



Fujitsu e FINIX: sessione CIO

**29/30 marzo 2023
Milano e Roma, Italia**

Udo Würtz
Fujitsu Fellow
Chief Data Officer

Lo sapevate?

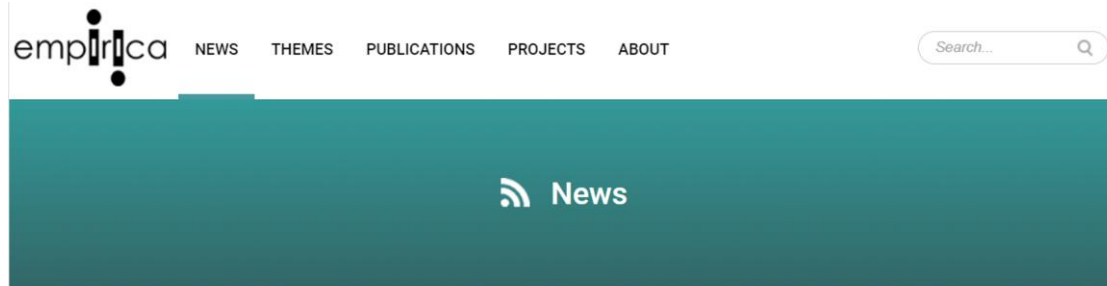
- 1,3 milioni di chilometri di cavi in tutto il mondo
- Il 90+% del traffico internet passa su cavi posati sott'acqua
- La quantità di dati trasferiti dall'UE agli Stati Uniti raddoppia ogni 2 anni.

- **Energia**
- **Comunicazione**
- **Trasporto**

- Il cloud è solo il computer di qualcun altro
- L'infrastruttura cloud è completamente fuori dal controllo dell'utente
- Il business del cloud si basa esclusivamente su leggi, fiducia e sicurezza.

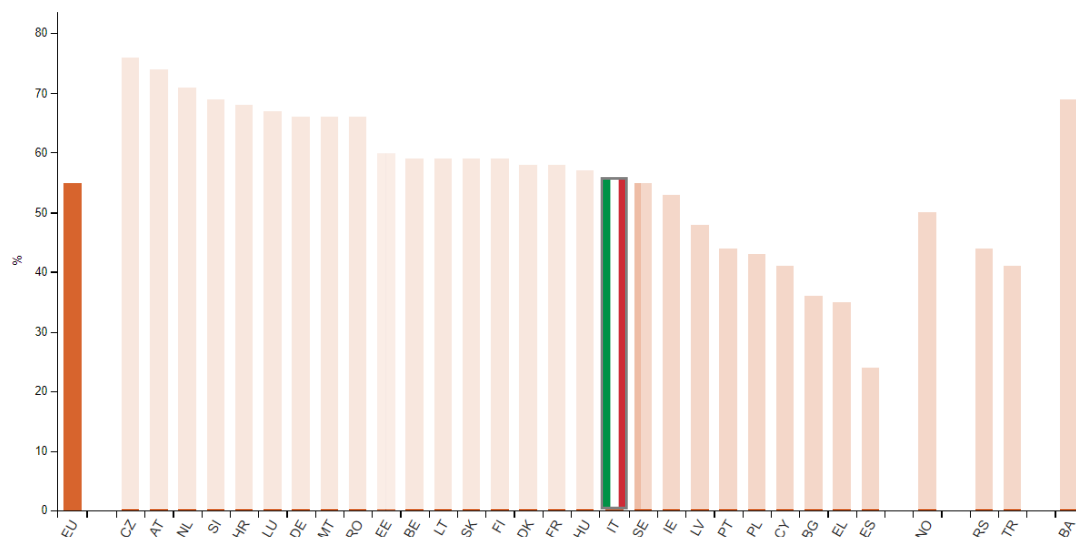
Resilienza Aziendale

Shortage di personale e competenze



Updated forecast of ICT labour market now expects a shortage of 526,000 ICT specialists in the EU in 2020. Release of Interim Report 'Digital Organisational Frameworks and IT Professionalism', including updated ICT labour market projections.

Enterprises that had hard-to-fill vacancies for ICT specialists, 2020 (% enterprises that recruited/tried to recruit)



