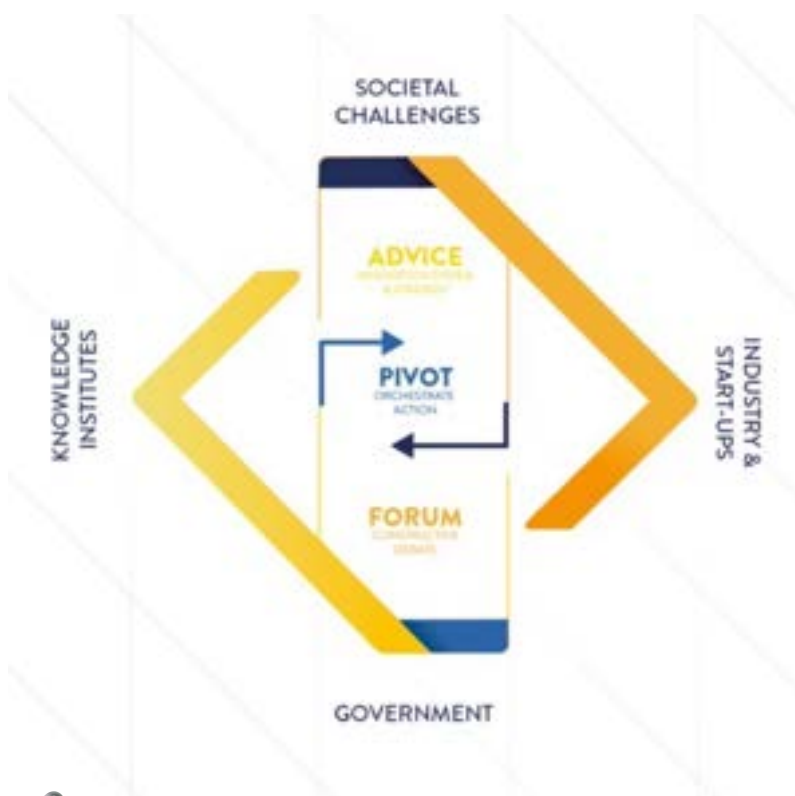


**Engineering System
Solutions for Society**

Henk van Houten



NAE: orchestrating debate, action, and strategic advice in Dutch engineering, technology, and innovation



ENGINEERING
TALENT



ECOSYSTEM
IMPROVEMENTS



SOCIETAL
TRANSITIONS



ENGINEERING
PRACTICES



VALORIZATION &
STARTUPS



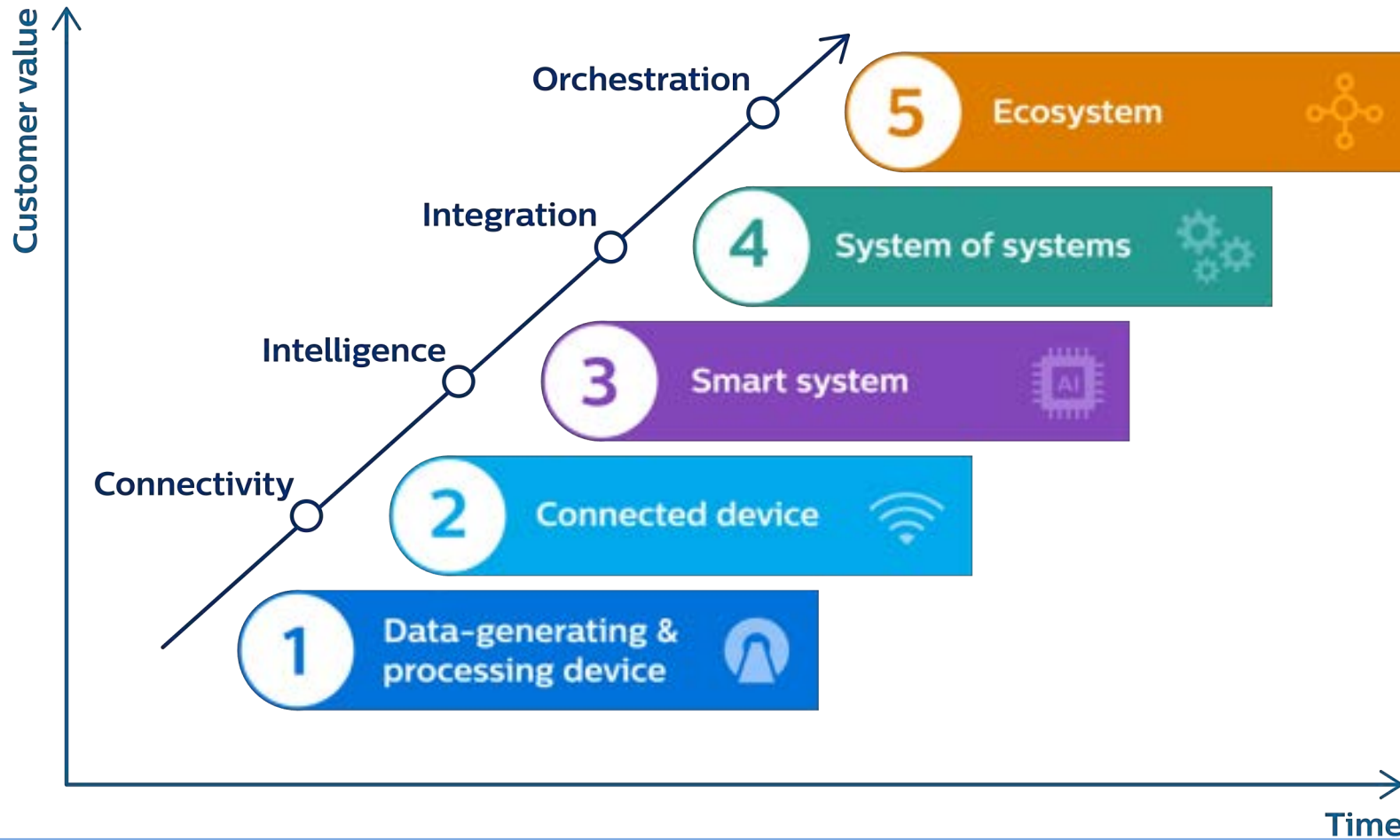
INTERNATIONAL
COLLABORATION

[NAE Positioning Paper](#)

Societal challenges require smart solutions



The digital transformation is enabling orchestrated smart system-of-system solutions



Source: <https://a.storyblok.com/f/74249/x/0233ebf693/keynote-2019-04-06-henk-van-houten-esi-final.pdf>

Smart energy



Smart healthcare



<https://www.mdpi.com/1996-1073/16/12/4835>

<https://health.clevelandclinic.org/ai-in-healthcare>

Smart water



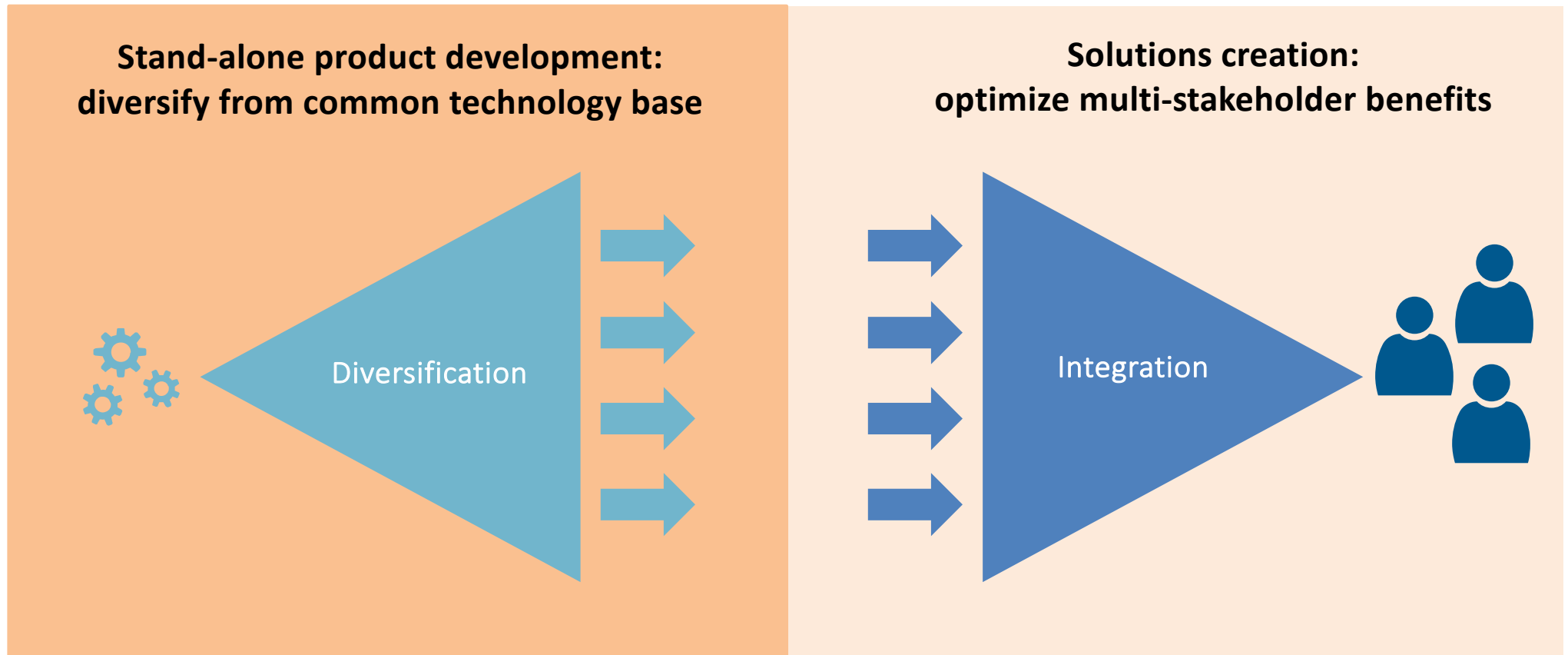
Smart agriculture



<https://hashstudioz.com/blog/smart-water-management-using-iot-in-2024/>

<https://www.vicon.nl/over-vicon/im-farming/smart-farming-nu-en-straks>

A paradigm shift in engineering: from products to systems-of-systems solutions



What does it mean to innovate for solutions and outcomes?



