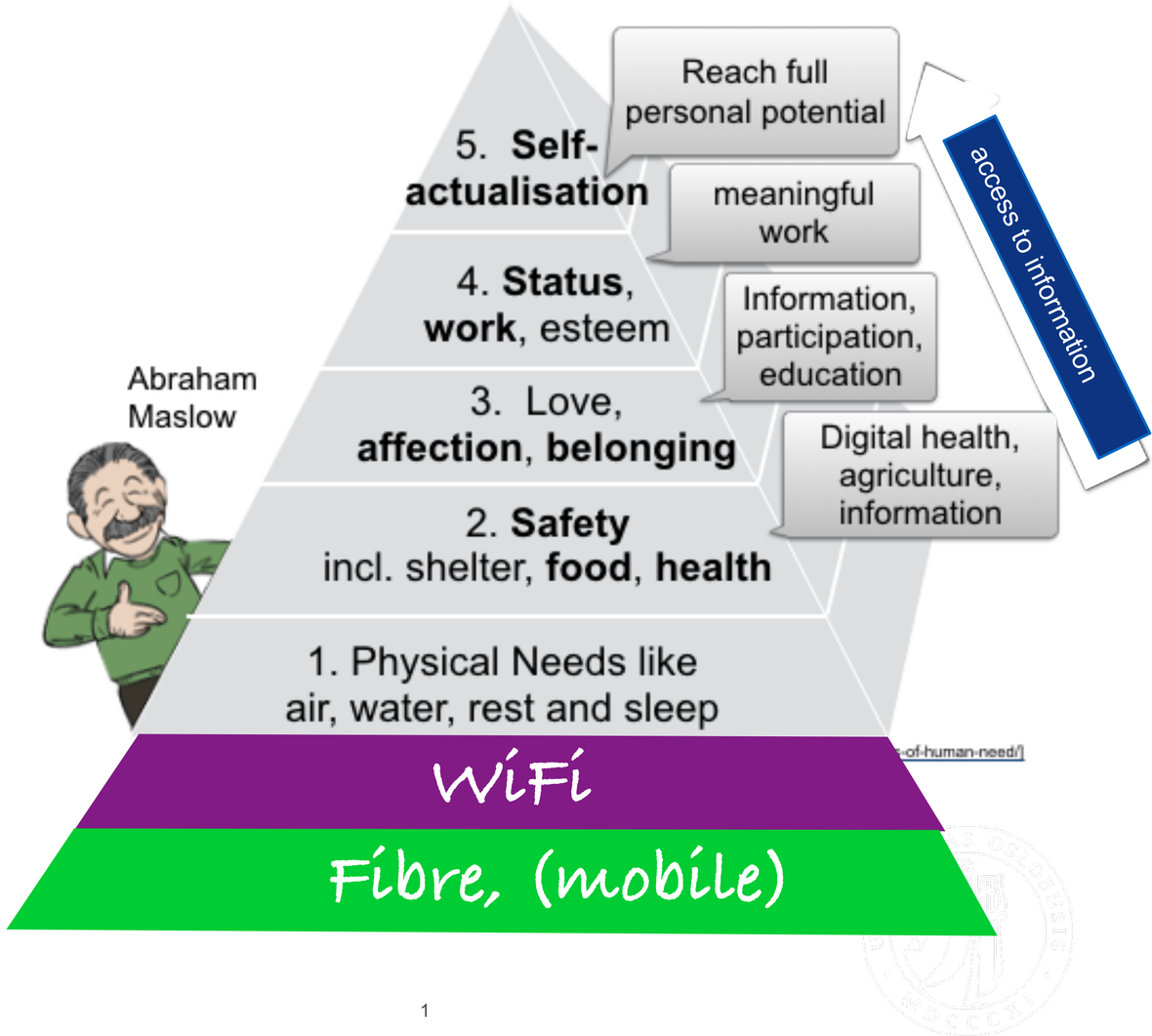
UNIVERSITY OF OSLO

Special Edition WiFi Sensing in Healthcare and Smart Homes, 4Nov2026

Identification, Authentication, Privacy and Smart Homes

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Privacy vs Positive Surveillance

- Elderly at home - “soon me”
  - monitoring - how?
  - emergency - whom to notice?
- Monitoring
  - WiFi monitoring
  - Smart Home: Electricity, water
  - Devices
- Privacy
  - Probability driven



