Federal Ministry
for Economic Affairs
and Energy

FORUM
DIGITAL
TECHNOLOGIES

Digital Technologies in Pre-competititive Funding in Germany

Marc Reznicek

Forum Digital Technologies

Fraunhofer Heinrich Hertz Institute (HHI)

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

Fraunhofer Heinrich-Hertz-Institut

VDI|VDE|IT

slido

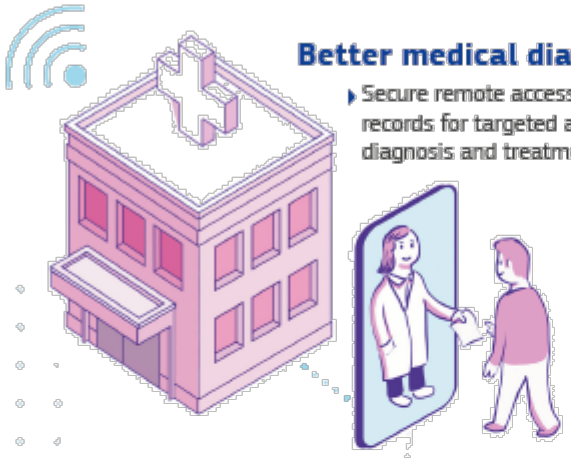
What are advantages of a digitized society?

ⓘ Start presenting to display the poll results on this slide.

Digital Technologies – Goals

FORUM DIGITAL TECHNOLOGIES

All Europeans can thrive in a digitalised society



Better medical diagnosis and treatment

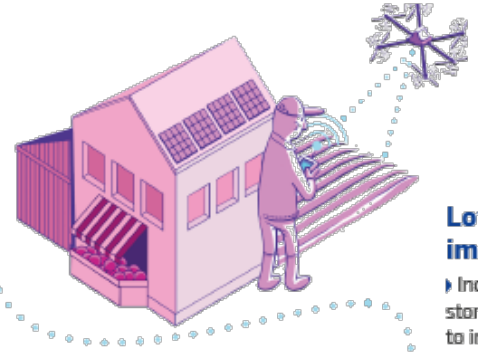
- Secure remote access to personal health records for targeted and faster research, diagnosis and treatment.

Stronger digital skills

- Lifelong access to digital technology and skills training.

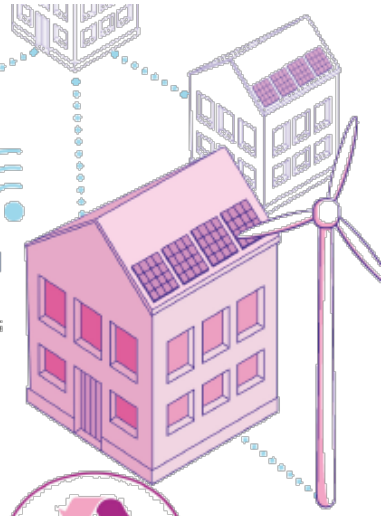
Trusted digital identity

- More personal privacy, less fraud and quicker interactions with government and business.



More environmentally friendly agriculture

- Better food with fewer pesticides, fertilisers, fuel and water thanks to AI, data and 5G.

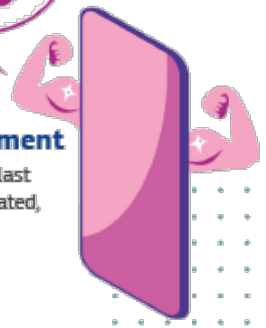


Lower climate impact and money saved

- Individual energy production and storage and lower energy bills, thanks to intelligent heating and cooling and smart grids.

Cleaner environment

- Electronic waste contains scarce resources and precious metals, but only about 35% of electronics are currently recycled.



Longer lasting electronic equipment

- Electronic devices that last longer can easily be updated, repaired and recycled.

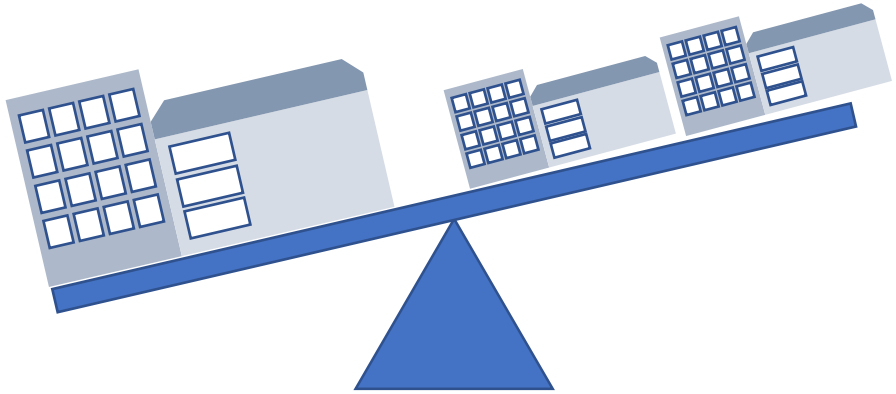
Digitalised transport

- Better and safer mobility thanks to interactions between cars and with road infrastructures.

Fight against online disinformation

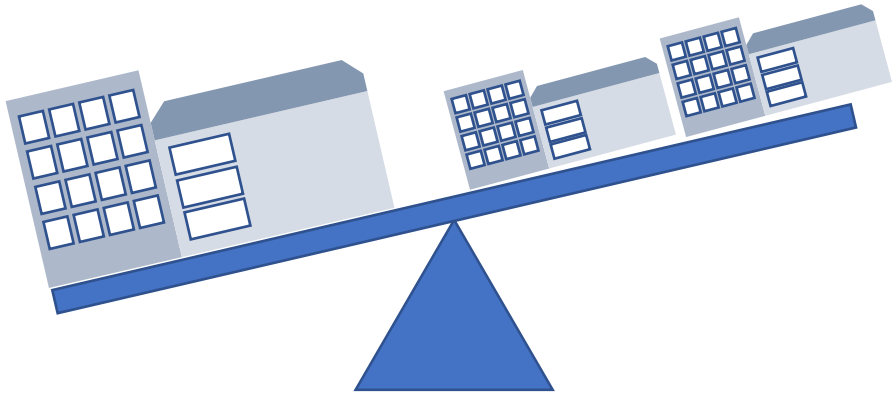
- Access to diverse and reliable media content.

Research Funding in pre-competition



Free market forces

Research Funding in pre-competition

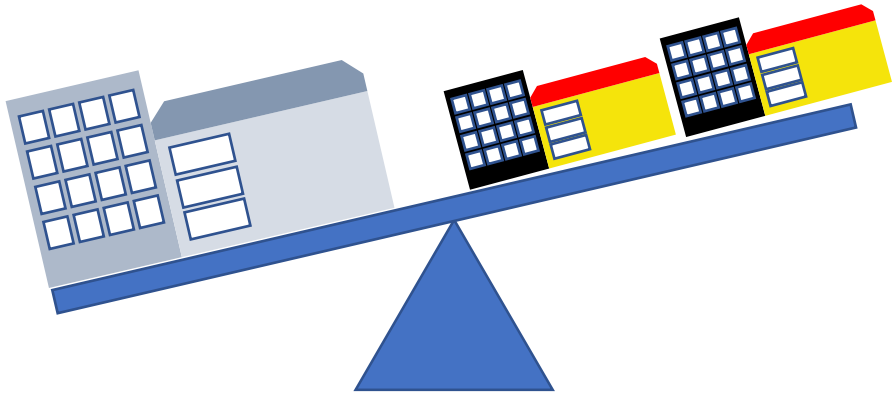


Free market forces

Former Federal Minister of Economic Affairs 2018 - 2021
Peter Altmaier

"***Innovations come to a large extent from medium-sized companies*** *- but many SMEs do not have their own research department. This is where collaborative industrial research comes in: Its unique selling point is the close, pre-competitive cooperation between industry and research across all sectors. Project results are transferred into practice, resulting in real innovations and business models.“*