Society centric innovation

Innovating beyond system features and performance, creating fully integrated solutions fulfilling unmet **needs of multiple stakeholders**



Integration and partnerships

Integrating technology via a common deployment **platform** that connects end-users, services, 3rd party offerings



End-user Value

Making the shift to a **value-based** business model, delivering on multiple stakeholder KPI's.



Continuous delivery

Continuous improvement, leveraging capabilities in Software, Systems, data and AI with a **cross-functional Solutions Suite** mindset.

NAE, KIVI, and IVA are supporting Arthur D. Little in a study to understand what shapes the “Future of engineering” and what the role of AI will be in engineering

STUDY OBJECTIVE



Defining the role of AI in today’s complex system engineering and how it can be deployed alongside rapidly advancing technologies and new ways of working

KEY QUESTIONS AND SCOPE

1 - Industry view

Industry challenges

What is the power of AI in engineering?

Opportunities & threats of AI

2 - Company view

Maturity & bottlenecks

How to make it work in practice?

AI potential & use cases

SURVEY STATUS

97+ survey respondents

90+ different companies engaged globally

821+ AI use cases reviewed to date



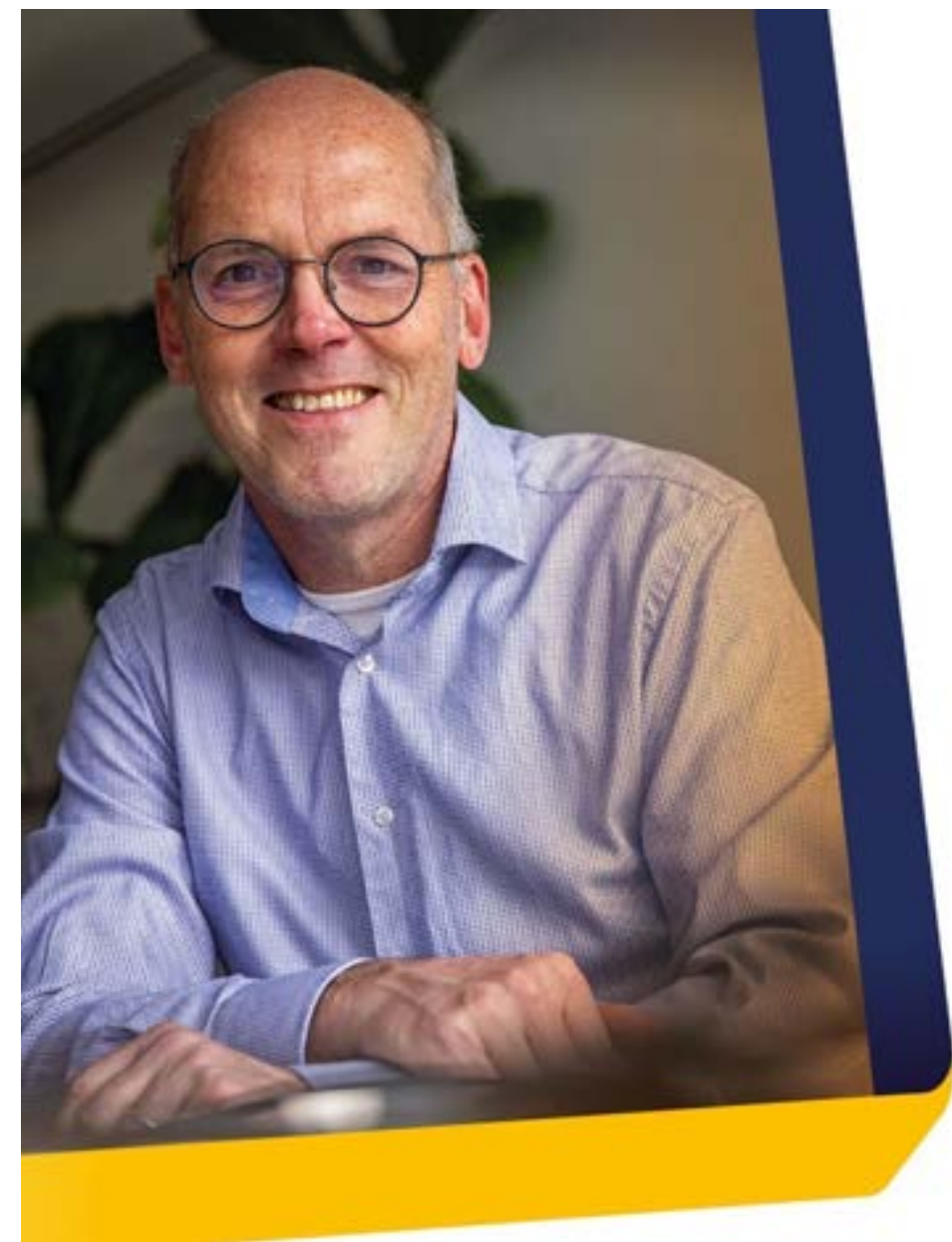
The study report is planned to be published in Q1/2025. The survey remains open for participation. Please feel invited to contribute to the study and share your view by scanning this link to the survey

Smart System of System Solutions need a powerful Architecture and Interdisciplinary Teamwork



<https://www.khm.at/en/object/323/>





KEYNOTE:

DE ZIN EN ONZIN VAN KUNSTMATIGE INTELLIGENTIE

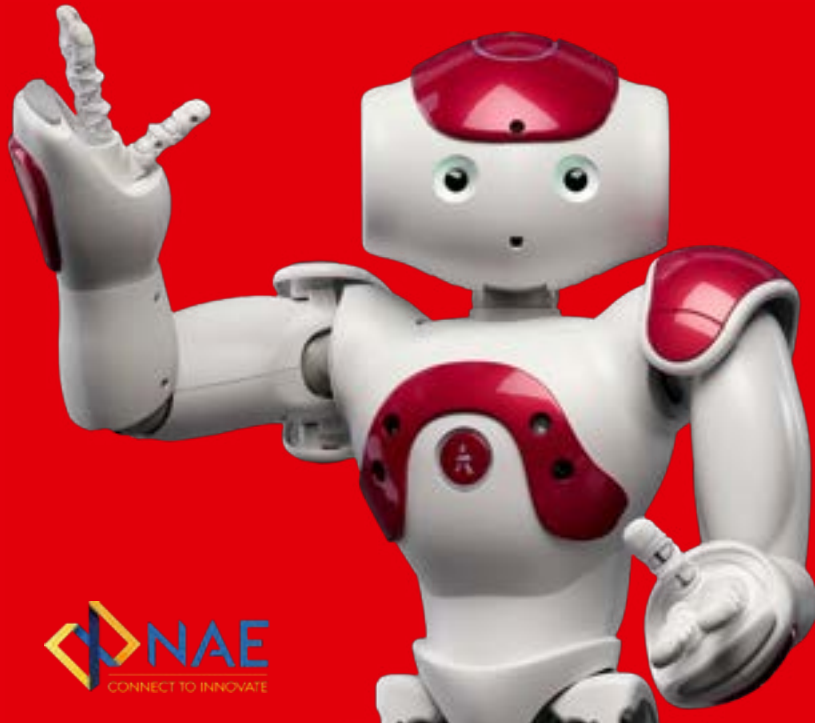
TOM HESKES

HOGLERAAR DATA SCIENCE,
RABBOUD UNIVERSITEIT



De zin en onzin van kunstmatige intelligentie

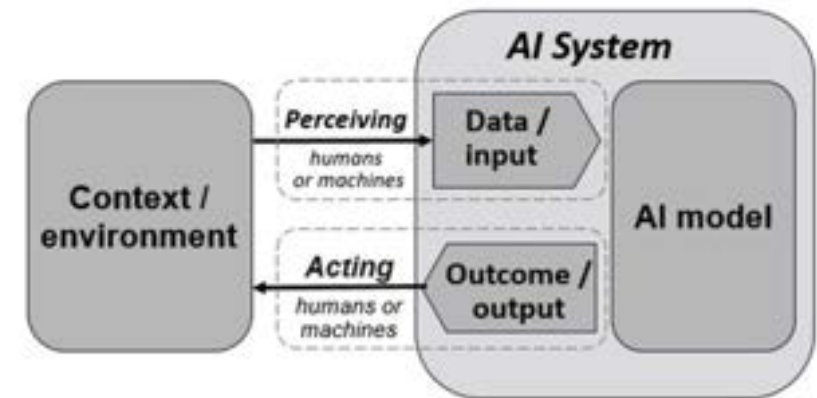
Tom Heskes
14 november 2024



Wat is AI?

