IL ROTARY CONNETTE IL MONDO

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Artificial Intelligence: a change in perspective

Prof. Rita Cucchiara
Università di Modena e Reggio Emilia
Direttore del lab Nazionale CINI AIIS in Artificial Intelligence and Intelligent Systems

ASDI Assemblea Distrettuale

Bologna 4 maggio 2019

Governatore 2019/2020
Angelo O. Andrisano

JOHANNES VERMEER

A LADY WRITING 1665

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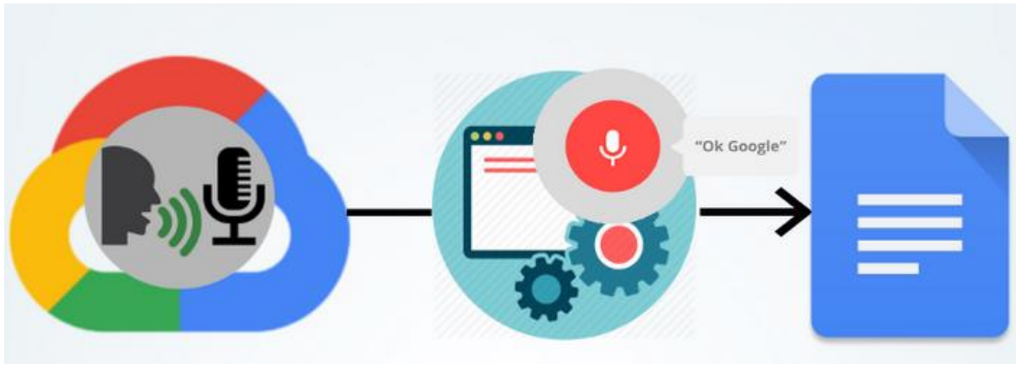
2011



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I AM SKARED.. IS A MISTERY….

OH MY GOSH… OK GUGU…

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Ma c’e’ una magia che e’ opera divina
La’ dove la scienza di Dio si manifesta
attraverso la scienza dell’uomo…
(U.Eco 1984)

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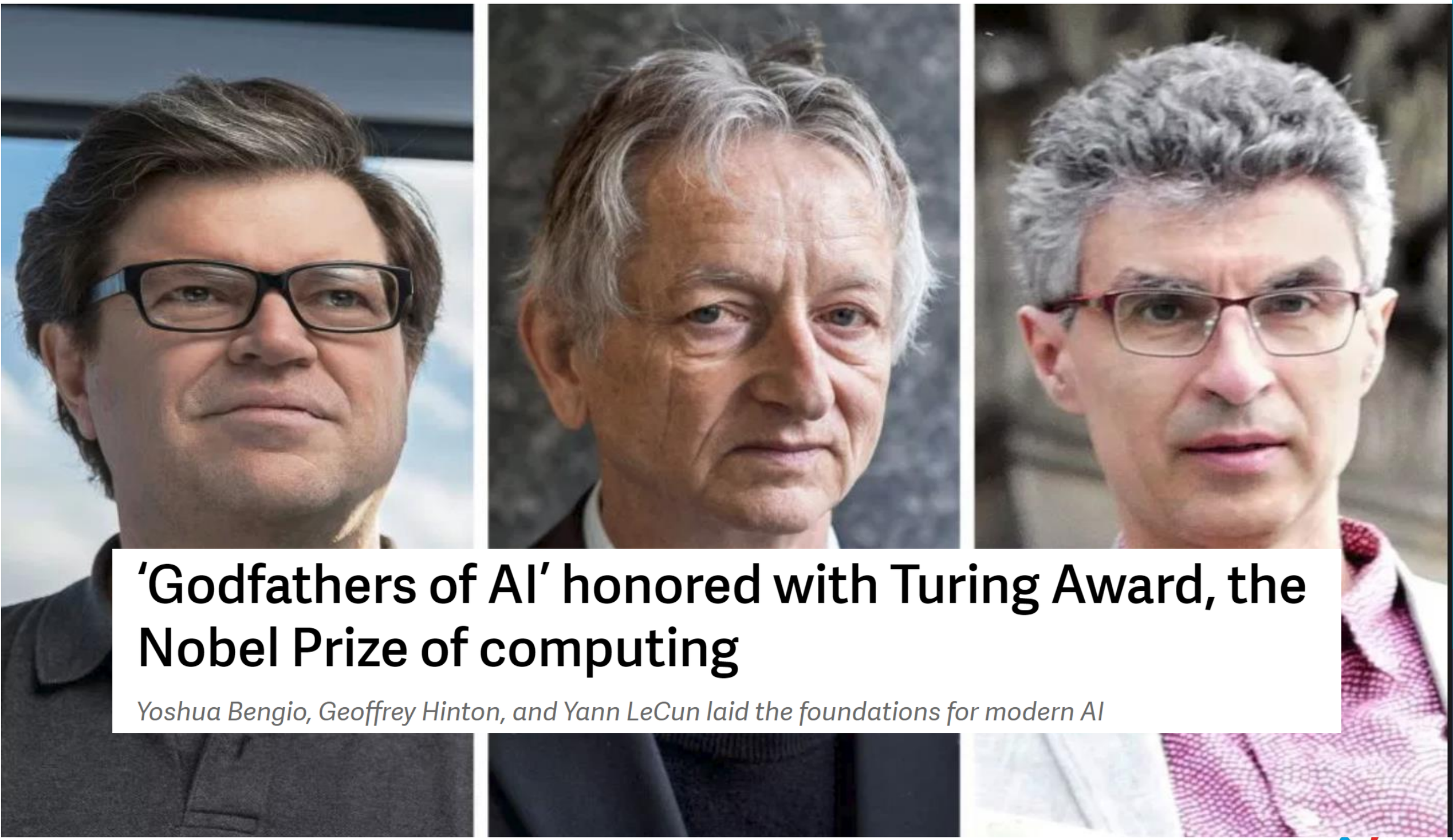

‘Godfathers of AI’ honored with Turing Award, the Nobel Prize of computing

Yoshua Bengio, Geoffrey Hinton, and Yann LeCun laid the foundations for modern AI

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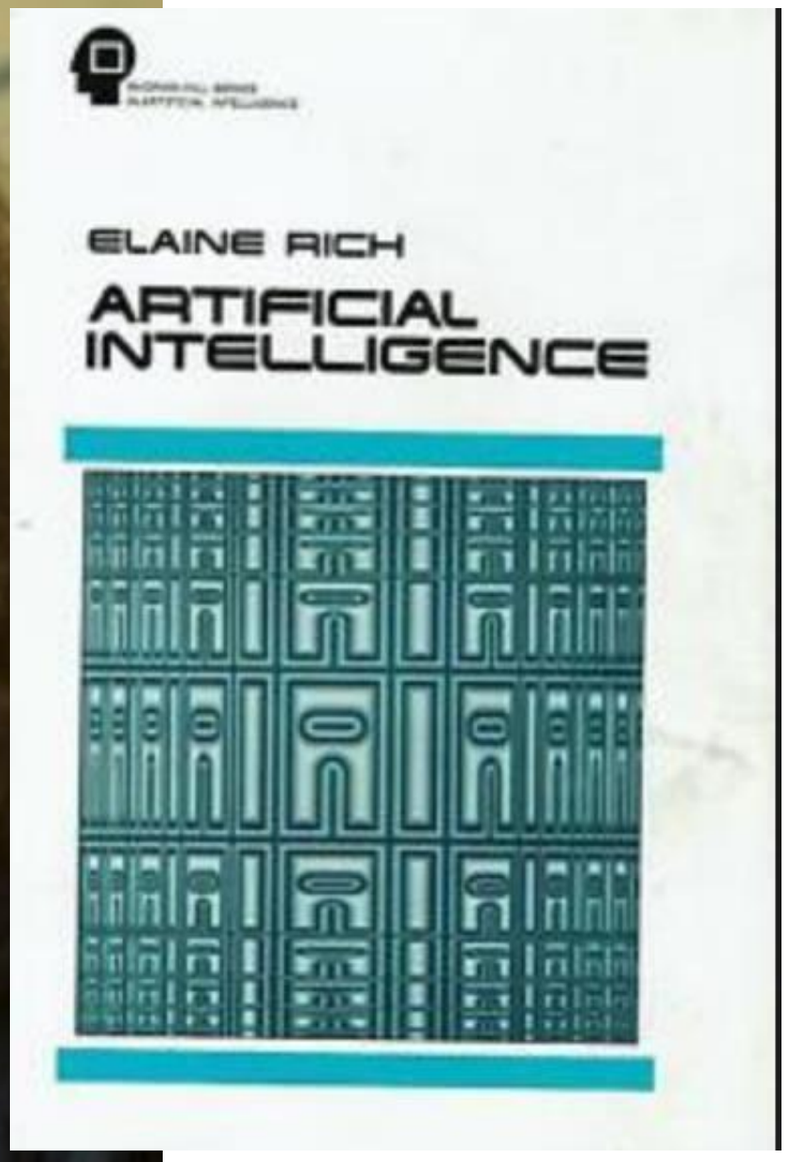

l’Ai e’ lo studio di come far fare a computer cose che per ora gli uomini fanno meglio”..

Elaine Rich 1983

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80 miliardi neuroni
100 miliardi connessioni

Siamo solo noi?

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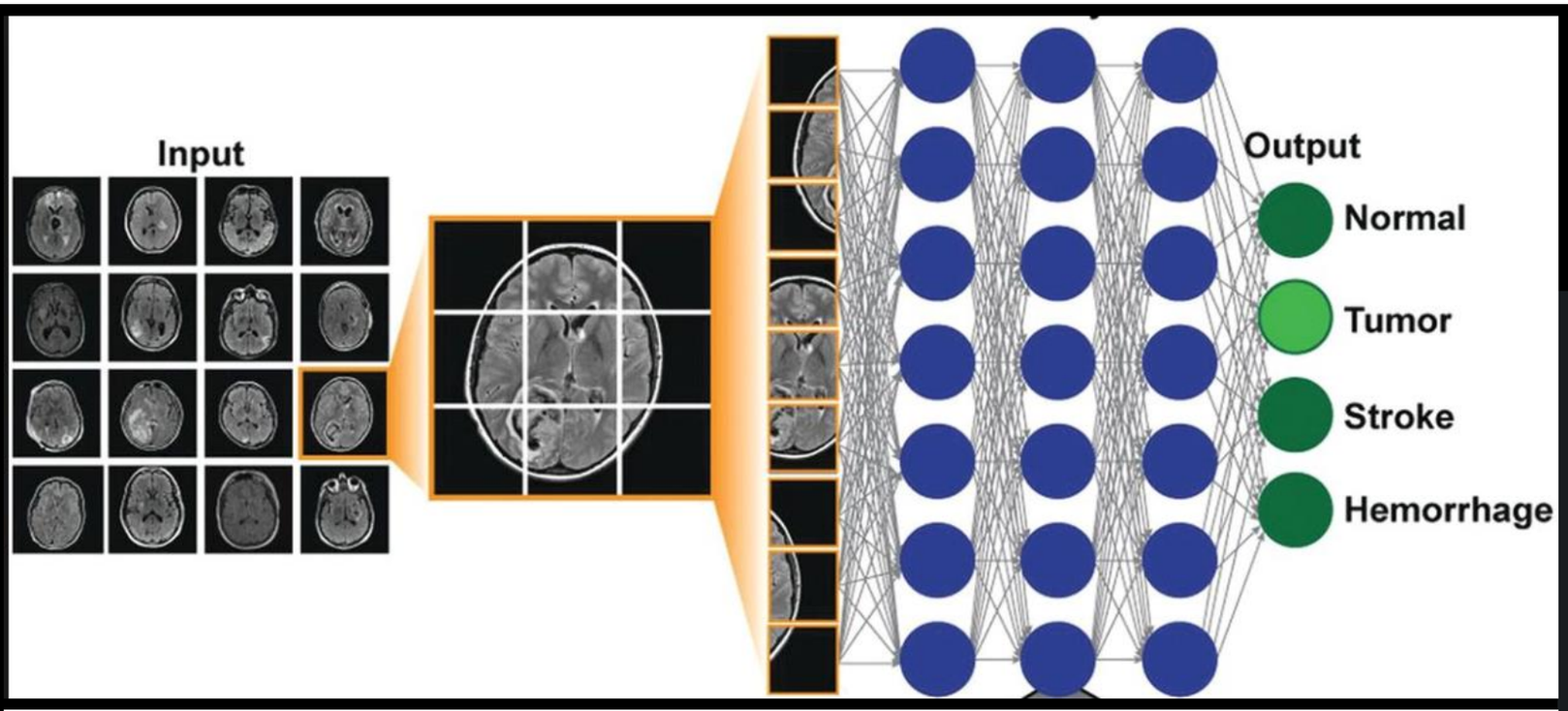
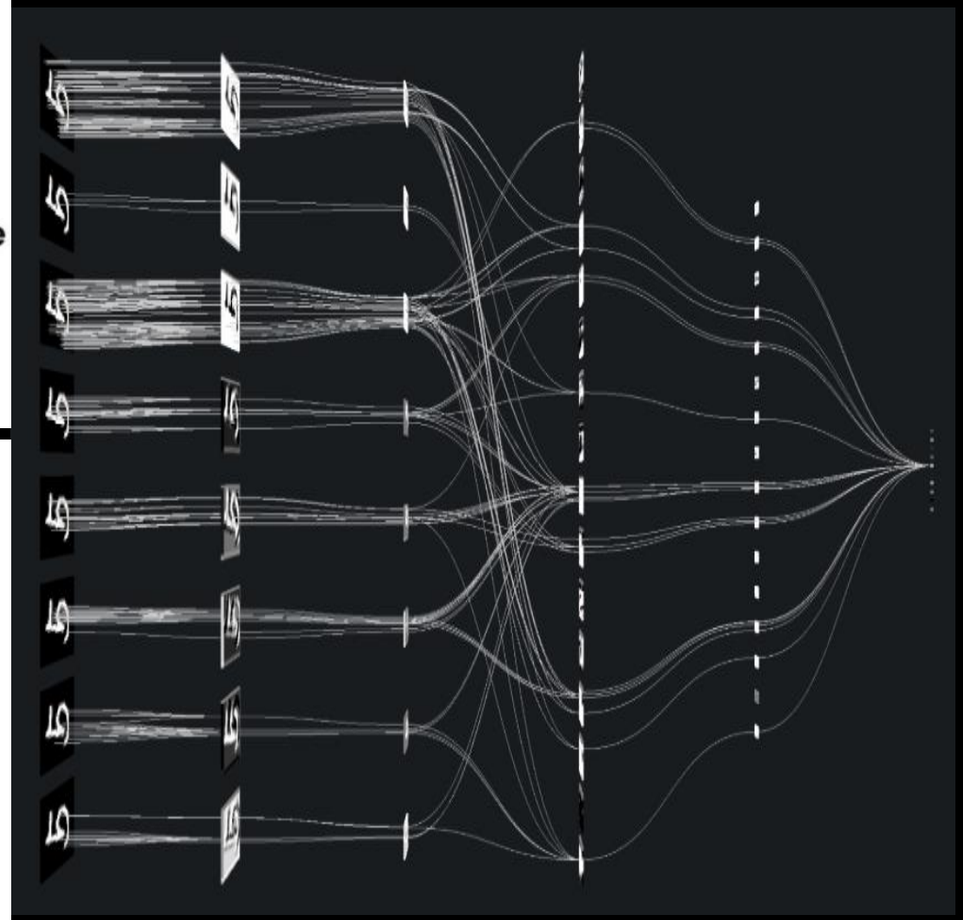
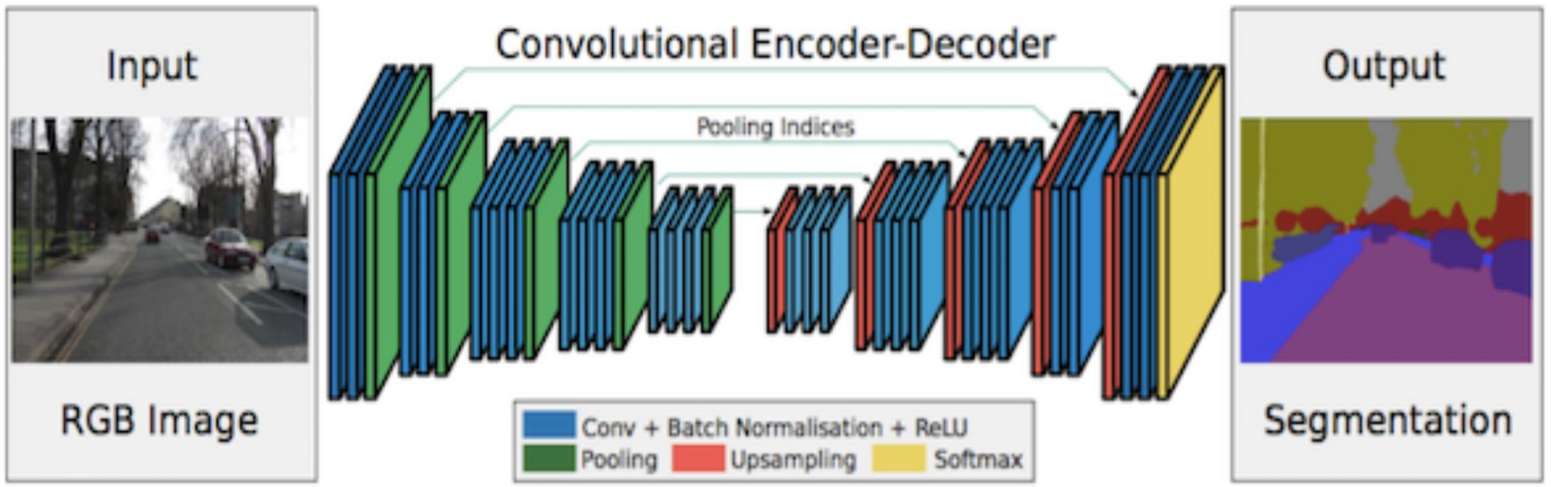
0,8 miliardi neuroni
10 miliardi connessioni