Research Funding in pre-competition

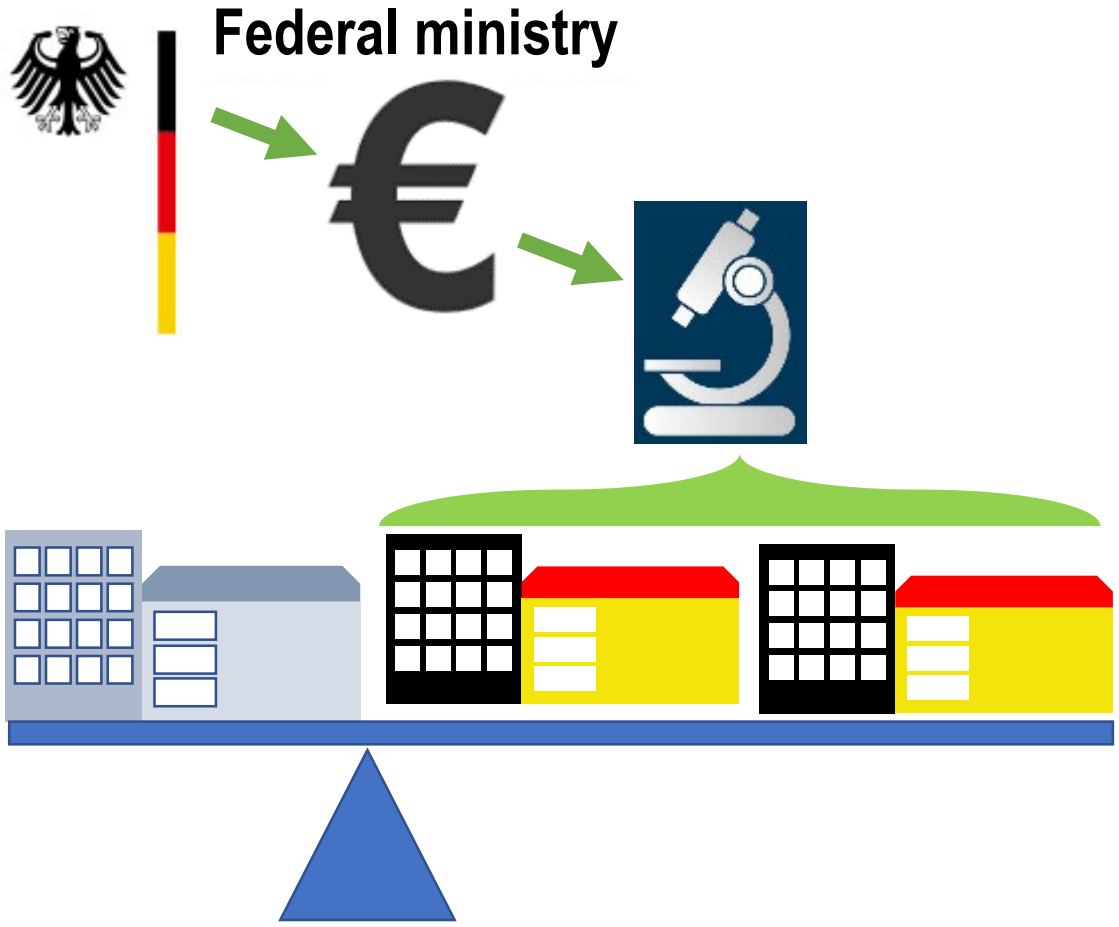


Free market forces

Former Federal Minister of Economic Affairs 2018 - 2021
Peter Altmaier

*"**Innovations come to a large extent from medium-sized companies** - but many SMEs do not have their own research department. This is where collaborative industrial research comes in: Its unique selling point is the close, pre-competitive cooperation between industry and research across all sectors. Project results are transferred into practice, resulting in real innovations and business models."*

Funding of pre-competitive research



Digital Technologies for Europe – Strategies

Digital Technologies for Europe – Strategies

Technology that works for people

An open, democratic and sustainable digital society

A fair and competitive digital economy

Europe as a global digital player

Digital Technologies for Europe – Strategies

FORUM DIGITAL TECHNOLOGIES

Technology that works for people

An open, democratic and sustainable digital society

A fair and competitive digital economy

Europe as a global digital player

Digital Sovereignty as leitmotiv for the European digital policy

eu2020.de

- Human-centric AI
- Transparent European Healthcare Data Space
- Digital financial market union
- Cyber security

Digital Technologies for Europe – Funding Schemes

2014 – 2020

Horizon 2020 – 79 b. Euros

Digital Technologies for Europe – Funding Schemes

2014 – 2020

Horizon 2020 – 79 b. Euros

2021 – 2027

Horizon Europe – 81 b. Euros

Missions

Climate change, Cancer, Smart cities

Healthy waters, Soil health and food

European Partnerships

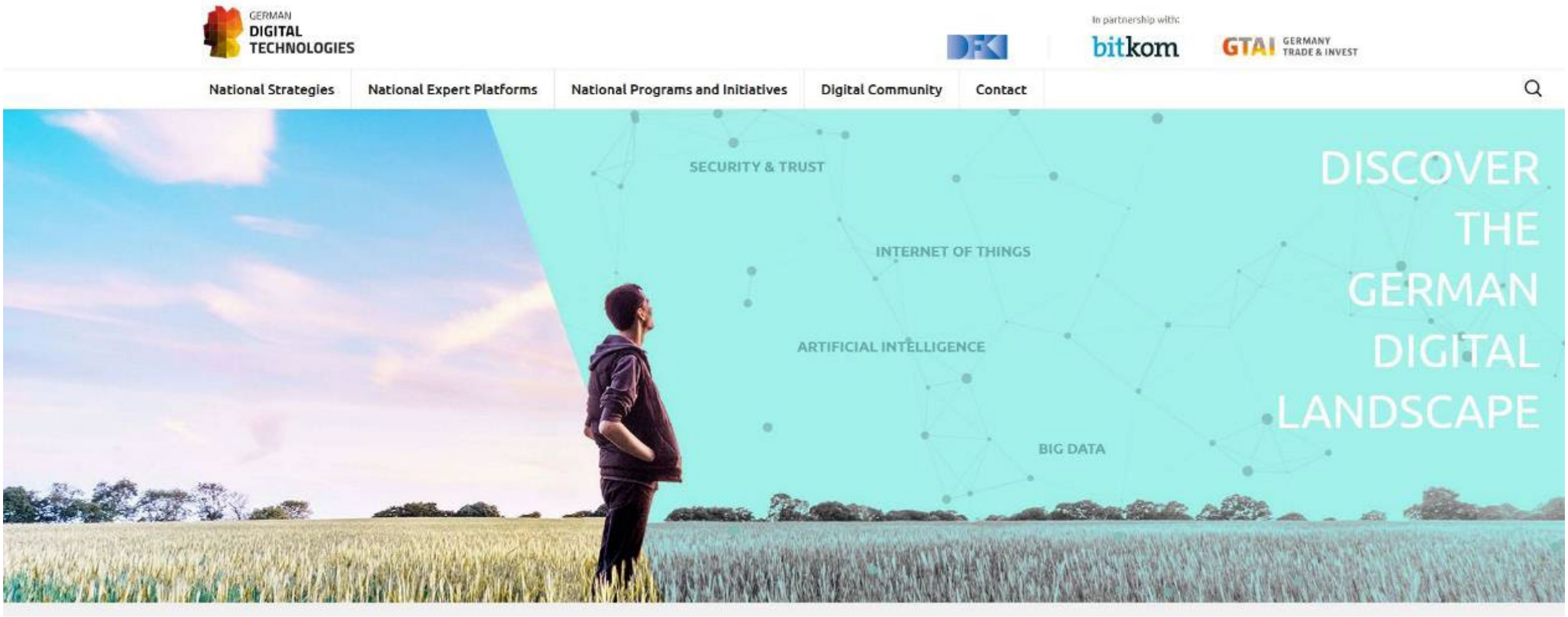
self-driving cars, 5G/6G, new batteries …

Digital Europe – 9.2 b. Euros

- Supercomputing
- Artificial intelligence
- Cybersecurity
- Advanced digital skills

Digital Innovation Hubs – 9.2 b. Euros

German Digital Technologies



FORUM DIGITAL TECHNOLOGIES

https://germandigitaltechnologies.de

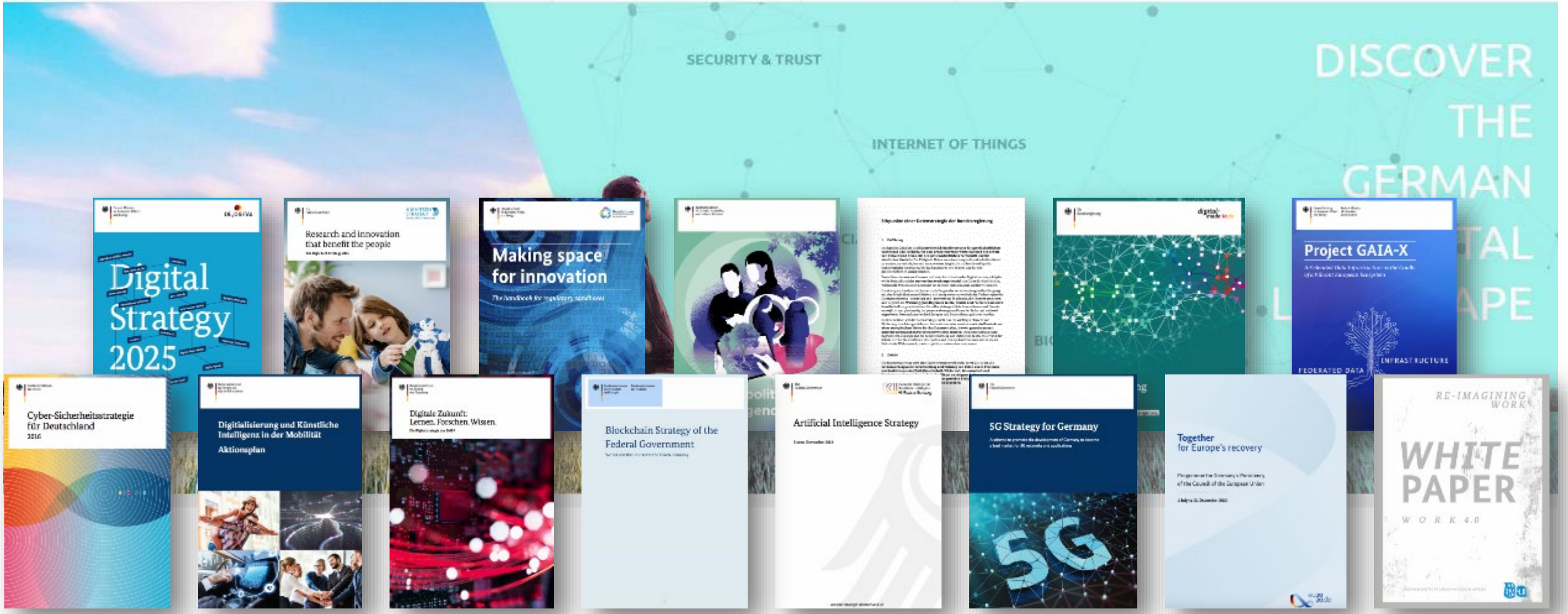
German Digital Technologies – Strategies

FORUM DIGITAL TECHNOLOGIES

GERMAN DIGITAL TECHNOLOGIES

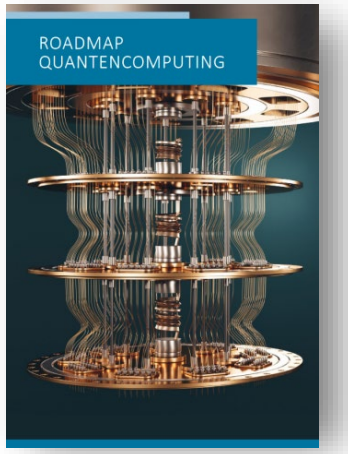
In partnership with: bitkom GTAI GERMANY TRADE & INVEST

National Strategies | National Expert Platforms | National Programs and Initiatives | Digital Community | Contact



German Governmental Digital Strategies

Future Research and Innovation Strategy
https://www.bmbf.de/bmbf/en/research/future-research-and-innovation-strategy/
The strategy sets the path to enhance Germany's innovation capacity by creating better conditions for the development of urgently needed innovations through the advancement of science, research, and transfer.



