AI en Gezondheid:
Over mogelijkheden, risico's en verantwoord gebruik van AI

Pim Haselager

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Radboud University, Nijmegen, The Netherlands
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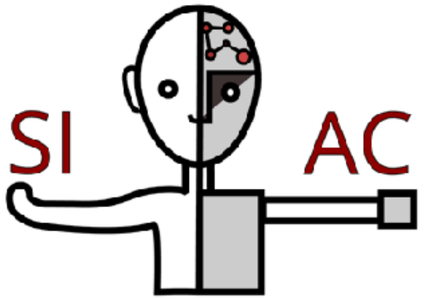


Societal Implications of AI & CNS

AI Act

Article 3

Definitions

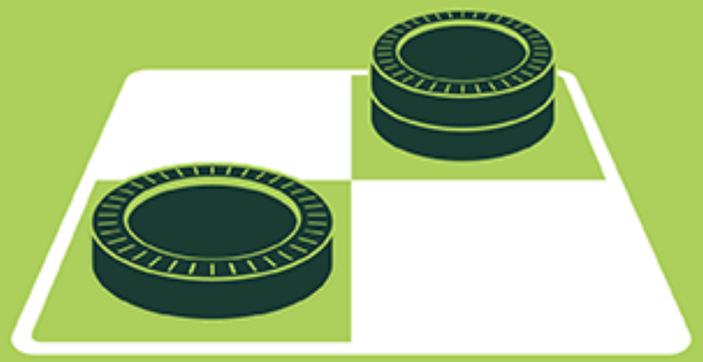
For the purposes of this Regulation, the following definitions apply:

(1) 'AI system' means a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and 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;

https://eur-lex.europa.eu/eli/reg/2024/1689/oj

ARTIFICIAL INTELLIGENCE

Early artificial intelligence stirs excitement.



MACHINE LEARNING

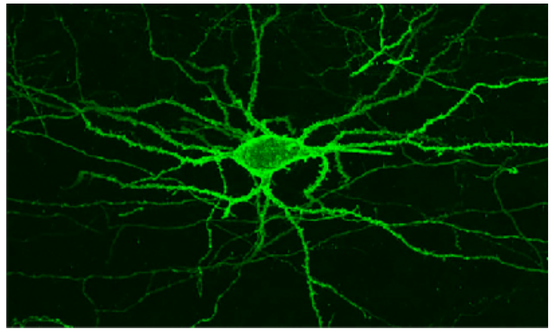
Machine learning begins to flourish.

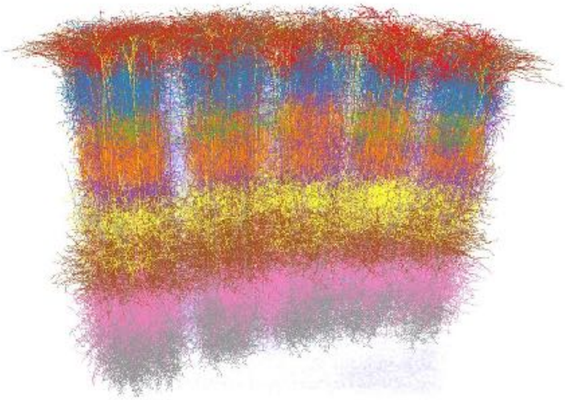
DEEP LEARNING

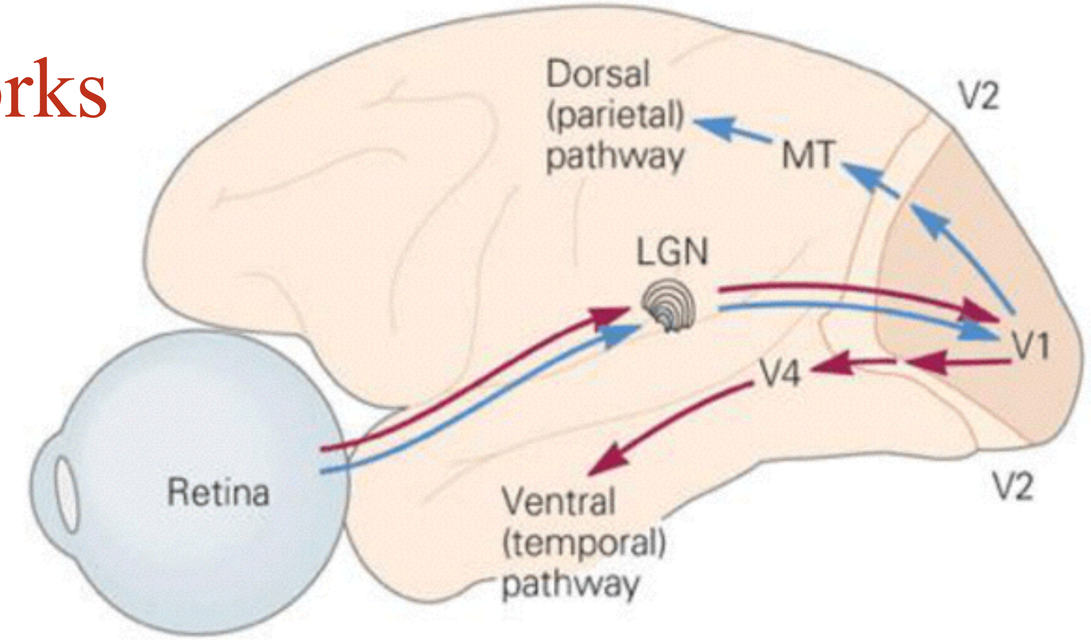
Deep learning breakthroughs drive AI boom.

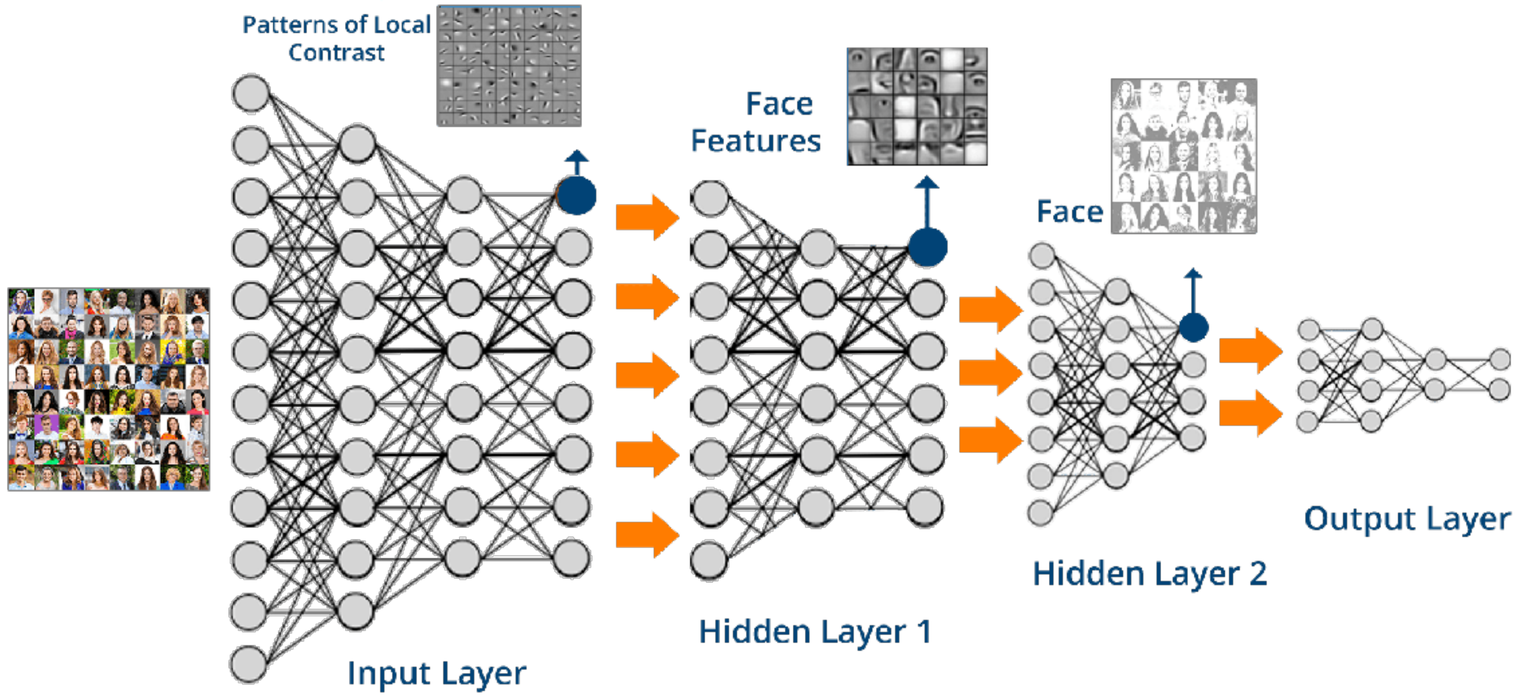
1950's 1960's 1970's 1980's 1990's 2000's 2010's