Emergency care, door opening
https://www.youtube.com/watch?v=lm8eS9PUDfU

Identification and authentication using WiFi sensing





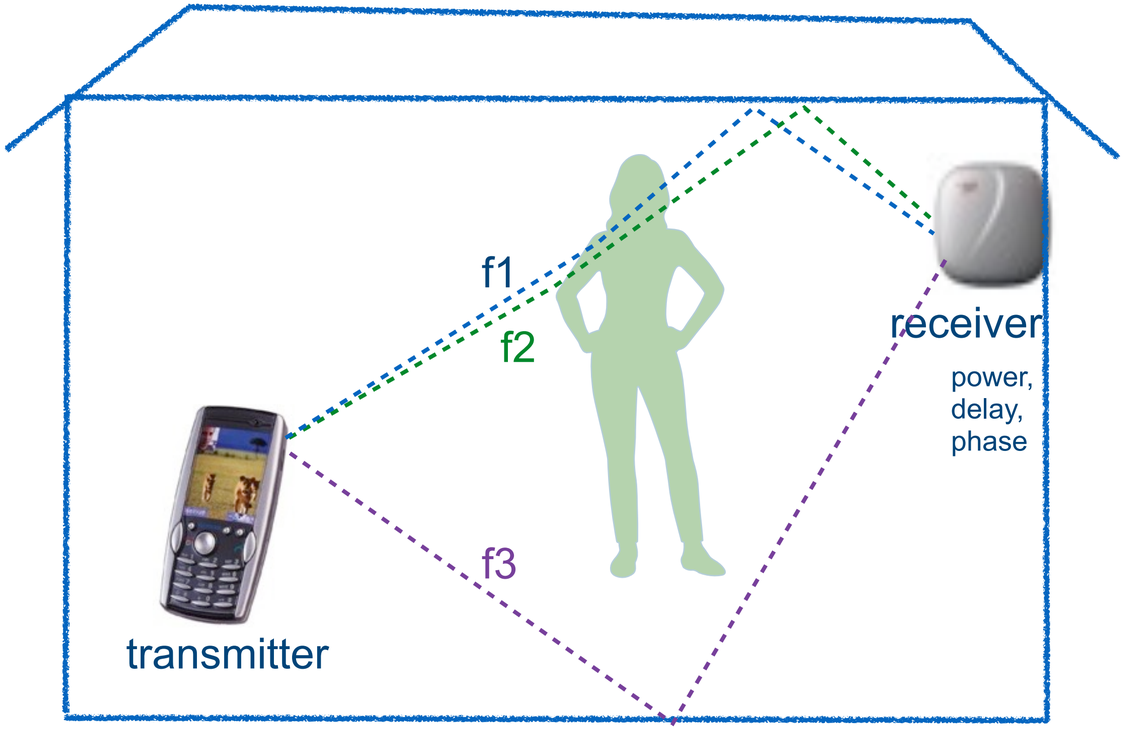
Based on NRK nyheter Aug2026

https://www.nrk.no/video/visste-du-at-wi-fi-en-din-kan-se-deg_a4fd80ab-eb29-4910-b8f9-5c92897396f3

https://www.tiktok.com/@nrknyheter/video/7670968299206855968?lang=nb

WiFi CSI Sensing

- Channel State Information (CSI)
  - OFDM, multi-paths, multi-frequency
  - unique attenuation and phase
- used for
  - activity recognition,
  - gesture recognition
  - object recognition
  - human localisation and tracking,
  - respiratory rate estimation
  - human counting
- Challenge: access to firmware, specialised hardware



Todt et al., 2026, https://dl.acm.org/doi/epdf/10.1145/3719027.3765062

WiFi (and mobile) identification

- Background:
  - Karlsruhe Institutt of Technology (KIT) identify people
- Achievement
  - Identify 194 people
- Set-up
  - AI-profiling of beam-forming information
  - walking through a corridor

https://www.sciencedaily.com/releases/2026/05/260522023127.htm

Ordinary WiFi can now identify people with near perfect accuracy

Scientists say ordinary WiFi routers may soon be able to secretly recognize and track people with near-perfect accuracy.

Date: May 22, 2026

Source: Karlsruher Institut für Technologie (KIT)

Summary: Scientists in Germany have demonstrated a startling new form of surveillance: identifying people using nothing more than ordinary WiFi signals. By analyzing how radio waves bounce around a room, researchers can effectively "see" and recognize individuals — even if they are not carrying a device and even if their phone is turned off.