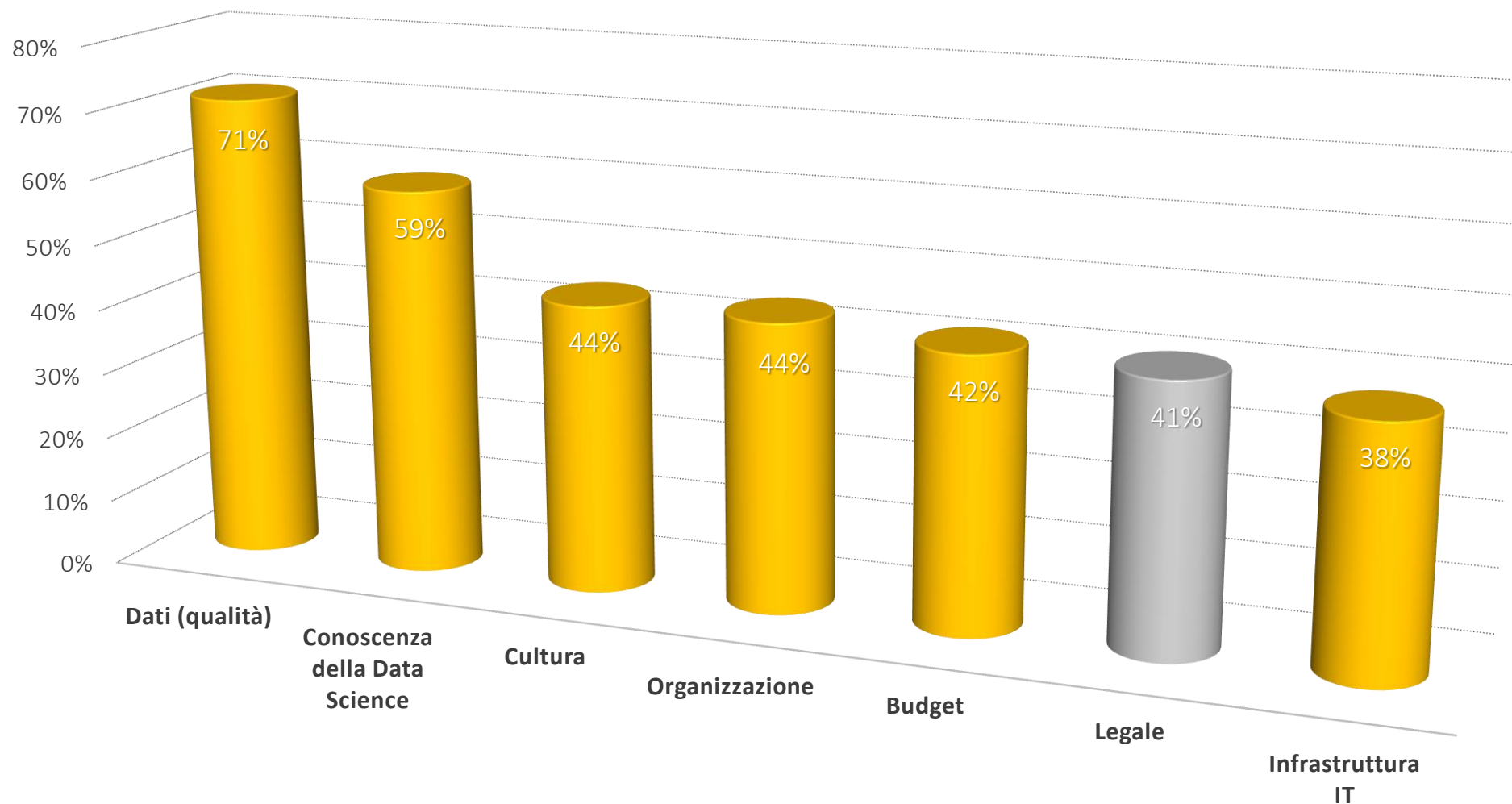
HOME » TECH » VOLKSWAGEN SUCHT TAUSENDE VON SOFTWAREENTWICKLERN

Volkswagen cerca migliaia di sviluppatori

dpa

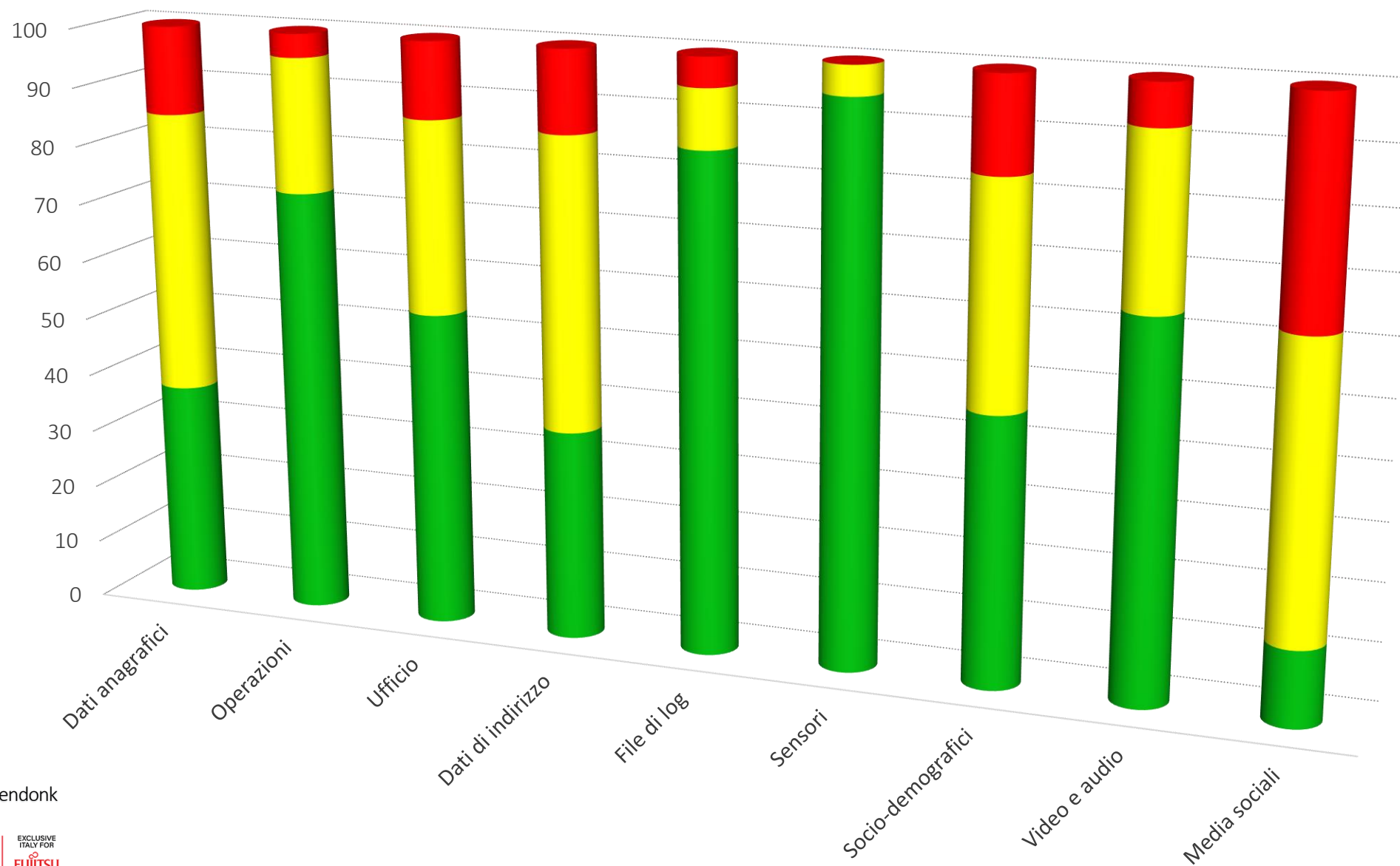


Ostacoli all'adozione dell'IA



Source: Lünendonk

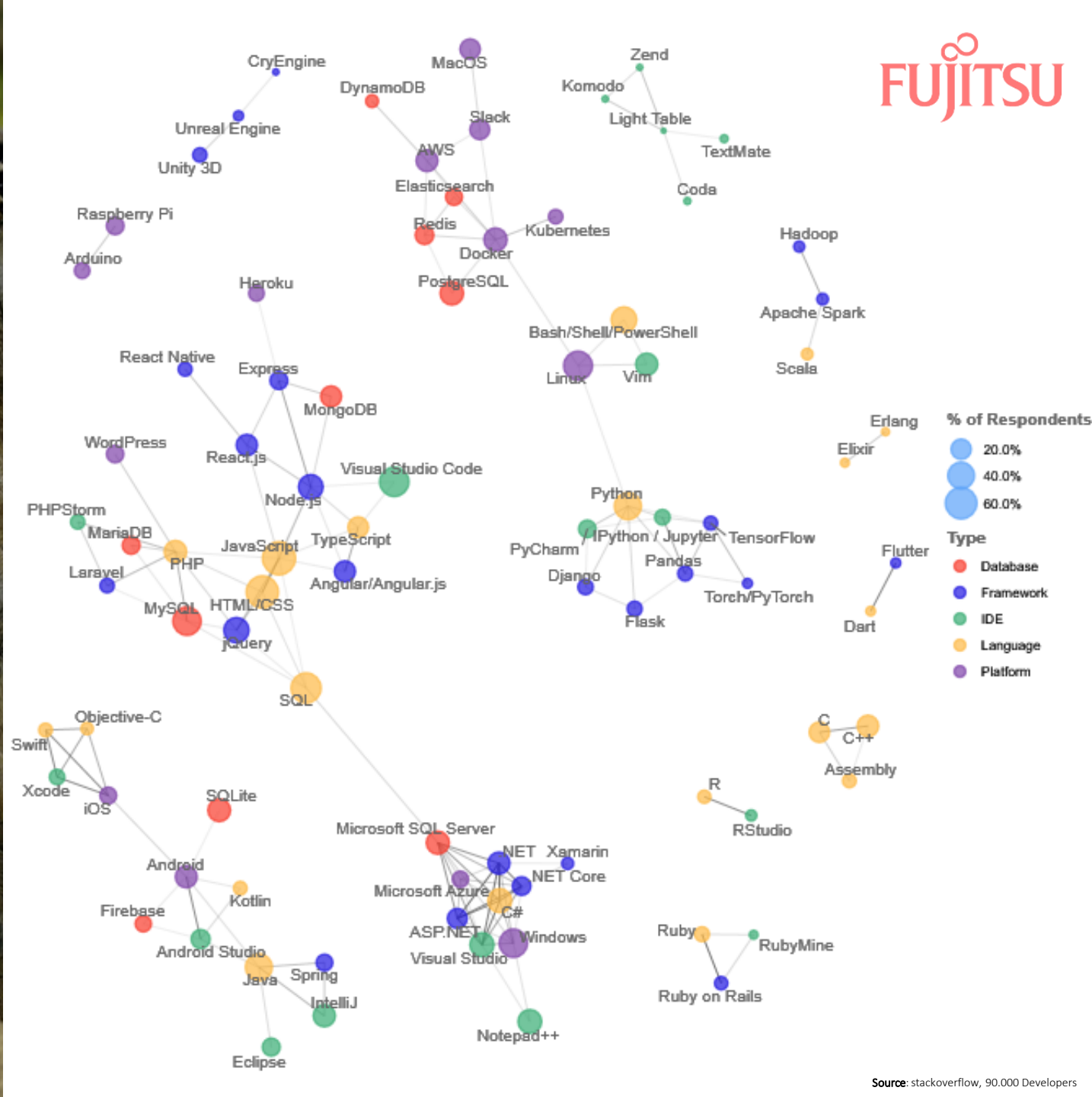
Ostacoli all'adozione dell'IA