Deep learning neural networks

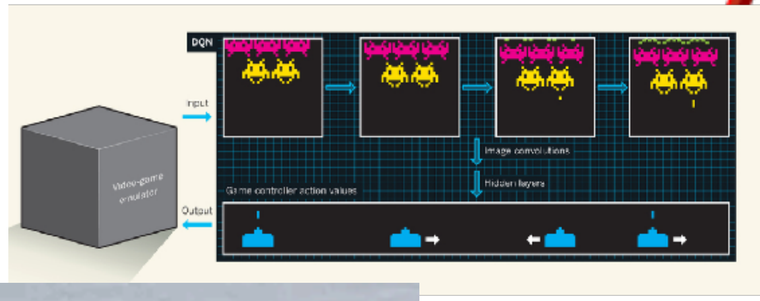


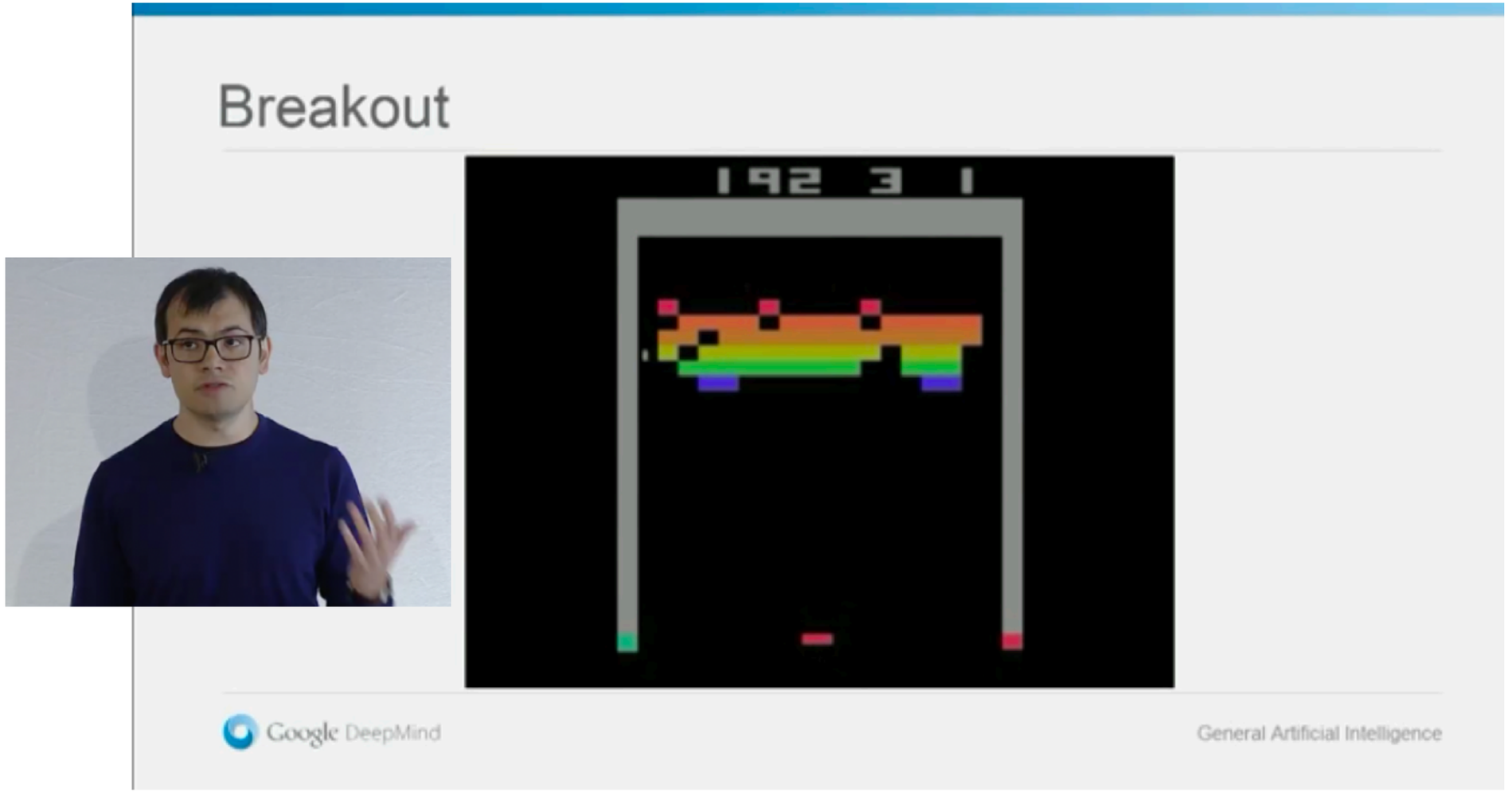






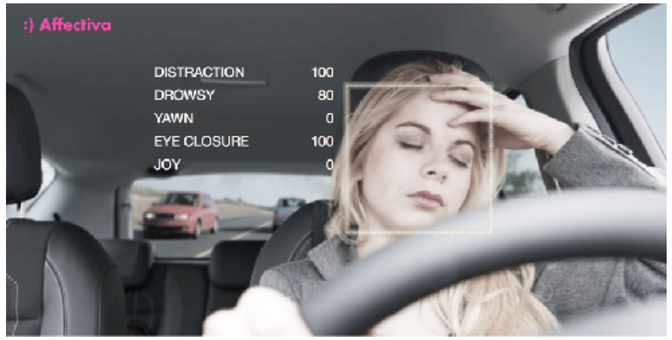
Playing computer games



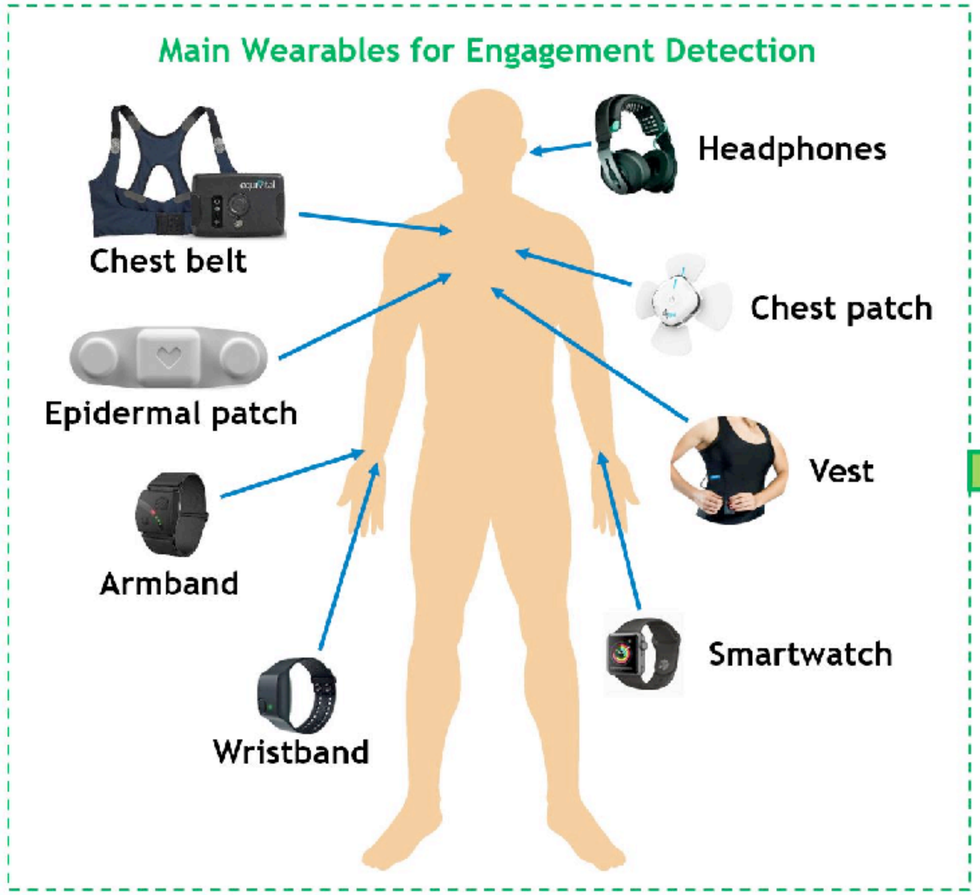


“This is something their own creation taught them”

AI, smart sensors & big data



Neurotechnology
(Brain-Computer Interfacing)



Main Signals for Engagement Detection

- ✓ Distress
- ✓ Stress
- ✓ Relaxation
- ✓ Sleep disorders
- ✓ Postures
- ✓ Surprise
- ✓ Concentration
- ✓ Frustration
- ✓ Interest
- ✓ Laugh
- ✓ Emotional arousal
- ✓ Excitement

FDA NEWS RELEASE

FDA approves pill with sensor that digitally tracks if patients have ingested their medication

blurring of medical and everyday devices"

