



**Informatica  
& Società**



LABORATORIO NAZIONALE **cini**



**I.R.C.C.S. Ospedale  
Galeazzi - Sant'Ambrogio**

Gruppo San Donato

**ReD OPEN**  
responsibility & design in open ecosystems



**Modeling Uncertainty,  
Decisions and  
Interaction Laboratory**

# Dipendenza, contrasto e 'giusta distanza'

QUALE RUOLO PER LA NUOVA INTELLIGENZA ARTIFICIALE NEL  
PROCESSO DECISIONALE E NEL GIUDIZIO PROFESSIONALE?



**PROF. FEDERICO CABITZA**

Automazione:

esecuzione di compiti da parte di macchine (anche software)



Automazione:

esecuzione di compiti da parte di macchine (anche software)

Intelligenza Artificiale:

Automazione di compiti che se eseguiti da esseri umani,

richiedono intelligenza e competenze



*+ efficacia*

*+ efficienza*

*+ comodità*



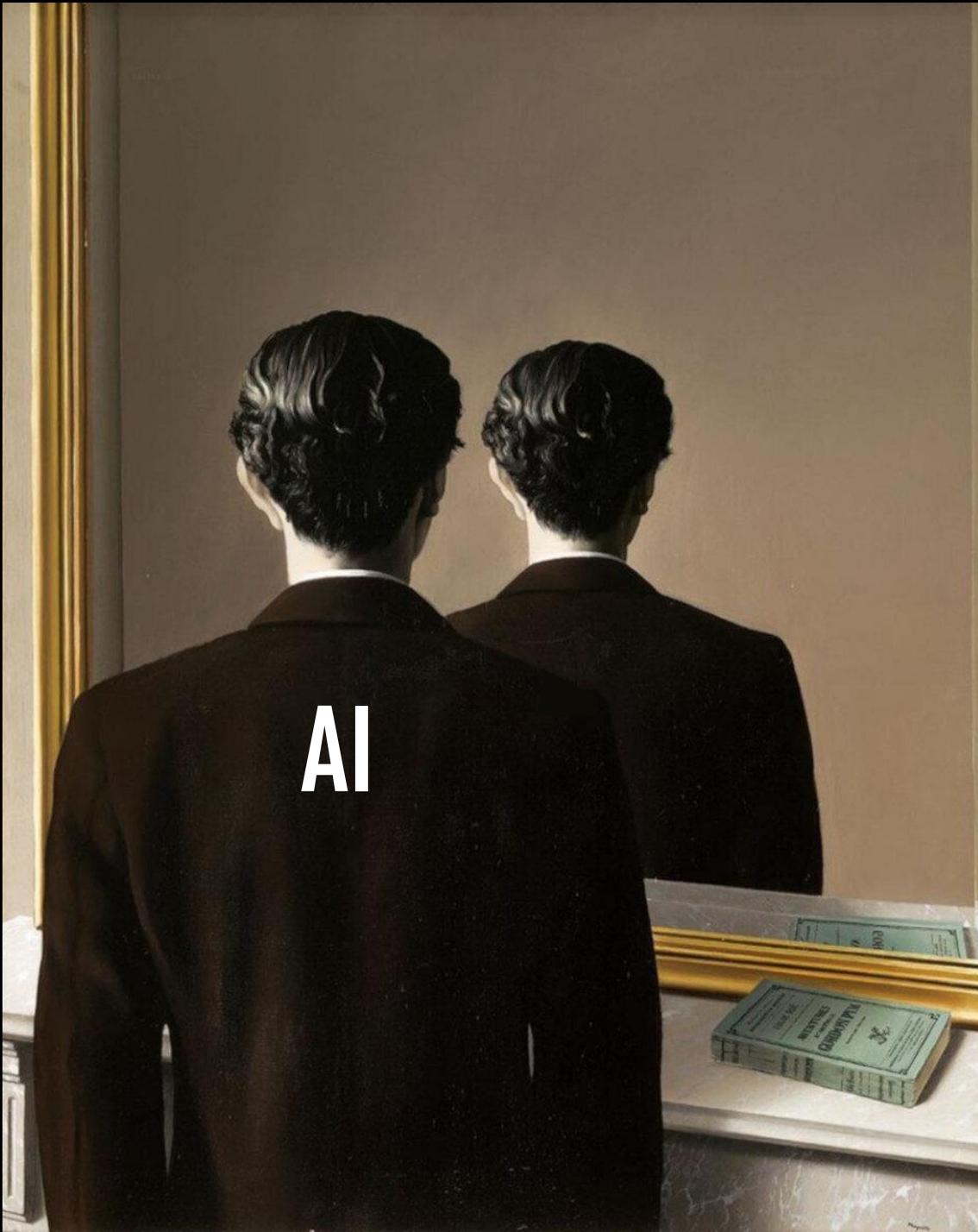
- Accelerate administrative processes** — administrative processes are often mundane tasks such as coordinating meeting requests, booking travel or making notes during meetings. A virtual assistant can do many of these tasks. The more advanced AI will become, the more tasks these virtual assistants can perform.
- Drive innovation** — AI can help advance your R&D activities by providing insights into your customers' (latent) needs, combined with how they use your products. That information can help to speed-up innovation
- Augment your employees to make them more effective and efficient** — AI can provide your employees with the right information at the right moment to make them more efficient and effective, but also exoskeletons can augment your employees to make repetitive hard work easier. Ford has been rolling out exoskeletal technology globally to help employees who perform repetitive overhead tasks. Such AI skeletons can help employees accomplish accuracy and precision even when faced with immense complexity.
- Automate your customer service department** — conversational AI, a.k.a. chatbots — can significantly reduce the number of customer service representatives and the more advanced chatbots become, the more they can automate many, if not all, tasks generally performed by the customer service department or IT department. For example, JP Morgan Chase has implemented chatbots in their IT department to handle 1.7 million requests per year, doing the work of 140 people.
- Change your company culture** — currently, most organisations are pure human-to-human networks, where humans collaborate and organise activities to achieve a particular goal. How humans collaborate and interact, depend on their company culture. However, if collaboration shifts from human-to-human networks to human-to-machine and increasingly machine-to-machine interactions, it changes the company culture, especially when algorithms are supervising work.
- Communicate with your customers and employees** — just like it can automate your customer service department, conversational AI can also communicate directly with your customers and colleagues, whether by providing automated targeted advertising messages to your customers or answer questions for your colleagues. In the future organisation, AI will directly communicate with your customers and employees.
- Control your financial activities** — obtaining a complete overview of an organisation's financial operations is often complicated and requires the work of an accountant. In addition, invoicing, procurement and audits still require manual work. However, AI can do most of these tasks. Already, there are AI-powered invoice systems that can automate invoice processing, automate procurement and make it completely paperless as well as perform a completely automated audit of an organisation's financial transactions. In the future, a real-time overview of an organisation's financial status can be achieved with a push of a button.
- Create new jobs** — AI will not only eliminate a lot of jobs, but it will also create a lot of new jobs, some we cannot even think of. Most of these jobs will be related to creating, controlling and auditing the algorithms of an organisation, developing the required robotics and making sure that algorithms across organisations and industries can talk to each other without violating customers' privacy.
- Eliminate language barriers across your business units** — Instant translations have been around for a while now, and although Google Translate has significantly improved in the past years, it still makes mistakes. However, in the coming years, AI translations will become a lot more accurate, enabling instant and perfect translations between languages. For organisations that operate across borders, it will eliminate language barriers and improve communication.
- Empower your employees at all levels** — administrative processes provide more people with access to knowledge through big data analytics, power is distributed more equally, enabling empowerment within an organisation. As such, AI can provide employees with better information and knowledge that enables them to make better decisions.
- Enhance your (digital) security** — Artificial intelligence will improve your (digital) security significantly, as it is much better to monitor a certain (digital) environment than humans can. Smart CCTV cameras combined with sophisticated pattern recognition across networks will allow organisations to better find anomalies that could indicate a breach of security.
- Ensure data privacy for your customers and employees** — artificial intelligence does not mean the end of privacy. On the contrary, artificial intelligence can ensure a new level of privacy by using a technique called differential privacy. This means that AI adds noise when analysing a data set, thereby preserving a dataset's statistical features while limiting the risk that an individual can be identified. It was first used by Apple, but the easier it becomes to implement differential privacy, the more organisations will apply it.
- Expand your marketing activities** — the holy grail of marketing is to offer the right product at the right time for the right price to the right customer via the right channel. Hyper-personalisation has long been seen as the best chance to reach your customer in the information overflow that reaches consumers daily. Advanced deep learning and machine learning techniques now enable organisations to achieve this by finding patterns in large data sets and incorporating the context to tailor the right message.
- Fight cyber-attacks and malware** — AI offers our best chance to fight cyber-attacks and malware as it can incorporate many more datasets and information than humans can. Often, to discover and stop a cyber-attack, the context plays an important role, and small anomalies can provide great information about an imminent attack. AI will enable organisations to move from a responsive behaviour to predictive behaviour, stopping cyber-attacks before they can occur, instead of fixing the damage after they have happened.