Definities...

- *“An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments.”* –OESO (input voor EU AI Act)



- *“Artificial intelligence is the science and engineering of making computers behave in ways that, until recently, we thought required human intelligence.”* –Andrew Moore



Artificiële Intelligentie

Waar komt de hype vandaan?

Watson wint Jeopardy (2011)



AlphaGo verslaat Lee Sedol (2016)



ChatGPT (2022)

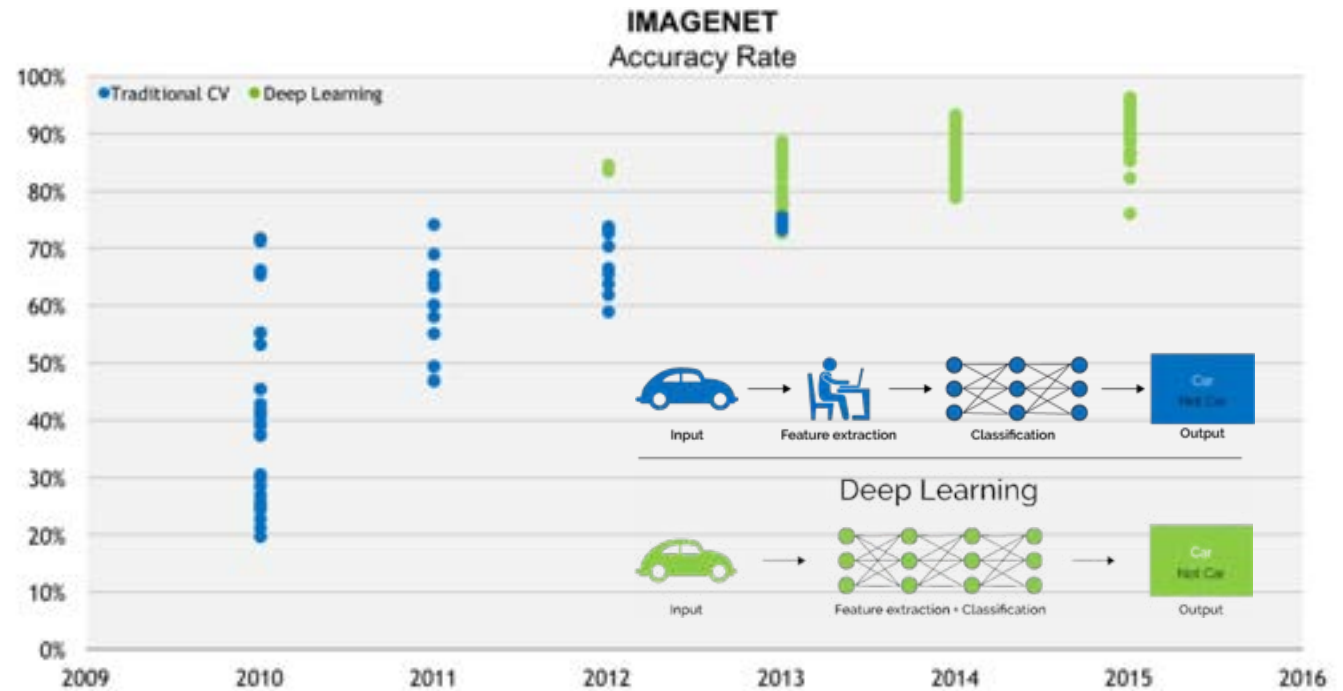


ImageNet

- 1,2M plaatjes om van te leren
- 100k om te evalueren
- 1,000 objectklassen (categoriën)
- jaarlijkse competitie



IMAGENET



Grote taalmodellen (1)

Attention Is All You Need

Ashish Vaswani*
Google Brain
avaswani@google.com

Noam Shazeer*
Google Brain
noam@google.com

Niki Parmar*
Google Research
nikip@google.com

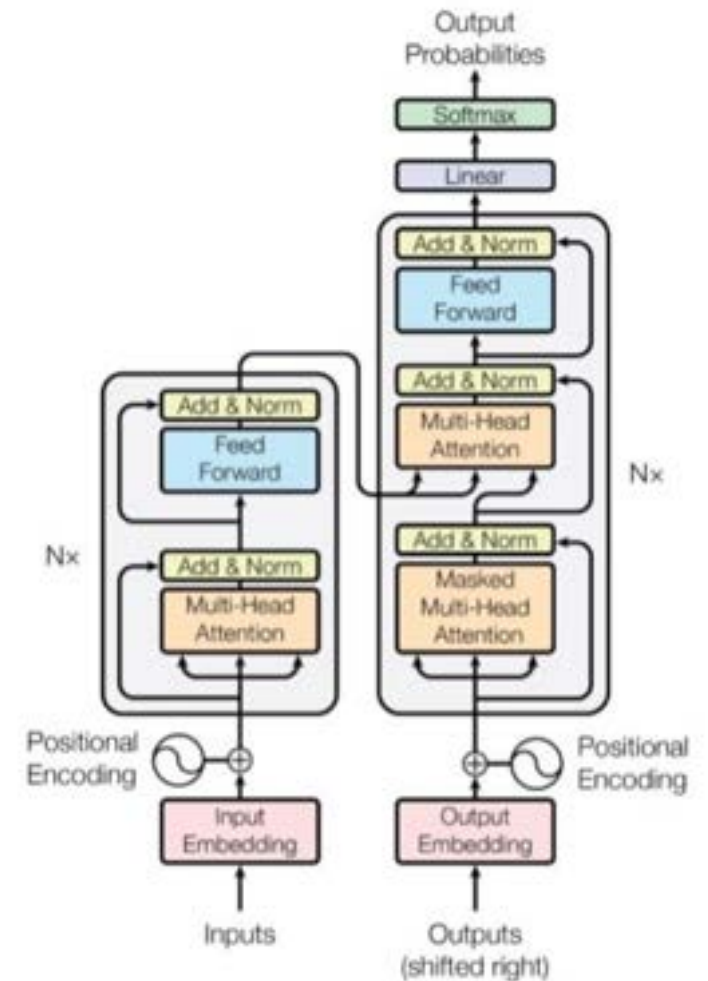
Jakob Uszkoreit*
Google Research
usz@google.com

Llion Jones*
Google Research
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Aidan N. Gomez* †
University of Toronto
aidan@cs.toronto.edu

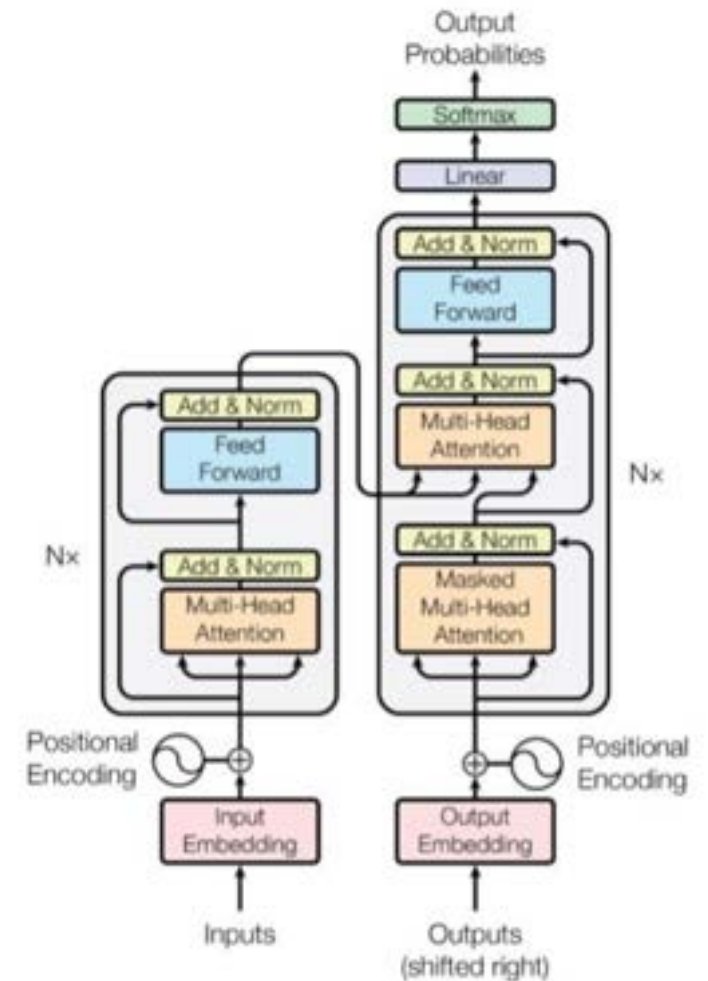
Lukasz Kaiser*
Google Brain
lukaszkaizer@google.com

Illia Polosukhin* †
illia.polosukhin@gmail.com



Grote taalmodellen (1)

- “Transformer” modellen om het **volgende woord** te voorspellen
- **Bakken met data** beschikbaar (Wikipedia, kranten, computercode, ...)
- Succesvol in verschillende taken (samenvatten, tekstgeneratie, vraag/antwoord, ...)