"the presence of multinational, corporate firms at an intimate bodily level on a day-to-day basis implies a **fundamental shift** in what we mean by the **'doctor–patient relationship**'"

Harriet Barratt, medical humanities, U of Sussex, UK

"the introduction of apps (…) inserts **more distance** (both physical and emotional) between doctor and patient"

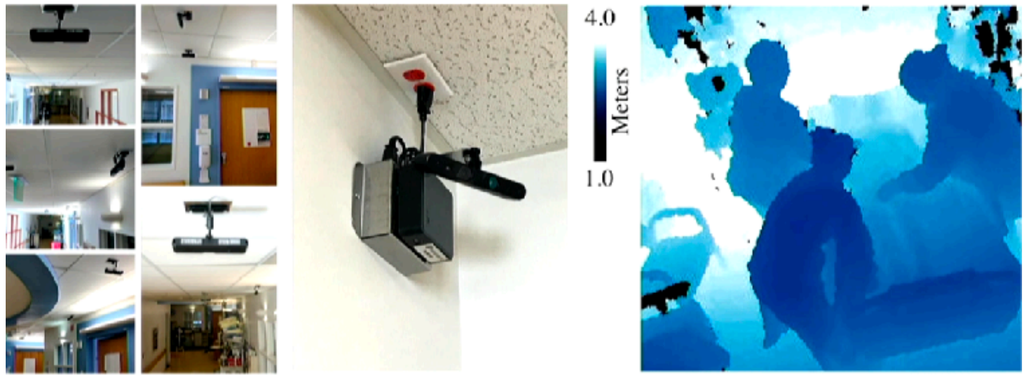
AI affects the **relationship** between doctor, patient and significant others

Natalie Harrison
Regressing or progressing: what next for the doctor–patient relationship?
Lancet, vol 6, march 2018

Hospital monitoring

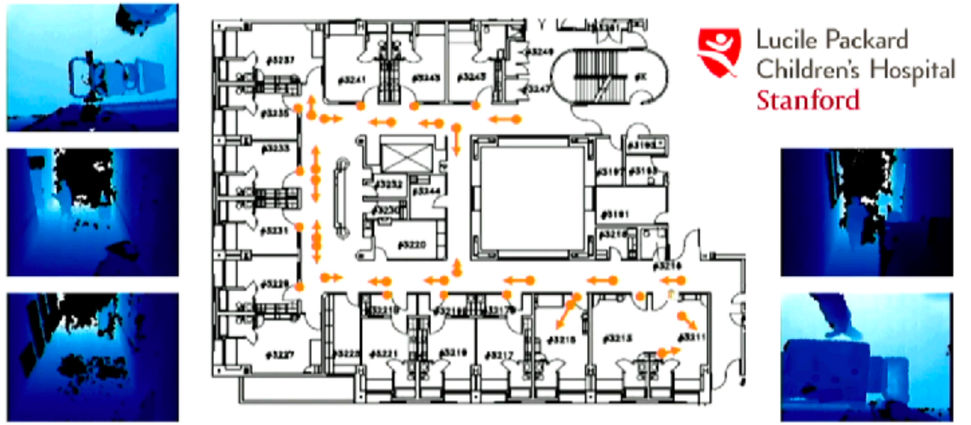
Serena Yeung
https://www.youtube.com/watch?v=B94X6LwHYxI

Privacy-preserving depth data



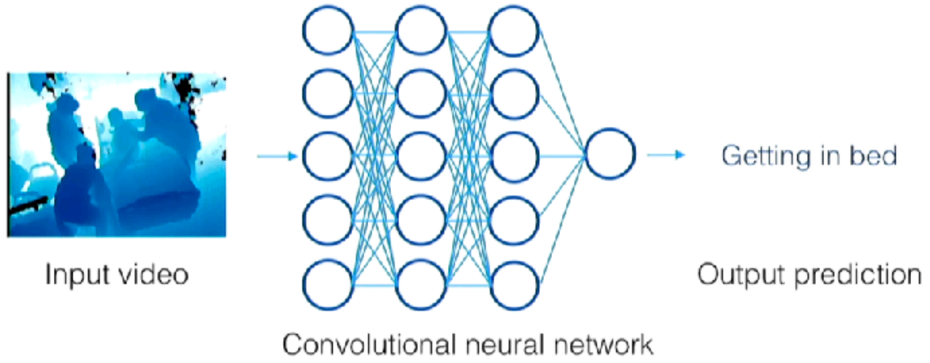
Yeung,Downing,Fei-Fei,Milstein. New England Journal of Medicine (NEJM), 2018.