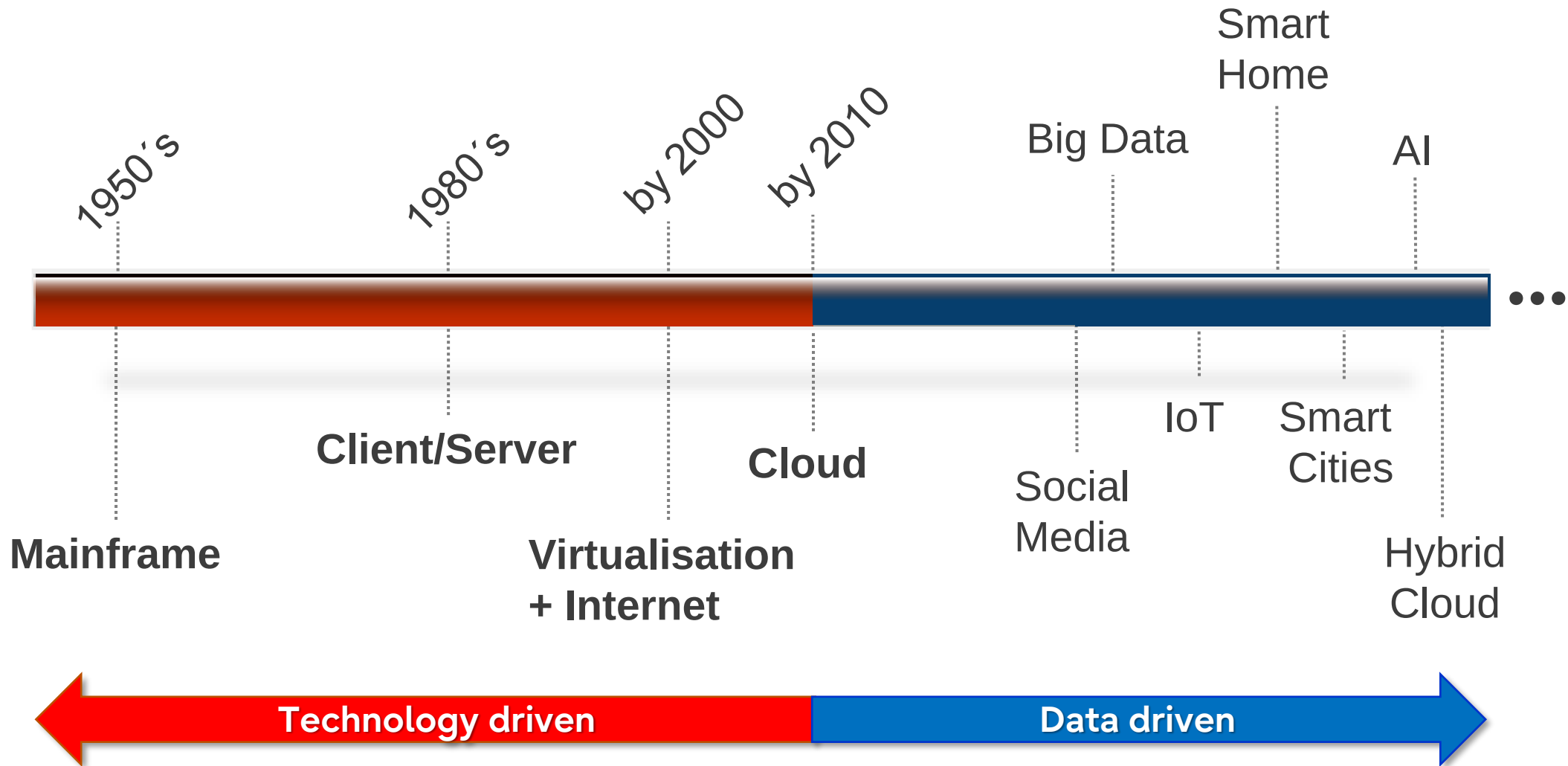
Source: Lünendonk



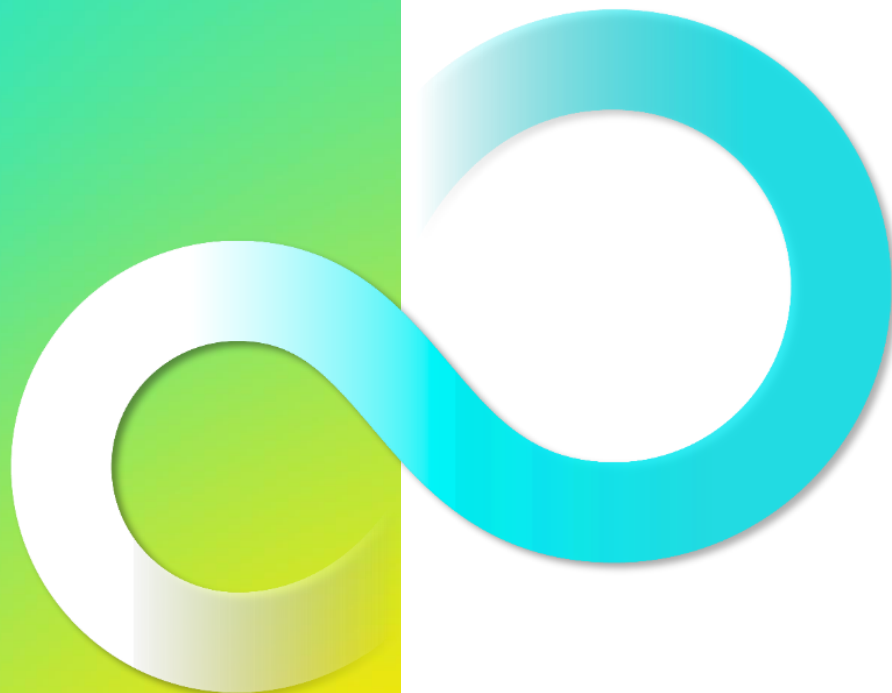
Custode di TechZoo



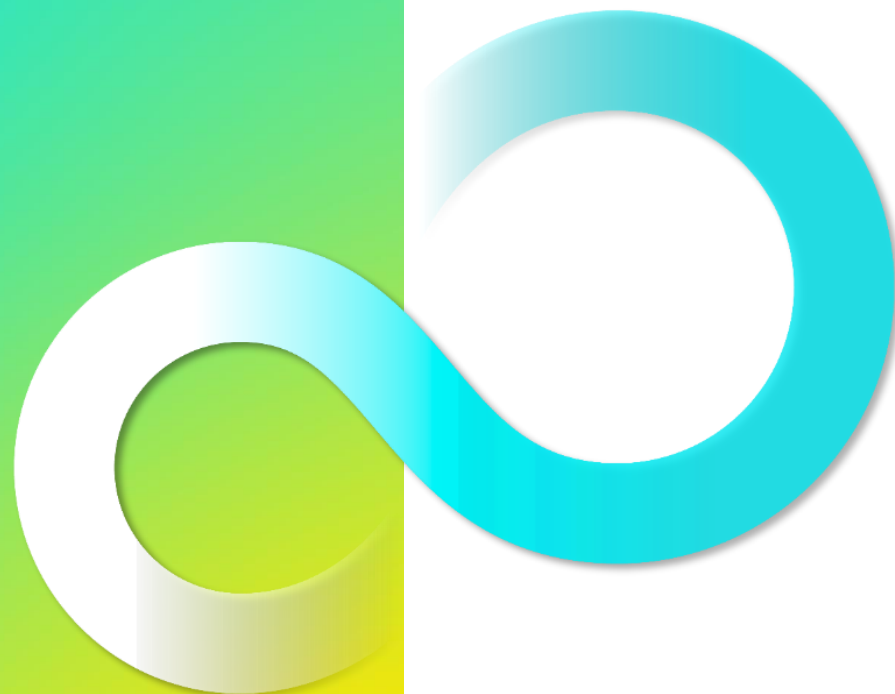
Perché i dati?



Digital Twin per l'industria



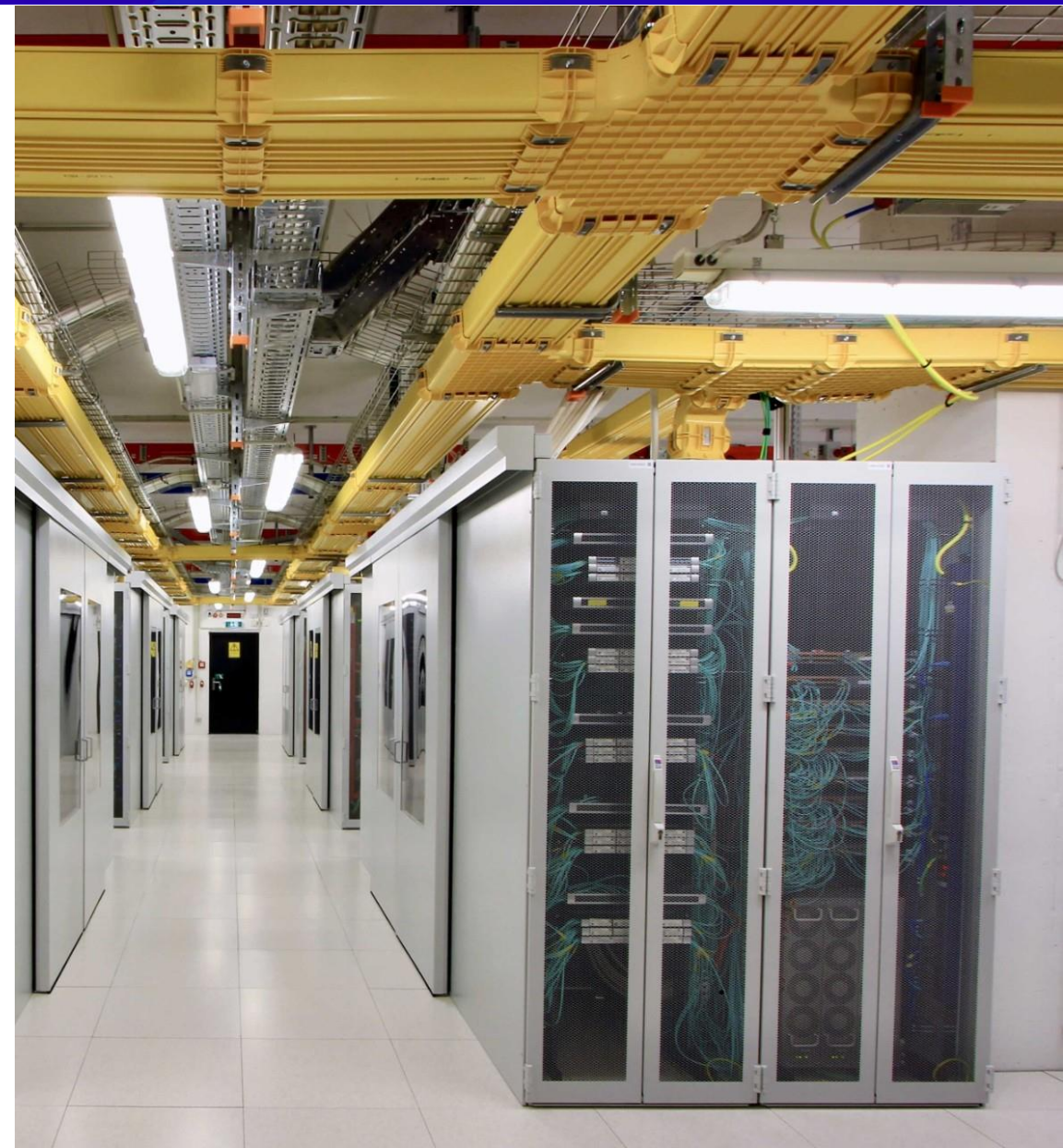
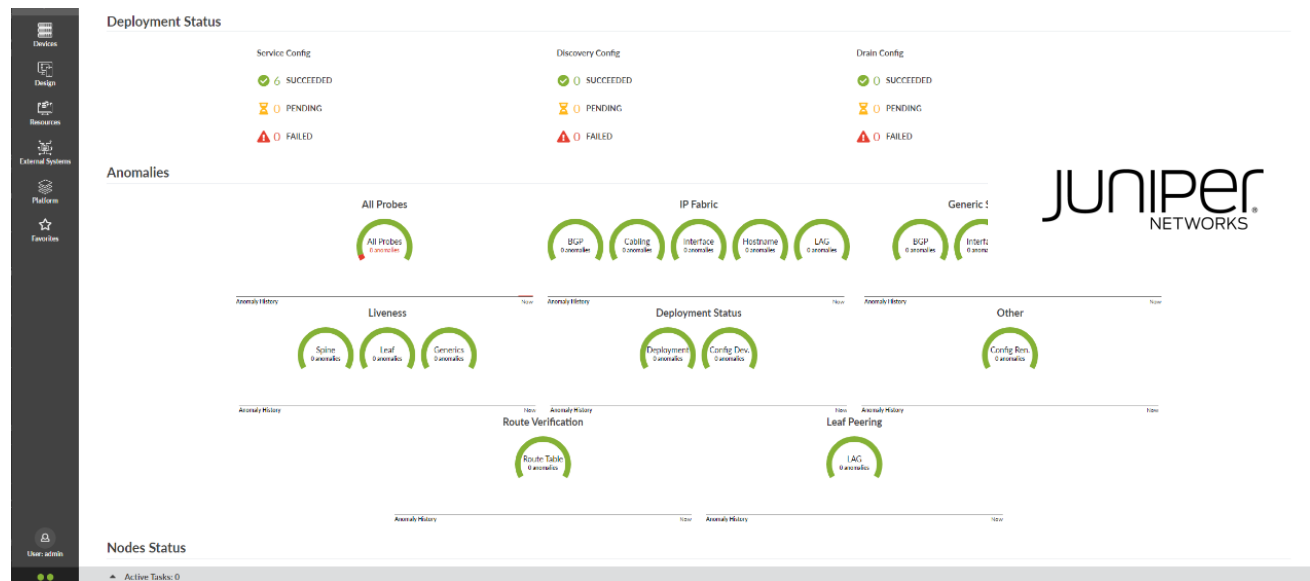
Operazioni IT + IA