Grote taalmodellen (2)

- Extreem **complexe** modellen
- GPT-3 trainen kost jaarlijkse **energieverbruik** van 100+ huizen
- GPT-4o aanzienlijk **beter**
- Andere haken aan: Llama (Meta), Gemini (Google), Claude (Anthropic), Poro/Viking (Silo), ...



Sora (1)



Several giant woolly mammoths approach treading through a snowy meadow, their long woolly fur lightly blows in the wind as they walk, snow covered trees and dramatic snow capped mountains in the distance, mid afternoon light with wispy clouds and a sun high in the distance creates a warm glow, the low camera view is stunning capturing the large furry mammal with beautiful photography, depth of field.

Sora (2)



Five gray wolf pups frolicking and chasing each other around a remote gravel road, surrounded by grass. The pups run and leap, chasing each other, and nipping at each other, playing.

Nobelprijs in natuurkunde voor neurale netwerken



Nobelprijs in scheikunde voor AlphaFold

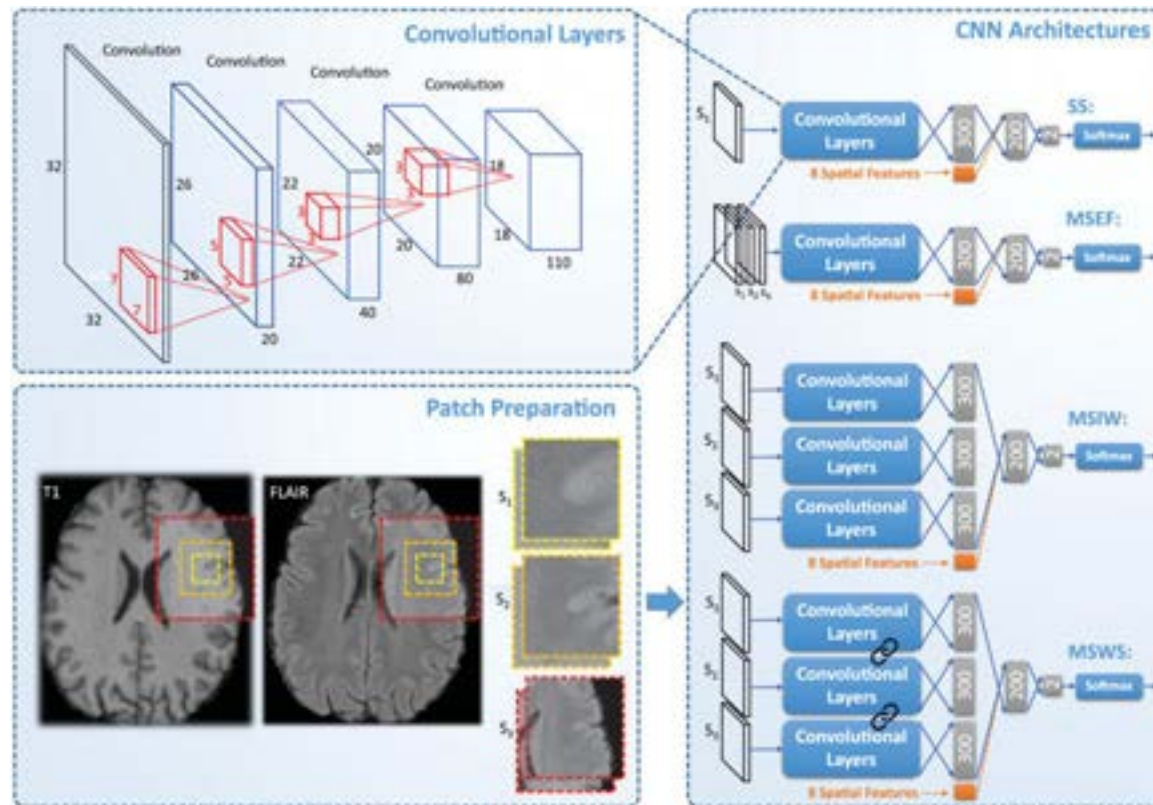


Wat kun je ermee?

AI in Engineering

- Routine automatisering (**kwakeiteitscontrole**, data analyse)
- Nauwkeurigere **voorspellingen**, bijvoorbeeld voor betere planning in onderhoud en productie
- Verbeterde **simulaties** en versnelde optimalisatie middels digital twins