Share:

RELATED TOPICS

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- Detectors

Computers & Math

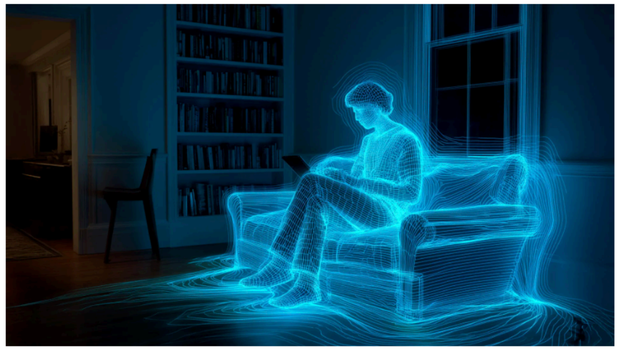
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- Neural Interfaces

Science & Society

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- Security and Defense

RELATED TERMS

FULL STORY

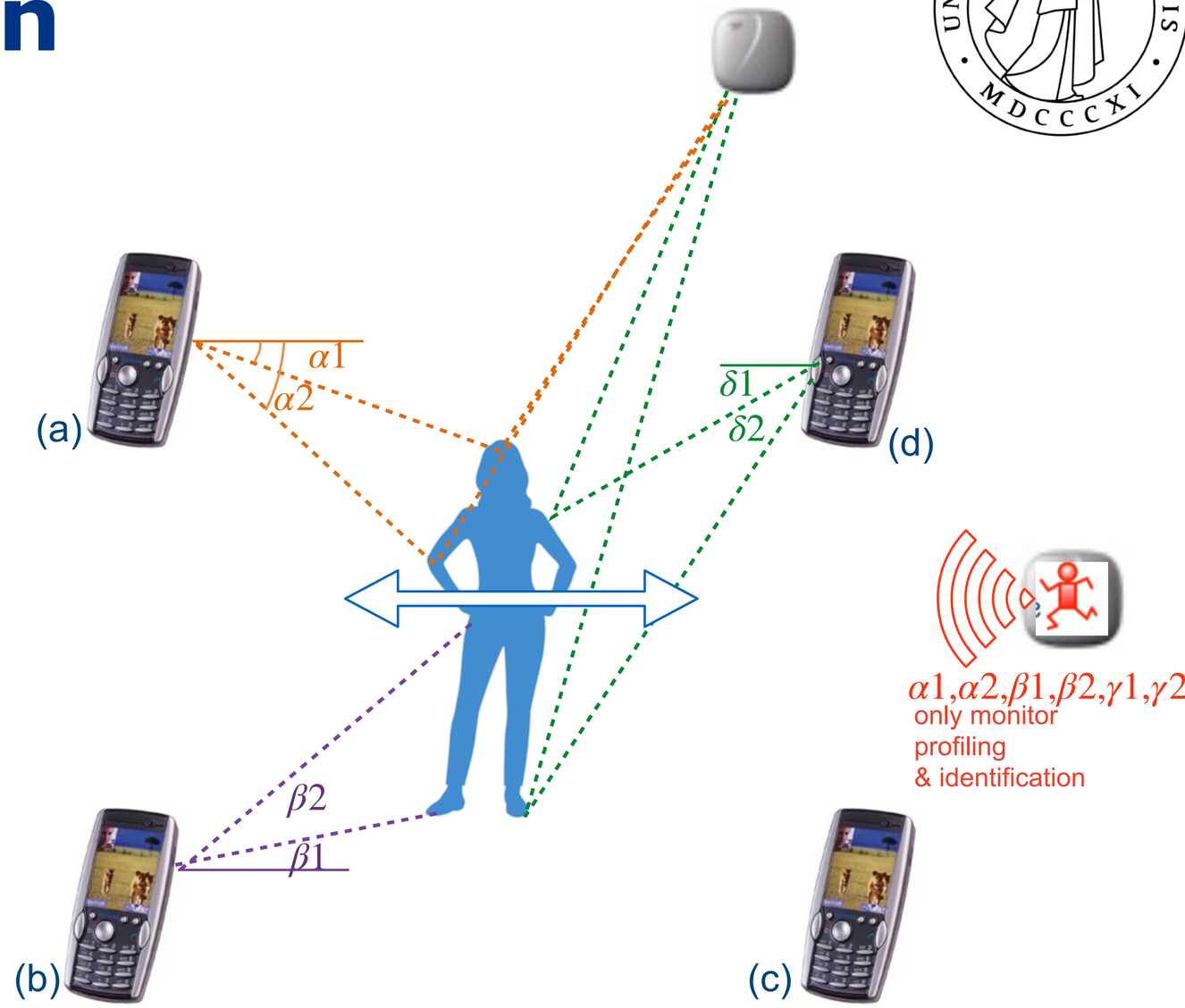


Researchers have shown that standard WiFi routers can identify people by analyzing how radio waves reflect off their bodies. Credit: AI/ScienceDaily.com