x miliardi neuroni
y miliardi connessioni





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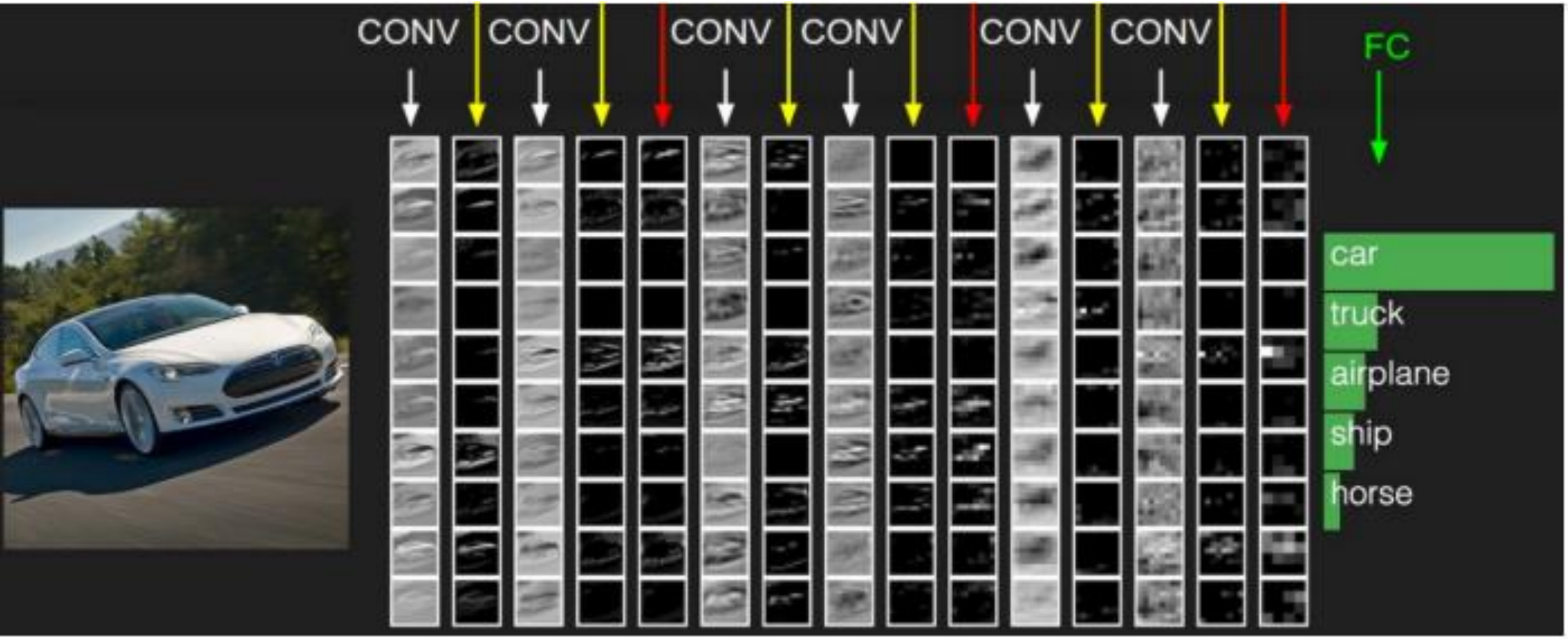

Credit Andrew Karpathy, Stanford 2016

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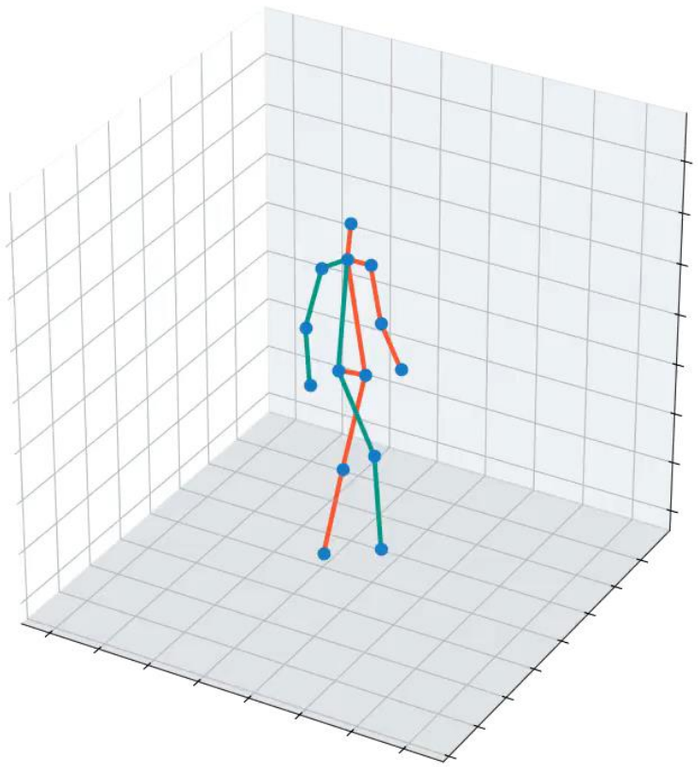
“L'intelligenza artificiale (AI) si riferisce a sistemi che mostrano un comportamento intelligente analizzando l'ambiente e intraprendendo azioni - con un certo grado di autonomia - per raggiungere obiettivi specifici. (EU April 2018)



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AI TODAY.

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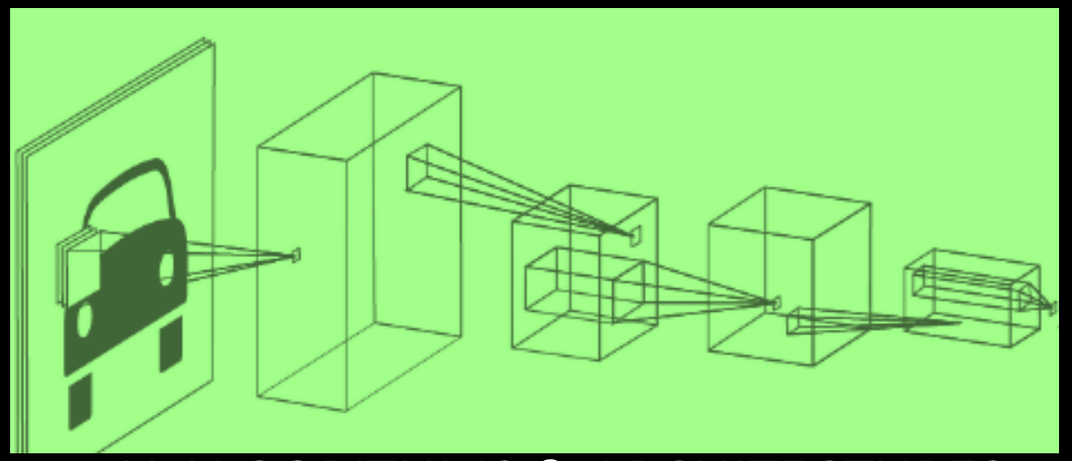
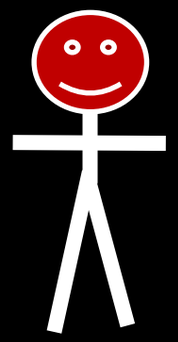
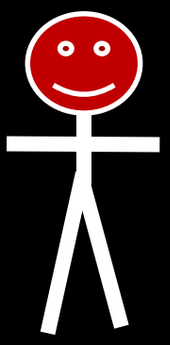
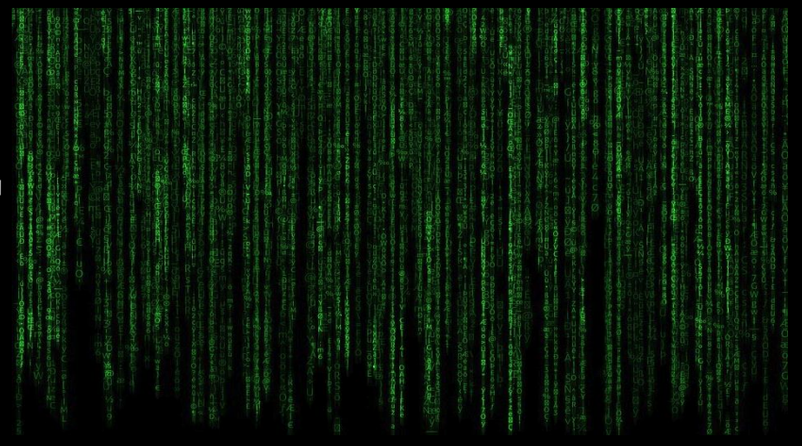


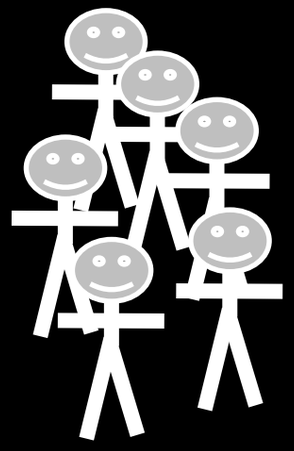


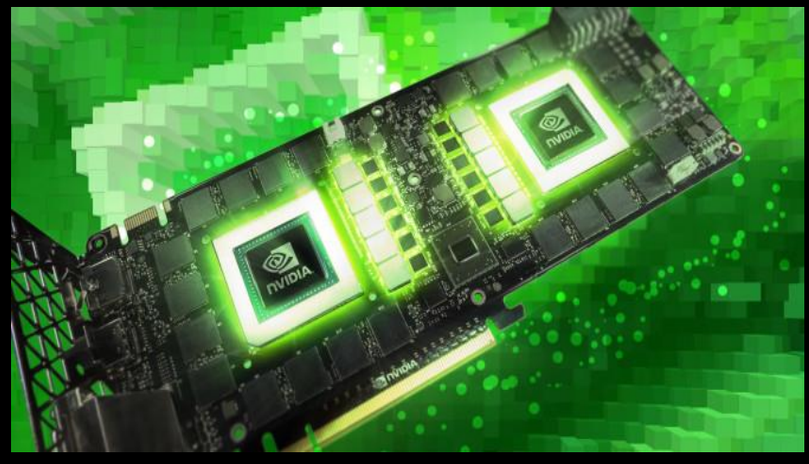
AI ALGORITHMS & ARCHITECTURES

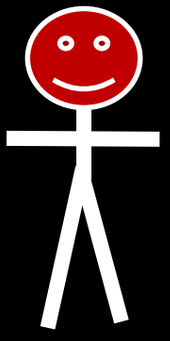




AI DATA







AI HARDWARE

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Fei-Fei Li:

How we're teaching computers to understand pictures

TED2015 · 17:58 · **Filmed** Mar 2015

25 subtitle languages

View interactive transcript

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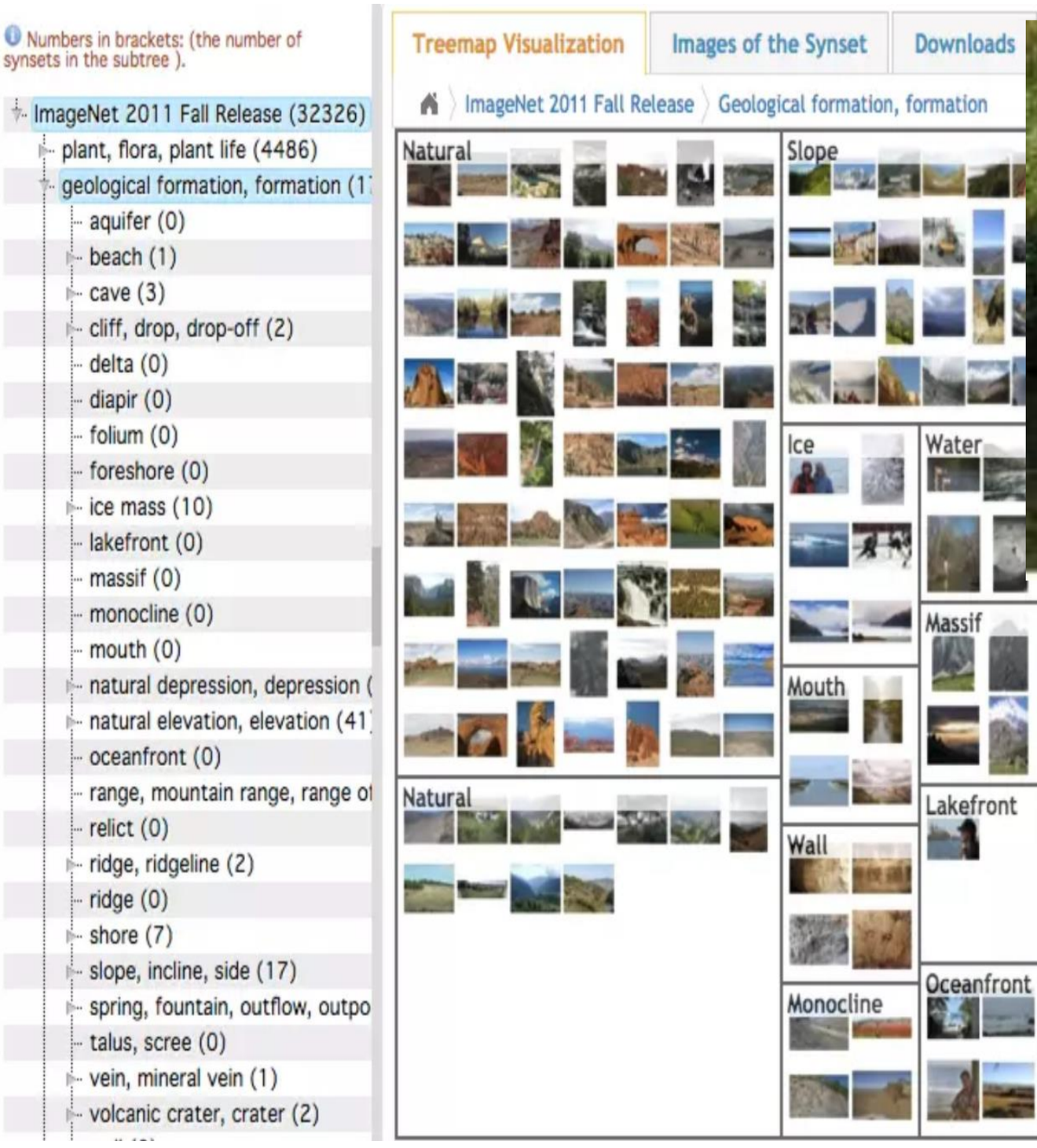

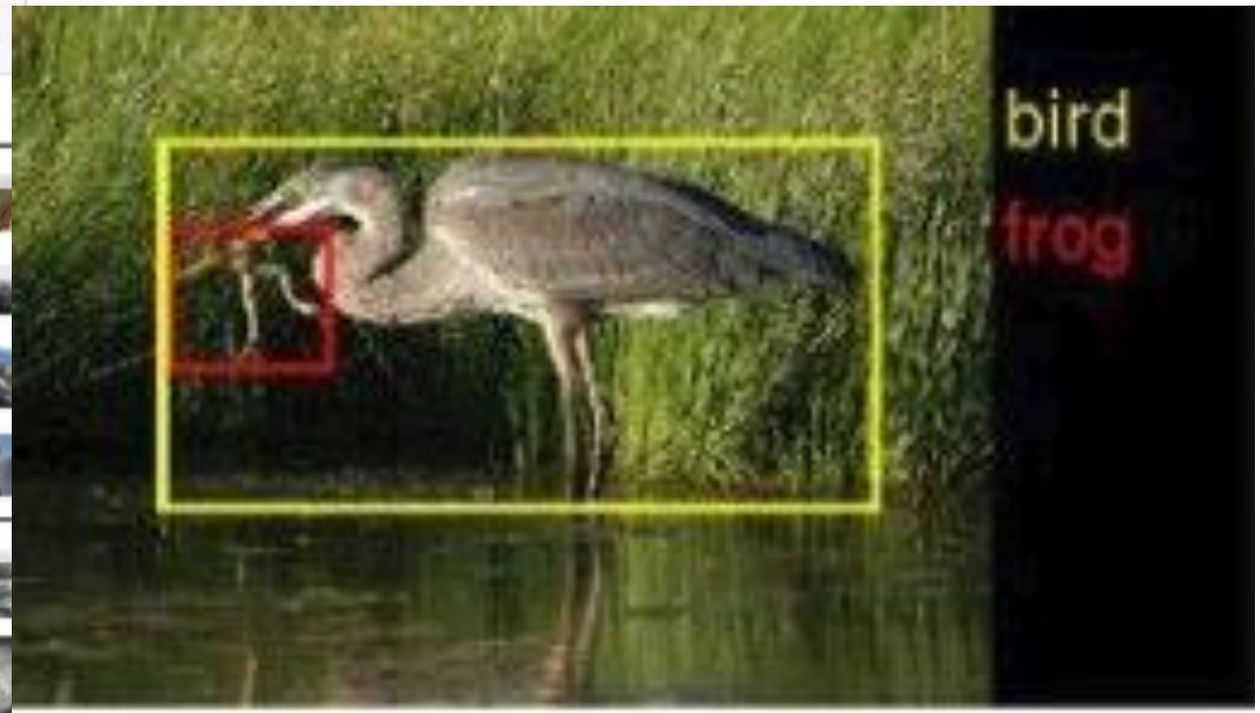

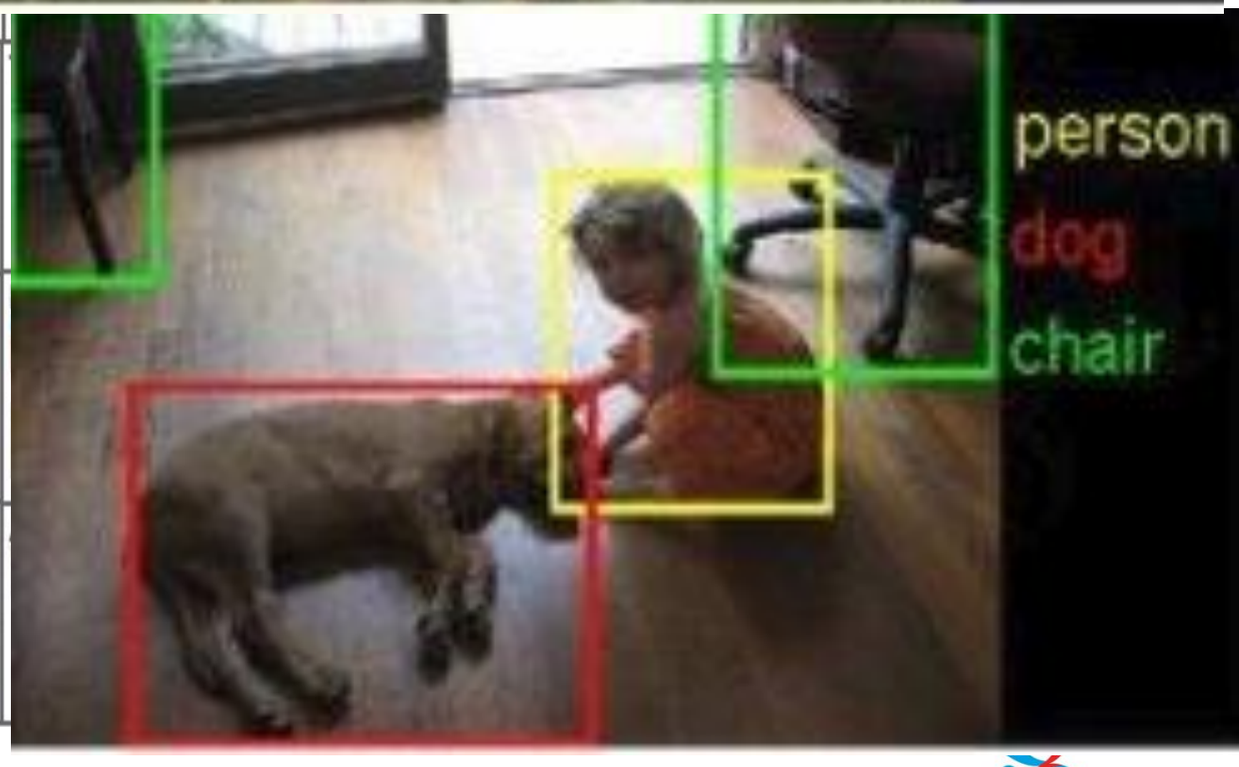

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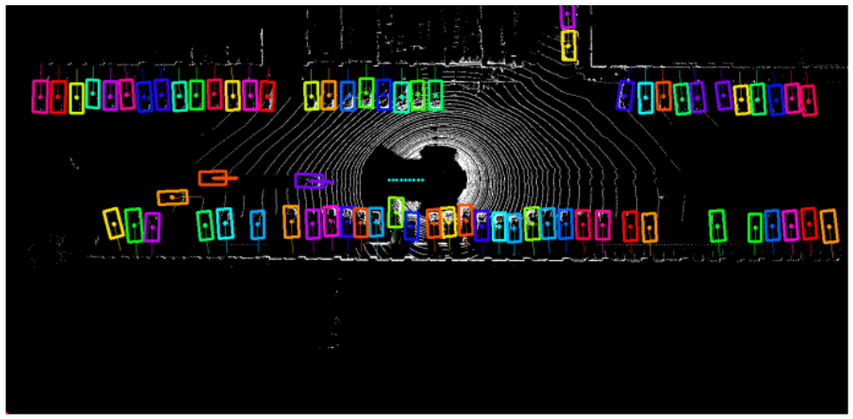
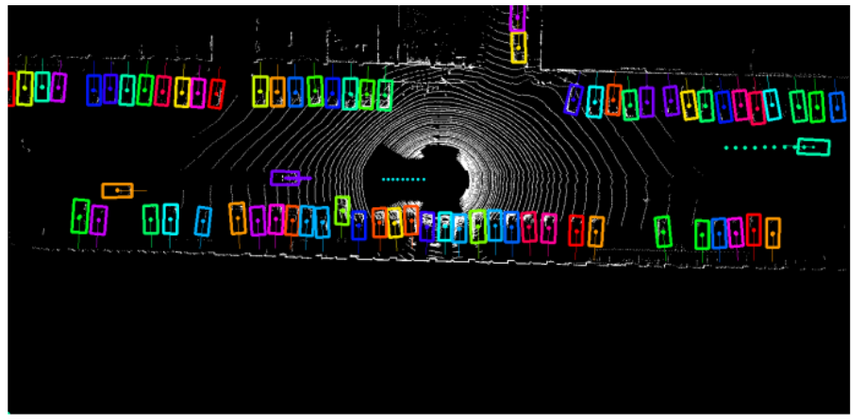
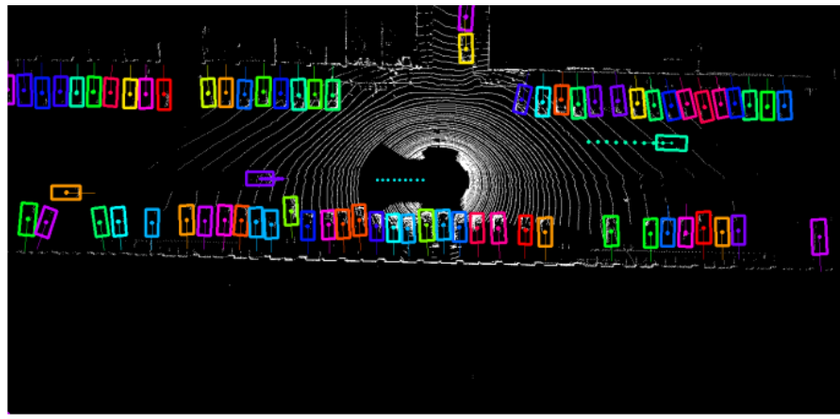
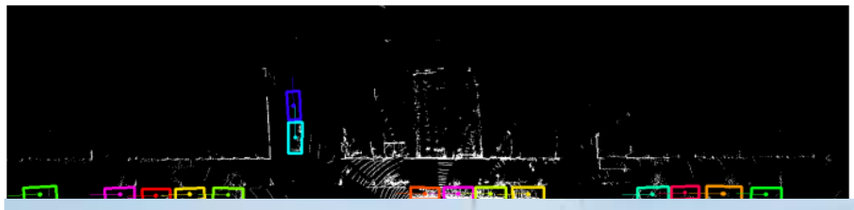
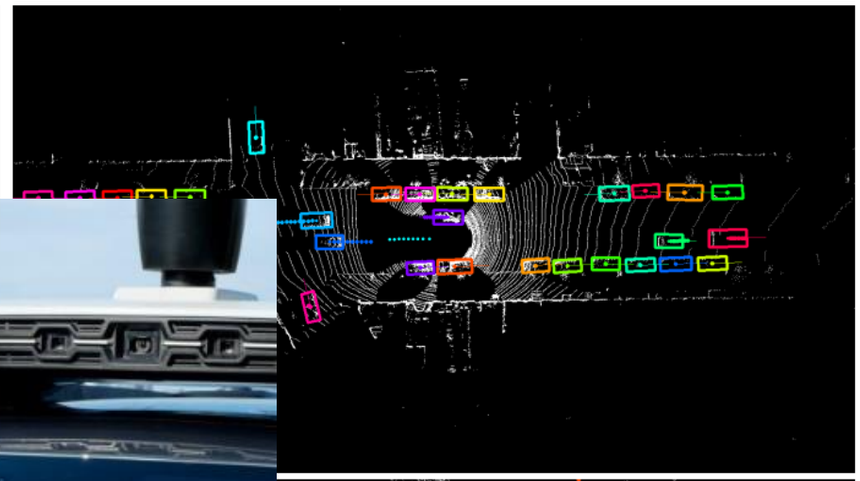
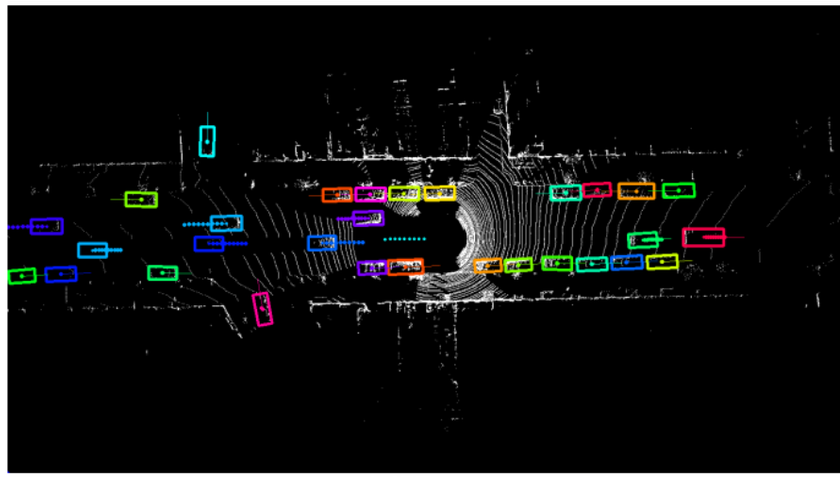


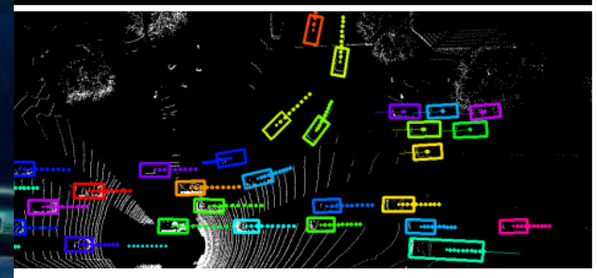


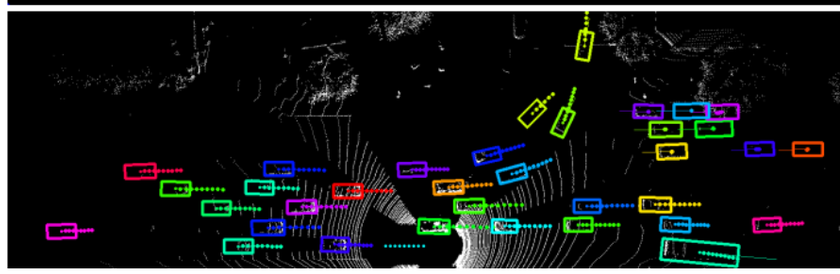








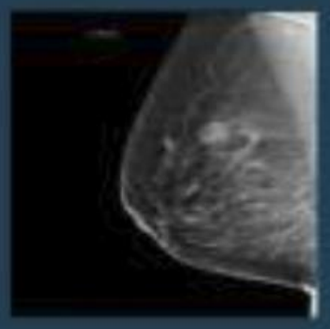




Fast and Furious: Real Time End-to-End 3D Detection, Tracking and Motion Forecasting with a Single Convolutional Net

Wenjie Luo, Bin Yang and Raquel Urtasun
Uber Advanced Technologies Group
University of Toronto

A 62-year-old woman presents for diagnostic mammography with a palpable mass in her right breast. Describe the finding.