- Forecast your maintenance requirements** — predictive maintenance enables organisations to save a tremendous amount of money. For example, an energy company with offshore windmills can use sensors and predictive maintenances to know when a windmill requires some sort of repair, instead of routinely flying by helicopter to do maintenance check-ups. It will not only save organisations a lot of money, but it will also make products safer as they are fixed before they break down.
- Improve the customer experience across channels** — a personalised omnichannel experience will improve customer engagement, and it will improve the experience customers have with your organisation. AI can contribute to a better social media experience, enable faster customer service and transform the customer experience by incorporating the context. With AI, you can service your customers through their channel of choice and provide a consistent brand experience.
- Increase productivity** — AI-powered machines can autonomously improve the efficiency of manufacturing processes, considering cycle times, quantities used, lead times, temperatures, downtimes, errors and market demand to improve the output of the machine, whether this is a burger-flipping robot or an advanced robot within in solar panel factory. When AI takes over, it will also enable us to limit miscommunication among departments and organisations, thereby further increasing productivity.
- Match the perfect candidate for the right job** — human resources can benefit significantly from AI as finding the right candidate for the right job still very difficult. An interview or a test is only a few data points that tell or so much about a candidate. However, with AI, we can now gain a better understanding of how a candidate will behave in certain situations. For example, a test will not only provide insights into whether the candidate has the right knowledge, but also provide insights into how a candidate answer questions. That information will offer more insights into the skills and behaviour of the candidate, who can then be better matched to the available jobs.
- Offload routine work from employees and automate routine processes** — routine tasks and processes are the first that can be automated, ranging from everyday physical tasks within factories to routine back-office administrative and financial activities. Using robotic process automation technology, AI can perform these tasks faster and better than humans can. After all, a robot will never get tired or require a day off.
- Optimise your company's investment activities** — when determining your next investment, more information is better. However, humans can only incorporate so much information, thereby sometimes missing relevant information. AI is capable of integrating the full context, as long as data is available, allowing organisations to optimise their investment activities.
- Personalise the marketing message** — the right message at the right moment for the right customer will drive sales and increase demand. Creating these hyper-personalised messages can now be done by AI, which creates them on the fly. This not only saves a lot of time, but it will also improve the results of your marketing messages.
- Predict consumer buying behaviour** — using AI, systems can simulate hundreds and thousands of possible production outcomes or consumer buying behaviour. These scenarios will help organisations to understand market demand better and match that to production outcomes to ensure the right number of products are made for the right amount of demand.
- Recommend better/new/other/additional products and services for your customers or employees** — recommender systems have been around for many years now, and they have proven their success. The more data becomes available; the better recommender systems will become, resulting in an increase in sale and/or productivity.
- Reduce risks across business units** — Risks within organisations exist because organisations do not have a complete overview of their environment and context. With big data analytics and advanced pattern recognition, it becomes possible to gain a better understanding of your next project/customer/investment, thereby reducing the risk you face.
- Scan your physical inventory** — using drones combined with image recognition, organisations can scan their physical inventory a lot faster than when done manually. Already, Walmart uses sophisticated drones that fly through their warehouses to determine the available stock. What would take a human a month to complete can be done in 24 hours.
- Shape your sales activities** — AI not only improves your forecasting, but it will also reduce customer churn and enhance your understanding of your (potential) customers as well as offer better leads, thereby allowing you to send better offers based on customers' habits and (latent) needs. Besides, AI can help the sales team better prioritise and automate many of the administrative tasks they usually do, resulting in more effective sales activities.
- Streamline your decision-making processes** — the best decisions consider as much information as possible. However, humans are limited in the amount of context they can include in their decisions. In addition, humans are driven by money, sex and status, which could influence their decisions, while existing AI is logical and probabilistically driven only, thereby better able to make an independent decision. As long as the algorithm is not trained using biased data and considers the entire context, AI can significantly improve your decision-making processes.
- Supervise your blue-collar workers** — in the not too distant future, AI will become the supervisor for many jobs, whereby workers no longer directly report to a human manager, but to an AI. Already, we see the first signs of this trend happening at companies such as Uber, where the algorithms determine where the driver should go, how many passengers he/she should pick-up and what the reputation score is based on their driving behaviour.
- Train your other algorithms** — recently, Google launched Cloud AutoML — a set of several machine learning techniques that help developers create and train deep-learning algorithms. Building, training, and optimising AI requires a deep understanding of the code and the mathematical formulae underlying the algorithm as well as extensive testing and tweaking of the algorithm. Now, this work can be done by AI, and while the technology is limited for now, it will likely improve over time, thereby allowing organisations to use AI to train AI.
- Transform corporate governance practices** — artificial intelligence is fundamentally different from human intelligence and, therefore, requires different corporate governance practices. After all, an artificial agent has different objectives and drivers than human agents. If we want to prevent AI from harming us, we should thus transform our corporate governance practices to solve the Principal-Agent problem when dealing with an artificial agent.