Roadmap Quantum Technology
https://www.quantentechnologien.de/
This paper lays the groundwork for successful inclusion and funding of specifically quantum technologies and computing within the economy, making recommendations for actions, as well as pointing out fundamental challenges.

Hightech Strategy 2025
hightech-strategie.de
The High-Tech Strategy 2025 stands for the aim of moving Germany forward on its way to becoming a worldwide innovation leader. The goal is for good ideas to be translated quickly into innovative products and services. Major funding is allocated for research and innovation in mobility, energy, health, security and economy sectors.

GAIA-X – A Federated Data Infrastructure
bmwi.de/.../data-infrastructure
Representatives of the German Federal Government, economy and science want to work with European partners to create the next generation of data infrastructure for Europe: a secure, federated system that meets the highest standards of digital sovereignty while promoting innovation.

German Digital Technologies – Funding Schemes

FORUM DIGITAL TECHNOLOGIES

National IT-Research Competence Center

Federal Ministry of Education and Research

- IT Security
- Big Data
- Machine Learning/ Artificial Intelligence

Digital Technology Programs

Federal Ministry for Economic Affairs and Energy

- Green Tech
- Edge data economy
- Quantum Computing - Applications for industry
- 5G Campus networks
- AI Innovation Competition
- Showcase programme “Secure Digital Identities”
- Smart Data Economy
- ICT for electric mobility
- Smart Living

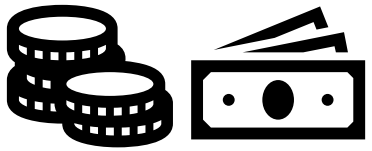
Transfer Initiatives

Federal Ministry of Education and Research

Federal Ministry for Economic Affairs and Energy

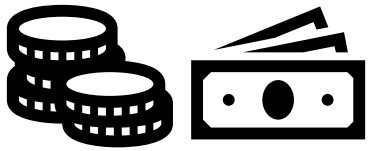
- Digital Hubs
- Testbeds
- Cluster Initiatives
- Showcase Regions
- SME Knowledge Center

Funding Infrastructures



Funding authority

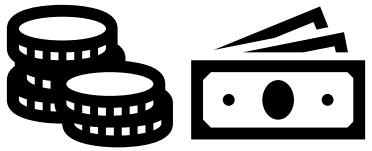
Funding Infrastructures



Funding authority

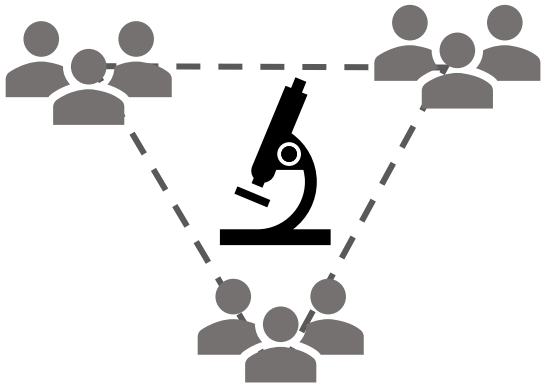
Project Management Agency

Funding Infrastructures



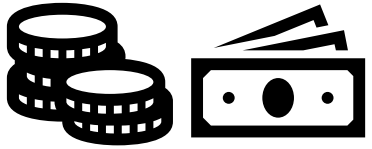
Funding authority

Project Management Agency



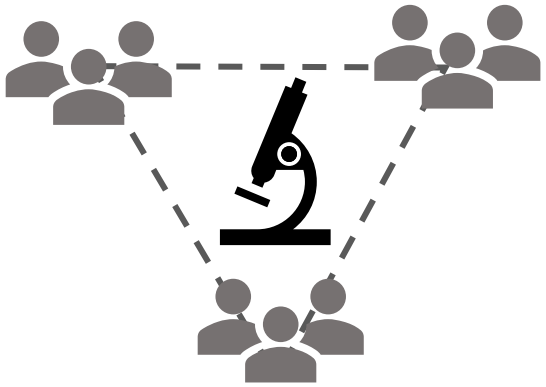
Research Consortium

Funding Infrastructures



Funding authority

Project Management Agency

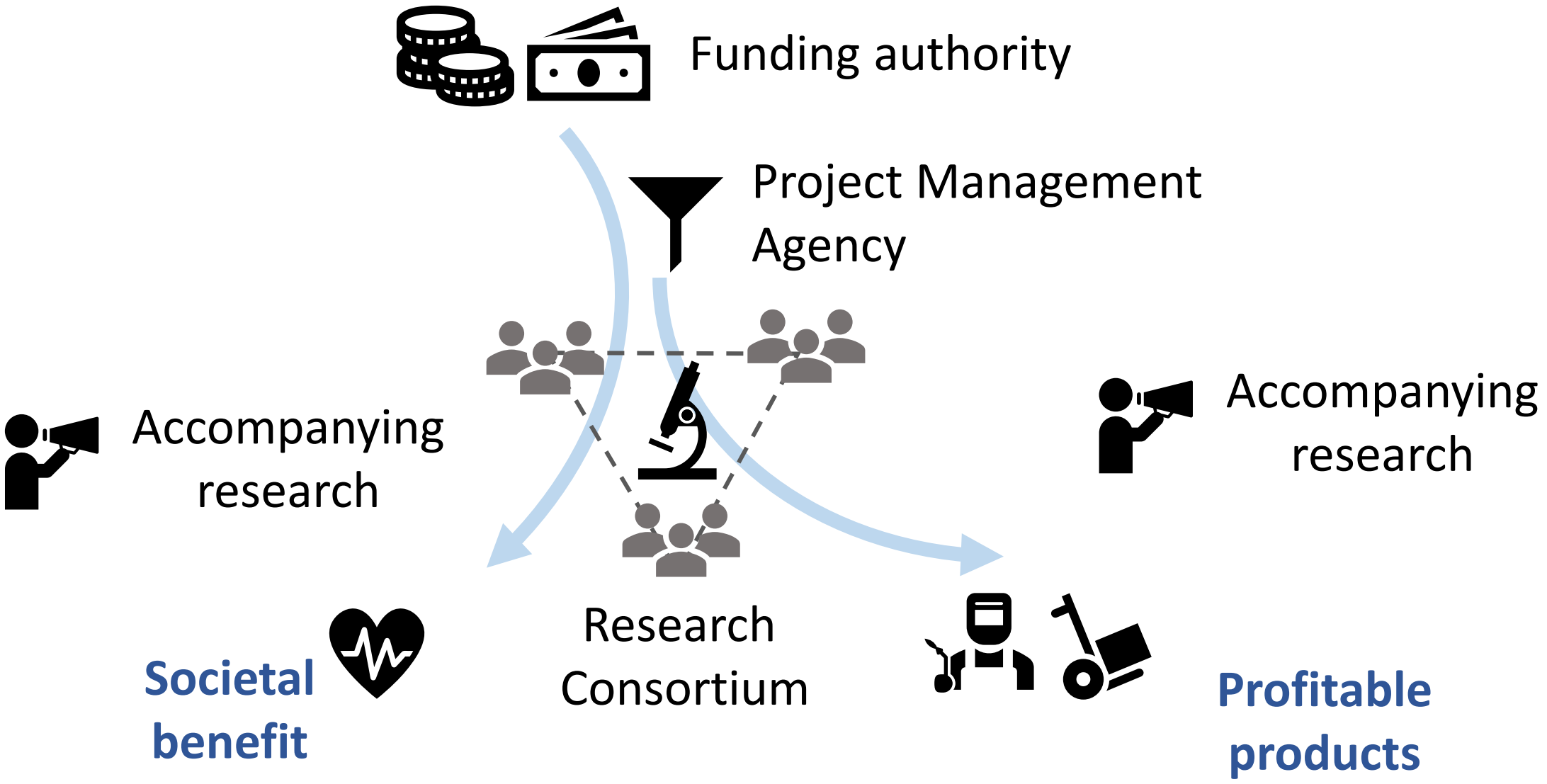


Research Consortium

Accompanying research

Accompanying research

Funding Infrastructures



Funding Infrastructures

FORUM DIGITAL TECHNOLOGIES

Federal Ministry for Economic Affairs and Energy

Funding authority

Project Management Agency

DLR Projektträger

PROSTEP integrate the future

Fraunhofer HHI

50% - 90%

Accompanying research

VDI|VDE|IT

Accompanying research

VDI|VDE|IT

Societal benefit

Research Consortium

SIEMENS

Profitable products

Federal Ministry
for Economic Affairs
and Climate Action

FORUM
DIGITAL
TECHNOLOGIES

Forum Digital Technologies

"Service provider" for the research projects funding area
Development of Digital Technologies

Fraunhofer Heinrich-Hertz-Institut

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

VDI|VDE|IT

The Forum Digital Technologies at a Glance

Our Mandate

Federal Ministry
for Economic Affairs
and Climate Action

- Commissioned by BMWK
- Jointly operated by: DFKI, Fraunhofer HHI, VDI/VDE-IT
- Networking platform & exhibition space
- Promoting innovation, transfer and exchange

German Research Center for Artificial Intelligence
Fraunhofer HHI
VDI|VDE|IT

Our Activities

- Showcasing emerging technologies
- Supporting research projects
- Knowledge transfer to SMEs
- Promoting visibility of technologies made in Germany

Our Services

- Berlin Showroom with demonstrators
- National and international transfer formats
- Online resources for navigating the German digital technology landscape

Think about the Forum as..