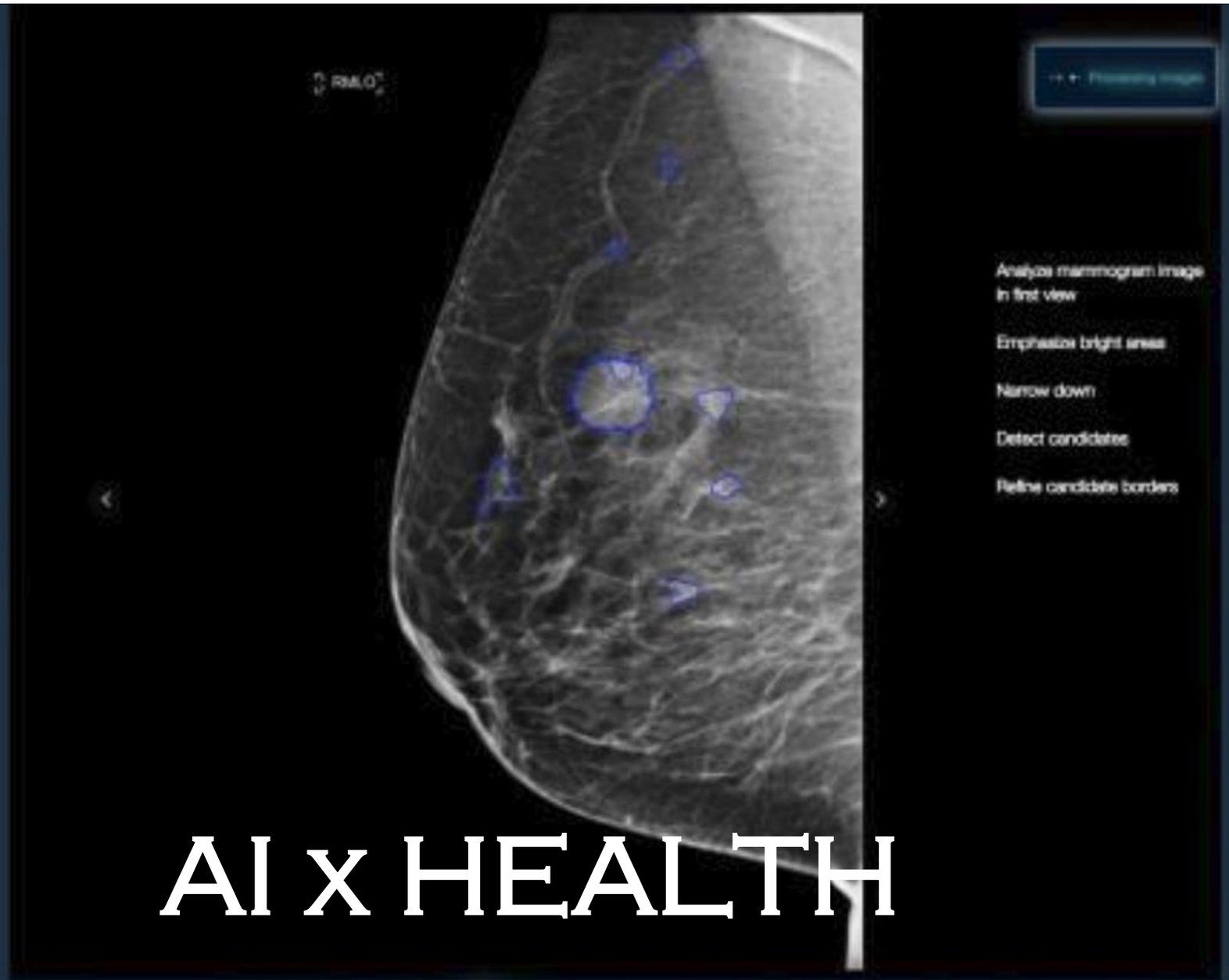
You answered

a. Infiltrating duct carcinoma of breast

b. Lipoma of breast

c. Fibroadenoma of breast

d. Fat necrosis of breast



AI x HEALTH

Patient Case Analysis

Age: **62 years**

Indication: **Diagnostic Mammography**

Physical exam: **Breast lump present**

Image Analysis

Watson Inference

Eyes of **Watson**

Analyzing Text → Analyzing Images → Reasoning → Selecting Answer

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AI – HUMAN COLLABORATION

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AI —HUMAN COOPERATION

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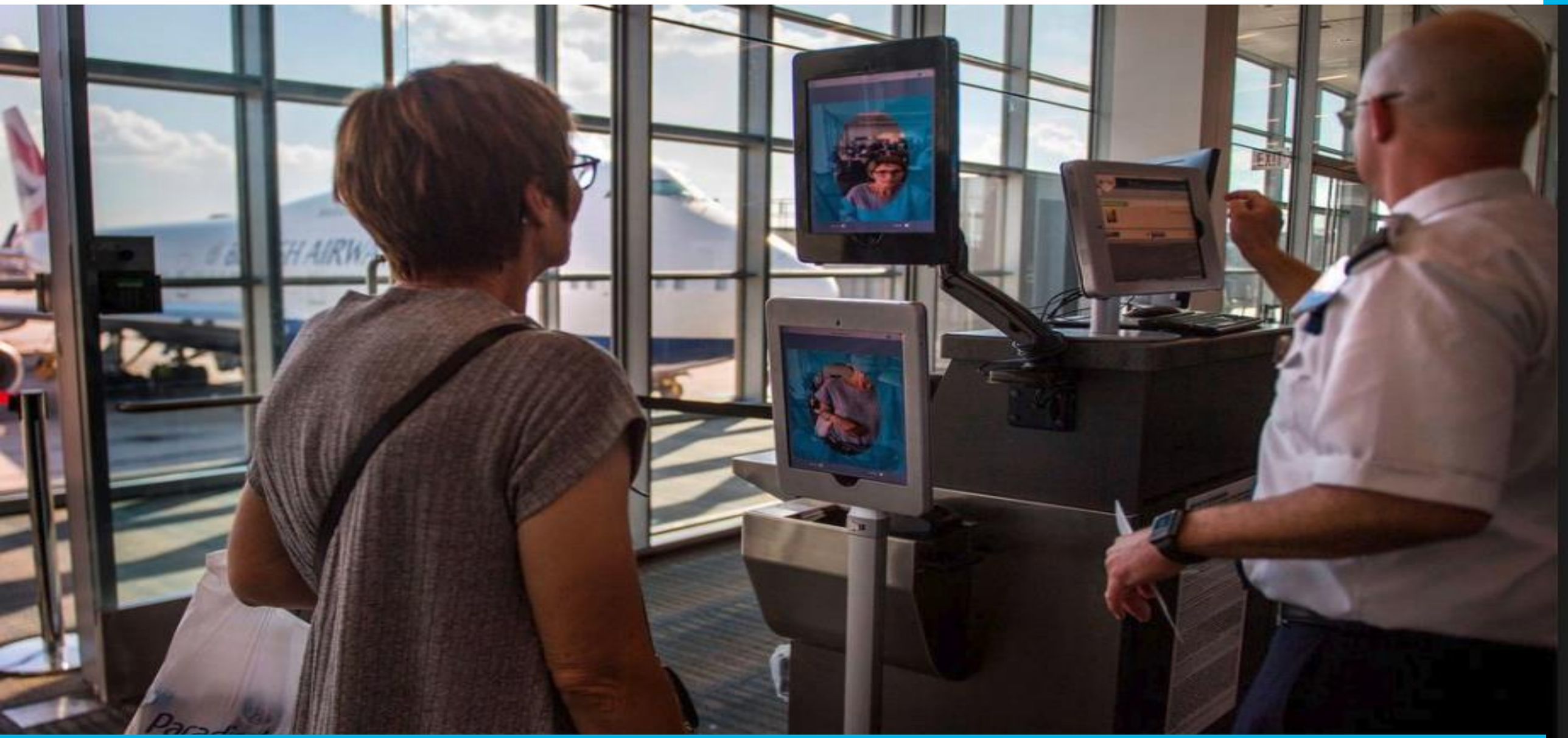

UNDERSTANDING HUMANS (COLLABORATIVE BIOMETRY)

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UNDERSTANDING HUMANS (NOT COLLABORATIVE BIOMETRY)

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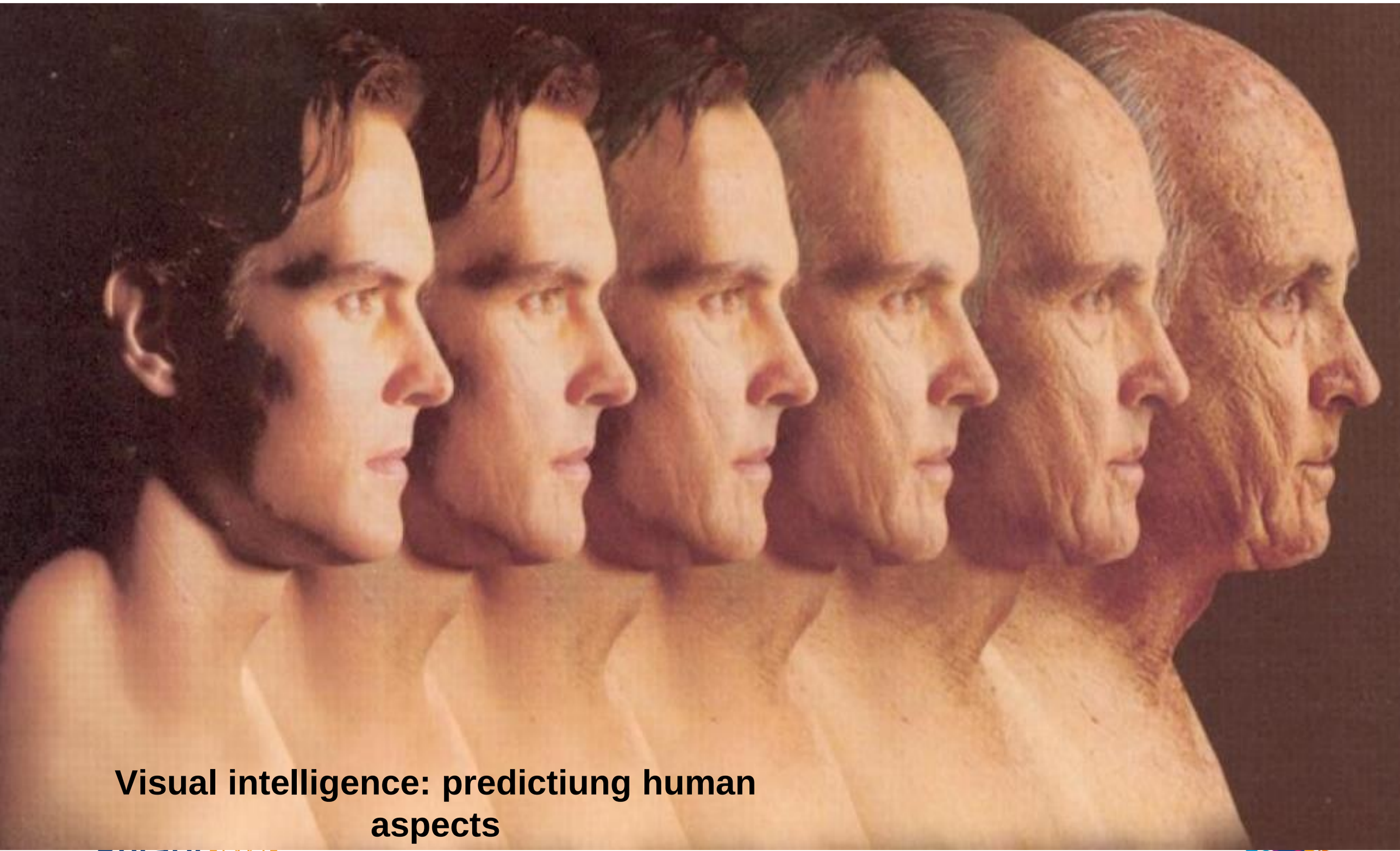