Medische beeldherkenning

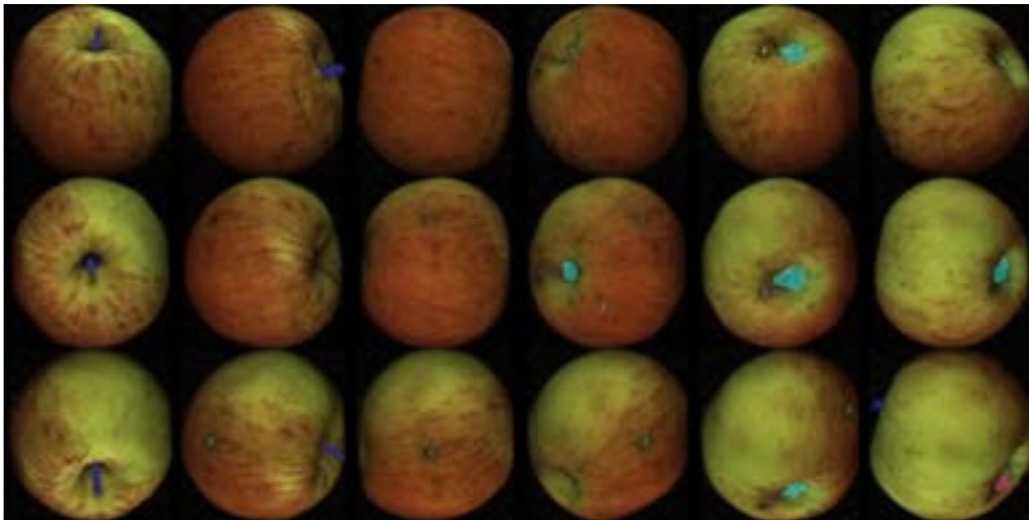


- ✓ Gezondheidszorg
- ✓ Routine automatisering

Radboudumc

Ghafoorian et al., 2017

Automatische sortering van fruit



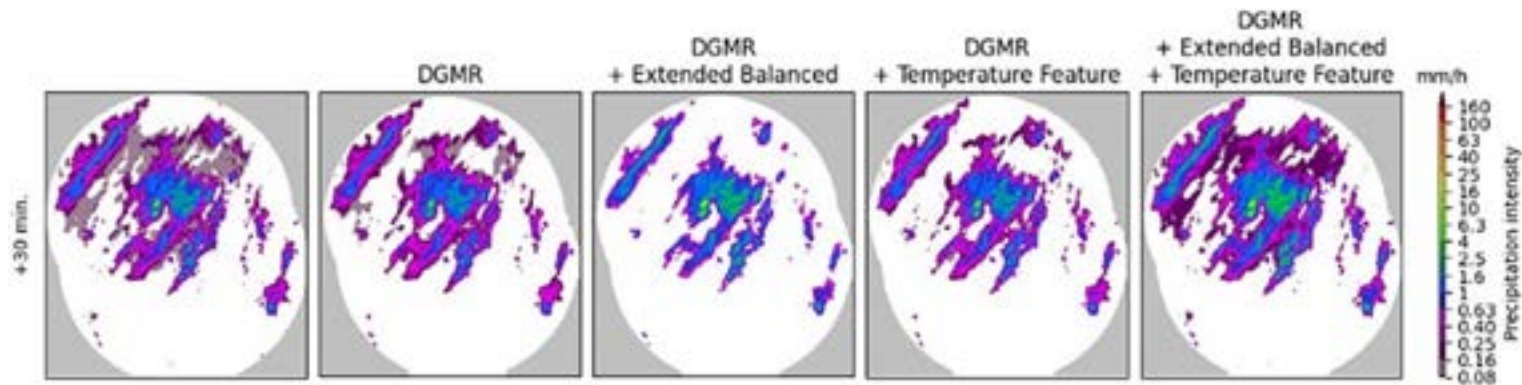
- ✓ Landbouw
- ✓ Routine automatisering



SILO_{AI}



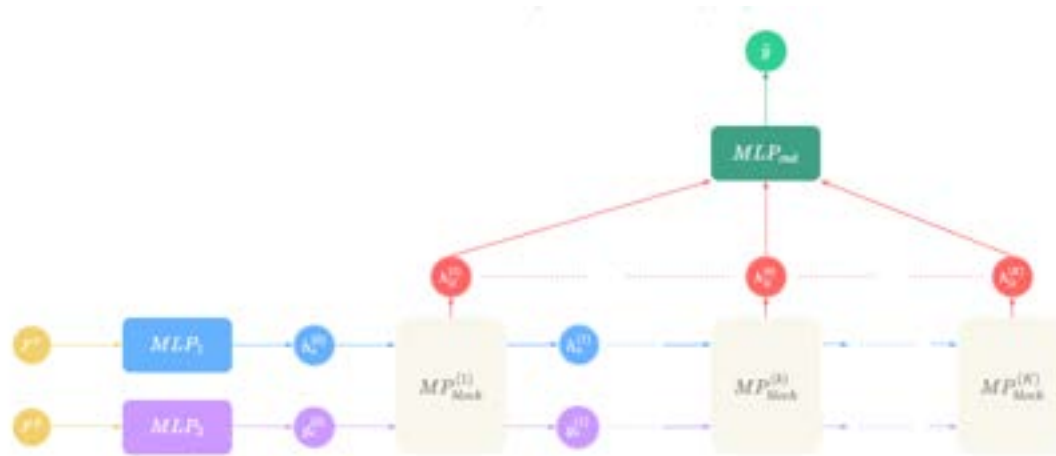
Nowcasting van gebeurtenissen met hoge intensiteit



- ✓ Water
- ✓ Nauwkeurigere voorspellingen

Cambier van Nooten et al., 2023

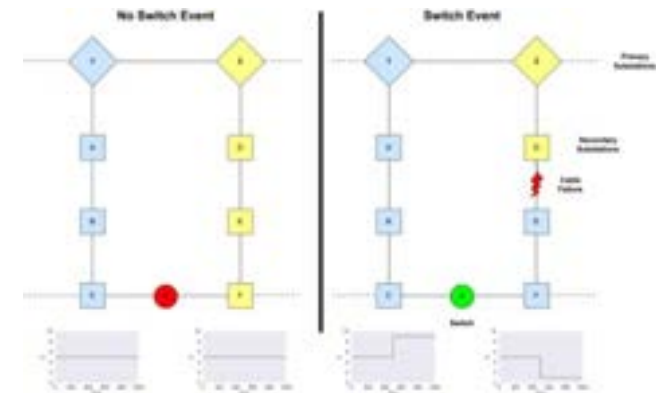
Betrouwbaarheid van het elektriciteitsnet



AI for
Energy Grids
Lab



- ✓ Energie
- ✓ Snellere optimalisatie
- ✓ Routine automatisering



Wat maakt het zo lastig?

(nog los van implementatie in de praktijk, certificering, acceptatie, ethische en juridische aspecten, onderhoudbaarheid...)

Kwaliteit van de data

- Succesverhalen vertalen zich niet eenvoudig naar andere domeinen:
gebrek aan voldoende goed gelabelde/geannoteerde data

- Vaak enorm overschat: noodzaak voor
verwachtingenmanagement

“Garbage in, garbage out”



Your analysis is as good as your data.

Beperkingen van de technologie

- Ook deep learning is en blijft statistiek en dus “tellen”
- Grote moeite om **gevallen in de staart** te vangen
- Geen boerenverstand, snapt niets van context
- Geen begrip van oorzaak en gevolg



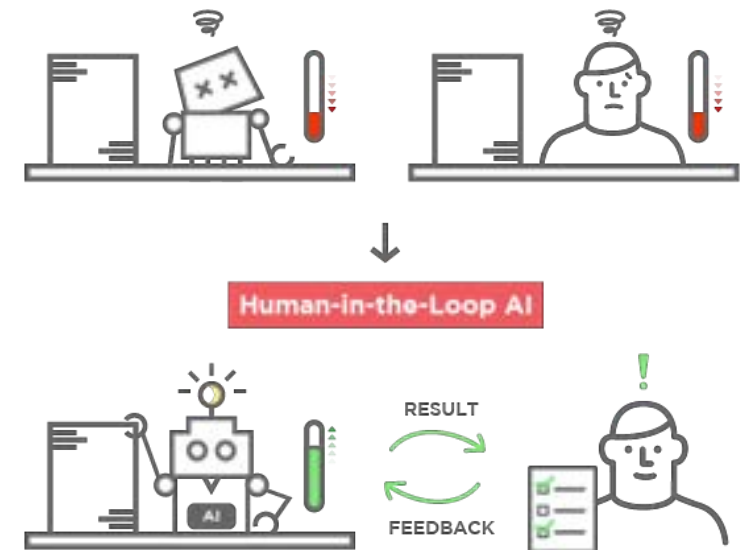
“Lange staart”

groot aantal, vaak kritische, ieder voor zich weinig voorkomende situaties



Take-home messages

- Huidige AI = **Statistiek 2.0** (maar ook Statistiek 1.0 en soms 0.0 wordt als AI verkocht)
- Bewezen verbeteringen in de analyse van **taal, spraak** en **beeld**
- Enorm **potentieel** voor allerlei toepassingen
- AI wordt een “**commodity**”, onder de motorkap
- Vooral **boerenverstand** blijkt (nog steeds) erg lastig voor computers
- **Nieuwe paradigma's** nodig?



*Disclaimer: nog veel meer te zeggen over niet-technologische aspecten die komen kijken bij implementatie in de praktijk

AI zal binnen een paar jaar een revolutie in engineering teweegbrengen

- Word wakker, die revolutie is al lang begonnen
- Zeker, het hele veld gaat op zijn kop
- Vast, maar het kan nog wel even duren
- Wie weet, maar niet met de huidige AI
- Aan me nooit niet
- Ik vraag het ChatGPT wel



OMGAAN MET PIEKBUIEN, KAN AI HELPEN?

HANNEKE VAN DER KLIS

DIRECTEUR DIGITALE TRANSFORMATIE, DELTARES



KNMI'23
klimaatscenario's



Deltares



Omgaan met piekbuien - Kan AI helpen?

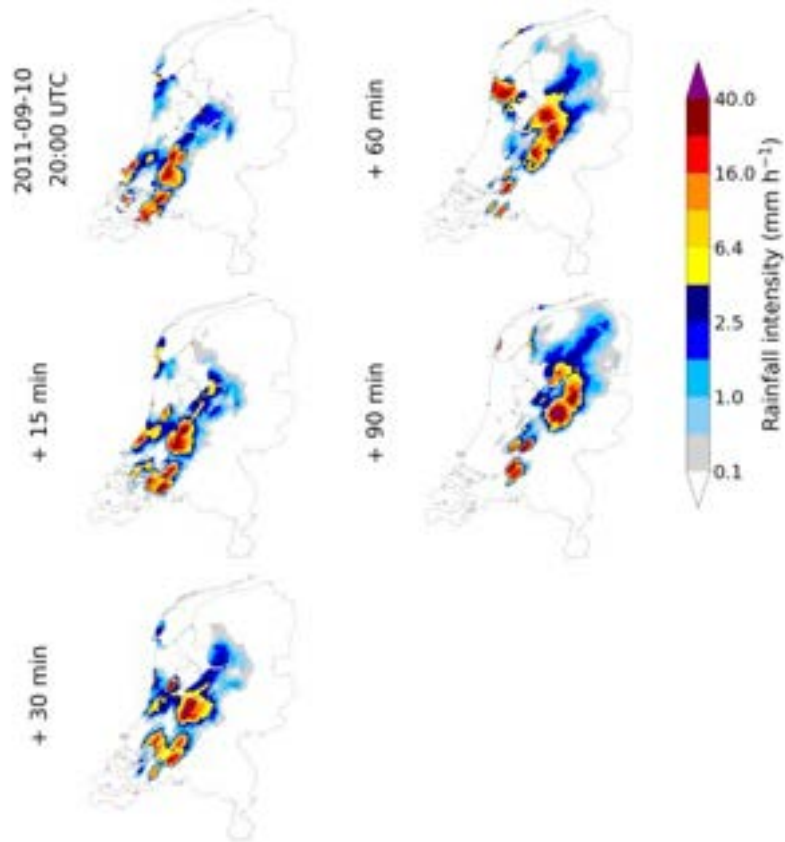
Dr. Ir. Hanneke van der Klis

Director Digital Transformation, Deltares



Direct en ter
plekke bij
actuele
informatie
op maat

Neerslag - nowcasting



nature > articles > article

Article | [Open access](#) | Published: 05 July 2023

Skilful nowcasting of extreme precipitation with NowcastNet

[Yuchen Zhang](#), [Mingsheng Long](#), [Kaoyan Chen](#), [Lanxiang Xing](#), [Binghua Jin](#), [Michael L. Jordan](#) & [Jianmin Wang](#)