ACCESS – Showroom & delegations

BOOSTER – Supporting our projects

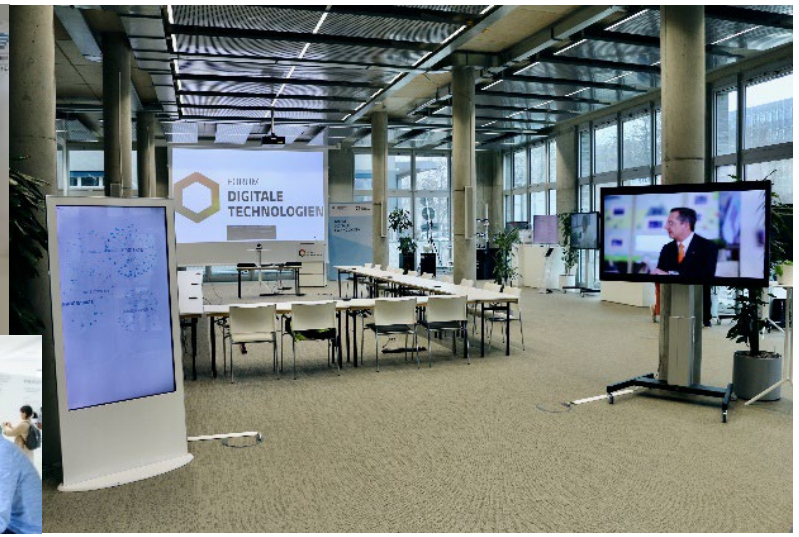
COLLABORATION – International roadshow

DEMONSTRATORS – Technical interfaces

ENABLER – Online resources

ACCESS – Showroom Open for Delegations

Our Showroom with demonstrators and technical interfaces is available for events and meetups with international guests.
Visit us in Berlin!



Project Meetings ● Workshops ● Networking & Matchmaking Events ●
Virtual Tours ● Delegations ● Research Colloquia ● Courses and Trainings

BOOSTER – Supporting Research Projects

We are a facilitator and service provider for research projects and startups from the technology programs and innovation competitions of the ministry.

Meet our projects!

IKT FÜR ELEKTROMOBILITÄT

SICHERE DIGITALE IDENTITÄT

KI-Innovationswettbewerb

Smarte Datenwirtschaft

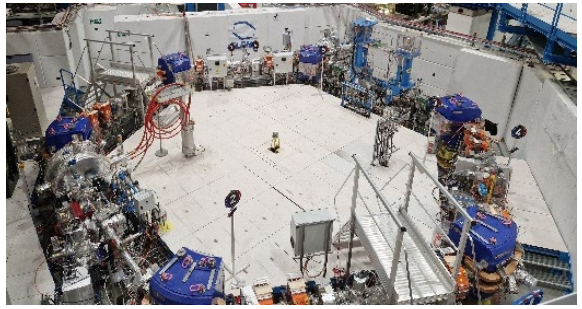
Smart Service Welt

Edge Datenwirtschaft

COLLABORATION – International Roadshows

Our aim is to strengthen and promote bilateral cooperation. We put the spotlight on our projects and conduct annual theme-based international roadshows.
Let's connect!



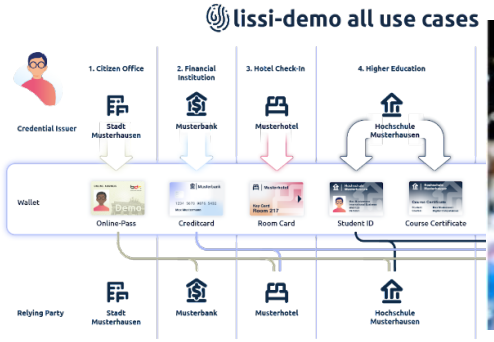
2023 France 'Resilience'

2024 ' GreenTech' ?




DEMONSTRATORS – Technology on Display

The Forum welcomes guests and stakeholders from politics, business and science to showcase interactive demonstrators from research projects.
Experience the tech!



ENABLER – Directories to Guide You

We put the spotlight on our projects and help you navigate the digital competence landscape of Germany.

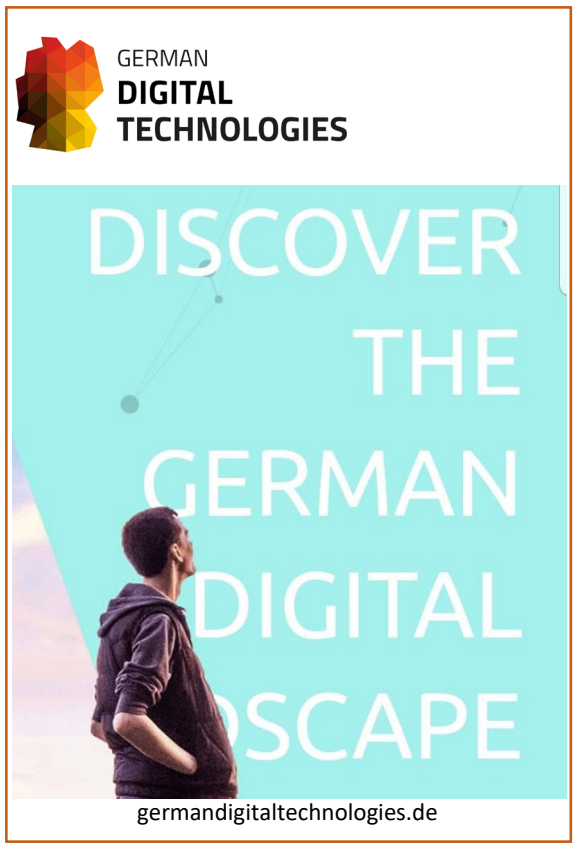
Check out our online resources!

digitale-technologien.de

kompass-digitale-technologien.de

@FDT_Berlin

@Forum Digitale Technologien



germandigitaltechnologies.de

- The Fraunhofer Association conducts **application-oriented research** of societal benefit
  and in direct support of both private and public enterprises.

- Customers:
  - Industry
  - Service Sector
  - Public Administration

Fraunhofer-Gesellschaft

- Europe's largest research organization

76
institutes in Germany

Worldwide
research collaborations

More than
30.000
employees

2,9
billion euros budget

Fraunhofer HHI

- Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut, HHI

Fraunhofer HHI Main Building

The listed building in Berlin-Charlottenburg was constructed by Carl-Heinz Schwennicke.

1928

Founded as the "Heinrich-Hertz-Institut für Schwingungsforschung" in Berlin

Since the 1960s

Research in photonic data transmission

Since the 1980s

Digital video coding research

Since 2003

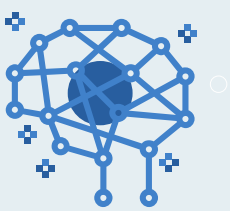
Member of the Fraunhofer-Gesellschaft

Since 2009

Branch Office in Goslar

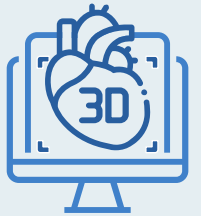
Research Focus

- Fraunhofer Institut for Telecomunication, Heinrich Hertz Institute, HHI



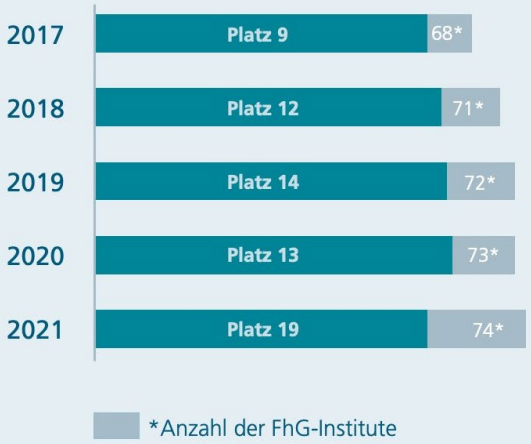
Explainable Artificial Intelligence

6G-Technologies



Medical Technology and Image Analysis

Staff



*feldspezifische Zitationsrate der FhG

Topics and Departments

Explainable Artificial Intelligence

6G-Technologies

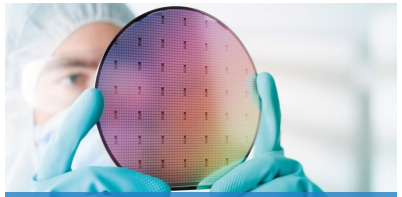
Medical Technology

Quantum Communication Technologies

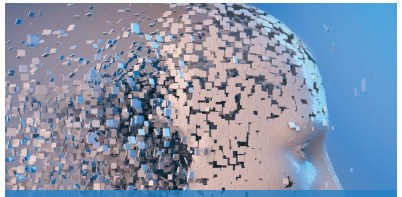
Photonic & Fiber Optic Sensor Technology