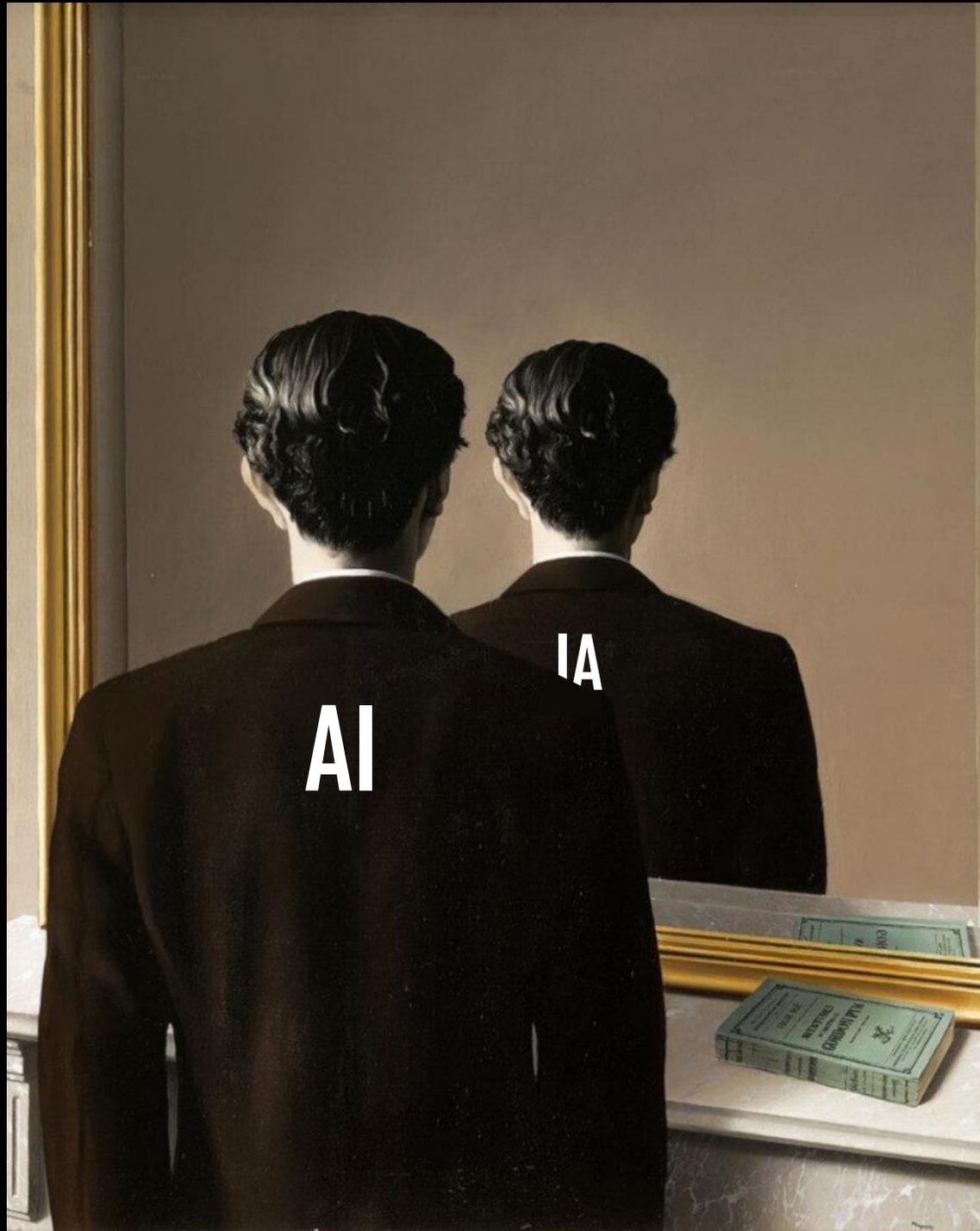
Dr Mark van Rijmenam

# 30 Ways How AI Will Change Your Business





Perché è importante riflettere sul ruolo della AI nel nostro lavoro e nella vita di tutti i giorni?