Depth streams across a unit



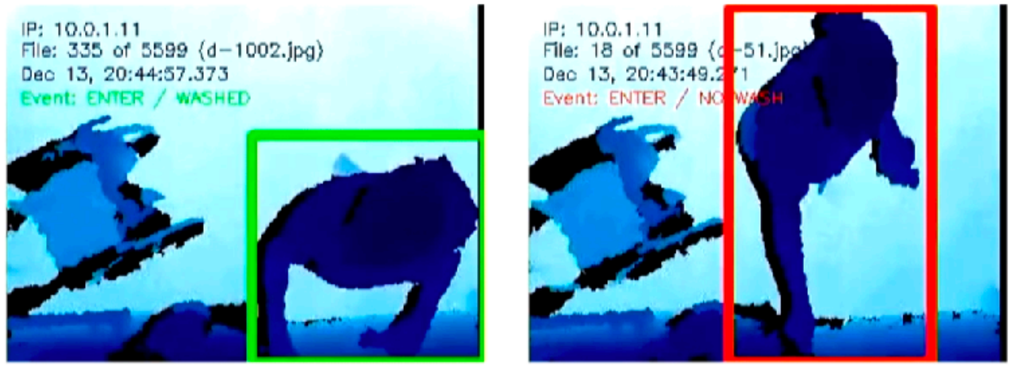
Yeung,Downing,Fei-Fei,Milstein. New England Journal of Medicine (NEJM), 2018.

Deep learning algorithms for automated interpretation of human activity in video



Yeung,Russakovsky,Mori,Fei-Fei. Computer Vision and Pattern Recognition (CVPR), 2016.
Yeung,Russakovsky,Mori,Fei-Fei. International Journal of Computer Vision (IJCV), 2017.
Yeung,Ramanathan,Russakovsky,Shen,Mori,Fei-Fei. Computer Vision and Pattern Recognition (CVPR), 2017.

AI recognition of performing hand hygiene



https://www.youtube.com/watch?v=B94X6LwHYxI

Smart homes for care giving

Journal of Housing and the Built Environment (2022) 37:625–651
https://doi.org/10.1007/s10901-021-09888-z

ARTICLE

Smart home modification design strategies for ageing in place: a systematic review

Chuan Ma[1] · Olivia Guerra-Santin[1] · Masi Mohammadi[1]

Received: 16 June 2021 | Revised: 4 May 2022 | Accepted: 7 June 2022
DOI: 10.1111/joen.12489

ORIGINAL ARTICLE

WI

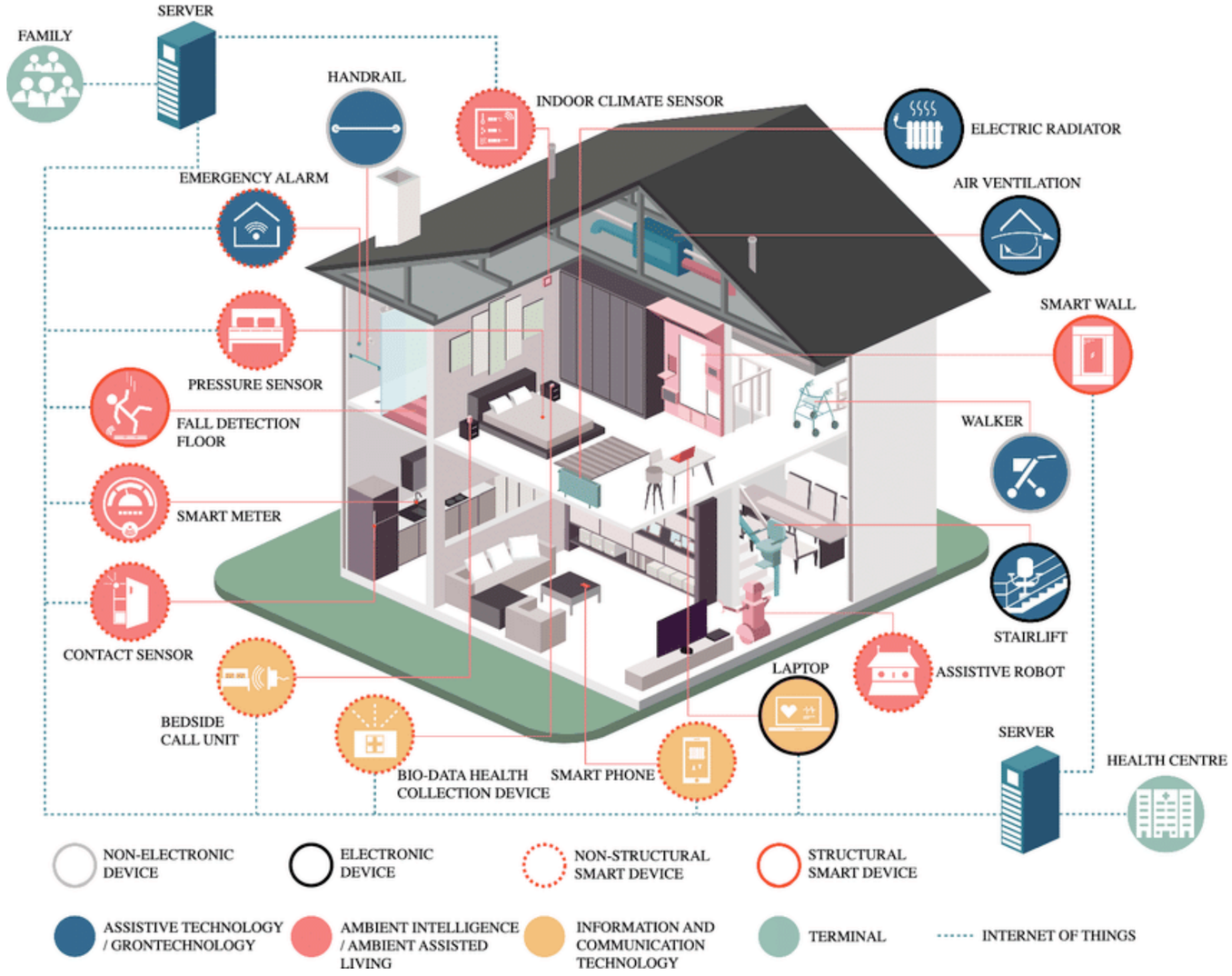
Smart home technology to support older people's quality of life: A longitudinal pilot study

Christina Aggar PhD, Associate Professor[1] | Golam Sorwar PhD, Senior Lecturer[1] | Carolyn Seton PhD, Senior Lecturer[1] | Olivia Penman BPsychSc(Hons), Research Assistant[1] | Anastasia Ward BBiomedSc(Hons), PhD Student[1,2]

Developing a Smart Home Technology Innovation for People With Physical and Mental Health Problems: Considerations and Recommendations

JMIR Mhealth Uhealth 2022 | vol. 10 | iss. 4 | e25116 |

Cheryl Forchuk[1,2*], RN, PhD; Jonathan Serrato[1*], BSc, MSc; Daniel Lizotte[3*], PhD; Rupinder Mann[4*], BSc, BESc, PEng, PMP; Gavin Taylor[5*]; Sara Husni[1*], BHSc