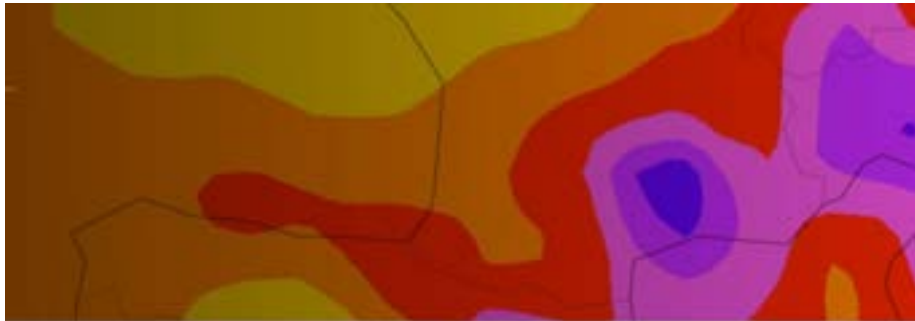
Nature 619, 526–532 (2023) | [Cite this article](#)

65k Accesses | 97 Citations | 445 Altmetric | [Metrics](#)

Abstract

Extreme precipitation is a considerable contributor to meteorological disasters and there is a great need to mitigate its socioeconomic effects through skilful nowcasting that has high resolution, long lead times and local details^{1,2,3}. Current methods are subject to blur, dissipation, intensity or location errors, with physics-based numerical methods struggling to capture pivotal chaotic dynamics such as convective initiation⁴ and data-driven learning methods failing to obey intrinsic physical laws such as advective conservation⁵. We present NowcastNet, a nonlinear nowcasting model for extreme precipitation that unifies physical-

Vervanging van 'klassieke' modellen



NEWS AIFS: a new ECMWF forecasting system

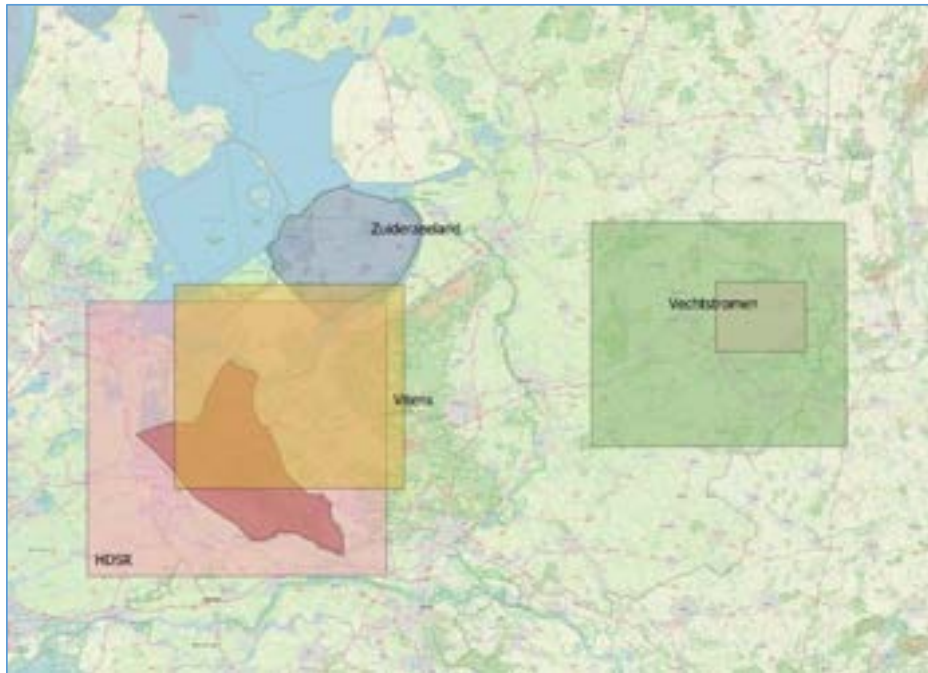
Simon Lang, Mihai Alexe, Matthew Chantry, Jesper Dramsch, Florian Pinault, Baudouin Raoult, Zied Ben Bouallègue, Mariana Clare, Christian Lessig, Linus Magnusson, Ana Prieto Nemesio



Using AI to make critical flood forecasting information universally accessible

TKI-Deltatechnologie

AI-kennis voor grondwatermodellen



- Een neurale netwerk-versie van bestaande MODFLOW-modellen

zodanig dat:

- Het consistent is met het onderliggende MODFLOW-model

waarbij:

- Metamodel 100-1000 keer sneller is dan MODFLOW-model

Voor:

- Scenarios en effectberekeningen
- Ensembles voor onzekerheidsberekeningen
- Tablet versies voor onderweg



Met AI in onze toolbox maken
we piekbuien hanteerbaar

topsector
energie  innovatie voor een
duurzame toekomst

EEN SLIMMER ENERGIENETWERK MET AI

CLAIRE GROOSMAN

PROGRAMMADIRECTEUR DIGITALISERING,
TOPSECTOR ENERGIE



"De complexiteit van opereren en onderhouden van het energiesysteem van de toekomst kunnen we met AI het hoofd bieden"



IMPLEMENTATIE VAN AI IN DE GEZONDHEIDSZORG

WIRO NIESSEN

DECAAN UMCG &
CAPTAIN OF SCIENCE TOPSECTOR LIFESCIENCES

AI 4 Health: challenges, opportunities & how to seize these in the NL

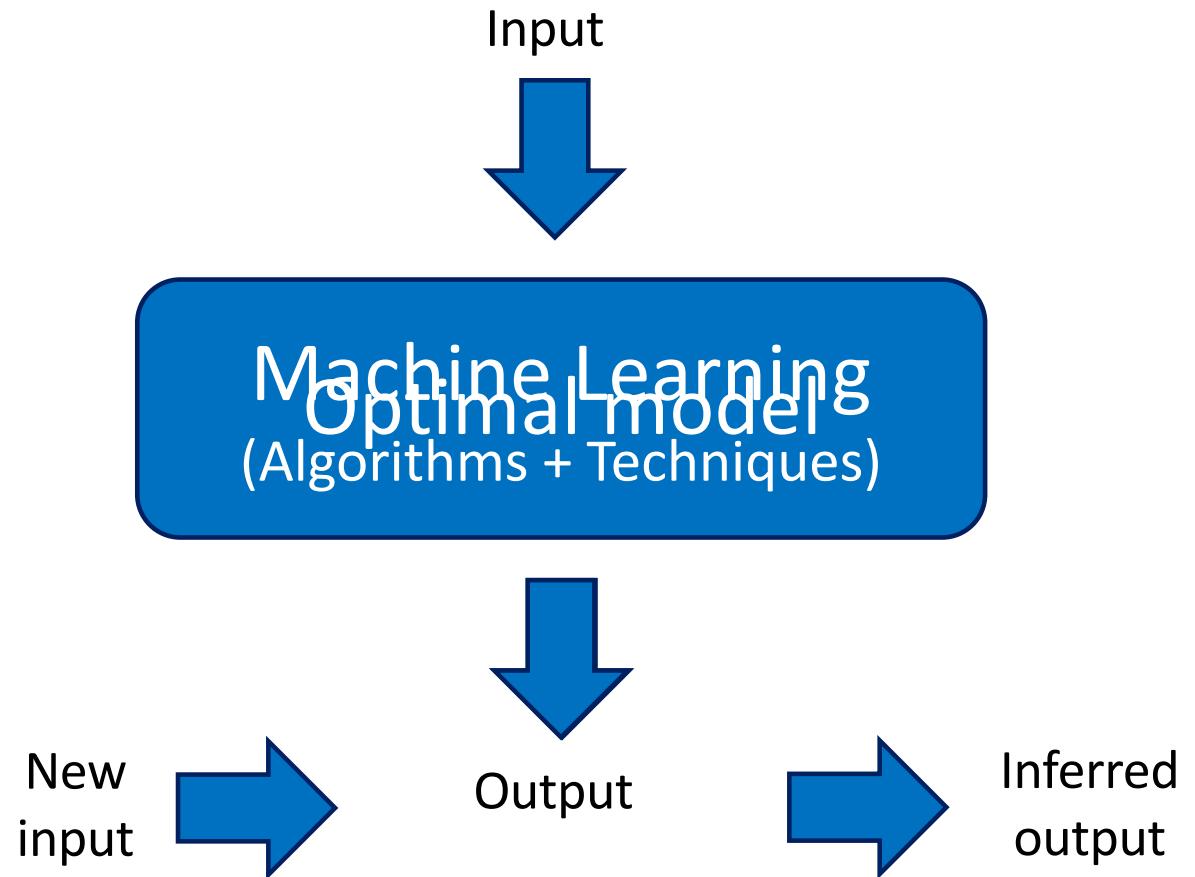
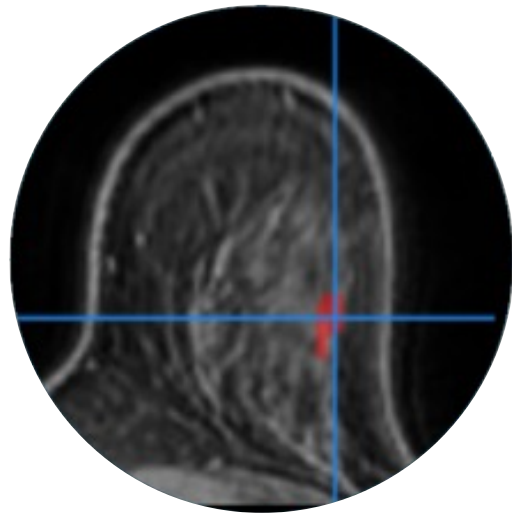