Perché è importante riflettere sul ruolo della AI nel nostro lavoro e nella vita di tutti i giorni?

Per il suo doppio:  
l'IA (Intelligence Augmentation)



State of Market|



- state of marketing
- state of marketing 2018
- state of marketing report
- state of marketing technology 2018
- state of marketing automation 2018
- state of market report pjw
- state of market deepak singh
- state of marketing 2017
- state of marketing automation
- state of marketing report 2017
- looking ...

Report inappropriate prediction

# NETFLIX

Movies, TV shows, actors, directors, genres

Watch Instantly

Browse DVDs

Your Queue

Movies You'll ♥

## Congratulations! Movies we think You will ♥

Add movies to your Queue, or Rate ones you've seen for even better suggestions.

Spider-Man 3



Add

★★★★☆

Not Interested

300



Add

★★★★★

Not Interested

The Rundown



Add

★★★★☆

Not Interested

Bad Boys II



Add

★★★★☆

Not Interested

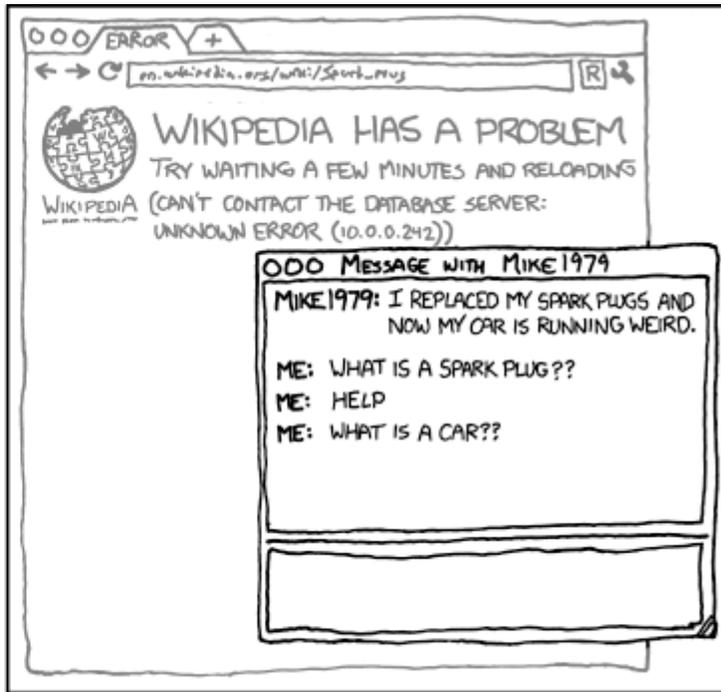
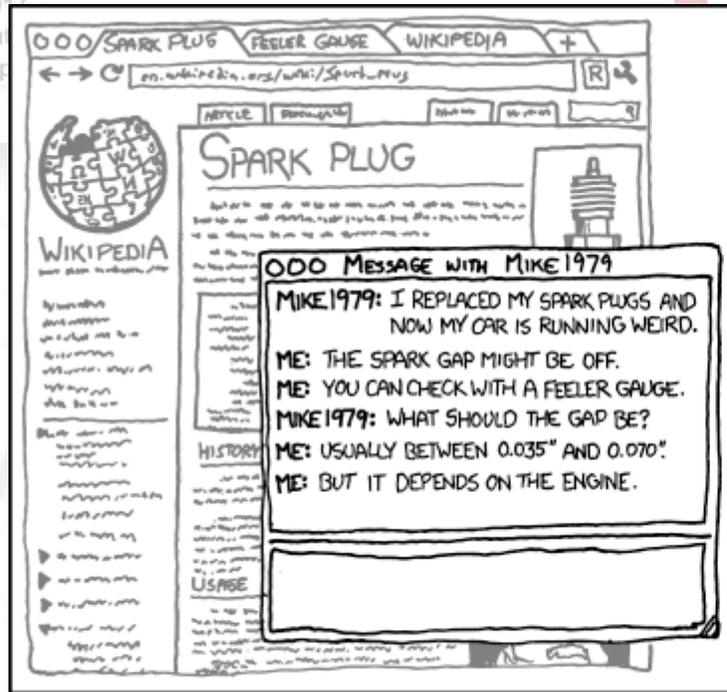


- state of marketing
- state of marketing 2018
- state of marketing report
- state of marketing technology 2018
- state of marketing automation 2018
- state of market report pjm
- state of market deepak singh
- state of marketing 2017
- state of marketing au
- state of marketing rep
- looking ...

- Watch Instantly
- Browse DVDs
- Your Queue
- Movies You'll ♥

### Congratulations! Movies we think You will ♥

Add movies to your Queue, or Rate ones you've seen for even better suggestions.



WHEN WIKIPEDIA HAS A SERVER OUTAGE, MY APPARENT IQ DROPS BY ABOUT 30 POINTS.

the "Google Effect"...