Visual intelligence: predictiung human aspects

AI-SMART CITY

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IL MONDO

Rotary
Distretto 2072

IL ROTARY CONNETTE IL MONDO

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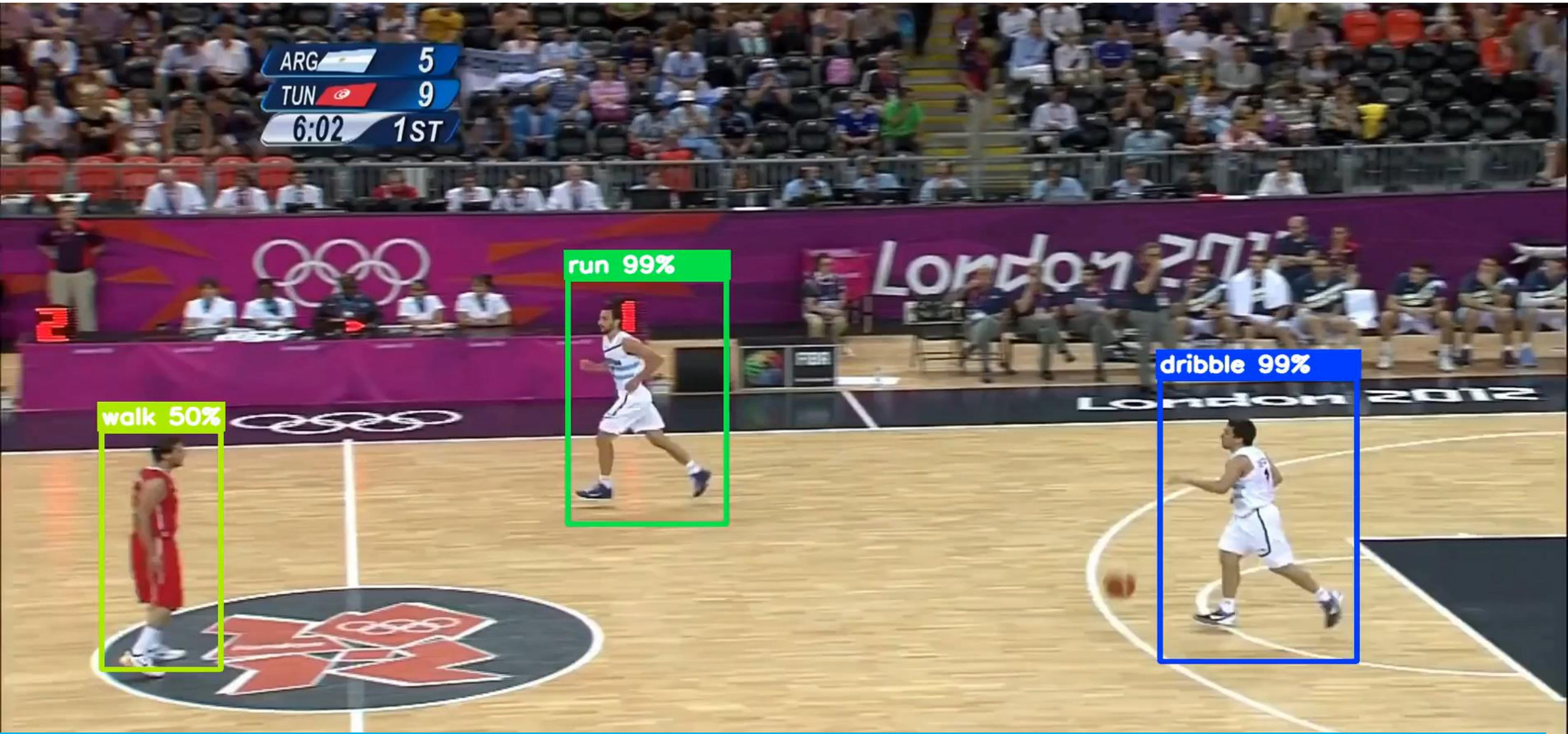

UNDERSTANDING HUMAN ACTIONS

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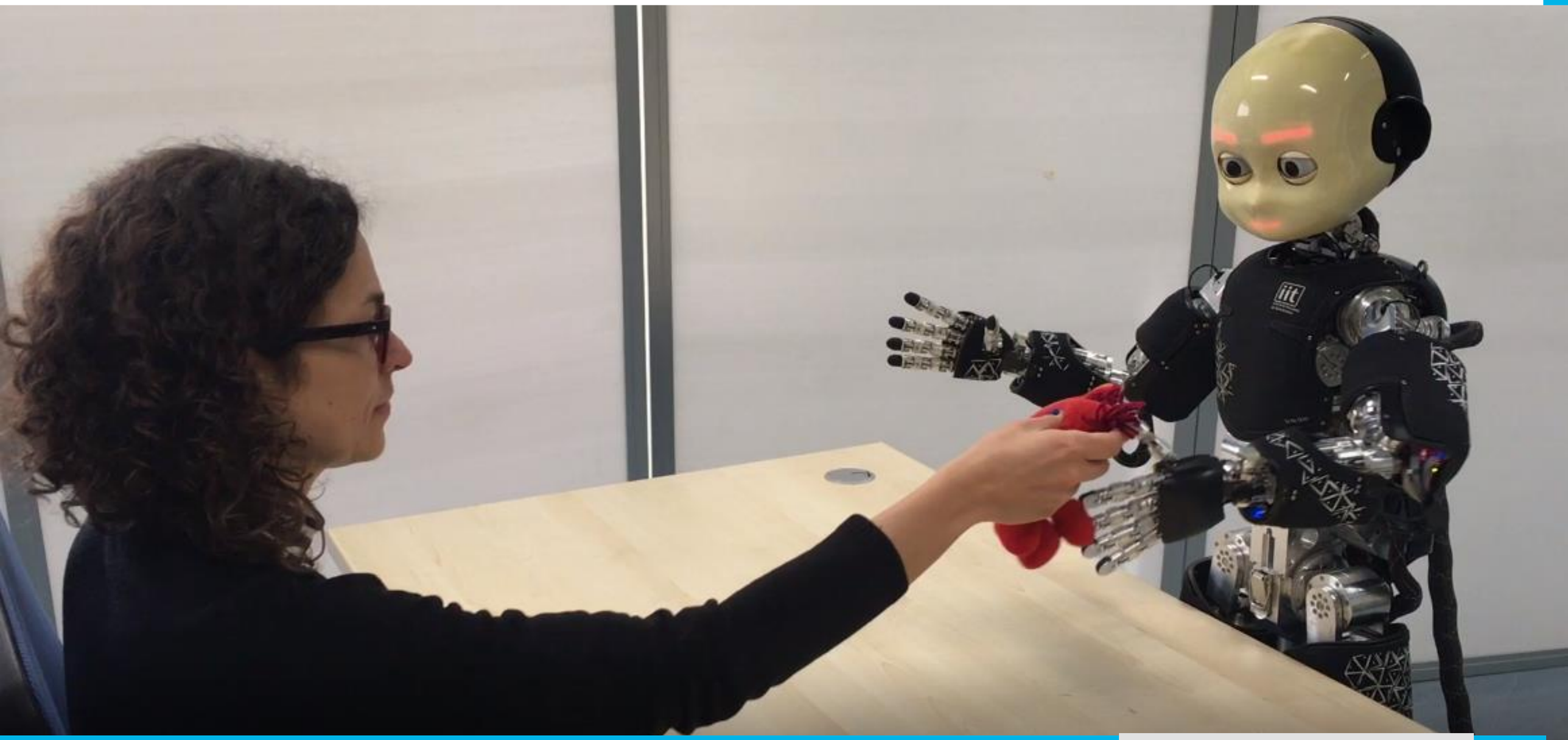
IL MONDO



HUMAN ROBOT INTERACTION

ISTITUTO ITALIANO DI TECNOLOGIA

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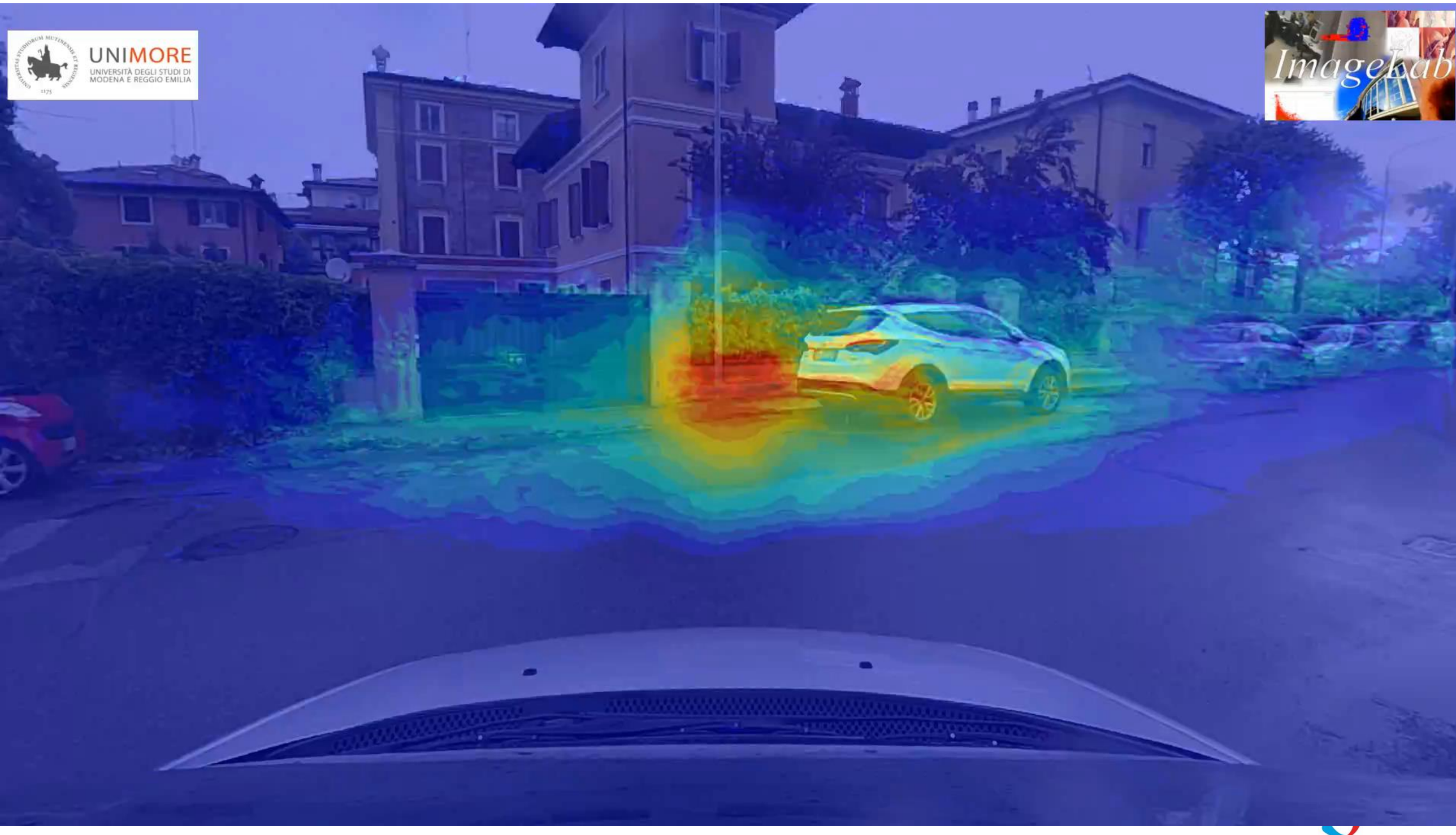

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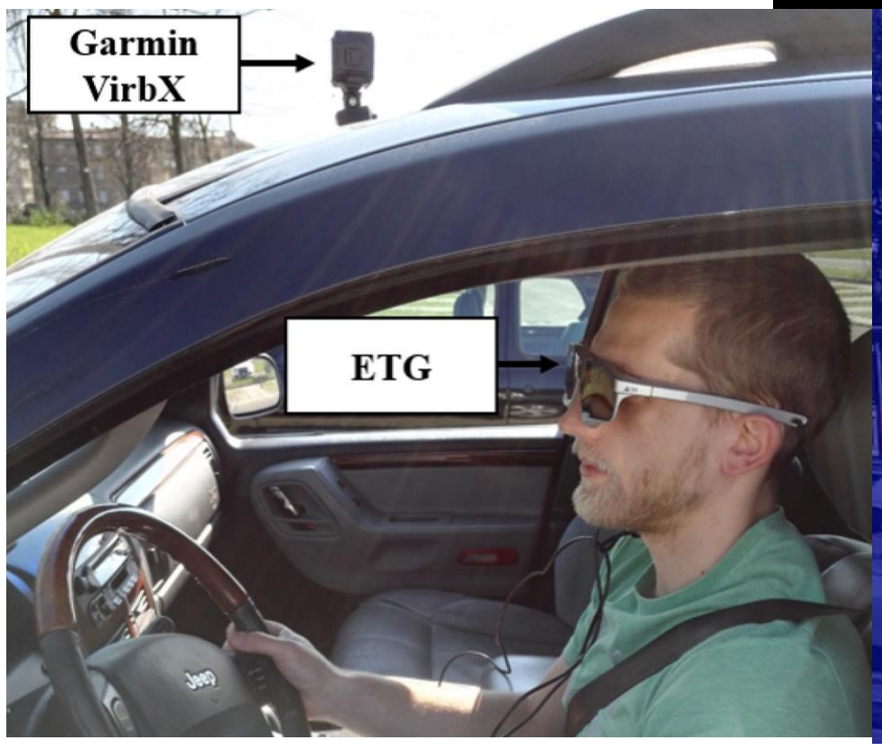
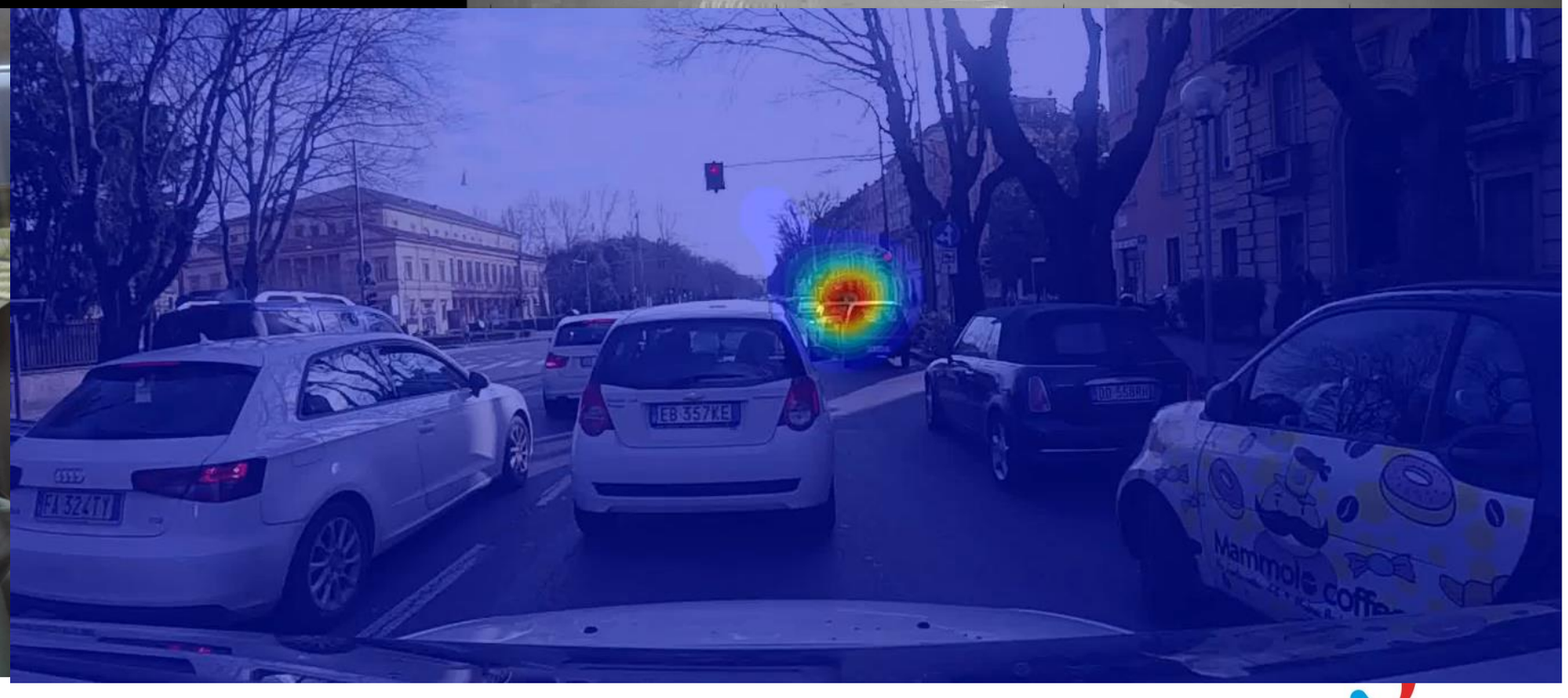
Computers
learn by humans
to train computers