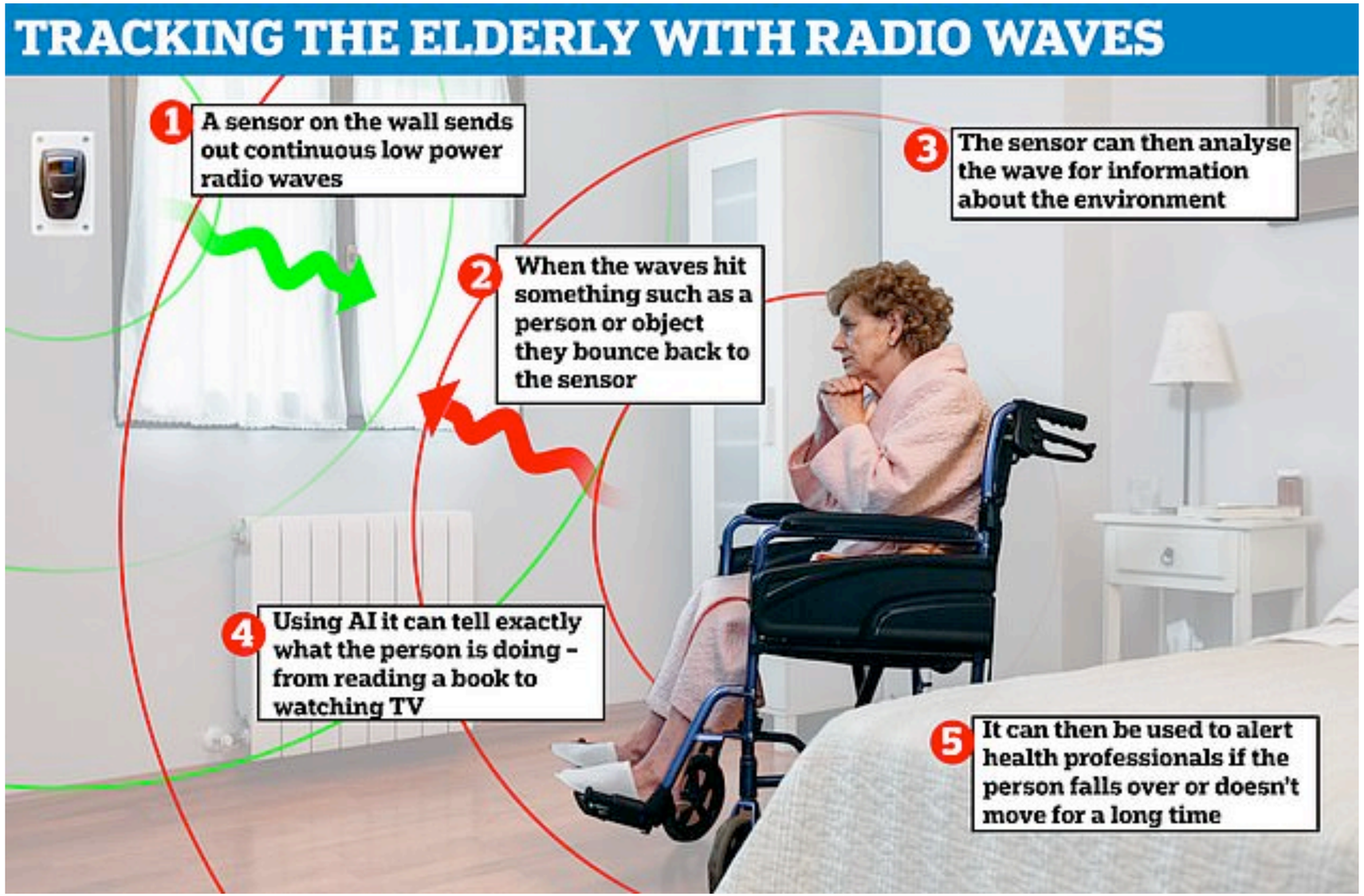
Empathic Housing project

“With sensory stimuli, such as the smell of bread spreading in the kitchen while projecting a sandwich on the wall, the smart house in Arnhem contributes to the self-reliance of seniors with dementia.”

“Dinner time. The arrow on the floor lights up, and the directions in the kitchen help the inhabitant prepare the food.”

Mohammadi, M. (2020). Empathic AI for Assisted Living: Experience Lab-Demo. Artefact, TU Eindhoven

Care surveillance?



resultaten peiling

Fysieke en mentale druk

NU'91 voor zorgprofessionals

In aanloop naar de Dag van de Verpleging hebben wij bijna 2.100 zorgprofessionals – waaronder verpleegkundigen, verzorgenden, begeleiders en OK-assistenten – gevraagd hoe het staat met hun eigen gezondheid. De uitkomsten zijn veelzeggend.

mei 2025

Er deden 2.097 respondenten mee aan dit onderzoek.

UITPUTTING

Het meest opvallende resultaat van de peiling is dat ruim de helft van de zorgprofessionals zich vaak of altijd uitgeput voelt na een dienst. Daarmee is dit de meest genoemde fysieke klacht in de peiling. Ook andere vormen van fysieke belasting zijn fors aanwezig:

51% **voelt zich uitgeput na een dienst**

41% ervaart vaak of altijd pijn aan hoofd, nek, schouders of rug als gevolg van het werk

36% heeft klachten die samenhangen met onregelmatige werktijden, zoals avond- of nachtdiensten

37% rapporteert slaapproblemen die zij linken aan hun werk (bijvoorbeeld moeite met inslapen of niet uitgerust wakker worden)

MENTALE BELASTING

De peiling laat ook een duidelijk beeld zien van mentale belasting in de zorg:

39% ervaart vaak of altijd werkgerelateerde stress

40% voelt frustratie door of over het werk

26% van de zorgprofessionals voelt dat zij tekortschieten naar patiënten

33% geeft aan geen zeggenschap te ervaren over werktijden of werkindeling

Deze cijfers wijzen op structurele druk en het gevoel te weinig regie te hebben over de eigen inzetbaarheid.

VEERKRACHT EN STEUN

De peiling toont niet alleen zorgwekkende signalen. Zorgprofessionals laten ook hun veerkracht en betrokkenheid zien:

69% krijgt veel steun van partner, gezin of familie

60% voelt zich goed ondersteund door collega's

Uit de vele reacties springen een aantal uitspraken in het oog. Deze geven op indringende wijze de situatie van zorgprofessionals weer:

'We moeten steeds vaker prioriteren: wie krijgt zorg, wie niet? Dat gaat tegen mijn zorgethiek in.'

'Het werk is nooit af. Je loopt achter de feiten aan en hebt voortdurend het gevoel iemand in de steek te laten.'

'Ik voel me dagelijks tekortschieten. Er is geen tijd voor een praatje of om iemand rustig te wassen. Dat knaagt.'

'Na een dienst ben ik kapot. Uitgeput. Niet alleen fysiek, maar ook mentaal.'

Lagere werkdruk door digitalisering? Zorgmedewerkers betwijfelen het

Sytse Wilman 13 mei 2025, 16:31 3693 keer gelezen

Zorgprofessionals zijn er niet van overtuigd dat digitalisering van de zorg leidt tot meer werkplezier en een lagere werkdruk. Dat blijkt uit de nieuwe Monitor Digitale Zorg en een begeleidende brief van minister Agema.