Researchers in Germany are warning that ordinary WiFi networks could become a powerful new form of invisible surveillance. Using standard wireless signals and artificial intelligence, they demonstrated a system capable of identifying people with striking accuracy, even if those individuals are not carrying an active device.

WiFi BFI identification

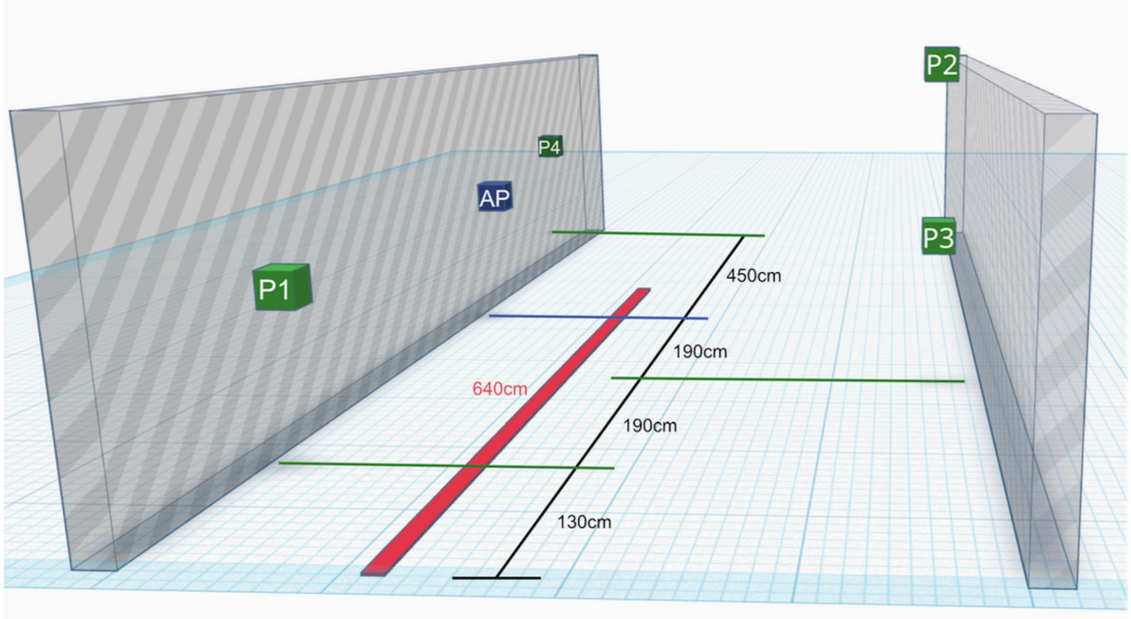
- Beam Forming Feedback Information (BFI)
  - human detection
  - localisation, occupancy
  - activity recognition
  - human localisation
  - device identification
  - crowd counting
  - **identification** (by KIT)
- Unencrypted Broadcast
  - any receiver can record