Compression of Image, Video and Neural Networks

Wireless Communications and Systems (WN)

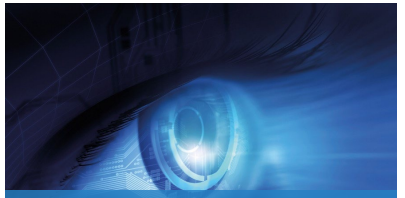


Photonic Components (PC)



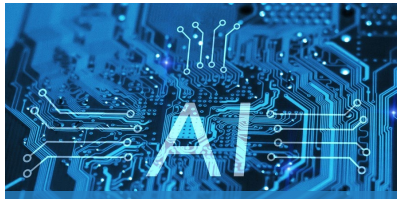
Video Coding and Analytics (VCA)

Photonic Networks and Systems (PN)



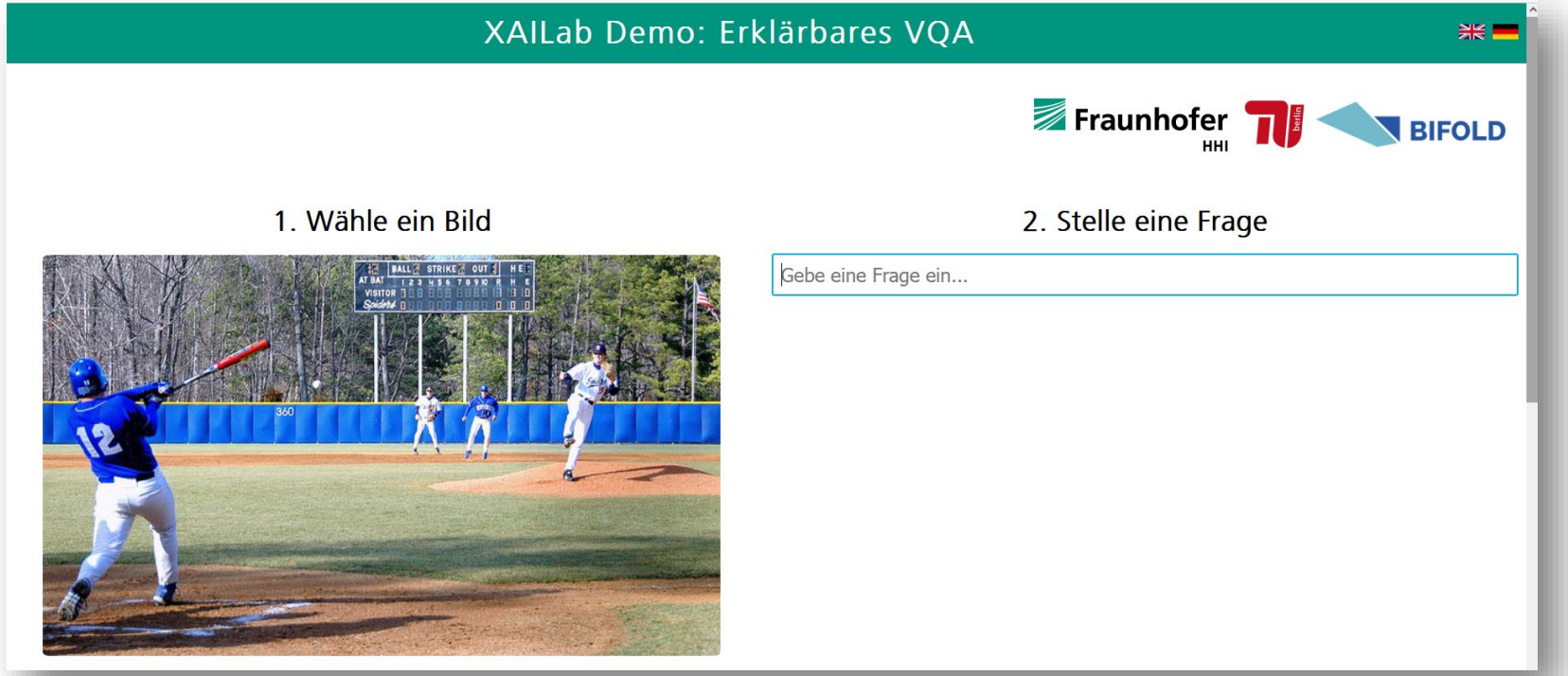
Vision and Imaging Technologies (VIT)

Fiber Optical Sensor Systems (FS)

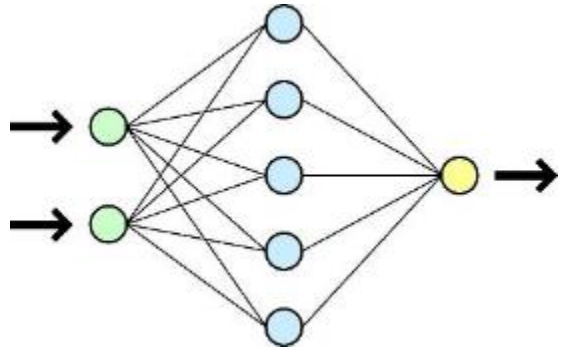


Artificial Intelligence (AI)