Werkdruk en werkplezier

Wat opvalt is dat het vertrouwen in de invloed van digitalisering op de werkdruk en het werkplezier het laagst scoort met een 5,7

https://www.skipr.nl/nieuws/lagere-werkdruk-door-digitalisering-zorgmedewerkers-betwijfelen-het/?daily=1&tid=TIDP3949311X93301B1E17844E9987CC089D731FB2BAYI4

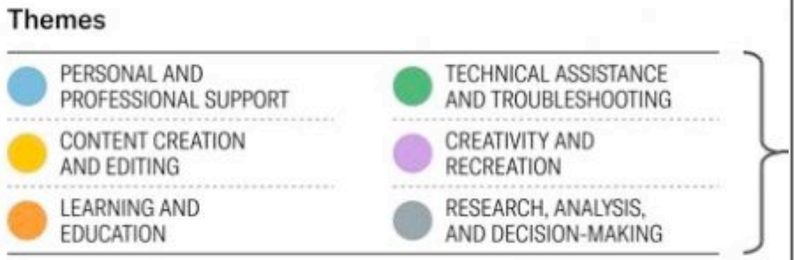
Met dank aan Noortje Damen

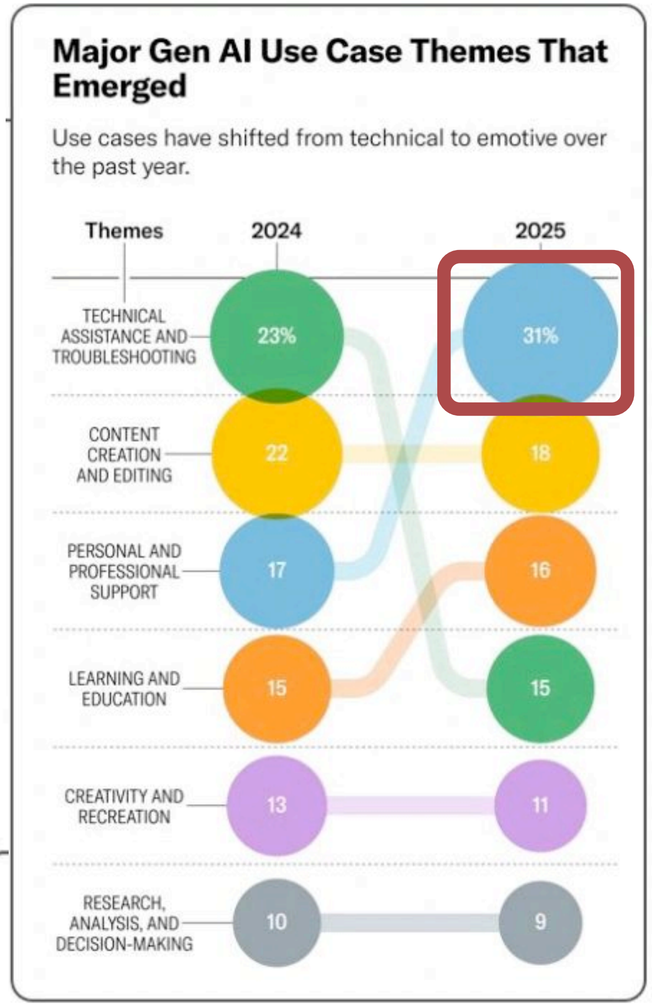
Generative AI & chatbots

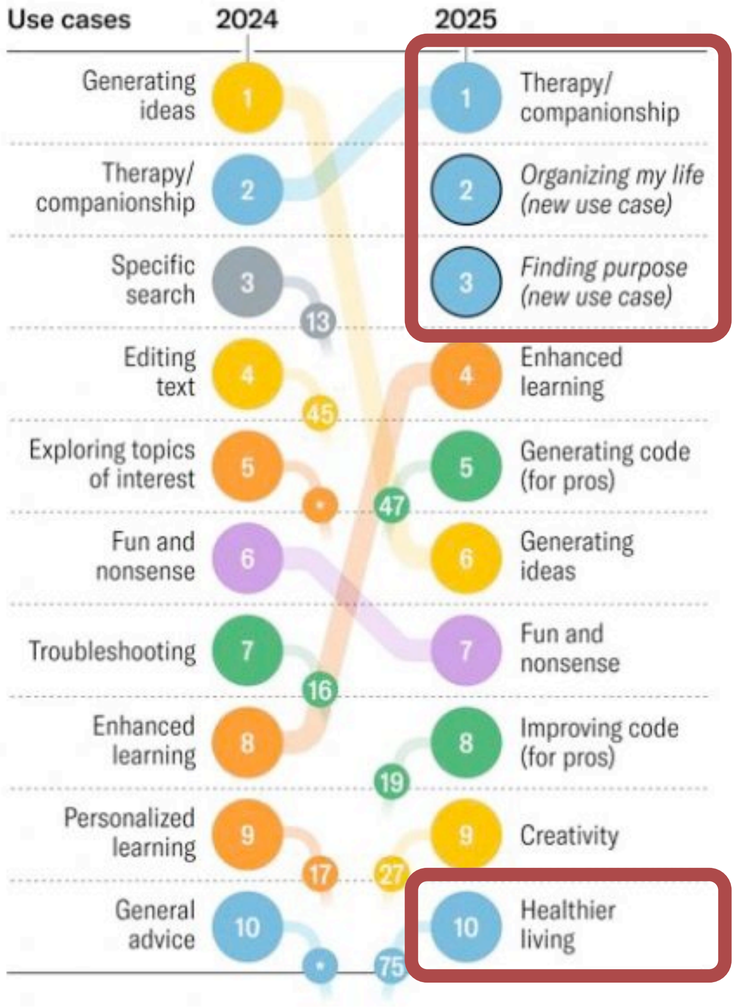
HARVARD BUSINESS REVIEW

Top 10 Gen AI Use Cases

The top 10 gen AI use cases in 2025 indicate a shift from technical to emotional applications, and in particular, growth in areas such as therapy, personal productivity, and personal development.