**«Dopo un buon pasto, si può  
perdonare chiunque, anche i  
propri parenti» Oscar Wilde**



**«Dopo un buon pasto, si può  
perdonare chiunque, anche i  
propri parenti» Oscar Wilde**

**Ma appena prima, un giudice può condannare chiunque,  
anche un innocente.**

# Lunchtime Leniency: Judges' Rulings Are Harsher When They Are Hungrier

RESEARCH ARTICLE | SOCIAL SCIENCES | FREE ACCESS

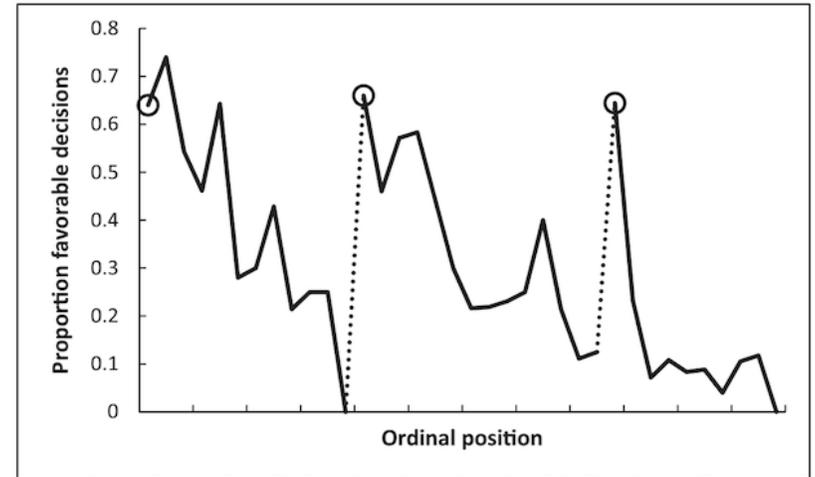


## Extraneous factors in judicial decisions

Shai Danziger, Jonathan Levav , and Liora Avnaim-Pesso [Authors Info & Affiliations](#)

April 11, 2011 | 108 (17) 6889-6892 | <https://doi.org/10.1073/pnas.1018033108>

*«the hungry judge effect»*



**Fig. 1.** Proportion of rulings in favor of the prisoners by ordinal position. Circled points indicate the first decision in each of the three decision sessions; tick marks on x axis denote every third case; dotted line denotes food break. Because unequal session lengths resulted in a low number of cases for some of the later ordinal positions, the graph is based on the first 95% of the data from each session.

**Law**

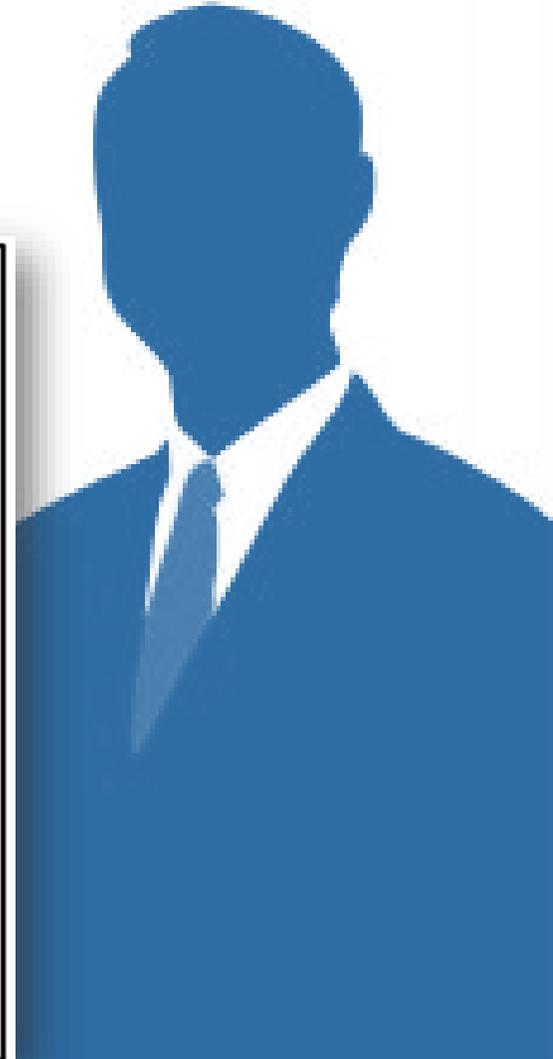
Judges are more lenient after taking a break, study finds

Prisoners are more likely to be granted parole early in the day or after a break such as lunch, according to researchers



# Ouch, 50% Of New Hires Fail! 6 Ugly Numbers Revealing Recruiting's Dirty Little Secret

By [Dr. John Sullivan](#) April 10, 2017



## New-Hire Failure Rates By Job Level

**Overall failure rate** – What % of all new-hires fail within 18 months? **“46%”** (Source: Leadership IQ)

**Hourly new-hires** – What % of all hourly employees quit or are fired within their first 6 months? **“50%”** (Source: Humetrics)

**Management new-hires** – What % of management new-hires fail within 18 months? **“Between 40 and 60%”** (Source: Harvard Business Review)

**High managerial talent** – What % miss the mark on high managerial talent? **“In 82% of their hiring decisions”** (Source: Gallup)