Explainable AI

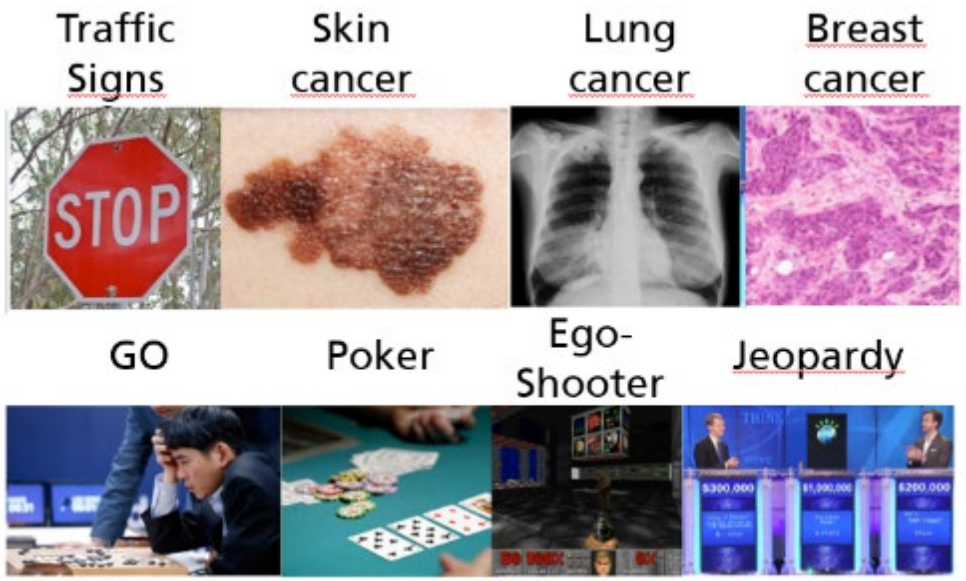


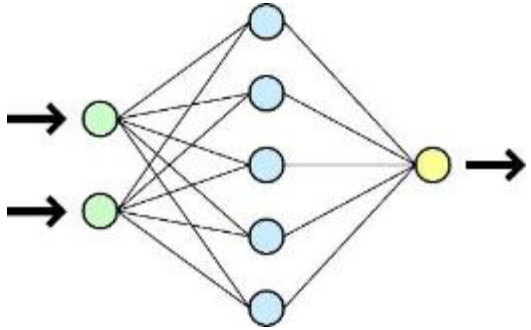
Transparent AI

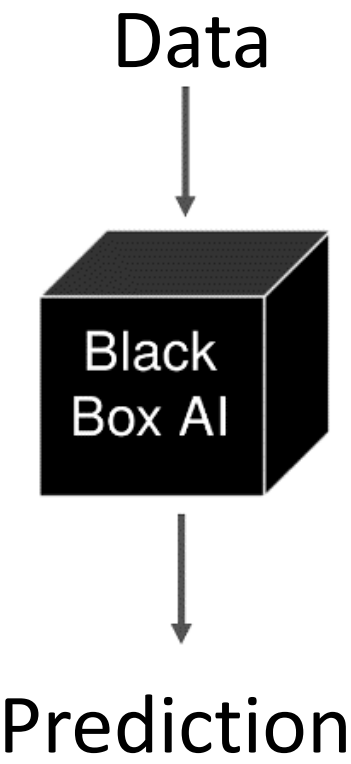


Sebastian Lapuschkin – Fraunhofer HHI

Transparent AI





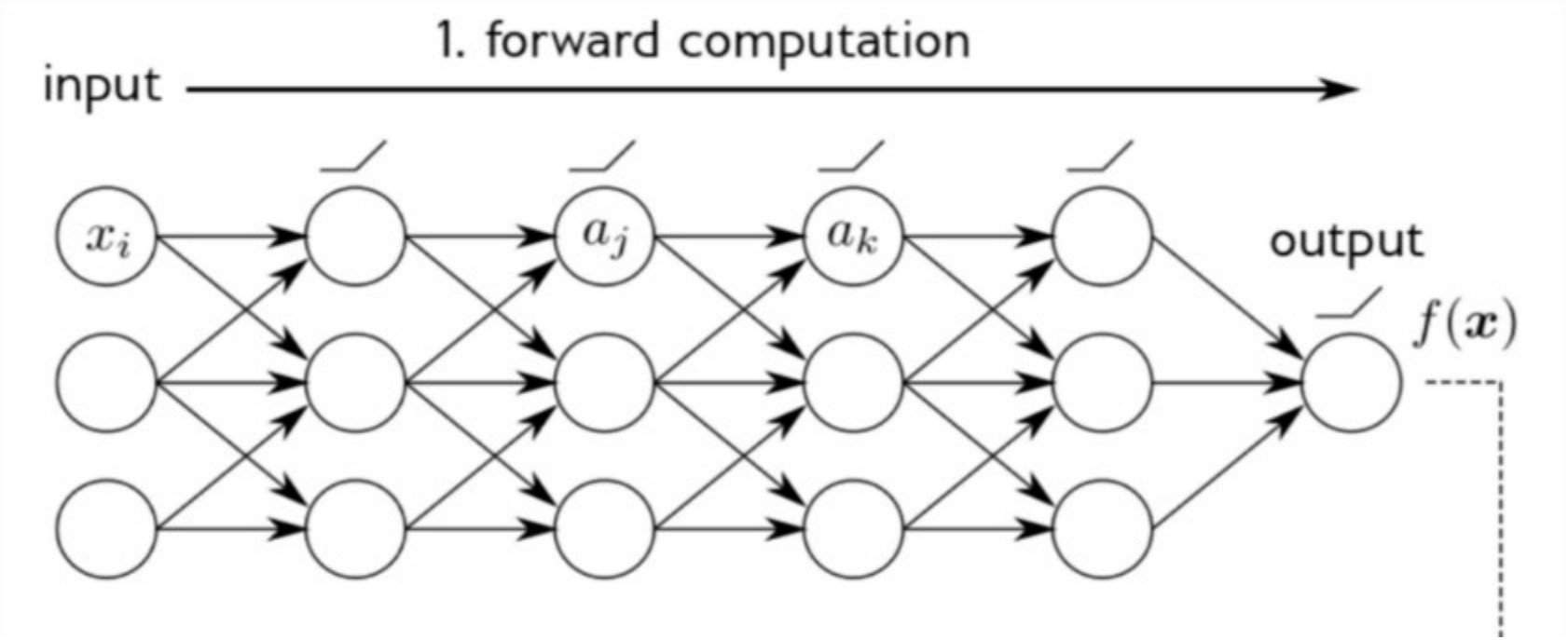


Sebastian Lapuschkin – Fraunhofer HHI

FORUM DIGITAL TECHNOLOGIES

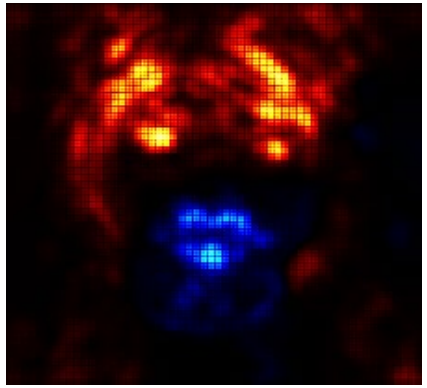
Layer-wise Relevance Propagation (LRP) *[Bach et al. 2015]*

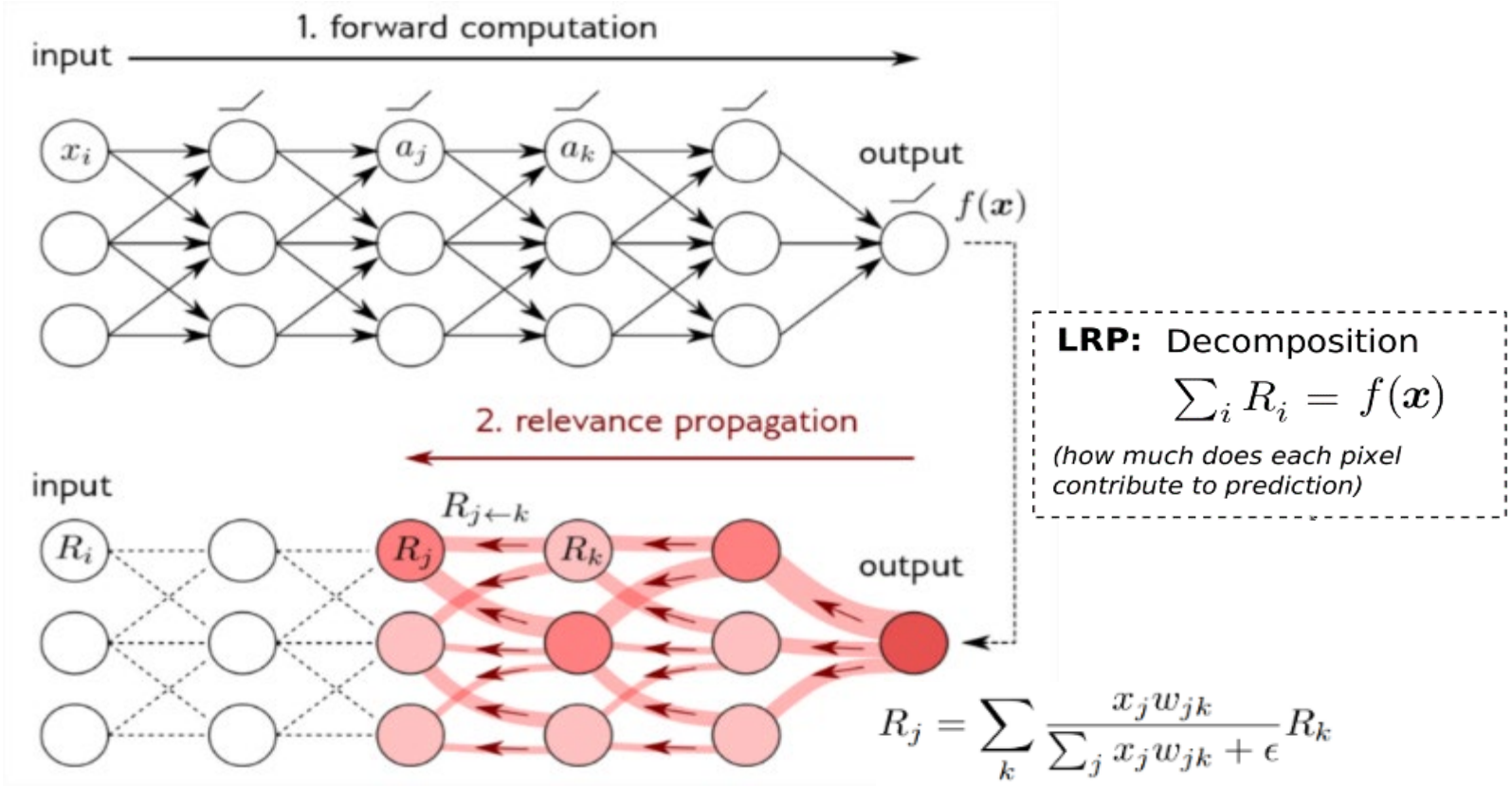
Different layers render the input information more and more abstract



FORUM DIGITAL TECHNOLOGIES

Back-tracing of the activation shows relevant details in input data





Sebastian Lapuschkin – Fraunhofer HHI

FORUM DIGITAL TECHNOLOGIES

Use case 1: Classification on Pascal VOC

Special event:

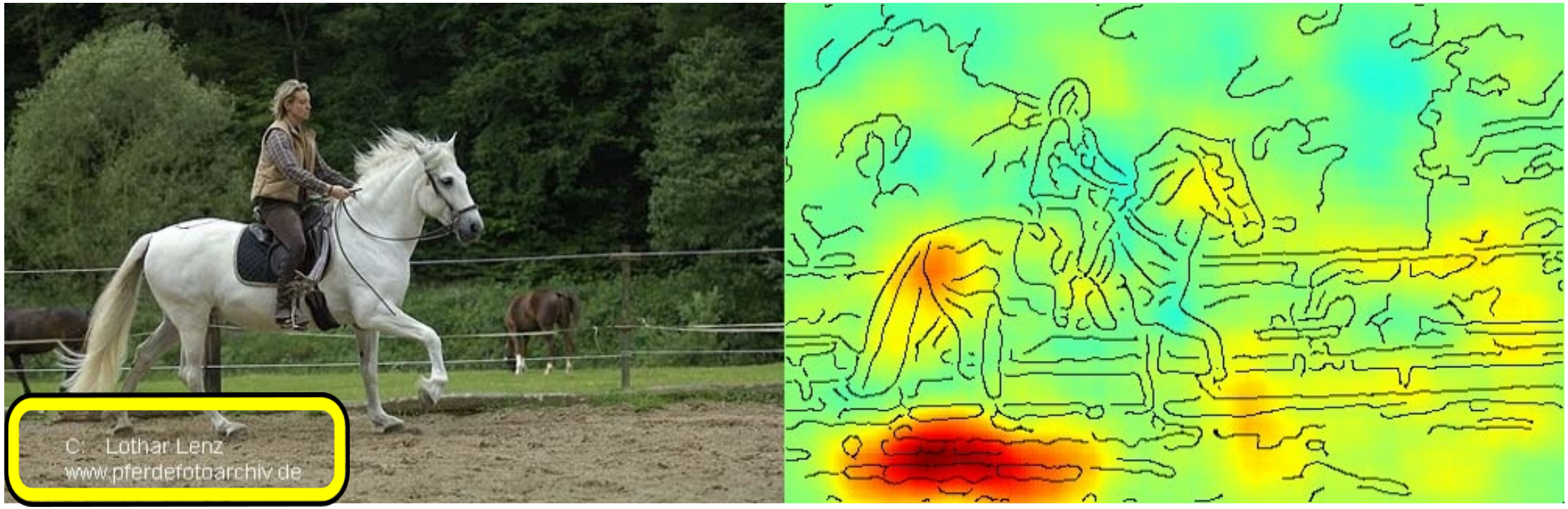
Recognition of **horses**:
>80% AP-Value

[Perronnin et al. 2010]
[Chatfield et al. 2011]
[Sánchez et al. 2013]