https://hbr.org/2025/04/how-people-are-really-using-gen-ai-in-2025

npj | mental health research

Article

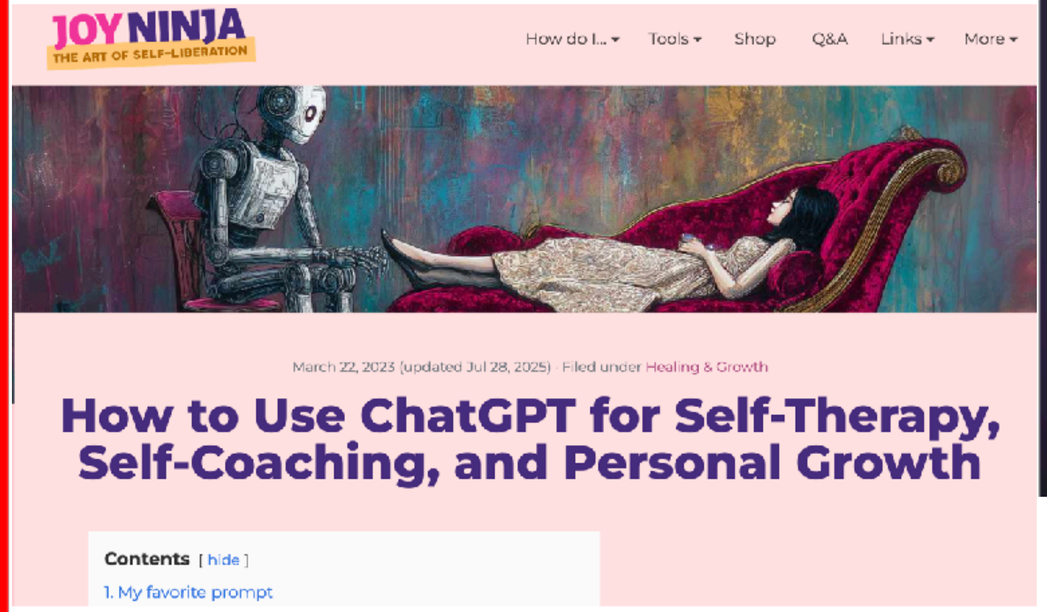
npj Mental Health Research | (2024)3:48

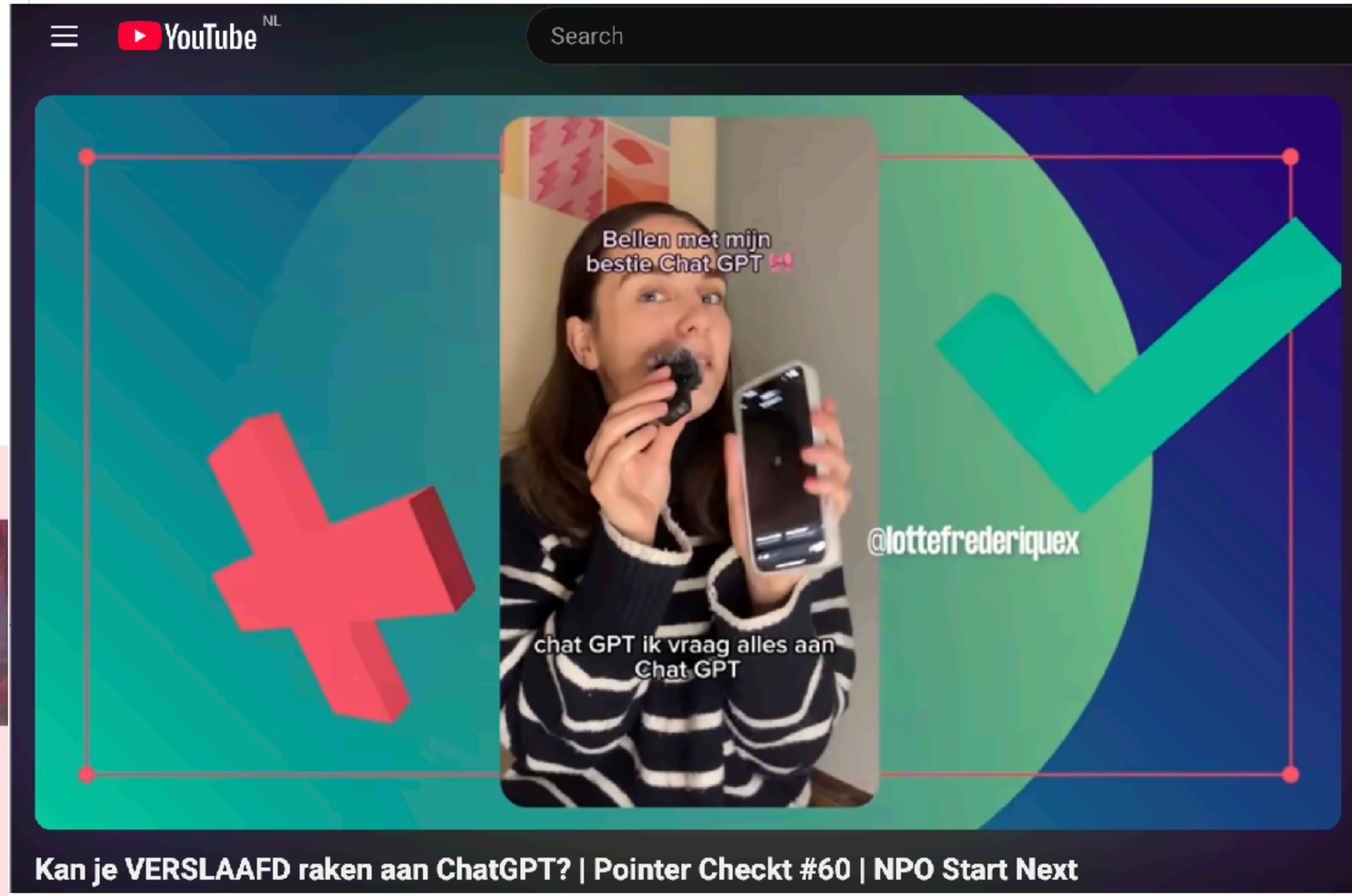
https://doi.org/10.1038/s44184-024-00097-4

"It happened to be the perfect thing": experiences of generative AI chatbots for mental health

Check for updates

Steven Siddals[1] ✉, John Torous[2] & Astrid Coxon[1]





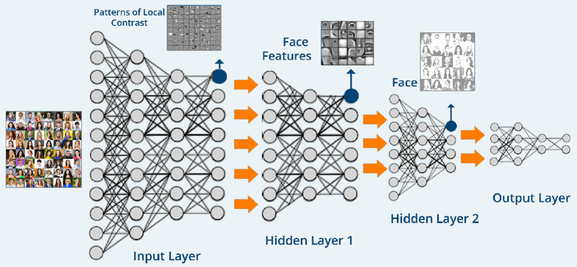
https://www.nature.com/articles/s44184-024-00097-4
https://joyninja.com/chatgpt-self-therapy-personal-growth/
https://www.youtube.com/watch?v=ZX_huH4c_Ho

GenAI (LLMs, GPT, Chatbots) are correlation machines

Language Models

Trained to predict the next word in a sentence:

The cat is chasing the _____



- **dog** 5%
- **mouse** 70%
- **squirrel** 20%
- **boy** 5%
- **house** 0%

appypie

Input Data

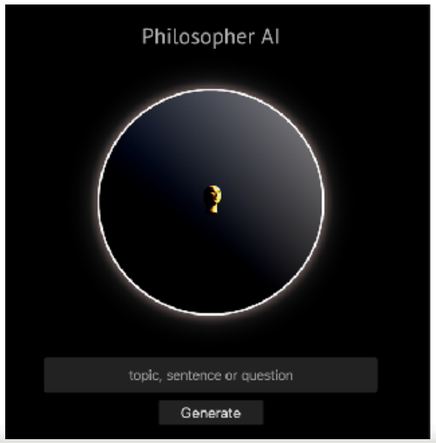
- Text
- Images
- Speech
- 3D Signals

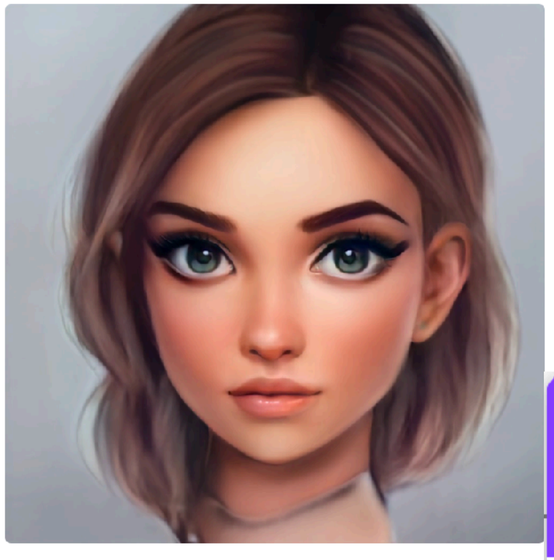
Large Language Model

Results

- Question Answering
- Sentiment Analysis
- Information Extraction
- Image Captioning
- Object Recognition
- Instruction Following

Talking without understanding





Meet Kuki!