Todt et al., 2025, BFId, CCS '25, Taipei, Taiwan

WiFi BFI supervision

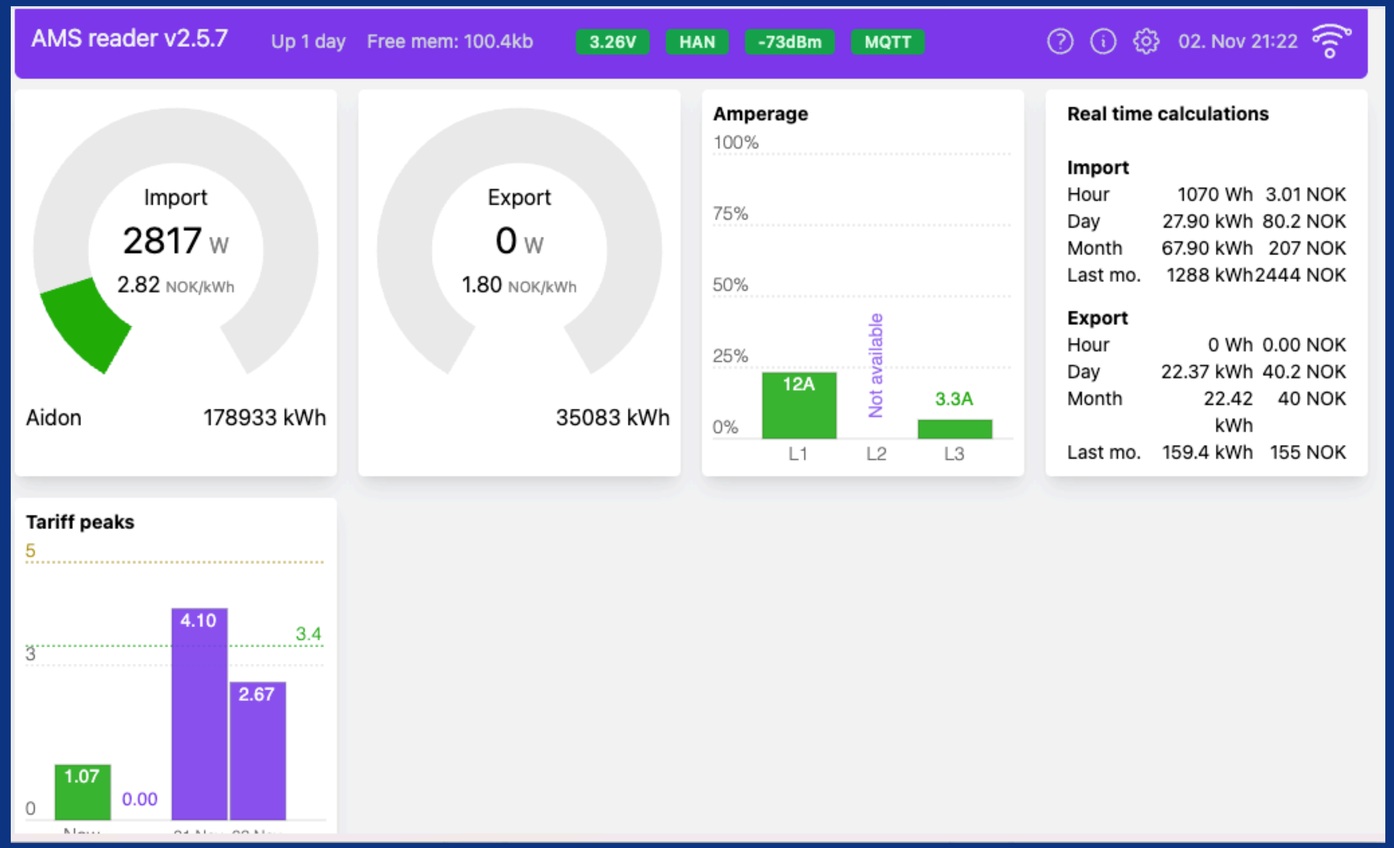
- Individual recognition, accuracy 99.5% ±0.38
  - no specialised hardware
- works across walking styles
  - normal walking style, with backpack, carrying crate
- Application areas
  - security control factory
  - device-free authentication
  - …
- Positive surveillance