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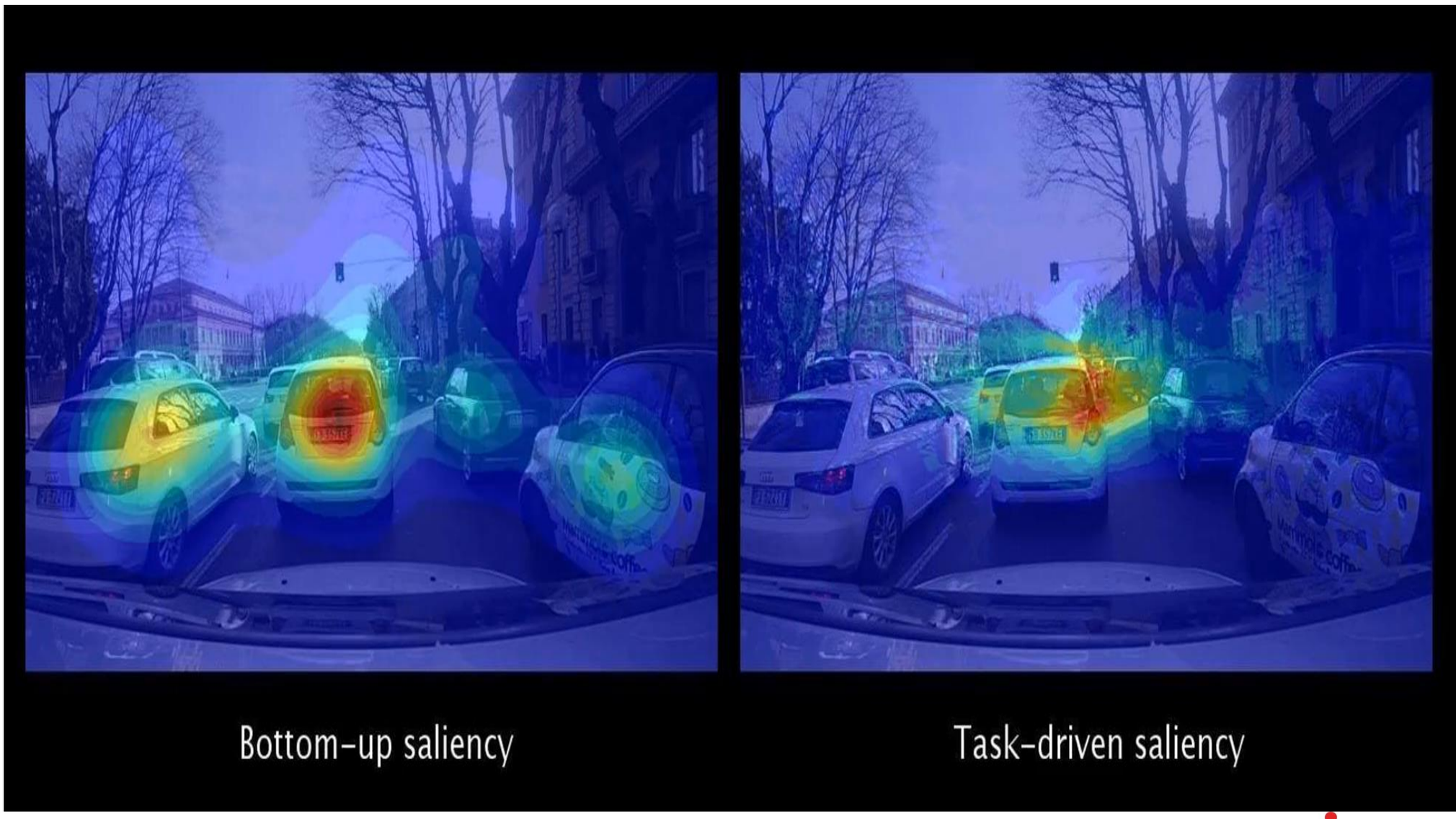
Learning to see as humans do

Neural networks trained

In collaborative AI

Dr(EYE)ve UNIMORE



AImage Lab

UNIMORE
UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

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CREATIVE AI

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IL MONDO

Which of these are real photos ?

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Drug Database

idates

A B

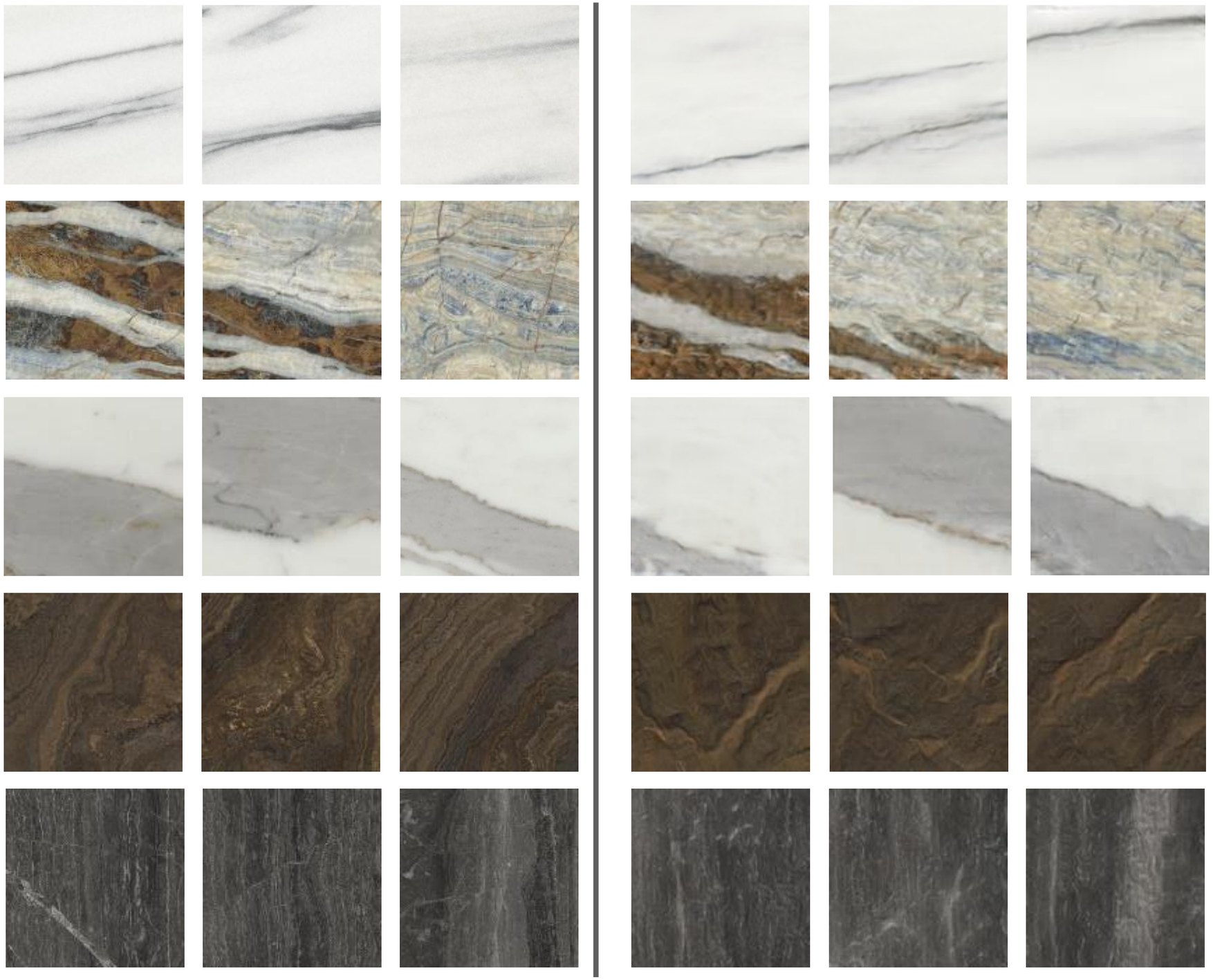
discriminator

Molecular properties

Disease

oduci (k)

REAL



FAKE

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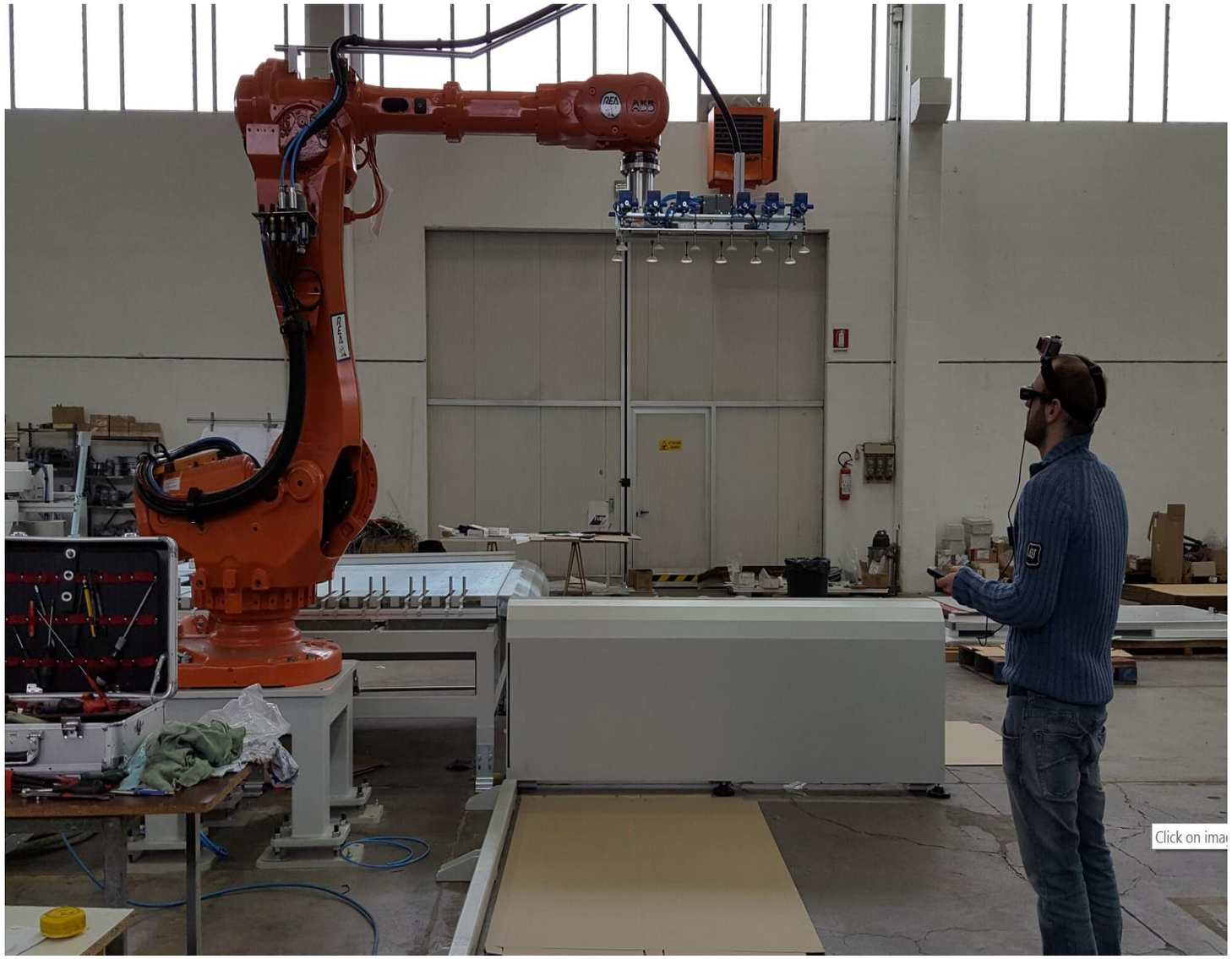

How can I help this poor man?

“Please give me a weel”

Ok I will do it

“ go to take my coat in the other room”

Ok but… What are these persons doing?

How can I run out of the room?

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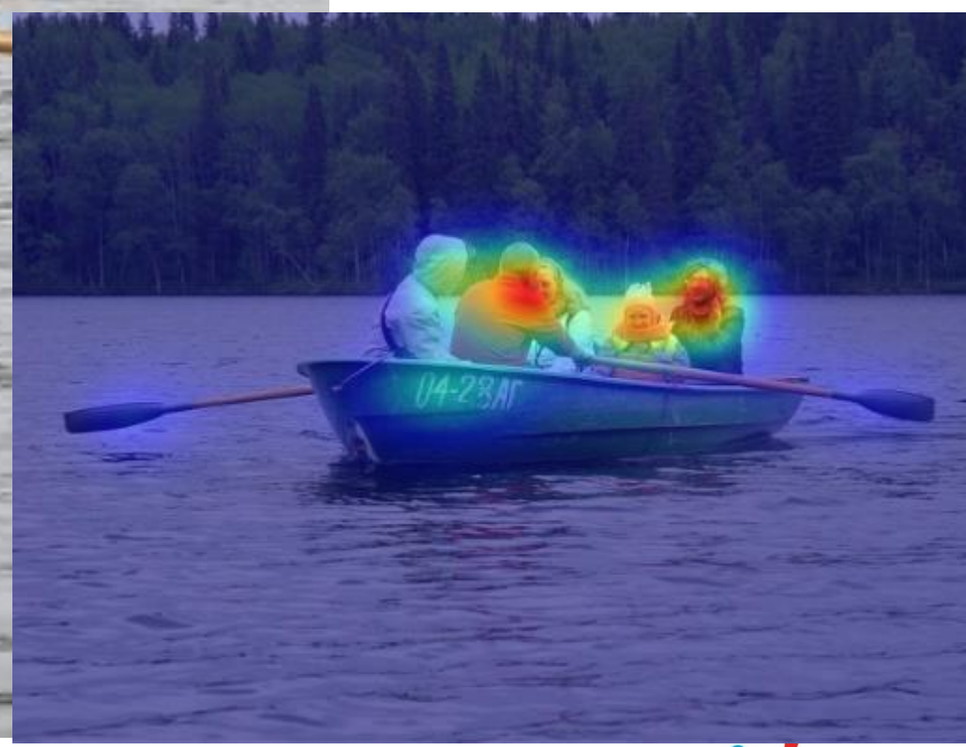

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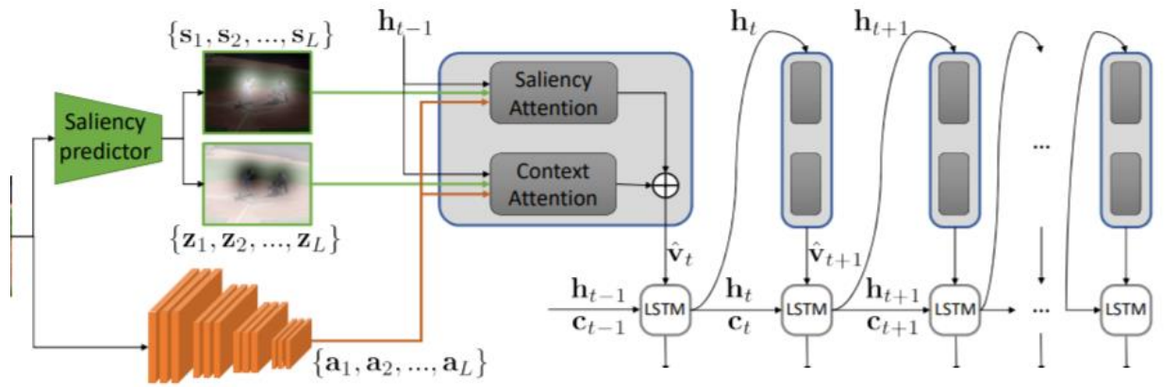

A group of people sitting on a boat in a lake.