Gestione della rete basata sull'intelligenza artificiale



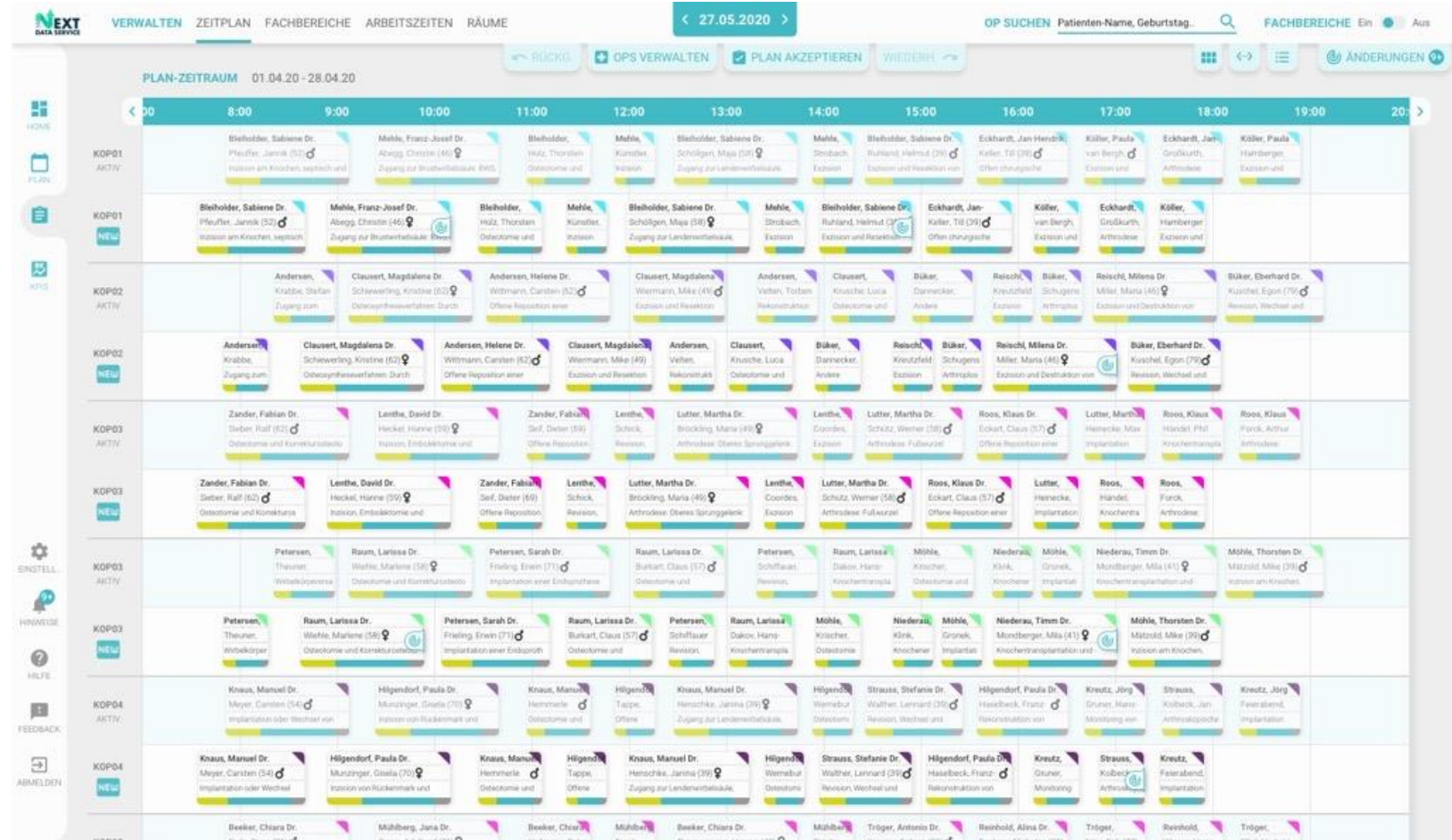
Network automation helps Raiffeisen Informatik accelerate digital banking



Soluzioni dell'ecosistema Fujitsu DDTS: Pianificazione delle sale operatorie supportata dall'intelligenza artificiale