Wiro Niessen, Dean Faculty of Medical Sciences, University of Groningen, Board Member UMCG
Captain of Science, TopTeam Life Science & Health, Ministry of Economic Affairs

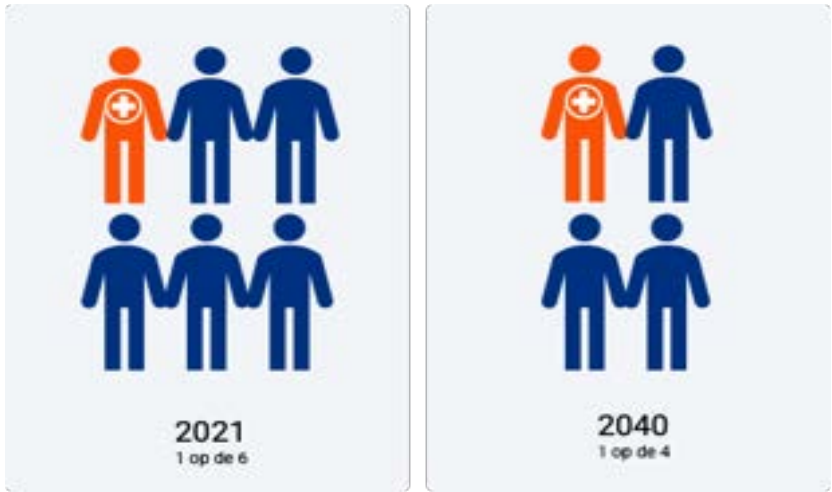


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Machine Learning: paradigm shift in science & beyond



Why are we here today talking about AI in life science & health?



LEVENSV ERWACHTING



Mensen met een laag inkomen en lage opleiding leven **15 jaar** minder lang in goede gezondheid

AI Powerful technology that has the potential to address some of the most pressing problems in health and healthcare today



Three themes in which AI will be disruptive in Life Science & Health Sector

- **Preclinical research and innovation**
 - Development novel drugs and therapies (more efficient, faster)
- **Learning healthcare system**
 - Data-driven health(care) : “precision medicine” / evidence-based prevention
 - Diagnostics, prediction, clinical decision support; digital twin concept
- **Generative AI in health:**
 - Optimizing processes, automating administration, increase job satisfaction, improved patient experience and participation

How to create an innovation ecosystem in the NL to become frontrunners internationally, generating societal impact and economic spin-off?

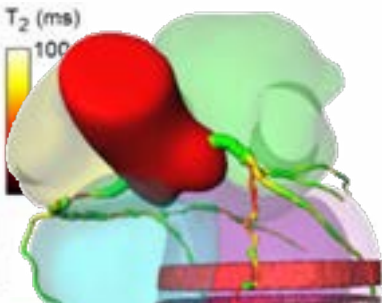
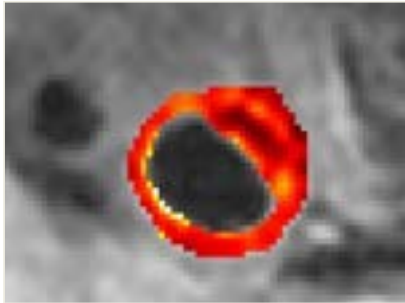
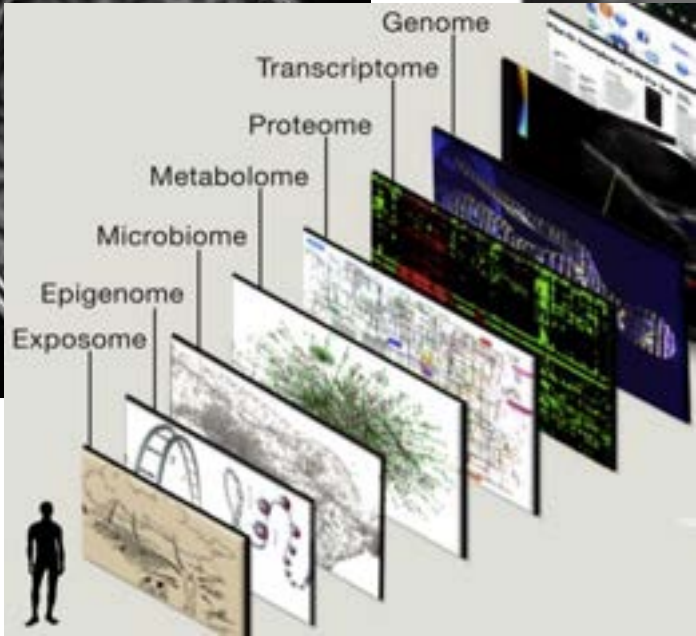
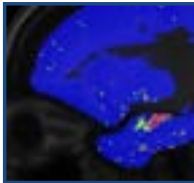
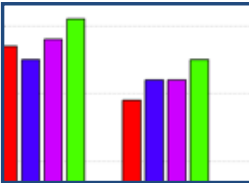
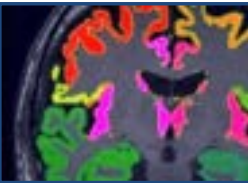
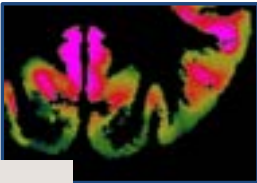
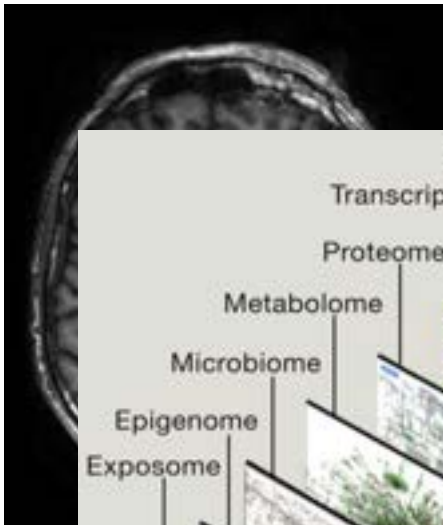
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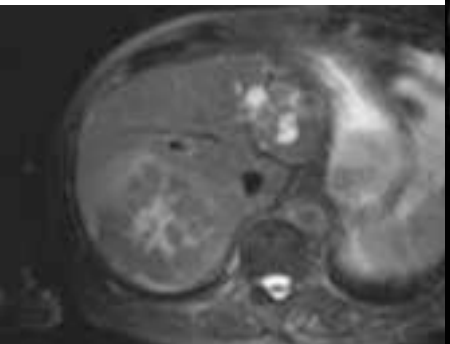
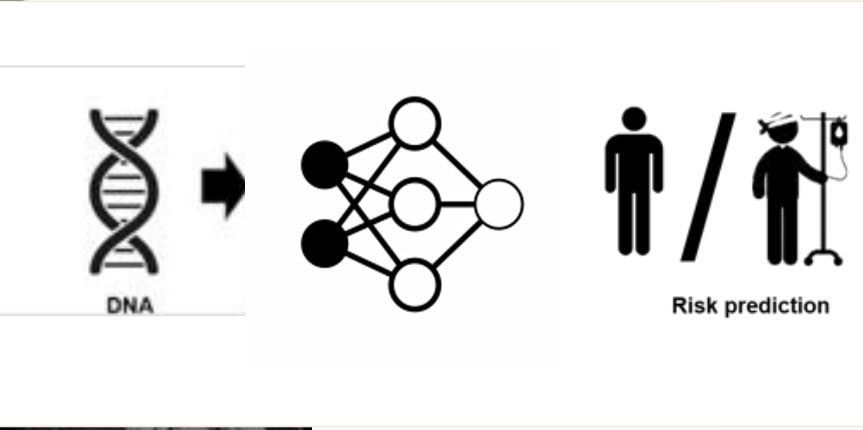
How to create an innovation ecosystem in the NL to become frontrunners internationally, generating societal impact and economic spin-off?

How is AI changing diagnostics and clinical decision making?