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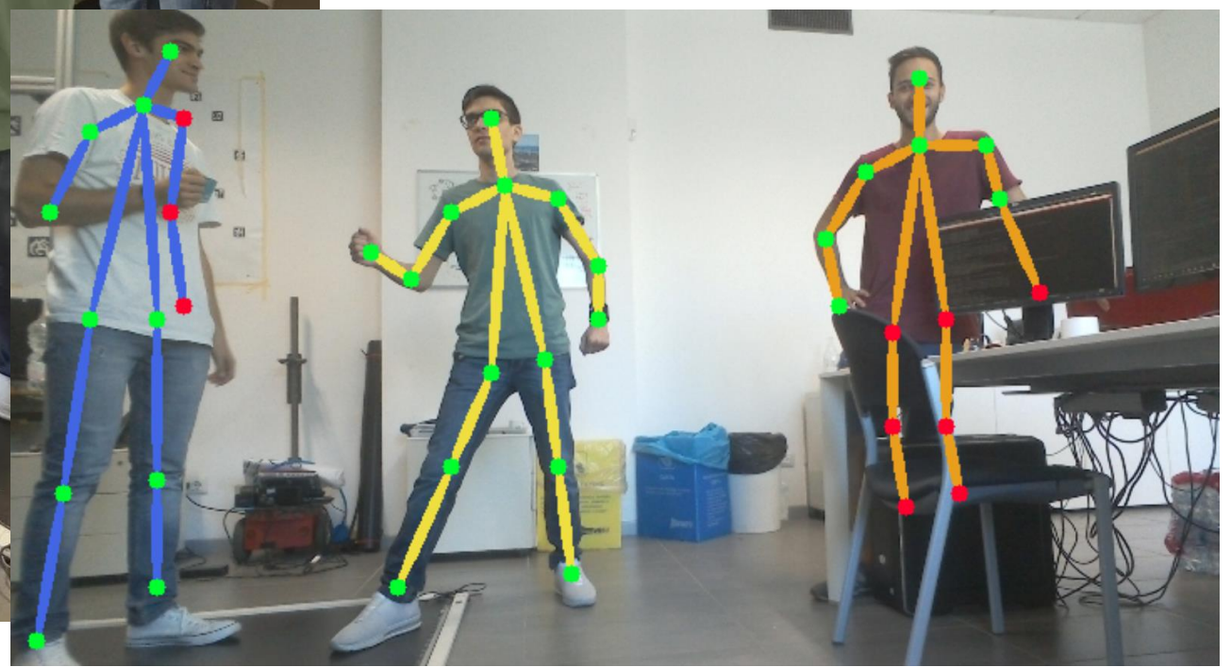
A group of people are standing in front of me



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I see…

“two standing women have a phone and a cup ”

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Homo faber fortunae sue..

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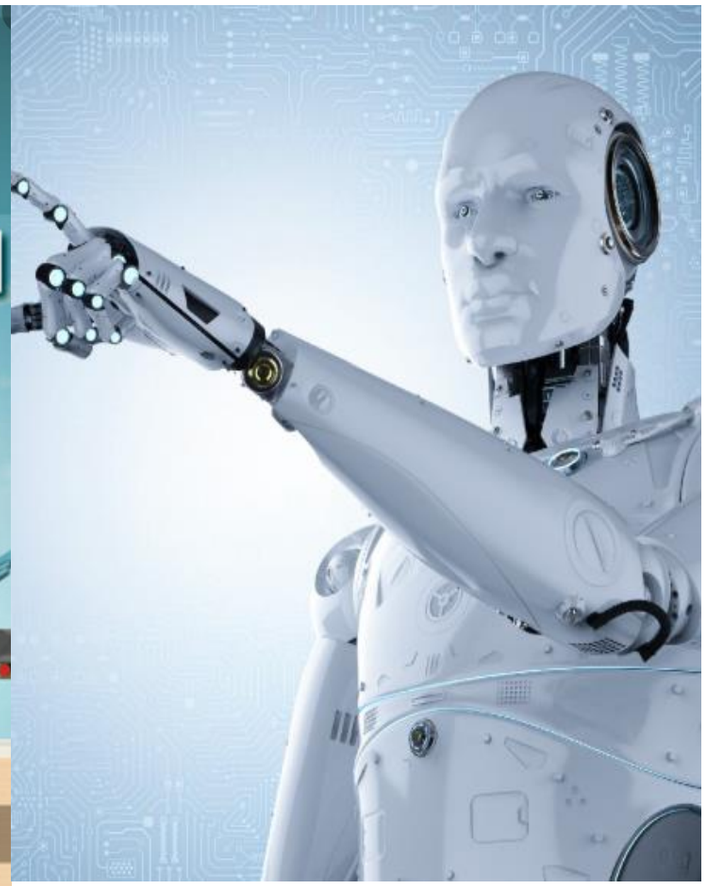
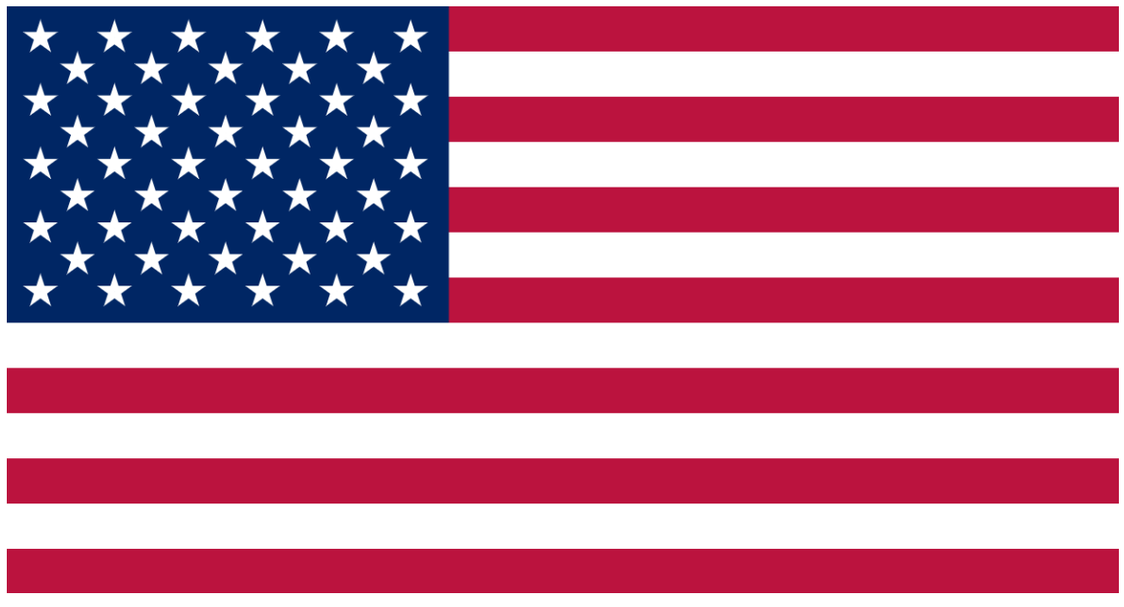


1,2,3 and 4 industrian revolution



Like electricity, increased adoption of narrow AI technology will deliver diverse capabilities that influence economic and military power.*

***Strategic Competition in an Era of Artificial Intelligence**

,

July 2018 (CNAS).

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The EU viewpoint (dec 2018):

World business revenues:
2016 6.4 billion €
2020 more than 37.8 billion €
2030 could contribute 12.8 trillion € (increase 14% GDP)
7.4 trillion € consumer demand
5.4 trillion € higher market productivity

The EU plans 20billion € before 2020

The economic impact of AI will be significant and heralds many opportunities for those countries and firms which embrace it. It is estimated that the global adoption of cognitive systems and AI across a wide area of sectors will drive worldwide business revenues from 6.4 billion euro in 2016 to more than 37.8 billion euro in 2020.[5] More broadly, AI could contribute 12.8 trillion euro to the global economy by 2030, representing an increase of 14% on today's global GDP.[6] It is anticipated that 7.4 trillion euro could come from consumer demand for new products, while 5.4 trillion euro could be generated from higher market productivity. Indeed, AI could boost productivity by up to 40% by 2035.[7] Increased

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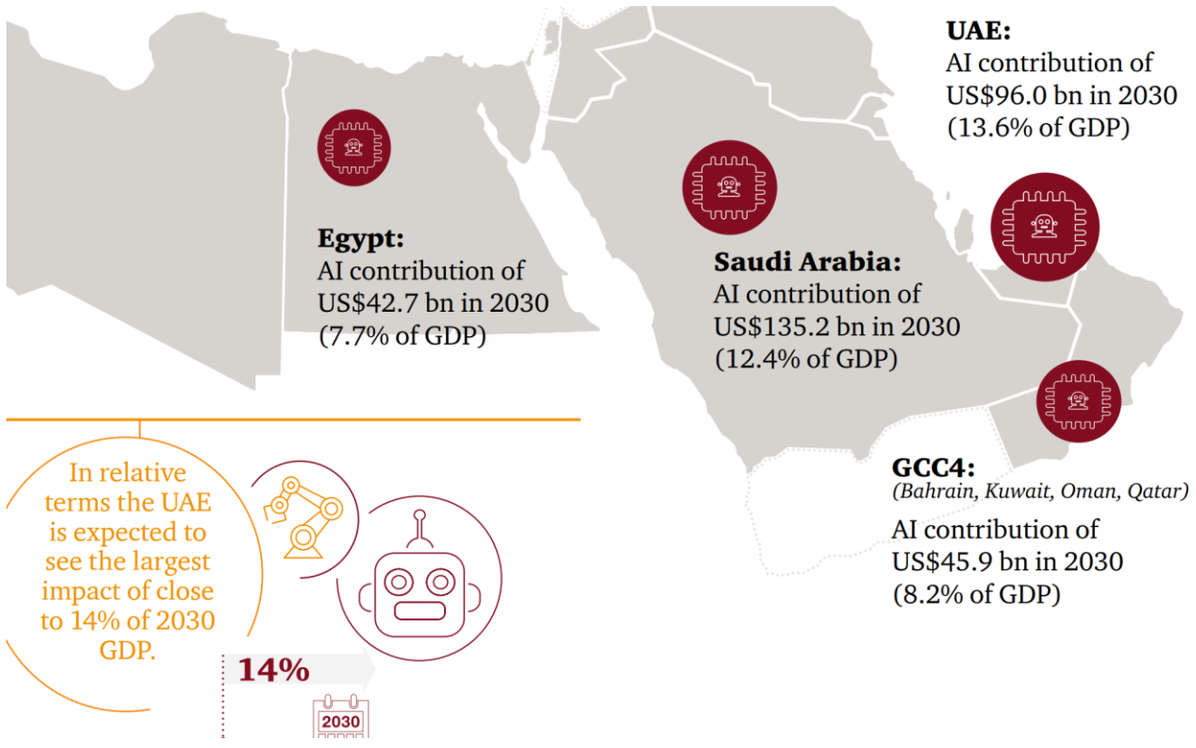
The middle east viewpoint:

H.E. Omar bin Sultan Al Olama
Minister of Artificial Intelligence

AI: Changing the game

AI is going to be a big game changer in the global economy, and much of the value potential is up for grabs. We estimate that AI could contribute up to $15.7 trillion to the global economy in 2030[1], more than the current output of China and India combined. Of this, $6.6 trillion is likely to come from increased productivity and $9.1 trillion is likely to come from benefits to consumers.