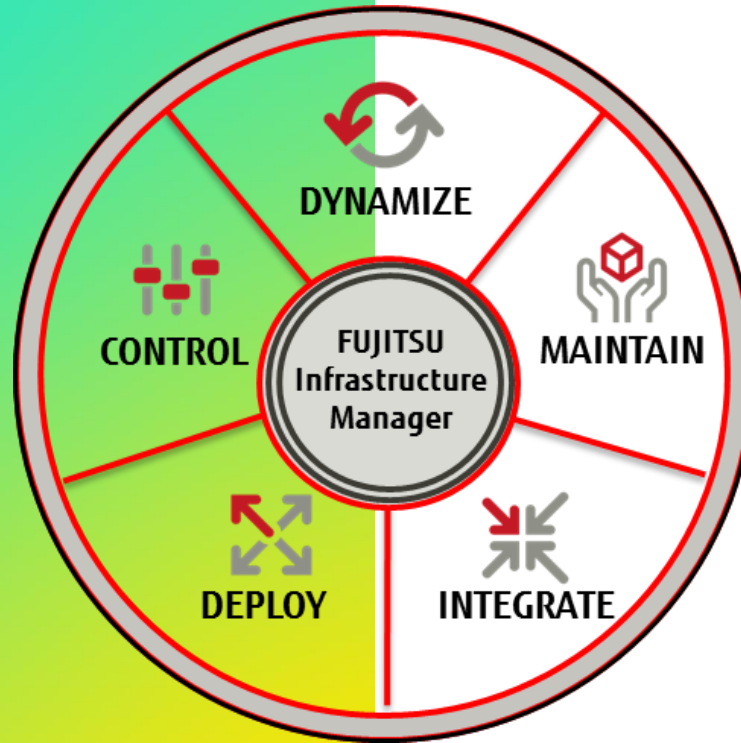


Productive,
Predictive and
Personalised
Healthcare

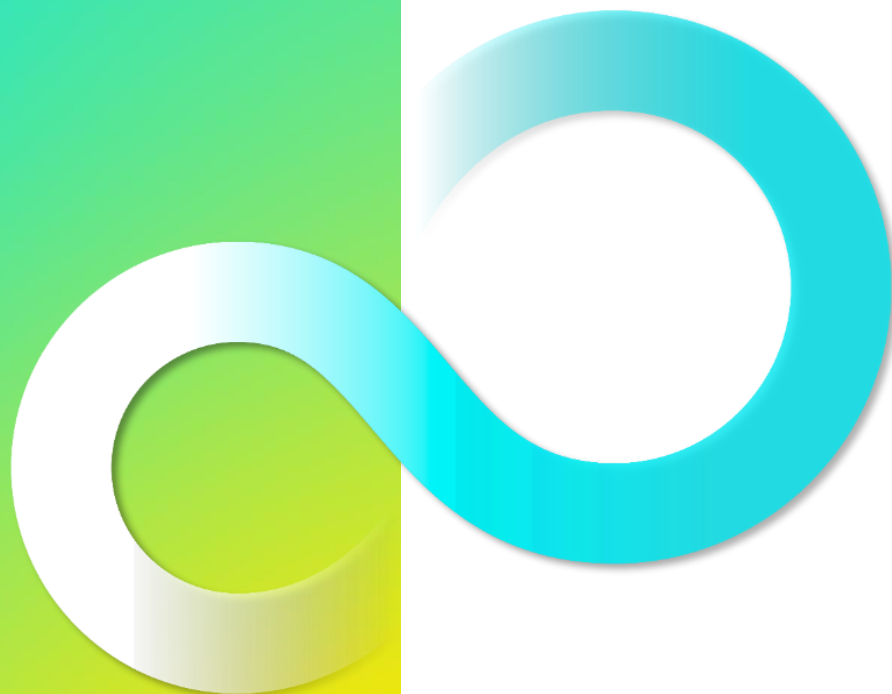


Zero Ops per le applicazioni basate su macchine virtuali

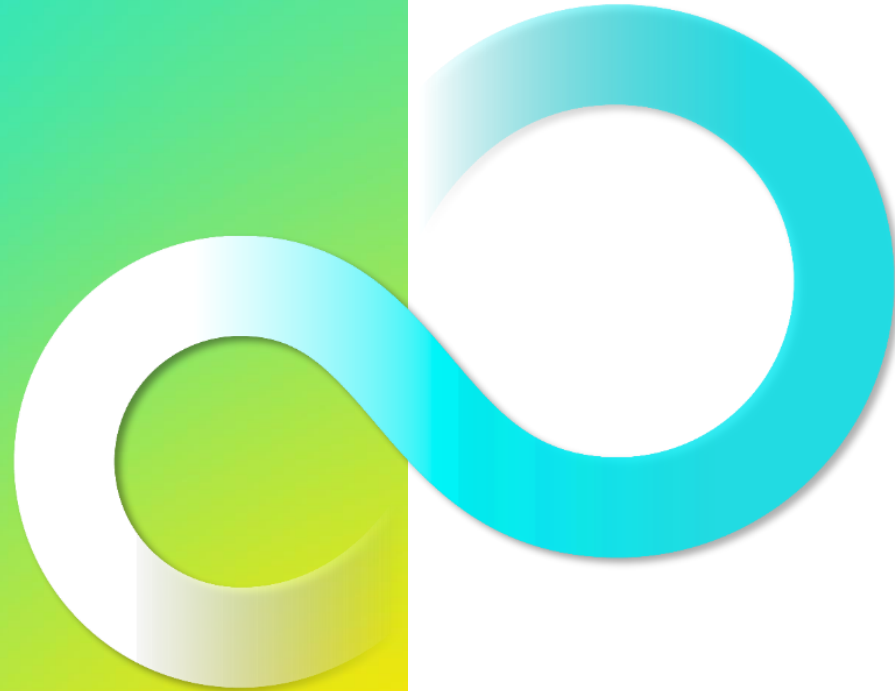
Piattaforma di resilienza



Rilevamento di oggetti minuscoli



Analisi del sentimento



Text Analyser

Input some text into the form below and retrieve a prediction to its overall positivity

I have received your article and am surprised at how easy it is to use. The device integrates beautifully into my existing SmartHome and responds very quickly.



Choose a file or drag it here

Predict Sentiment

Sentiment	Probability
Positive	98
Neutral	1.8
Negative	0.2

Input some text into the form below and retrieve a prediction to its overall positivity

I have received your article and am surprised at how easy it is to install. The device integrates beautifully into my existing SmartHome and responds very quickly. I received your article but, to be honest, I expected more. The operation is far from intuitive and the instructions do not help. Do you have a youtube video I can watch to finally get the device up and running? Otherwise, I will send the device back.

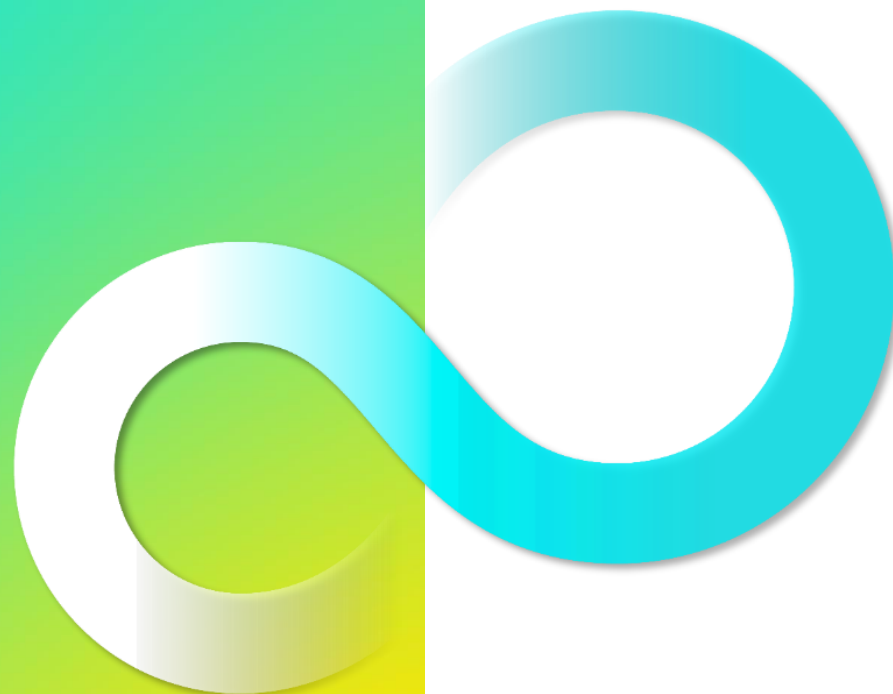


Choose a file or drag it here

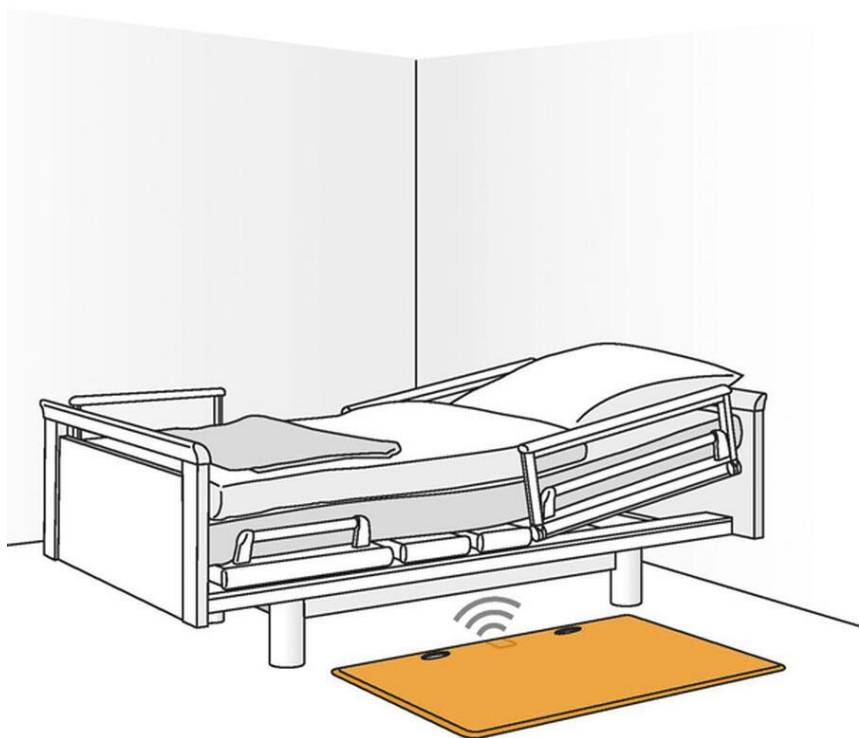
Predict Sentiment

Sentiment	Probability
Positive	49.1
Neutral	32
Negative	18.9

Assistenza sanitaria



Rilevamento di situazioni di emergenza con l'intelligenza artificiale



1500 euro senza installazione, tecnologia proprietaria, igiene e manutenzione rilevanti

contro

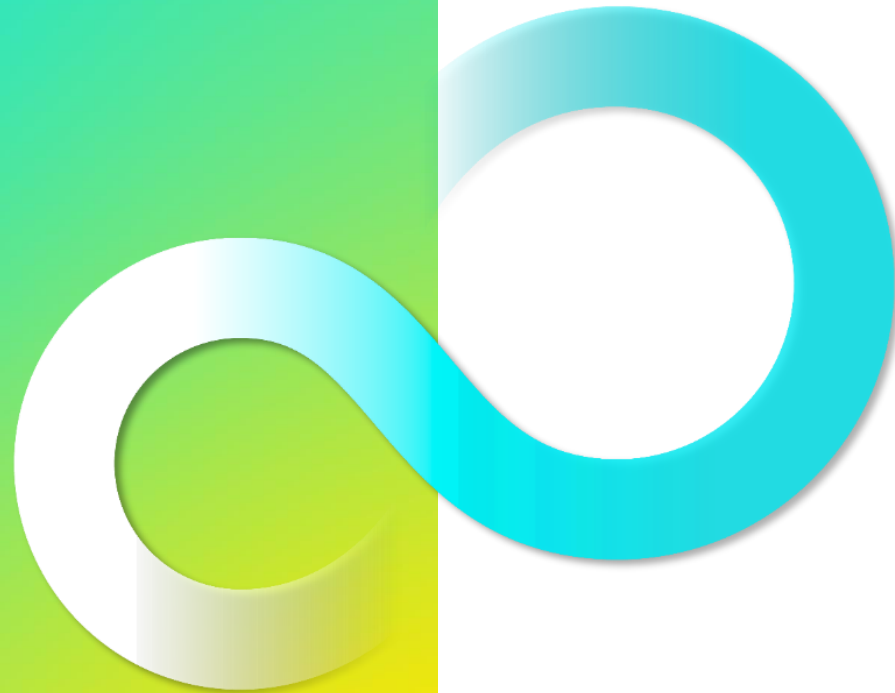


80 euro senza installazione e alimentazione, senza manutenzione

Rilevamento di situazioni di emergenza con l'IA



Automotive





Sfida

- Nordschleife: 20,8 km di lunghezza, molte salite e 73 curve
- Diverse centinaia di veicoli in pista contemporaneamente
- Monitoraggio solo via radio

Rendiamo il Nürburgring più sicuro

- Oltre 100 telecamere supportate dall'IA
- Rilevamento automatico delle minacce grazie al monitoraggio assistito da IA
- Rilevamento automatico delle minacce grazie al monitoraggio assistito da IA