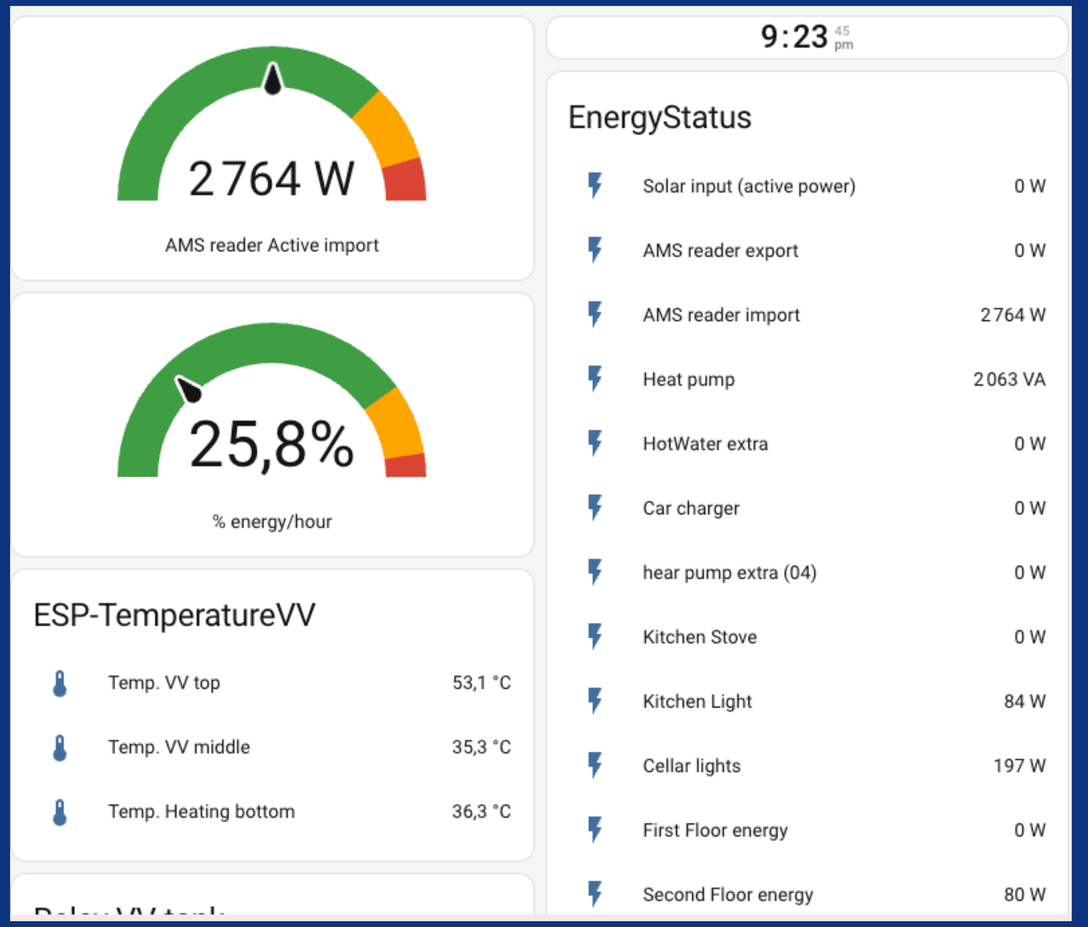


	CSI	BFI
Network access req.	×	×
Fully passive	✓	✓
No. of perspectives	1	Any
Perspective from AP to	malicious node	legitimate nodes
Specific hardware req.	✓	×

Todt et al., 2025, BFId, CCS '25, Taipei, Taiwan

Your power meter knows what you do!