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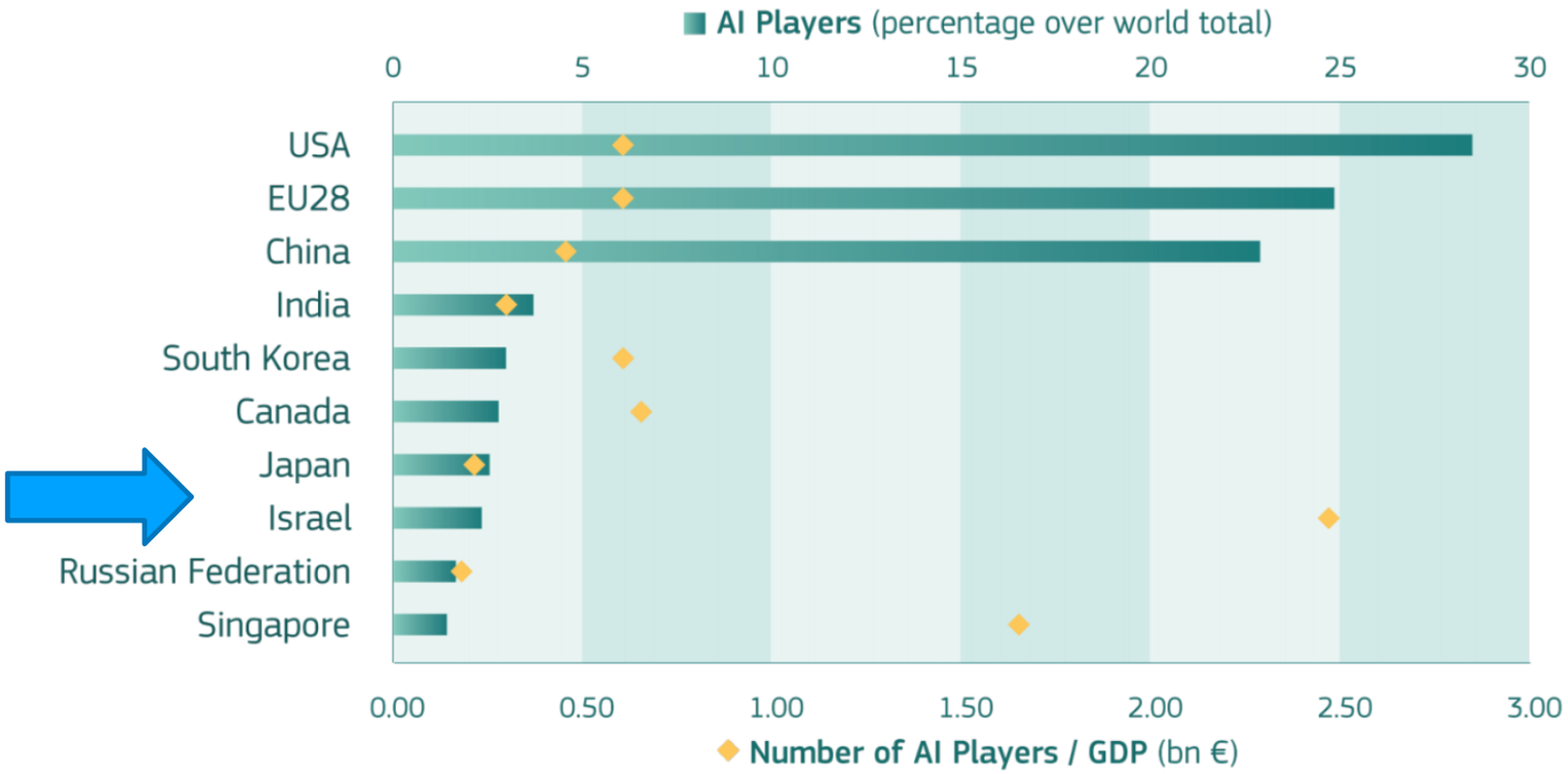
“AI Players” in the world and GDP

Report from JRC 2018

(number of players not market $)

Joint Research Centre
JRC



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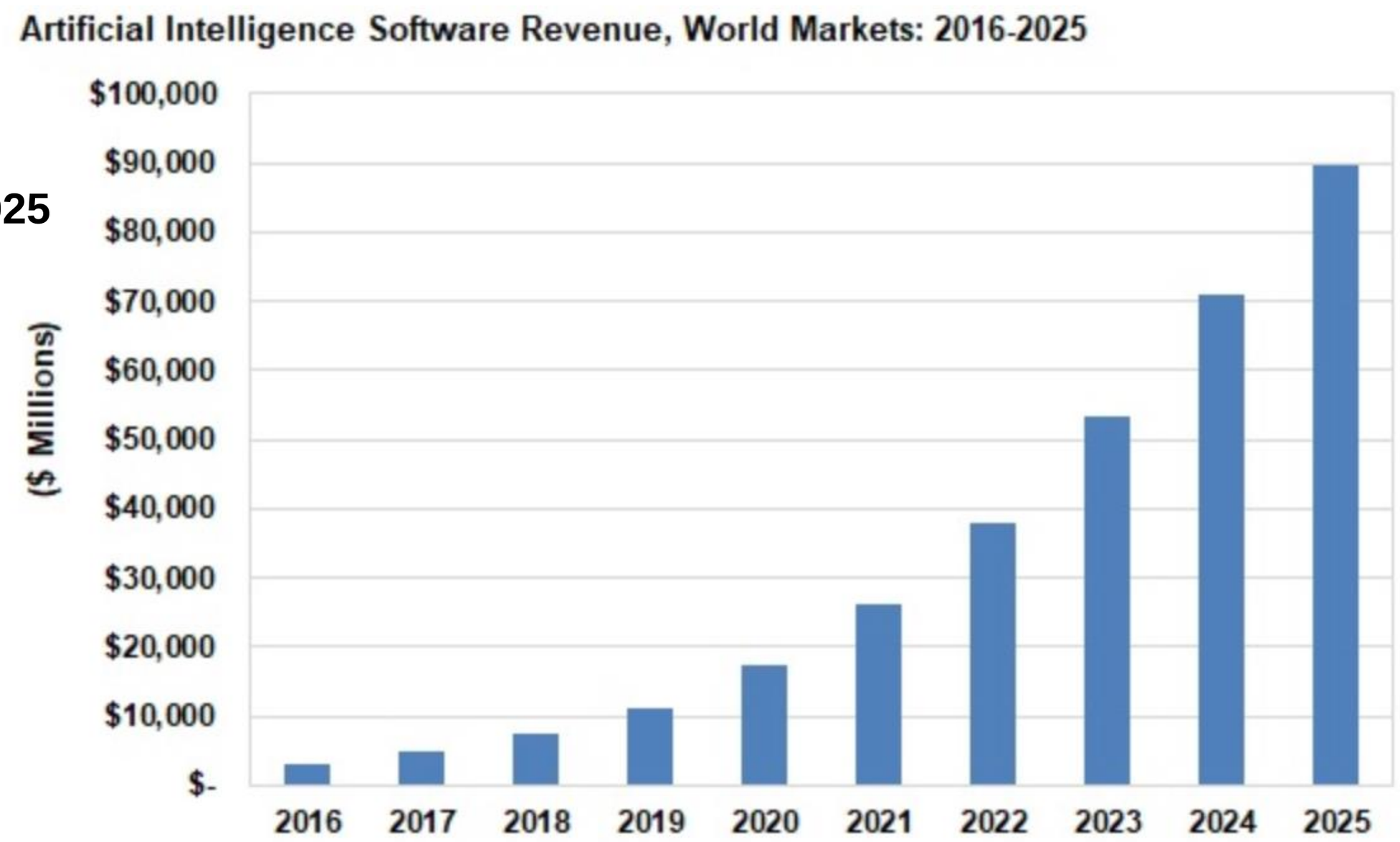
AI Revenue in the World Market 2016-2025

90 billion$
for software AI in 2025



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Tractica

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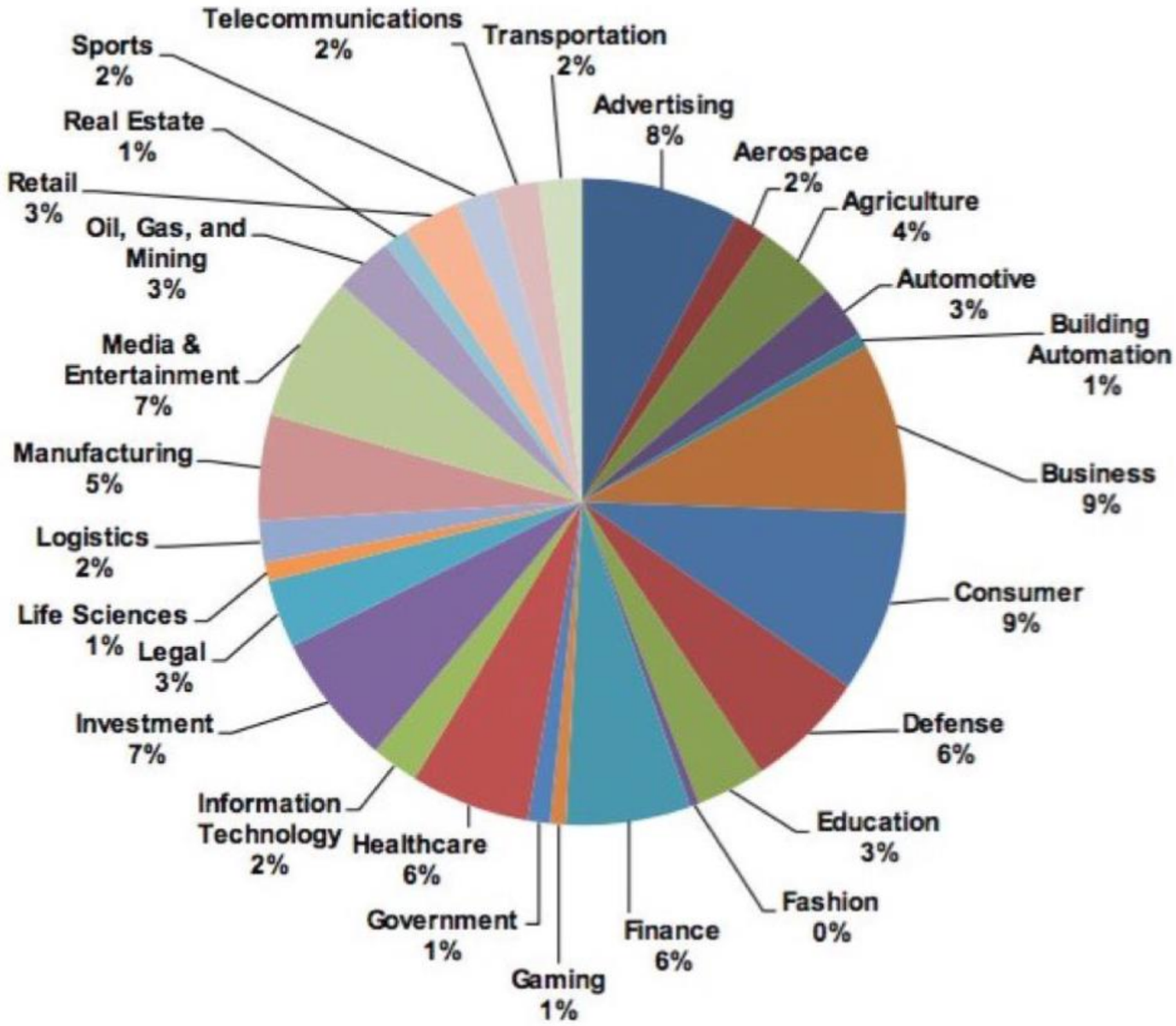

Artificial intelligence Revenue Share by Industry

(world market 2025 source Tractica)

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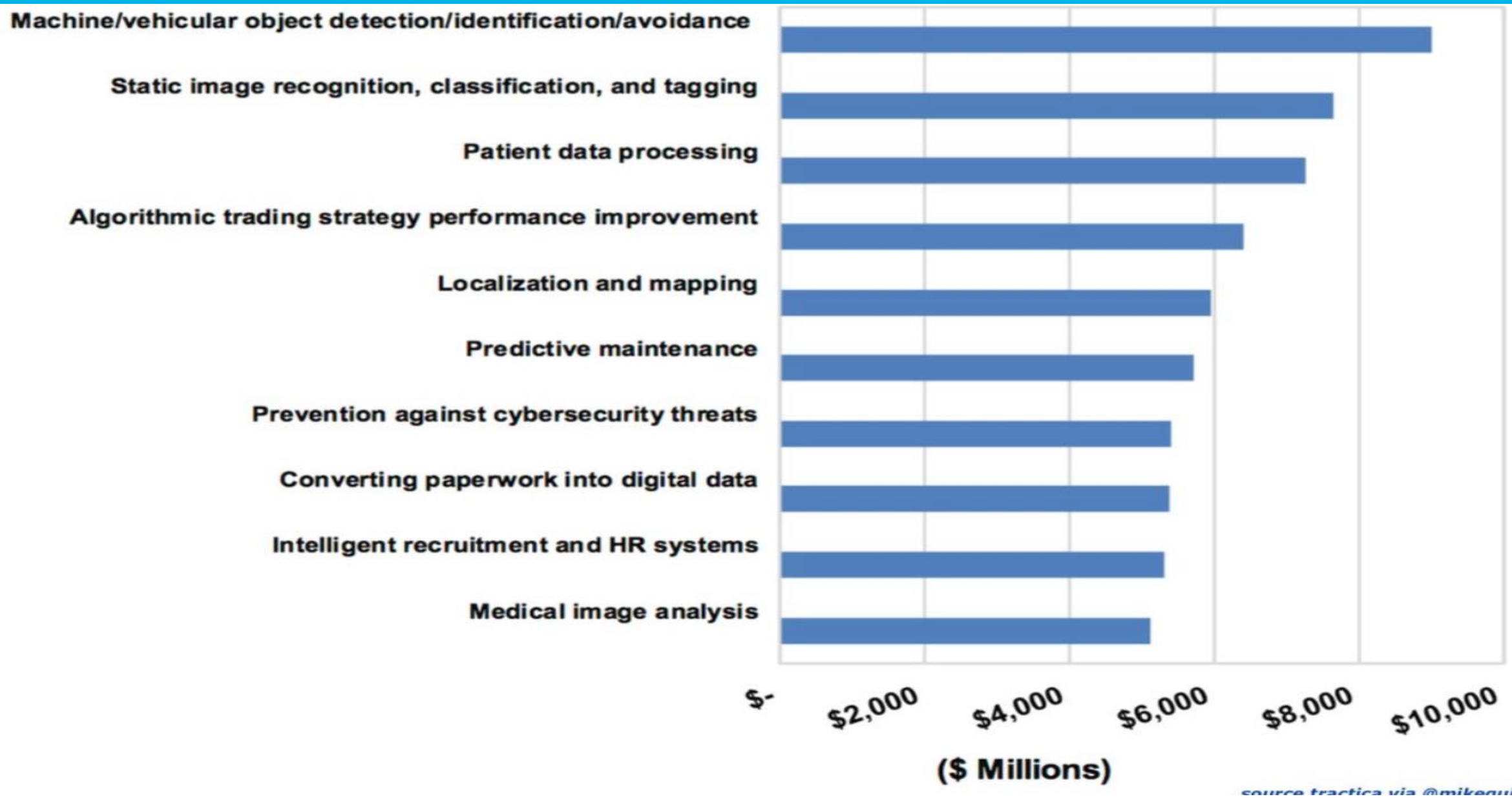
AI Revenue (Top 10 Use cases) in the World 2016-2025



source tractica via @mikequindazzi

AI in Italy? Very few data

Market AI in Italy 2018 only 80ML€?
But only Robotics and automation (not considered) is about 145 M€

INITIAL Survey with some companies:

- 12% “already” one AI project completed
- 8% is implementing one
- 31% some prototypes
- 21% budget for 2019
- 19% interested
- 9% not interested at all

POLITECNICO MILANO 1863
SCHOOL OF MANAGEMENT
DIPARTIMENTO DI ELETTRONICA, INFORMAZIONE E BIOINGEGNERIA

Osservatorio Artificial Intelligence

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AI in Italy? Research

In Italy???

What are the countries leading the AI revolution?* From 2010-2015

Papers in AI	
China	**41.000**
USA	**25.000**
Japan	**11.700**
UK	**10.100**
Germany	**8.000**

Cited papers in AI (1 average)	
Switzerland	**2.71**
Singapore	**2.24**
Hong Kong	**2.00**
USA	**1,79**
Italy	**1.74**

*** Futures platform 2018**

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Artificial Intelligence and Intelligent Systems

cini National Lab

Lab Nazionale CINI AIIS

- **52 nodi , 900 Membri**

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AImage Lab

AI academy

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AXYON.AI

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energyway

Vision-e Vision Engineering

PIKKART Technologies that reinvent your reality.

MIND

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Artificial Intelligence and Intelligent Systems
cini National Lab

RedVision lab

Facebook AI Research (FAIR)

DIVA

Panasonic

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THANKS

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