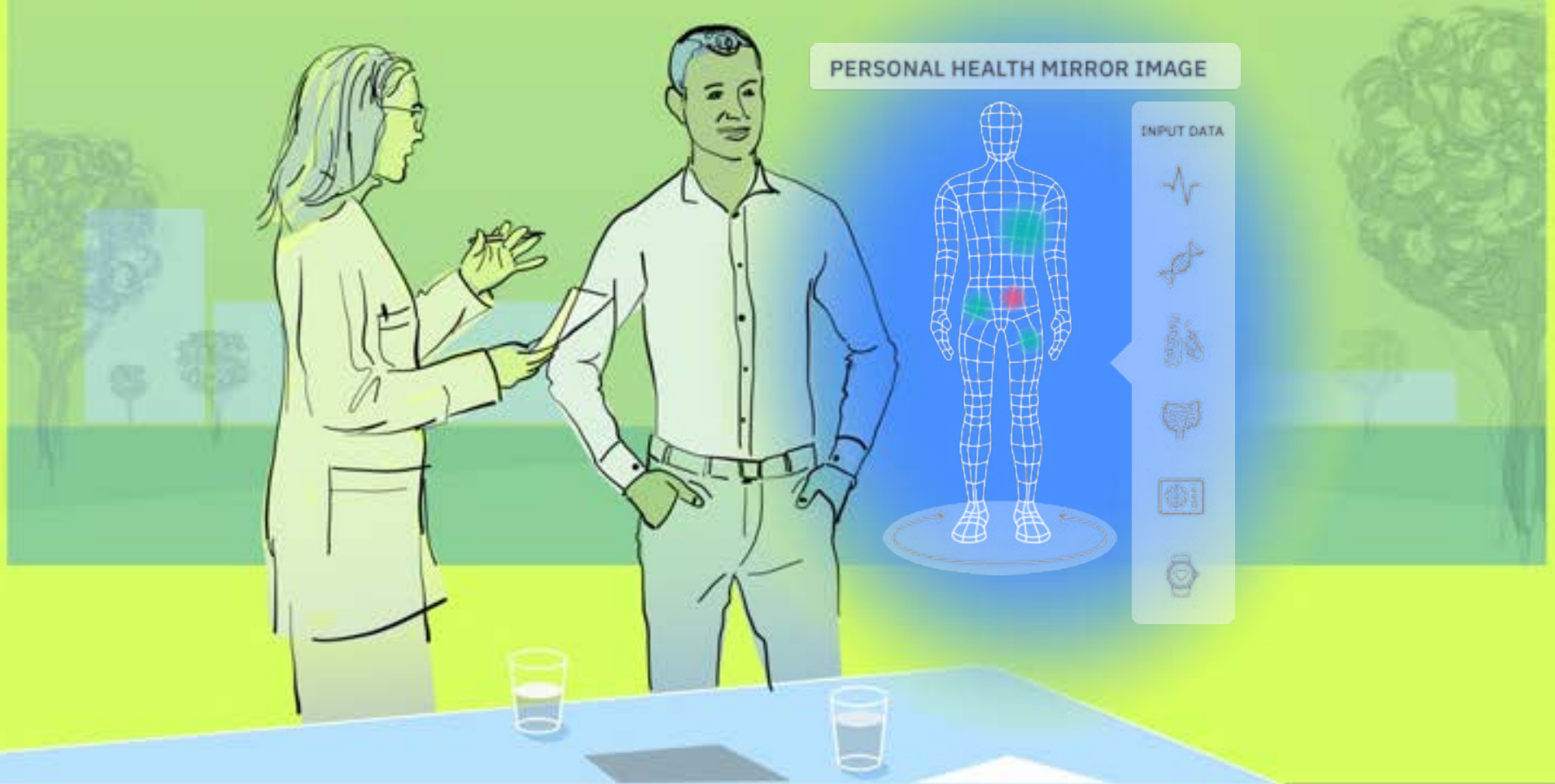
Learning from every patient encounter
to improve the treatment of every future patient



	Genetic Mutations		Therapy Response
	Tumor Phenotype		Patient Prognosis
	Dementia Diagnosis		Surgery Success



Our vision: more personal, efficient and better health(care) through AI



How will AI reduce administrative burden, improve healthcare, and make healthcare jobs more satisfactory

“Never having to click again”

“No more screens at the general practitioner”





Recent AI breakthrough

Large Language Models; AI can now process text (ChatGPT)

Generative AI: content generation

The screenshot displays a healthcare AI interface with a navigation bar at the top containing icons for AI, Pre-op, Discharge, Chronic Care, Nutrition, Payer, VBC/At Risk, Pharms, and Pharmacy. Below the navigation bar, there are several agent profile cards and a video player.

Agent Profiles:

- Linda:** CHF Discharge, Rating by Nurses: 82%, Style: Engaging, Estimated Cost: +\$5/yr*
- Kelsha:** CHF Discharge, Rating by Nurses: 82%, Style: Direct, Estimated Cost: +\$5/yr*
- Diana:** CKD Chronic Care, Rating by Nurses: 80%, Style: Engaging, Estimated Cost: +\$5/yr*
- Wyatt:** CKD Chronic Care, Rating by Nurses: 80%, Style: Engaging, Estimated Cost: +\$5/yr*
- Nancy:** Pre-Op Colonoscopy, Rating by Nurses: 80%, Style: Direct, Estimated Cost: +\$5/yr*

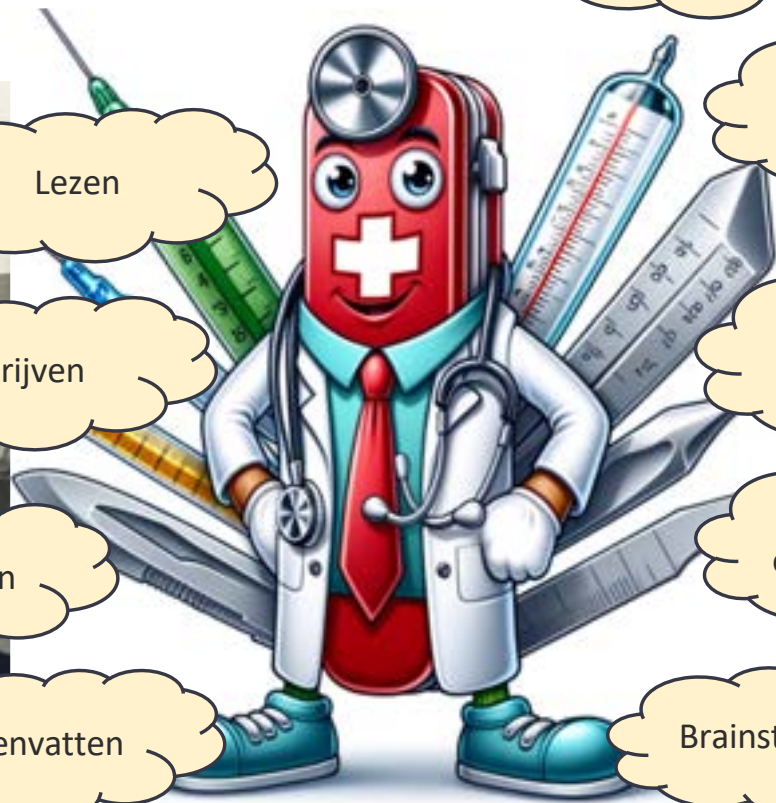
Video Player: Hear our GenAI Healthcare Agents in Action

Possibilities endless:

- Textual interface with an internet of knowledge
- Efficiency in care processes (shortage personnel)
- Job satisfaction (keeping personnel)
- Patient experience / autonomy

Generative AI

Swiss Army Knife for care



Lezen

Schrijven

Beredeneren

Samenvatten

Vertalen
Naar andere
taal

Vertalen
Naar ander
niveau

Vertalen
Naar
computertaal

Data analyse
en visualisatie

Brainstormen

Converseren



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Challenge: closing the gap between potential and impact

- Why: A healthier society and a sustainable high-quality healthcare sector driven by AI
- How: Accelerate responsible implementation of AI with positive (measurable) health impact
- What: AI as a transformative tool to address challenges like administrative burden, diagnostic accuracy, personalized care, and transition from treating disease to keeping people healthy

Challenges to address

- Data Quality & Accessibility: Essential for effective development, optimization and validation AI.
- Regulatory Hurdles: Complex requirements for compliance.
- Financial Constraints: Need for sustained investments.
- Human capital: lack of sector-wide AI-readiness (skill development at all levels)
- Ease of use
- Big-tech dependence; vendor lock-in

**How to create an innovation ecosystem
in the NL to become frontrunners
internationally in AI4Health(care),
generating societal impact and
economic spin-off?**



AI FOR DATA-INTENSIVE DISCOVERIES TO FEED THE WORLD

IOANNIS N. ATHANASIADIS

HOOGLERAAR AI,
WAGENINGEN UNIVERSITY & RESEARCH

DEEL 02:

WERKSESSIES

15:00 – 16:45

Water, Energie,
Gezondheid & Landbouw



DEEL 03:

DISCUSSIE

17:00 – 17:30

1. Wat is de toekomstvisie van de use case op landbouw, water, energie en gezondheid?

2. Wie moet wat doen om de toekomstvisie te bereiken?

3. Welke (engineering) inzichten zijn nodig?

4. Welke mate van integratie is nodig om dit te bereiken?

DANK VOOR UW KOMST!

Bedankt voor uw aanwezigheid en
deelname aan NAE

**PARTNER WORDEN
VAN NAE?**



nae.nl/partnership