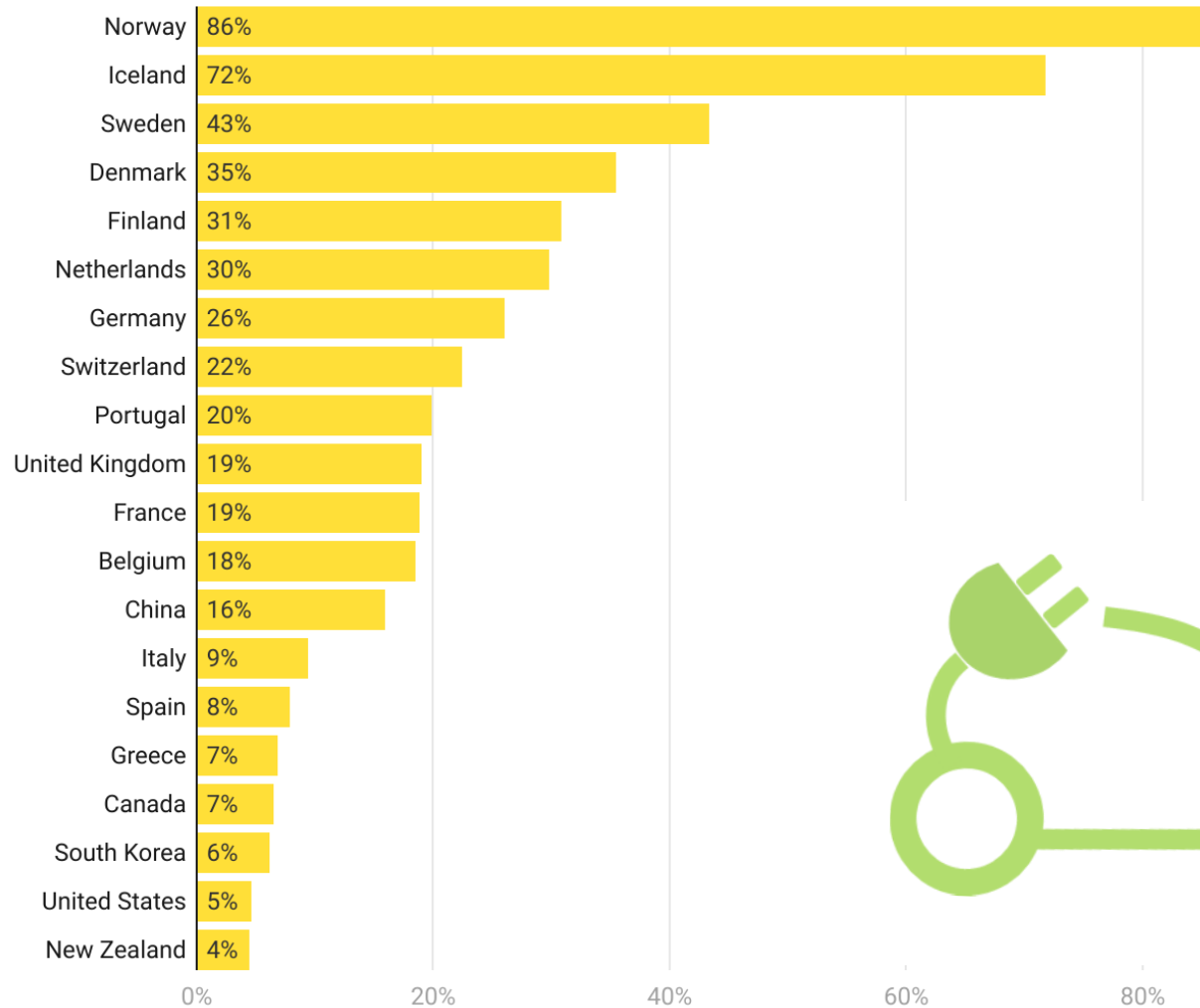
intel.
xeon®



Veicoli elettrici

Top 20 countries for EV sales

Electric vehicle sales as a percentage of overall car sales in 2021

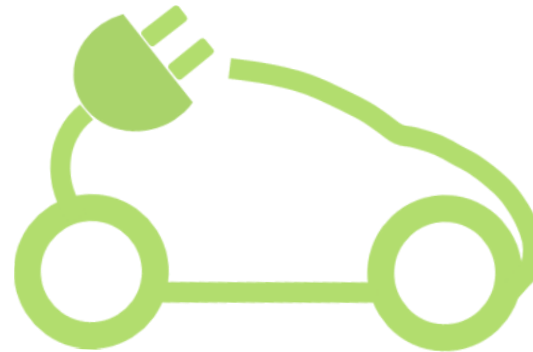


Top 10 countries with most EVs per capita

Number of electric vehicles per 1,000 residents in 2020



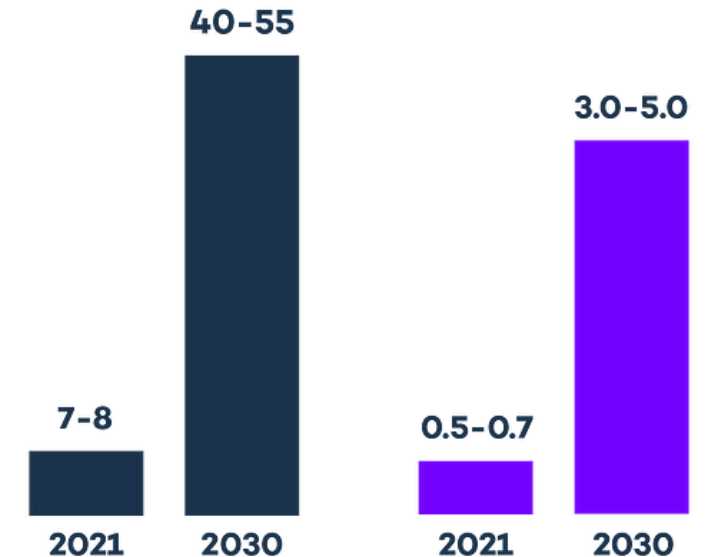
Chart: Canary Media • Source: Statista



Il business della ricarica nell'UE - Ricavi e margini

Ricavi(miliardi di euro)

Margine(miliardi di euro)



Source: Bain & Company

Esempi: Targhe di veicoli elettrici



Challenges:

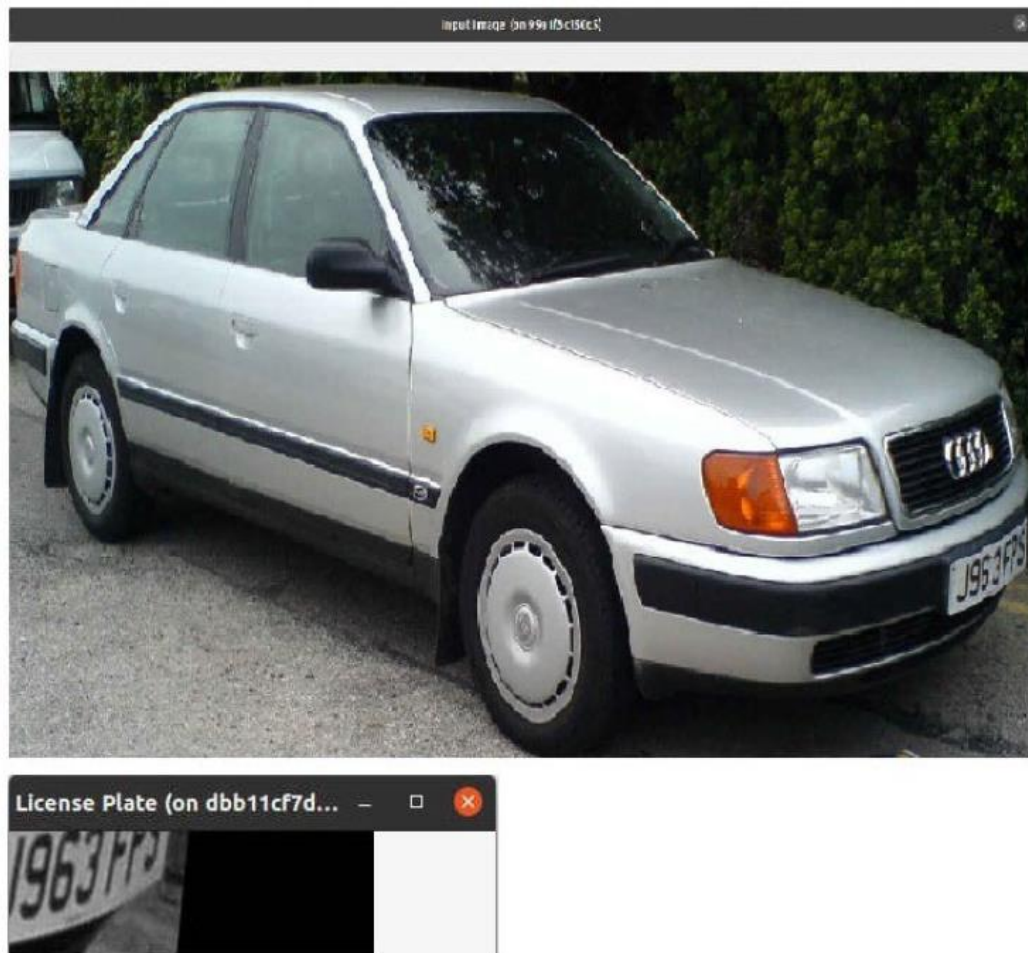
- Giorno vs. notte
- Colore vs. bianco/nero e scala di grigi
- Posizione
- Angolo
- Velocità
- Numero di oggetti
- ...