Sebastian Lapuschkin – Fraunhofer HHI

FORUM DIGITAL TECHNOLOGIES

Use case 1: Classification on Pascal VOC



Application of **LRP**

Sebastian Lapuschkin – Fraunhofer HHI

FORUM DIGITAL TECHNOLOGIES

Use case 2: Facial Recognition for Adience Face Recognition Benchmark

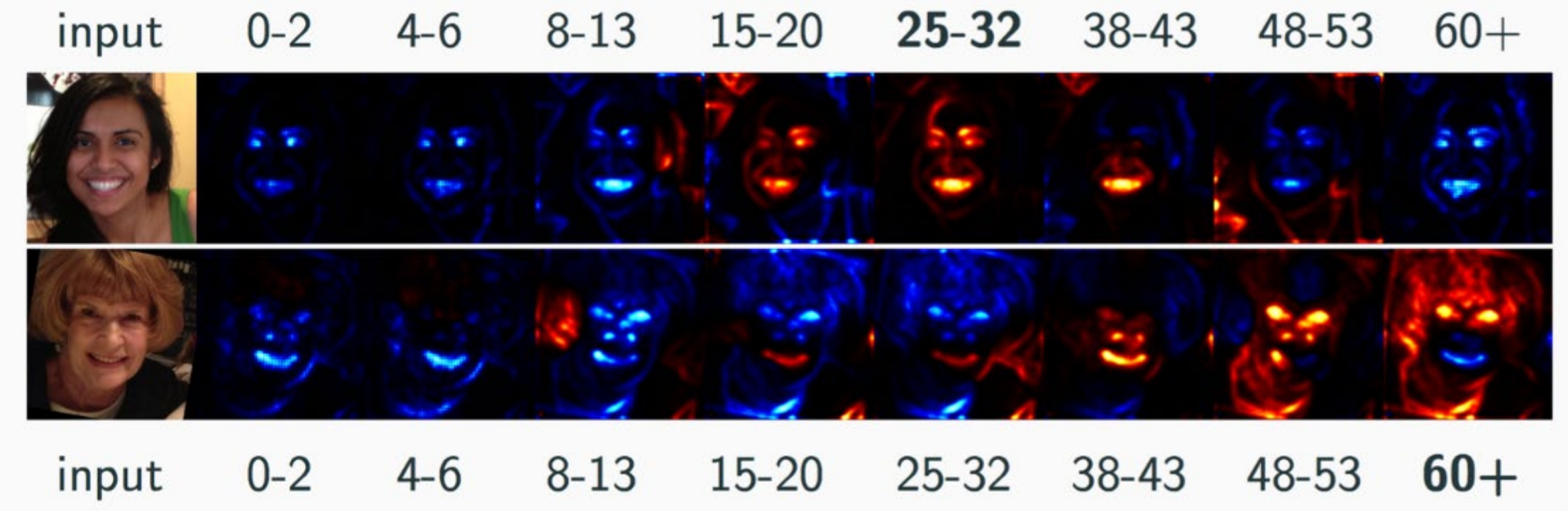
Label: Age, Sex
~27.000 Gesichert
Source: **flickr.com** + iPhone 5+

[Eidinger et al. 2014]

Sebastian Lapuschkin – Fraunhofer HHI

FORUM DIGITAL TECHNOLOGIES

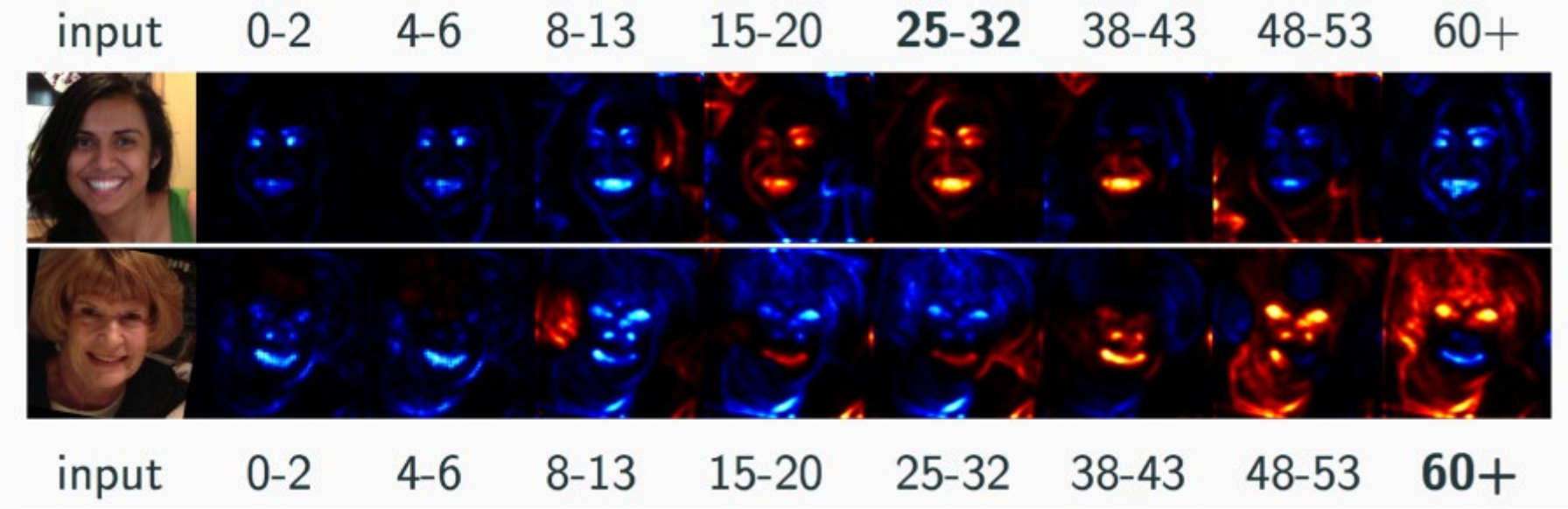
Use case 2: Facial Recognition for Adience Face Recognition Benchmark



Sebastian Lapuschkin – Fraunhofer HHI

FORUM DIGITAL TECHNOLOGIES

Use case 2: Facial Recognition for Adience Face Recognition Benchmark

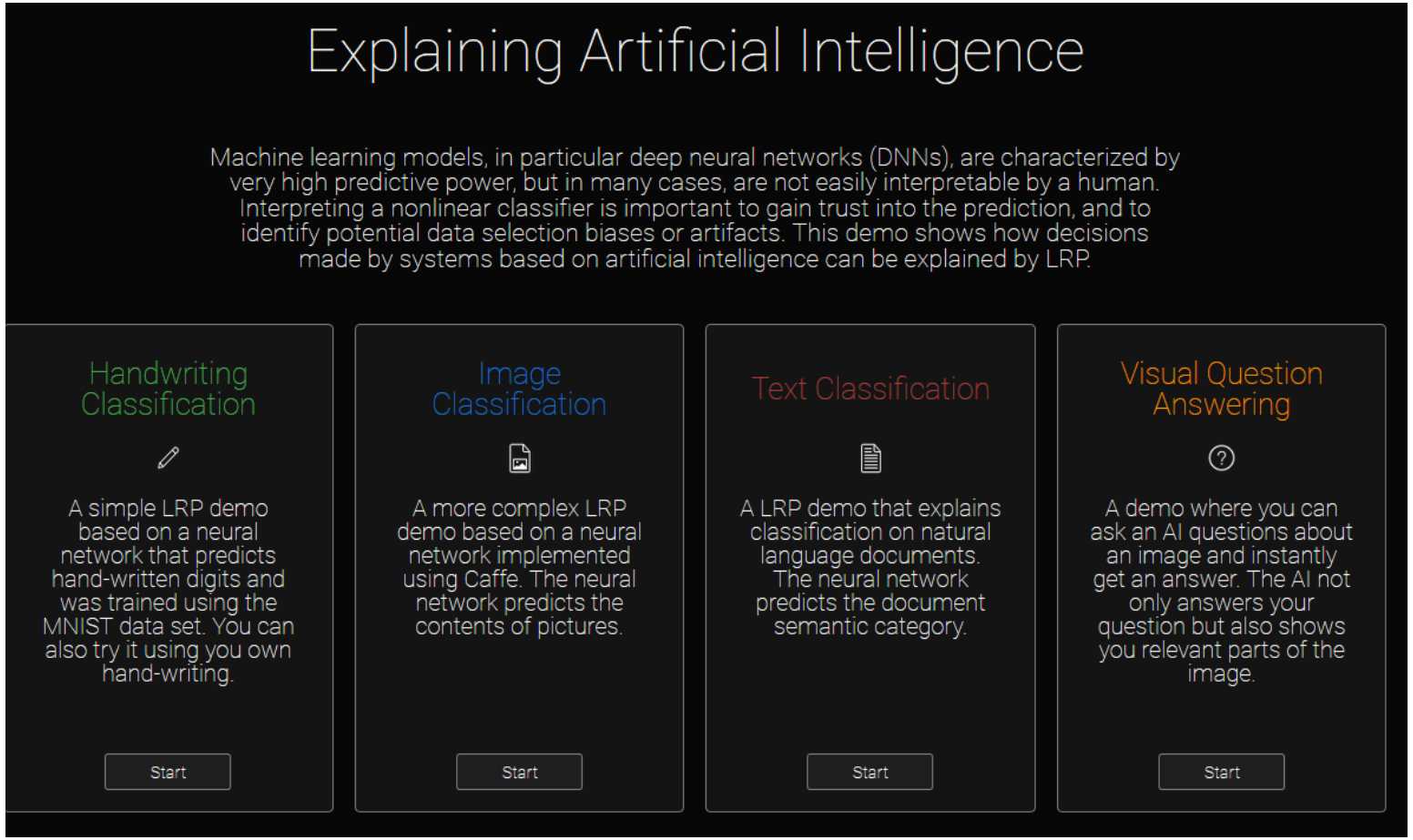


LRP: Smiling alters the recognised age group!