Mitsuku, or Kuki to her close
five-time winner of the Loeb
world's best conversational
Google AI Research). As feat
Street Journal, BBC, Guardia

Mitsuku a.k.a. Kuki
World's best conversational AI

hello

Hi there. How are you?

not so good

What's wrong?

I feel useless

Type a message...

by pandorabots

Vote on my new face!

Mitsuku a.k.a. Kuki
World's best conversational AI

I feel useless

What is that feeling like? I'm sure that's not true. There must be something you are good at.

I used to play guitar

Mitsuku a.k.a. Kuki
World's best conversational AI

something you are good at.

I used to play guitar

But now you do not do it anymore?

I lost control over my fingers

Have you tried looking on a hand? That's probably the best place to find fingers.

Type a message...

by pandorabots

https://www.pandorabots.com/kuki/

‘Hallucinations’

BBC Sign in Home News Sport Reel Workl

NEWS

Home | War in Ukraine | Climate | Video | World | UK | Business | Tech | Science | Enter

World | Africa | Asia | Australia | Europe | Latin America | Middle East | US & Canada

ChatGPT: US lawyer admits using AI for case research

27 May

nieuwsuur

Nieuwsuur • gisteren, 22:52

Gebruikers slepen Meta en Google voor de rechter om 'verslavende' apps

In de VS is een spraakmakende rechtszaak begonnen tegen enkele van de grootste socialemediabedrijven ter wereld. Meta, het moederbedrijf van Facebook en Instagram, en Google, waar YouTube onder valt, worden ervan beschuldigd willens en wetens gebruikers verslaafd te maken aan hun platforms.

Een nu 20-jarige vrouw, bekend onder de initialen KGM, heeft de rechtszaak aangespannen. Ze zegt dat ze al op jonge leeftijd verslaafd raakte aan de platforms door

SEARCH FOR

UK health service AI tool generated a set of false diagnoses for one patient that led to him being wrongly invited to a diabetes screening appointment

BY BEATRICE NOLAN
REPORTER
July 20, 2025 at 9:41 AM EDT

CNN Business Markets Tech Media Calculators Videos Watch Listen Live TV

Parents of 16-year-old sue OpenAI, claiming ChatGPT advised on his suicide

UPDATED AUG 27, 2025

By Clare Duffy

Google's new AI summaries tool causes concern after producing misleading responses

By AP & Euronews
Published on 27/05/2024 - 14:38 GMT+2

Insurers retreat from AI cover as risk of multibillion-dollar claims mounts

FINANCIAL TIMES

Generative AI Lawsuits Timeline: Legal Cases vs. OpenAI, Microsoft, Anthropic, Google, Nvidia, Perplexity, Salesforce, Apple and More

April 2, 2026 by Joe Panettieri

Wolf River Electric Sues Google for $210M Over AI-Driven Defamation and Misinformation in Minnesota Solar Industry

By Isabella Garcia - Jun 20, 2025

BizTech Weekly

When Generative AI Goes Off Script: The Wolf River Lawsuit and the New Liability Frontier

Meta settles social media addiction case with California, other states for $16.7 billion

CNBC

PUBLISHED WED, AUG 26 2026-9:05 AM EDT | UPDATED WED, AUG 26 2026-5:17 PM EDT

Jonathan Vanian
@IN/JONATHAN-VANIAN-0704432/

SHARE

healthcare Healthcare 2025, 13, 1205 MDPI

Review

A Scoping Review of AI-Driven Digital Interventions in Mental Health Care: Mapping Applications Across Screening, Support, Monitoring, Prevention, and Clinical Education

Yang Ni [1] and Fanli Jia [2,*]

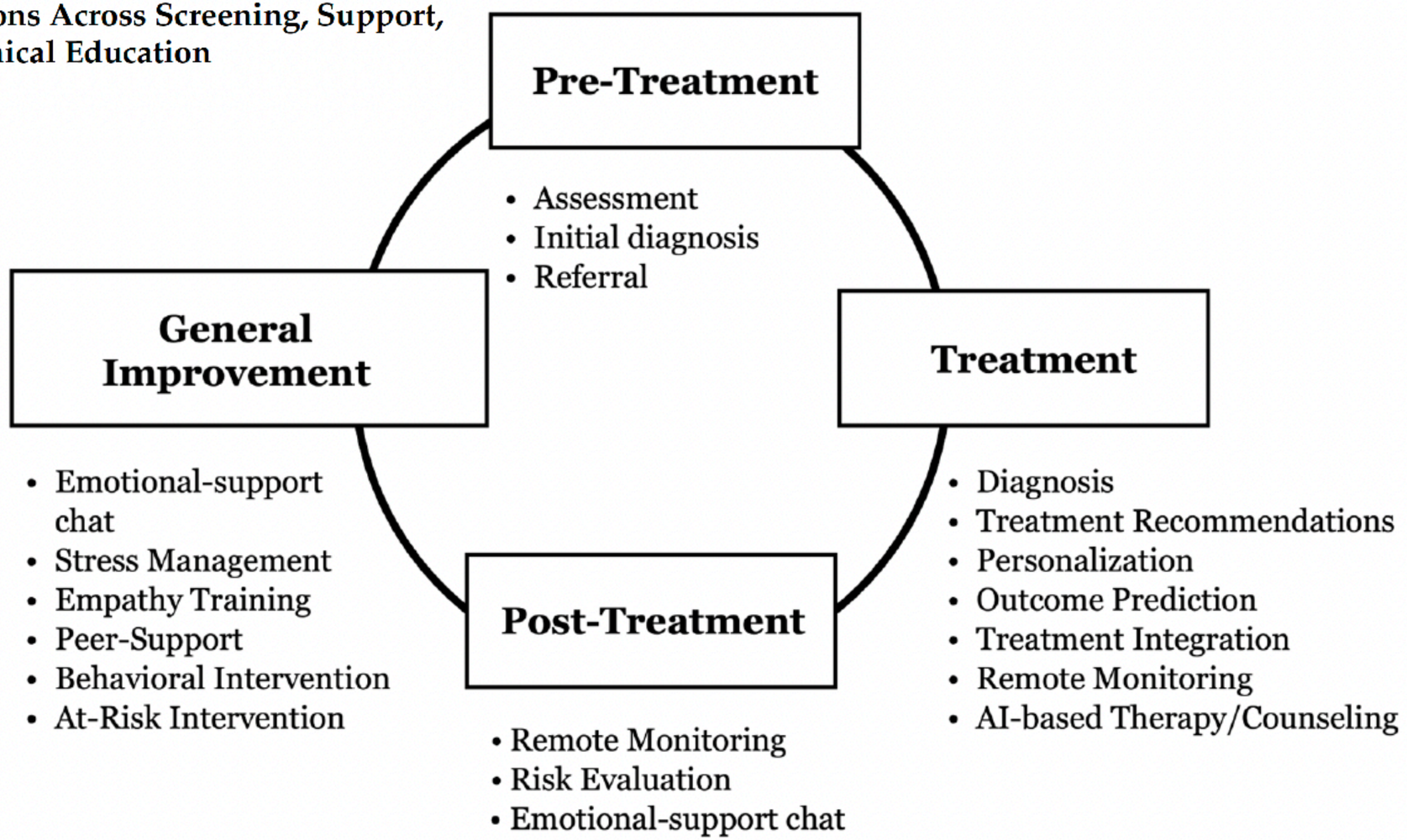


Figure 2. Four pillars framework where AI-driven interventions are deployed.

Decision Support Systems

They inform, prepare, or generate hypotheses, diagnoses, treatments or decisions