Cosa può fare chiunque



Soluzioni tradizionali di IA



La nostra soluzione IA



Perché la qualità dei dati è importante

- Risultati di casi di studio relativi all'ottimizzazione della qualità del riconoscimento

Accuracy

Riconoscimento (base)	76.2%
-----------------------	-------

Focus sul modello di IA	0.0% (76.2%)
-------------------------	-----------------

Focus sui dati	+16.9% (93.1%)
----------------	-------------------

Stanford
University



Andrew Ng
Ricercatore IA



**Optimizing Model with Dynamic Input Shape using
Intel® Distribution of OpenVINO™ Toolkit for
Implementing Unconstrained Automatic License Plate
Recognition**

White Paper

September 2022

- I veicoli elettrici sono identificati dal colore dei caratteri (verde).
- L'indicatore viene utilizzato per evitare il doppio riconoscimento

```
In 21 1 plt.imshow(binary)
2 img_grey = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
3 import cv2
4 imagem = cv2.bitwise_not(th3)
5

In 22 1 crop_characters, test_roi = crop_flat_lp_chars(imagem, plate_image, thre_mor)
2 print("Detect {} letters...".format(len(crop_characters)))
3 fig = plt.figure(figsize=(10,6))
4 plt.axis(False)
5 plt.imshow(test_roi)
6 plt.savefig('grab_digit_contour.png', dpi=300)

Detect 7 letters...
```



Risultato sulla tecnologia Intel Xeon:
0.033s = 30.3 rilevamenti al secondo

```
In 12 1 _, LlpImgs = lpd_inference("../data/austria_car_plate_1.jpg", "../models/lpd/wpod-net/FP32/saved_model.xml")

Latency: 0.033675 sec
Number of LPs: 1

In 13 1 plt.imshow(LlpImgs[0])

Out 13 <matplotlib.image.AxesImage at 0x7f0c92d529d0>
```



Advanced Matrix Extensions (Intel(R) AMX)

Nuovi acceleratori Bult-in

- Analisi dei dati
- Rete
- Storage I/O
- Crittografia
- Compressione dei dati

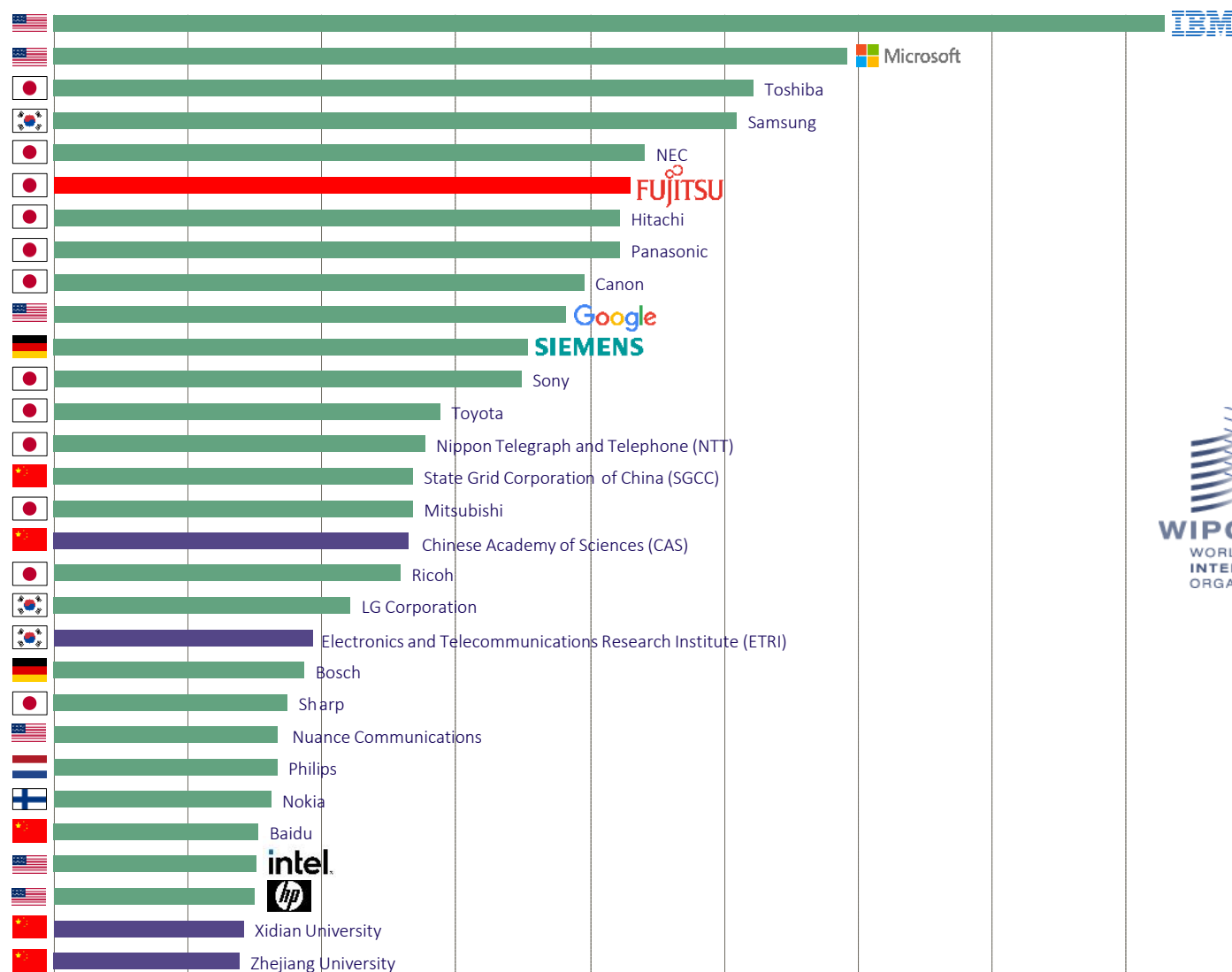


Performance data					SW CONFIG 1 Config1 (baseline) Precision: FP32 Framework: Tensorflow	SW CONFIG 2 Config2 Precision: AMX_BF16 Framework:	SW CONFIG 3 Config3 Precision: FP32	SW CONFIG 4 Config4 Precision: AMX_BF16 Framework: OpenVINO
Latency Test Case								
Model	Dataset	Physical cores	Streams	Batch size	Latency(ms)	Latency		Latency(ms)
WPOD-Net	9870 images	1	112	1	61.56	51.07		14.72
WPOD-Net	9870 images	2	56	1	52.01	47.49		11.09
WPOD-Net	9870 images	4	28	1	48.04	44.29		9.82
WPOD-Net	9870 images	56	2	1	50.57	50.87		8.79

5.000+ Immagini/sec

Latency Test Case					Speed up for Tensorflow FP32 vs OpenVINO FP32 (CONFIG 1 vs CONFIG 3)	Speed up for Tensorflow AMX_BF16 vs OpenVINO AMX_BF16(CONFIG 2 vs CONFIG 4)	Speed up for OpenVINO FP32 vs OpenVINO AMX_BF16(CONF IG 3 vs CONFIG 4)	Speed up for Tensorflow FP32 vs OpenVINO AMX_BF16 (CONFIG 1 vs CONFIG 4)
Model	Dataset	Physical cores	Streams	Batch size				
WPOD-Net	9870 images	1	112	1	1.97X	3.46X	2.11X	4.18X
WPOD-Net	9870 images	2	56	1	2.62X	4.28X	1.78X	4.68X
WPOD-Net	9870 images	4	28	1	3.42X	4.51X	1.42X	4.89X
WPOD-Net	9870 images	56	2	1	5.9X	5.78X	0.97X	5.75X

La posizione di Fujitsu nel mondo dell'IA



Le aziende rappresentano 26 dei 30 principali richiedenti di brevetti AI al mondo



~2 miliardi di dollari di R&S
10 laboratori globali di R&S
120.000 brevetti
I 10 principali brevetti di IA

Aziende
Università / istituto di ricerca pubblico

Source: https://www.wipo.int/tech_trends/en/artificial_intelligence/story.html

Il vostro banco da lavoro, pronto all'uso!

FUJITSU

Consulting Services

UNITY
CONSULTING & INNOVATION

NEXT
DATA SERVICE

BRAINPOOL.AI

Avenga

CEEDE

CUTTER
GROUP

CROSSVALE

FUJITSU

STRIPED
GIRAFFE

BIMm
Solutions

CO CRE8

WM
WEST
MEDICA

Alliance Partners

intel

vmware

NUTANIX

JUNIPER
NETWORKS

SUSE

NetApp

citrix

NVIDIA
CLOUDERA

SAP

Red Hat

BROADCOM

COMMVAULT

ORACLE

Datameer

VERITAS

Extreme
networks

Edge & AI, PLM, virtual reality

KNOW & DECIDE
Dynamic Asset Management

SQREAM

stefanini
GROUP

UWS
data technologies

ONLOGIC

isAP

Capgemini engineering

expert.ai

FUJITSU
Fujitsu Components

HR-Consulting and Collaboration

WorkSpan
culcha

Hofstede
Insights

ErlebnisWerkstatt

IoT

WIREPAS
Things connected - Naturally

Wyld

WITRA

ONLOGIC

SQREAM

App & Infra Discovery & Mgt, legacy migration

OpenLegacy

TIBCO

Gigamon

NEXT
DATA SERVICE

NETSCOUT

splunk

unicon

SHD

VNT IS NOW
FADDOM

Security & Forensics

ARMOR

FUJITSU

microCATgroup
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palmki
by PerfectID

nuix

BIOSEC

DATAWARE

SEIDOR
Human-focused
Technology experts

VDI

CUTTER
GROUP

Operational Services

CROSSVALE

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Compute/Storage/DP aaS, Disaggregated Storage