[Lapuschkin et al. 2017]

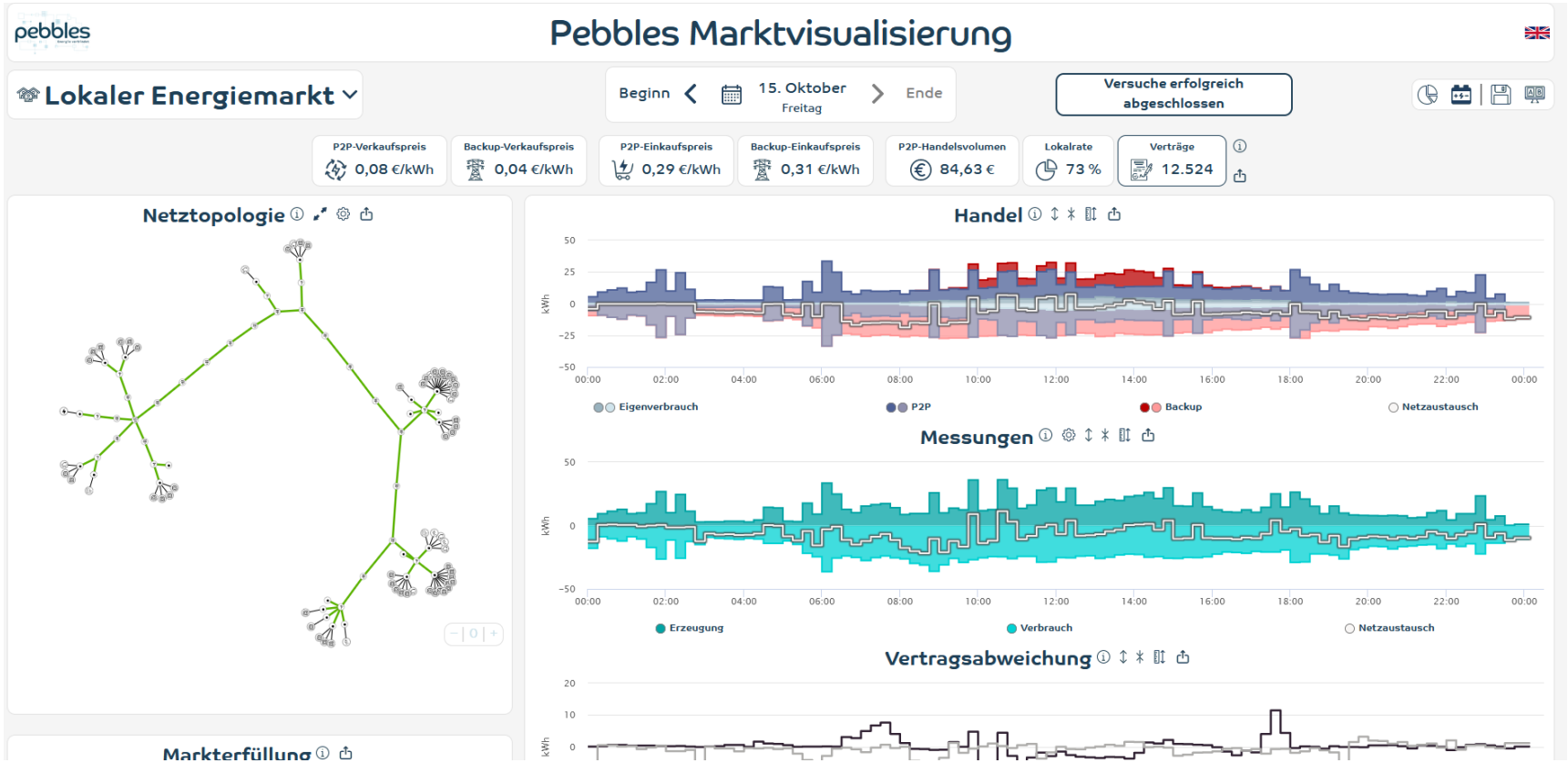
Sebastian Lapuschkin – Fraunhofer HHI

Transparent AI

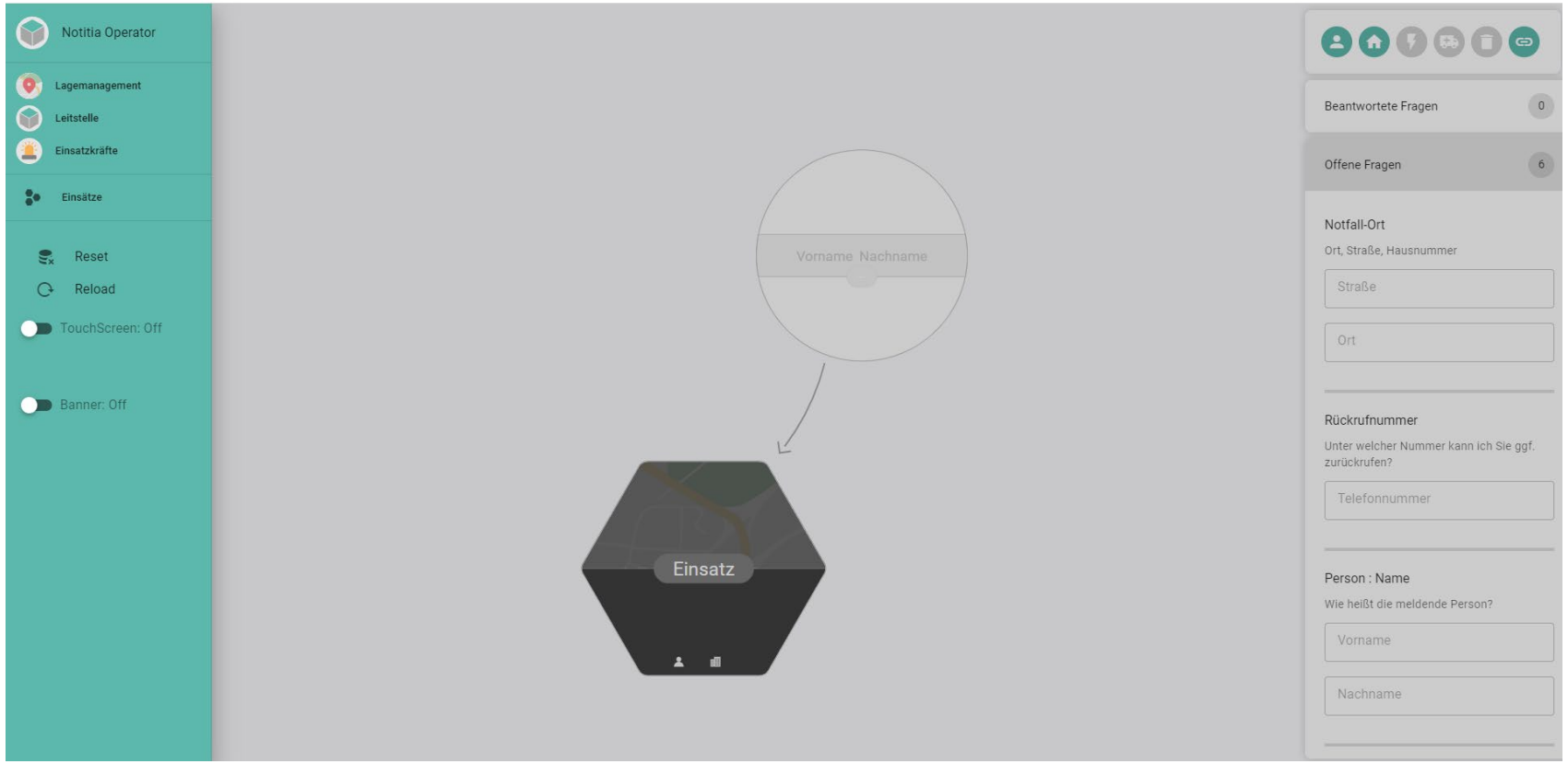


https://lrpserver.hhi.fraunhofer.de

pebbles


pebbles
Pebbles Marktvisualisierung
Lokaler Energiemarkt
Beginn
15. Oktober
Freitag
Ende
Versuche erfolgreich abgeschlossen
P2P-Verkaufspreis
0,08 €/kWh
Backup-Verkaufspreis
0,04 €/kWh
P2P-Einkaufspreis
0,29 €/kWh
Backup-Einkaufspreis
0,31 €/kWh
P2P-Handelsvolumen
84,63 €
Lokalrate
73 %
Verträge
12.524
Netztopologie
Handel
kWh
Eigenverbrauch
P2P
Backup
Netzaustausch
Messungen
Erzeugung
Verbrauch
Netzaustausch
Vertragsabweichung
Markterfüllung

SPELL


Notitia Operator
Lagemanagement
Leitstelle
Einsatzkräfte
Einsätze
Reset
Reload
TouchScreen: Off
Banner: Off
Vorname Nachname
Einsatz
Beantwortete Fragen 0
Offene Fragen 6
Notfall-Ort
Ort, Straße, Hausnummer
Straße
Ort
Rückrufnummer
Unter welcher Nummer kann ich Sie ggf. zurückrufen?
Telefonnummer
Person : Name
Wie heißt die meldende Person?
Vorname
Nachname

KI@Home

Contact

Marc Reznicek
Forum Digital Technologies
Marc.reznicek@hhi.fraunhofer.de
+49 30 31002 - 412

Fraunhofer
Heinrich-Hertz-Institut