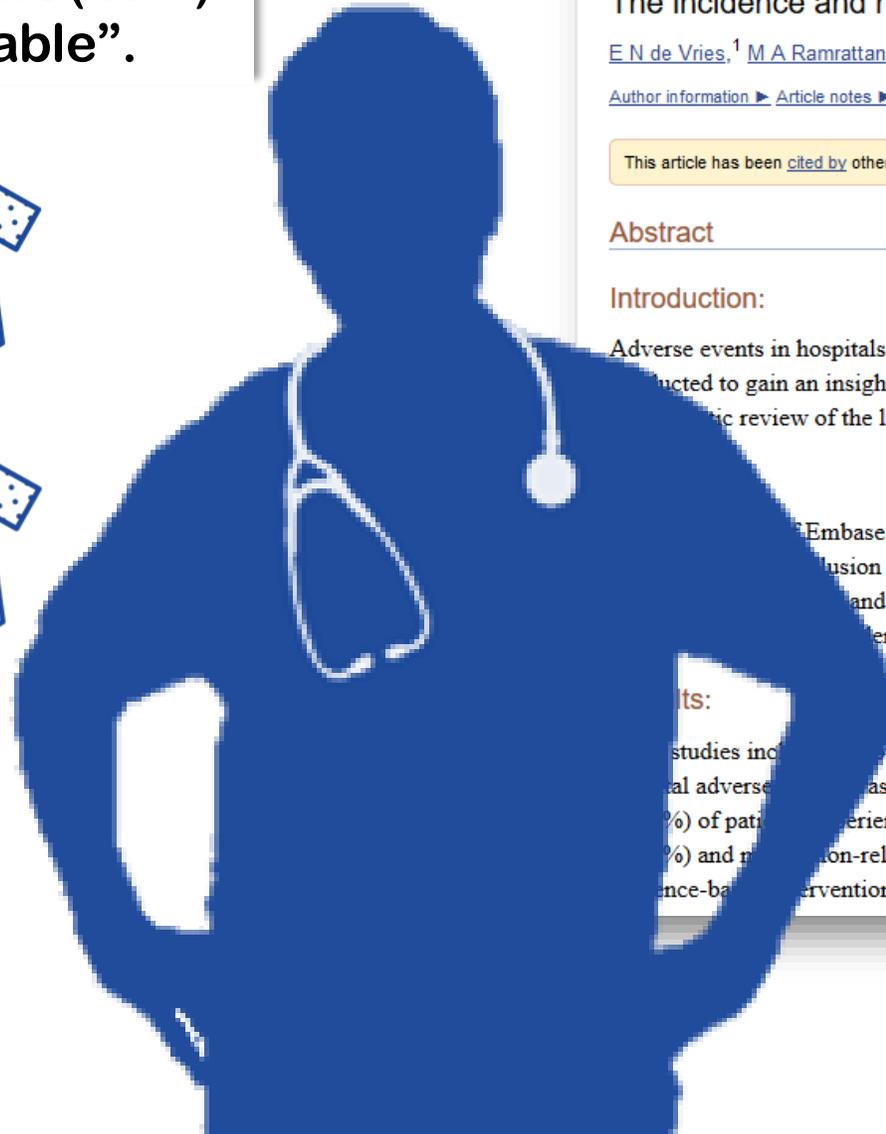
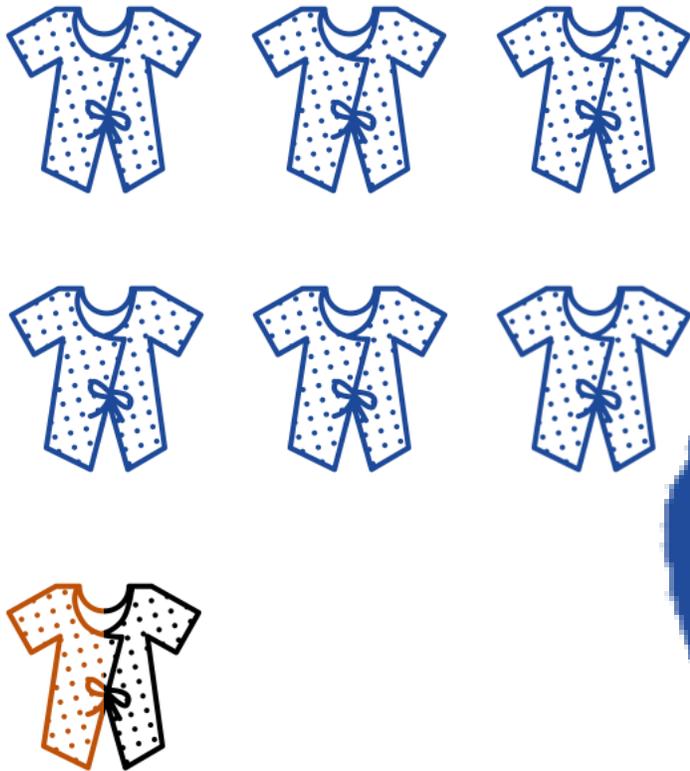
**Executive new-hires** – What % of executive new-hires fail within 18 months? **“Nearly 50%”** (Source: The Corporate Leadership Council)

**CEO failure** – What % of new CEO's fail outright within their first 18 months? **“Nearly 40%”** (Source: Center For Creative Leadership).

**Unequivocal success** - What % of new-hires can be declared as an unequivocal success? **“19%”** or 1 in 5 (Source: Center for Creative Leadership).

Table by Dr John Sullivan

“Adverse events during hospital admission affect nearly one out of 10 patients. A substantial part (43%) of these events are preventable”.



## The incidence and nature of in-hospital adverse events: a systematic review

[E N de Vries](#),<sup>1</sup> [M A Ramrattan](#),<sup>2</sup> [S M Smorenburg](#),<sup>2</sup> [D J Gouma](#),<sup>1</sup> and [M A Boermeester](#)<sup>1</sup>

[Author information](#) [Article notes](#) [Copyright and License information](#) [Disclaimer](#)

This article has been [cited by](#) other articles in PMC.

### Abstract

[Go to:](#)

### Introduction:

[Go to:](#)

Adverse events in hospitals constitute a serious problem with grave consequences. Many studies have been conducted to gain an insight into this problem, but a general overview of the data is lacking. We performed a systematic review of the literature on in-hospital adverse events.

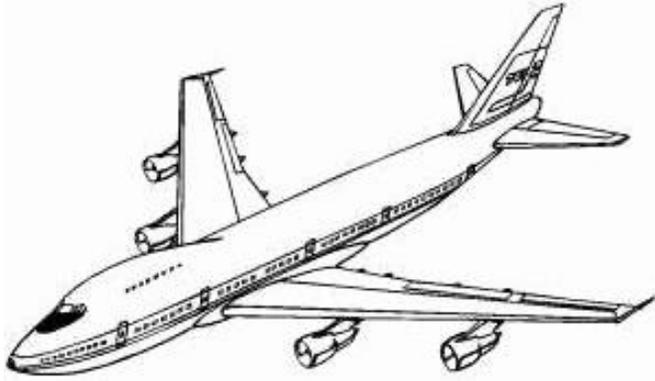
[Go to:](#)

A search of Embase, Cochrane and Medline was performed. Studies were reviewed independently according to inclusion and exclusion criteria and endpoints. Primary endpoints were incidence of in-hospital adverse events and percentage of preventability. Secondary endpoints were adverse event outcome, severity, location of care, location and type of event.