Cyxtera

EQUINIX

HARBOR

SJ-Solutions
Data Availability Solutions

S

Sostenere i nostri clienti

- Gratuito
- Sicuro e affidabile
- Disponibile all'interno dell'UE



Etica dell'intelligenza artificiale



United Nations

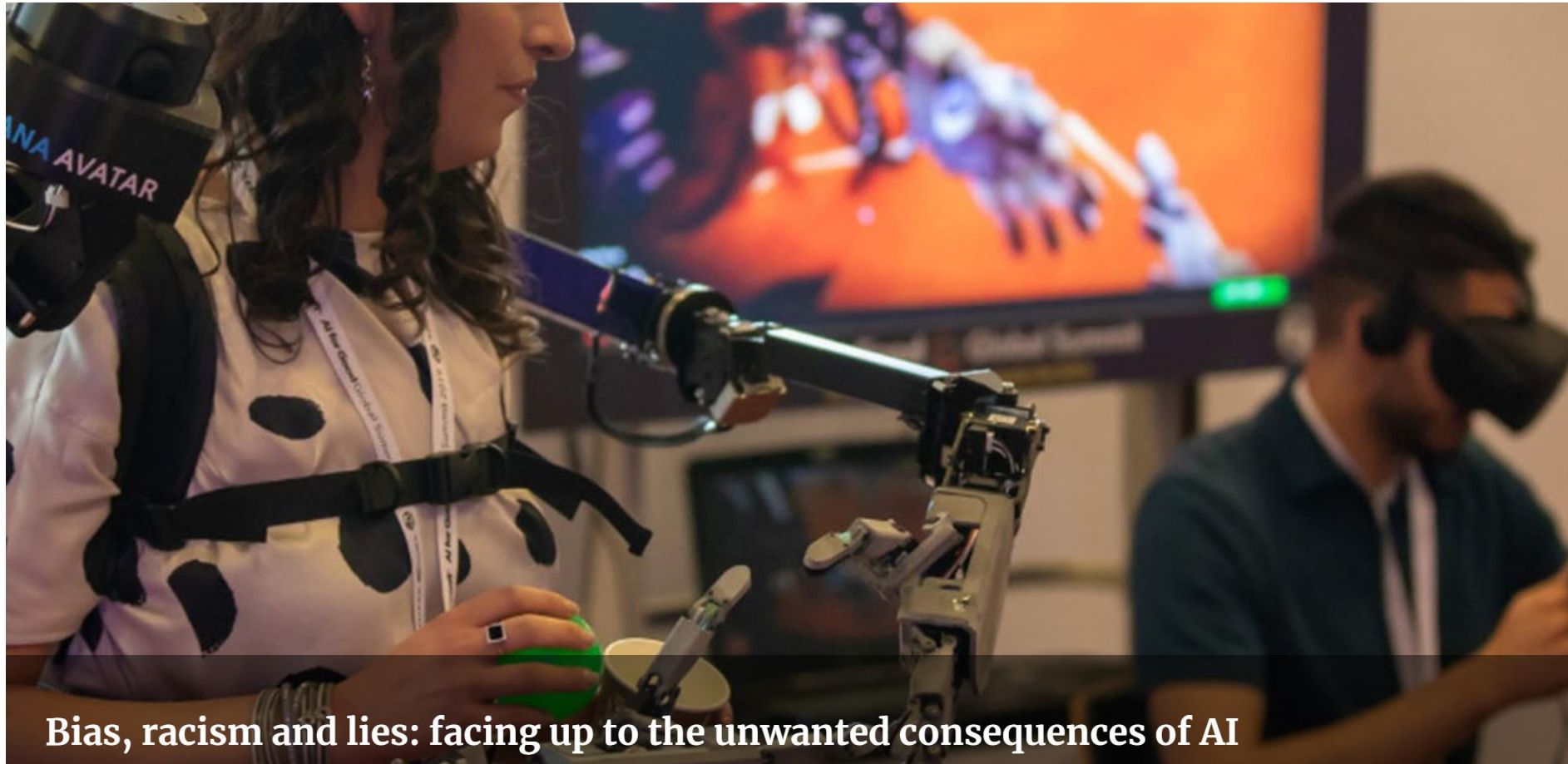
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Bias, racism and lies: facing up to the unwanted consequences of AI

Source:

<https://news.un.org/en/story/2023/12/1080192>

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Iniziative per l'etica dell'IA: Formulazione dell'Impegno AI del Gruppo Fujitsu

Initiatives for AI Ethics: Formulation of Fujitsu Group AI Commitment

● Tsuneo Nakata ● Tatsuki Araki ● Satoshi Tsuchiya ● Yuri Nakao
● Aisha Naseer ● Junichi Arahori ● Takahiko Yamamoto

While AI technology provides significant benefits, downsides of AI have also been reported, including AI that uses biased data for learning makes unfair decisions. To prevent further advancements in the technology from causing serious side effects, AI ethics are being discussed and many organizations and companies have recently announced new guidelines regarding AI. When Fujitsu released FUJITSU Human Centric AI Zinrai in 2015, we proposed "collaborative, human centric AI" and have paid attention to the ethical aspects of AI. In March 2019, we announced the Fujitsu Group AI Commitment that expresses our approach to AI ethics in a concrete and easy-to-understand manner based on the results of over 30 years of R&D and social implementation of AI. The promises of the Fujitsu Group AI Commitment were formulated in cooperation with AI4People, Europe's expert forum, and are in accordance with the AI ethics principles that the forum advocates. They are Fujitsu's message to its major stakeholders, including customers, people, society, shareholders, and employees. This paper presents the social trends related to AI ethics and describes the basic concept of Fujitsu's AI Commitment.

1. Introduction

Progress in AI technologies has led to the development of new methods for prediction and optimization based on the use of massive amounts of data and has brought about major benefits to human society. Along with these benefits, however, are also reports of the negative aspects of AI, such as generating fake news or crime-prediction discriminating against particular ethnic and racial groups—problems that are seen to only increasingly worsen and affect us more directly. It is imperative, therefore, to come up with measures to prevent the adverse effects of AI while ensuring the conveniences it brings. The approach to formulating such preventive measures emphasizes the ethical aspects of AI and involves discussing relevant issues from various perspectives. Many organizations and companies have recently announced their own AI ethics guidelines that summarize their ethical standards when carrying out the research, development, provision, and operation of AI technologies.

For its part, Fujitsu announced the FUJITSU Human Centric AI Zinrai in 2015 under the concept of "collaborative, human centric AI" by paying proper attention to

the ethical aspects of AI. Furthermore, in March 2019, we announced the "Fujitsu Group AI Commitment,"⁽¹⁾ which summarizes Fujitsu's AI ethics promises based on its more than 30 years of experience in R&D and social implementation of AI technologies and expresses its approach to AI ethics in a concrete and easy-to-understand manner.

This paper describes the background and social trends surrounding the increasing focus on AI ethics and explains the basic promises of the Fujitsu Group AI Commitment.

2. AI ethics

This section defines "AI ethics" and describes the social trends of initiatives related to them.

2.1 What is AI ethics?

The field of medicine has led the discussion in defining ethics in science and technology. Modern medical ethics have been discussed and practiced in medicine for more than 40 years. The Japanese Nursing Association (JNA), from its position of being a provider of health care services to patients, has defined ethics



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"Fairness by Design", Heralding New Horizons for AI technologies – our international research team combines engineering and social science expertise to achieve new breakthroughs

Researcher Interview

"Fairness by Design", Heralding New Horizons for AI technologies – our international research team combines engineering and social science expertise to achieve new breakthroughs



Artificial intelligence (AI) is having an ever wider impact on our daily lives, with myriads of different real-world implementations in a variety of fields. Learning large amounts of data at tremendously high speed, some AI has already achieved greater accuracy than human judgment. But AI also has potential drawbacks and can have a negative impact, with AI-influenced results potentially leading to human bias and discrimination. As a result, AI's critical social contribution has to be underpinned by more than just the technology, but also by the concept of "ethics". It is this principle that is driving Fujitsu Laboratories' unique and advanced AI research, conducted by our international AI Ethics Research Team drawn from Japan, the U.S., and Europe. In this interview, we spoke to three of the team members, whose vital collaboration transcends regional, cultural and research differences to achieve some major advances in creating fair and ethical AI for the future.

Published on May 14, 2021

MEMBERS



Yuri Nakao
Trusted AI Project
Fujitsu Laboratories



Ramya Malur Srinivasan
AI Ethics Group
Fujitsu Laboratories of
America, Inc.



Beatriz San Miguel
Gonzalez
Artificial Intelligence & DA
Research Group
Fujitsu Laboratories of
Europe, Ltd.

Diritti umani

Principio 1: Le imprese devono sostenere la tutela dei diritti umani riconosciuti a livello internazionale.

Principio 2: Le imprese devono assicurarsi di non essere complici di abusi dei diritti umani.

Lavoro

Principio 3: Le imprese devono sostenere la libertà di associazione e l'effettivo riconoscimento del diritto alla contrattazione collettiva.

Principio 4: Le imprese devono contribuire all'eliminazione di tutte le forme di lavoro forzato e obbligatorio;

Principio 5: Le imprese devono contribuire all'eliminazione del lavoro minorile;

Principio 6: Le imprese devono contribuire all'eliminazione della discriminazione in materia di impiego e occupazione.

Ambiente

Principio 7: Le imprese devono sostenere un approccio precauzionale alle sfide ambientali;

Principio 8: Le imprese devono adottare iniziative per promuovere una maggiore responsabilità ambientale; e

Principio 9: Le imprese devono incoraggiare lo sviluppo e la diffusione di tecnologie rispettose dell'ambiente.

Anticorruzione

Principio 10: Le aziende devono impegnarsi contro la corruzione in tutte le sue forme, comprese l'estorsione e la concussione.