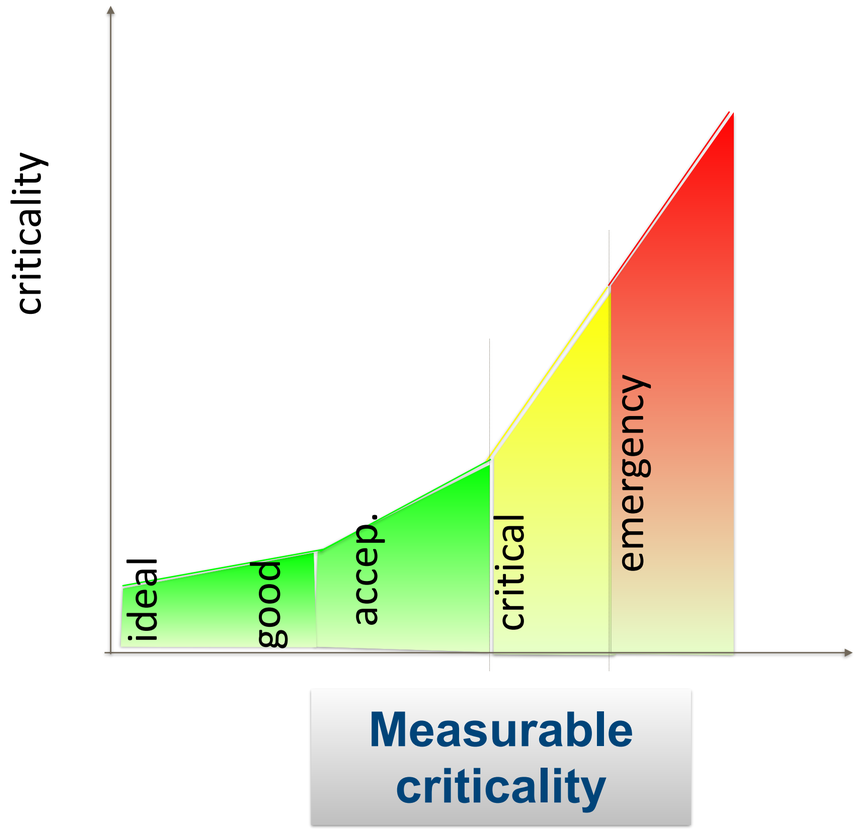


https://www.mn.uio.no/its/english/research/projects/dessi/

Smart Home (Profiling)

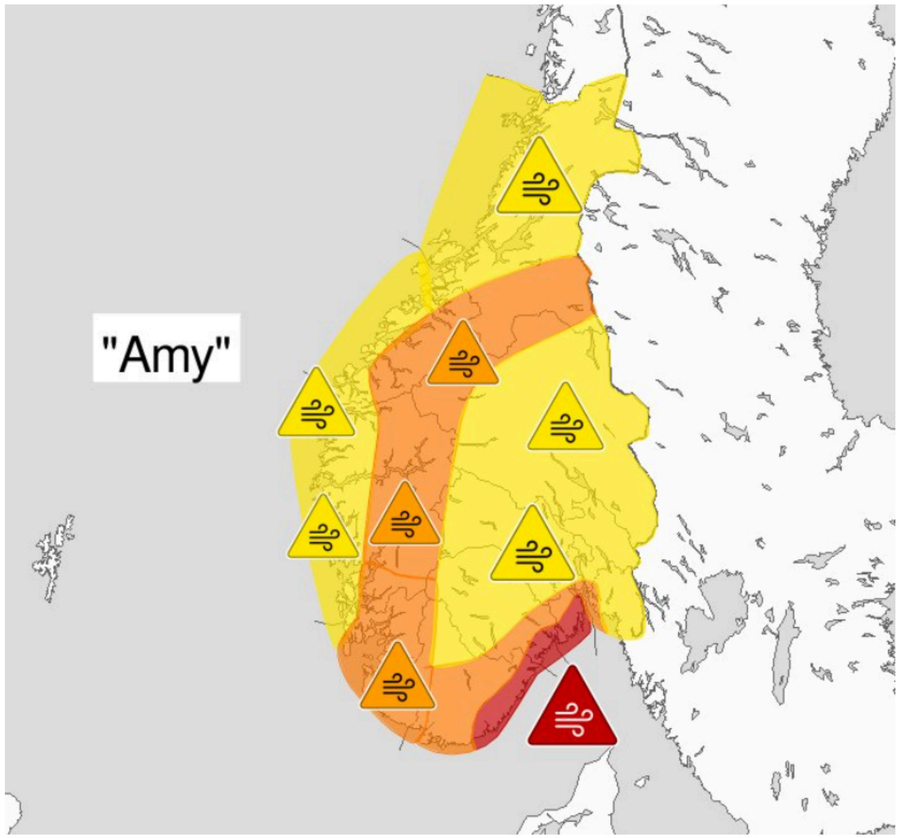
- Probability Approach
  - ideal, good, accept. > full privacy
  - critical > neighbours, children
  - emergency > no privacy
- grade of privacy: “my decision”

- AI-based profiling
  - decentralised in the home
  - from information to alarm



We need to prepare

- Positive monitoring
  - WiFi: emergency detection
  - Smart Home: electricity, water usage
- Resilience “minimum energy”
  - WiFi: 20-50 W
  - elevator: 4 kW_p(?), 10% activity cycle
  - cup of coffee: 1.5 kW, 5% aktiv
- decentralised solutions



Aasland, Støre...
- involve us
- “skattefunn til private”

Vedum
“future farmer is an energy farmer”

NVE, Stoltenberg...
- incentives & regulations for resilience and quality

psychology: our drivers
- autonomy
- fear
- neighbours