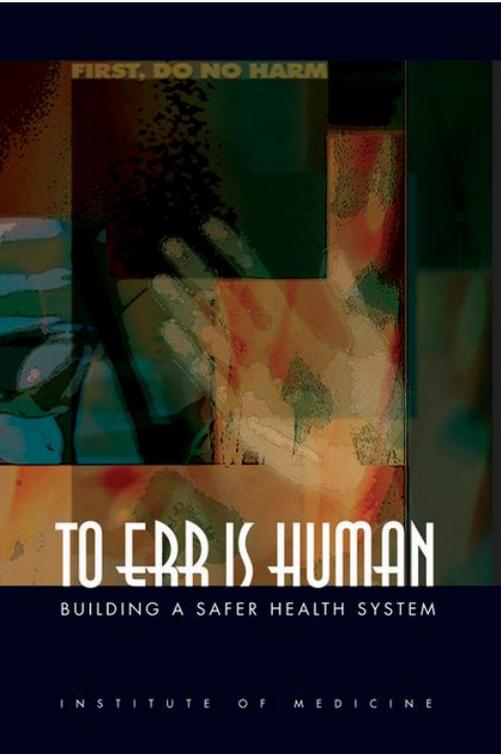
[Go to:](#)

### Results:

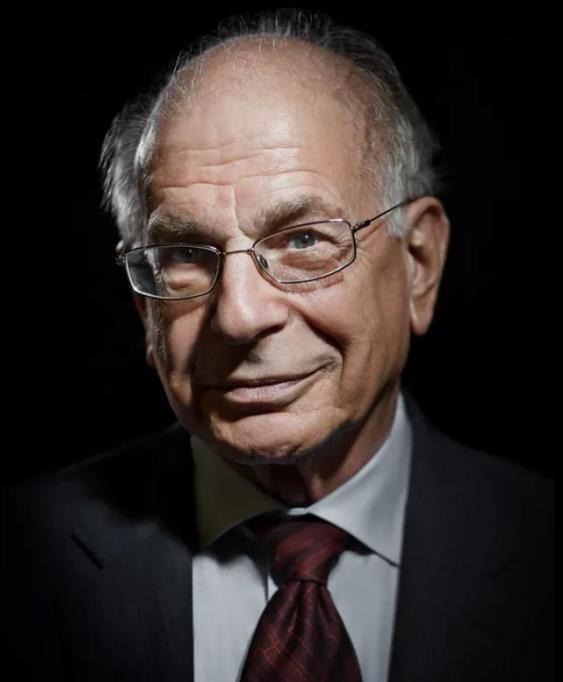
In 10 studies including a total of 74 485 patient records were selected. The median overall incidence of in-hospital adverse events was 9.2%, with a median percentage of preventability of 43.5%. More than half (51%) of patients experienced no or minor disability, whereas 7.4% of events were lethal. Operation-related (50%) and medication-related (15.1%) events constituted the majority. We present a summary of evidence-based interventions aimed at these categories of events.



«un jumbo jet al giorno»



«La sostituzione delle decisioni umane con un algoritmo dovrebbe essere presa in considerazione ogni volta che i giudizi professionali sono troppo rumorosi» (cioè si presentano diversi quando invece dovrebbero essere identici).



DANIEL  
KAHNEMAN

PREMIO NOBEL PER L'ECONOMIA

OLIVIER SIBONY  
CASS R. SUNSTEIN

# RUMORE

Un difetto del ragionamento umano

UTET

# DECISION SUPPORT SYSTEMS



# DECISION SUPPORT SYSTEMS

Qualsiasi strumento che supporta gli esseri umani in compiti decisionali complessi (ad es.: diagnosticare una radiografia, assumere o licenziare una persona, stabilire il rischio di recidiva di un imputato).\*

- Parasuraman, R., & Manzey, D. H. (2010). Complacency and bias in human use of automation: An attentional integration. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 52(3), 381-410.

# DECISION SUPPORT SYSTEMS

## LEVELS OF AUTOMATION OF DECISION AND ACTION SELECTION

- HIGH
10. The computer decides everything, acts autonomously, ignoring the human.
  9. informs the human only if it, the computer, decides to
  8. informs the human only if asked, or
  7. executes automatically, then necessarily informs the human, and
  6. allows the human a restricted time to veto before automatic execution, or
  5. executes that suggestion if the human approves, or
  4. suggests one alternative
  3. narrows the selection down to a few, or
  2. The computer offers a complete set of decision/action alternatives, or
- LOW
1. The computer offers no assistance: human must take all decisions and actions.

# DECISION SUPPORT SYSTEMS

## LEVELS OF AUTOMATION OF DECISION AND ACTION SELECTION

HIGH

10. The computer decides everything, acts autonomously, ignoring the human.

9. informs the human only if it, the computer, decides to

8. informs the human only if asked, or

7. executes automatically, then necessarily informs the human, and

6. allows the human a restricted time to veto before automatic execution, or

5. executes that suggestion if the human approves, or

4. suggests one alternative

3. narrows the selection down to a few, or

2. The computer offers a complete set of decision/action alternatives, or

LOW

1. The computer offers no assistance: human must take all decisions and actions.



# DECISION SUPPORT SYSTEMS

## LEVELS OF AUTOMATION OF DECISION AND ACTION SELECTION

- HIGH
10. The computer decides everything, acts autonomously, ignoring the human.
  9. informs the human only if it, the computer, decides to
  8. informs the human only if asked, or
  7. executes automatically, then necessarily informs the human, and
  6. allows the human a restricted time to veto before automatic execution, or
  5. executes that suggestion if the human approves, or
  4. suggests one alternative
  3. narrows the selection down to a few, or
  2. The computer offers a complete set of decision/action alternatives, or
- LOW
1. The computer offers no assistance: human must take all decisions and actions.

Deskilling?

Augmentation?

# The AI

# Singularity





*Gary Klein*

he has taught me more about the complexities and myster  
man decision-making than Gary Klein." — **Malcolm Gladwe**

Gary Klein ha definito "la seconda singolarità" la riduzione delle competenze a cui stiamo assistendo in molte organizzazioni quando esternalizzano l'autorità decisionale alle macchine: i lavoratori avranno meno opportunità di diventare più intelligenti, il che non fa che incoraggiare una maggiore esternalizzazione alle macchine.





*Gary Klein*

...ne has taught me more about the complexities and myster...  
...man decision-making than Gary Klein." — **Malcolm Gladwe**

Gary Klein ha definito "la seconda singolarità" la riduzione delle competenze a cui stiamo assistendo in molte organizzazioni quando esternalizzano l'autorità decisionale alle macchine: i lavoratori avranno meno opportunità di diventare più intelligenti, il che non fa che incoraggiare una maggiore esternalizzazione alle macchine.

**"Potremmo scoprire il valore della competenza solo dopo che è andata perduta".**





Gary Klein

...he has taught me more about the complexities and myster...  
...man decision-making than Gary Klein." — Malcolm Gladwe

- 1) possiamo cercare di aumentare la consapevolezza della seconda singolarità e dei rischi che essa comporta.
- 2) possiamo cercare di promuovere un maggiore apprezzamento per le competenze e i punti di forza che esse offrono.
- 3) possiamo chiedere ai governi e alle aziende di ridurre il loro sostegno alla costruzione di macchine più intelligenti e di sostenere invece i modi per costruire macchine che ci rendano più intelligenti.
- 4) possiamo incoraggiare una scienza pratica della competenza, che esca dal laboratorio e arrivi sul posto di lavoro. Questa attività tratterebbe la competenza come un bene essenziale e fragile e costruirebbe tattiche per rafforzarla.

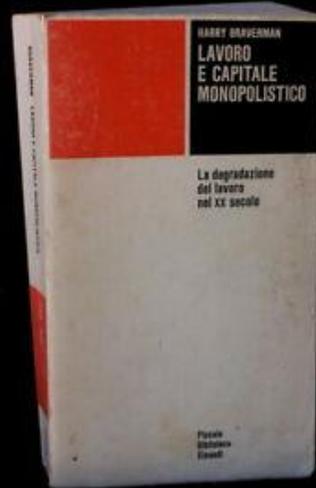


A high-contrast, black and white image of a crescent moon. The moon is the central focus, showing its characteristic curved shape and a surface covered in numerous small craters and larger, darker spots. The background is a solid, deep black, which makes the illuminated edge of the moon stand out sharply. The lighting is from the right, creating a bright, glowing arc on the right side of the moon's curve.

CONDISCENT  
DESKILL

The dark side of AI

DESKILLING



## Labor and Monopoly Capital

The Degradation of Work in the Twentieth Century

**Harry Braverman**

DESKILL



Braverman non usa mai il termine "deskilling".  
Piuttosto parla di "deterioration of skills" e "destruction of craftsmanship"



## Labor and Monopoly Capital

The Degradation of Work in the Twentieth Century

Harry Braverman

# Deskilling

From Wikipedia, the free encyclopedia

**Deskilling** is the process by which skills that were within an industry are progressively eliminated by the introduction of technologies. It is also associated with the loss of the bargaining power of the human worker due to savings due to lower investment in training and the loss of the bargaining power of the human worker.

**Deskilling** can also refer to individuals becoming less proficient over time. Examples include moving to a completely different profession (e.g. an accountant), and being out of a profession in order to focus exclusively on one area. It is criticized<sup>[3]</sup> for decreasing the quality of work and making workers less thoughtful and making workers less

Per deskilling si intendono due cose diverse, causa ed effetto.

Dequalificazione (degradamento del lavoro)

Perdita progressiva di competenze/abilità (preziose)



# Deskilling

From Wikipedia, the free encyclopedia

**Deskilling** is the process by which skills that were once in high demand are lost due to the introduction of technologies that require less skill. This can lead to a loss of bargaining power of the human worker due to savings due to lower investment in training and a loss of bargaining power of the human worker.

**Deskilling** can also refer to the process of becoming less proficient over time. Examples include moving to a completely different profession (e.g. from accountant to teacher), and being out of a profession in order to focus exclusively on one position in order to focus exclusively on one position. It is criticized<sup>[3]</sup> for decreasing the quality of work and making workers less thoughtful and making workers less thoughtful and making workers less thoughtful.

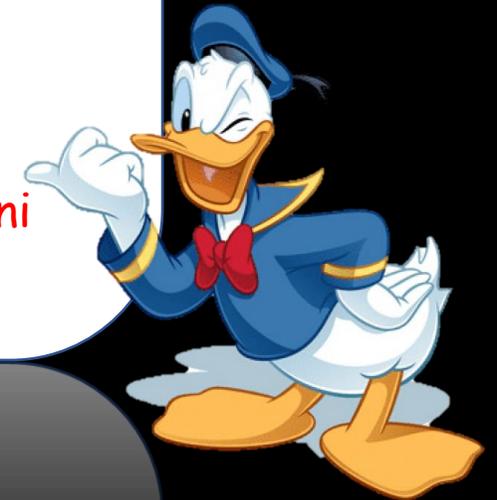
Per deskilling si intendono due cose diverse, causa ed effetto.

Dequalificazione (degradamento del lavoro)

Richiedere sempre meno abilità alle persone coinvolte in certe mansioni, per un lavoro + parcellizzato, semplificato e standardizzato.

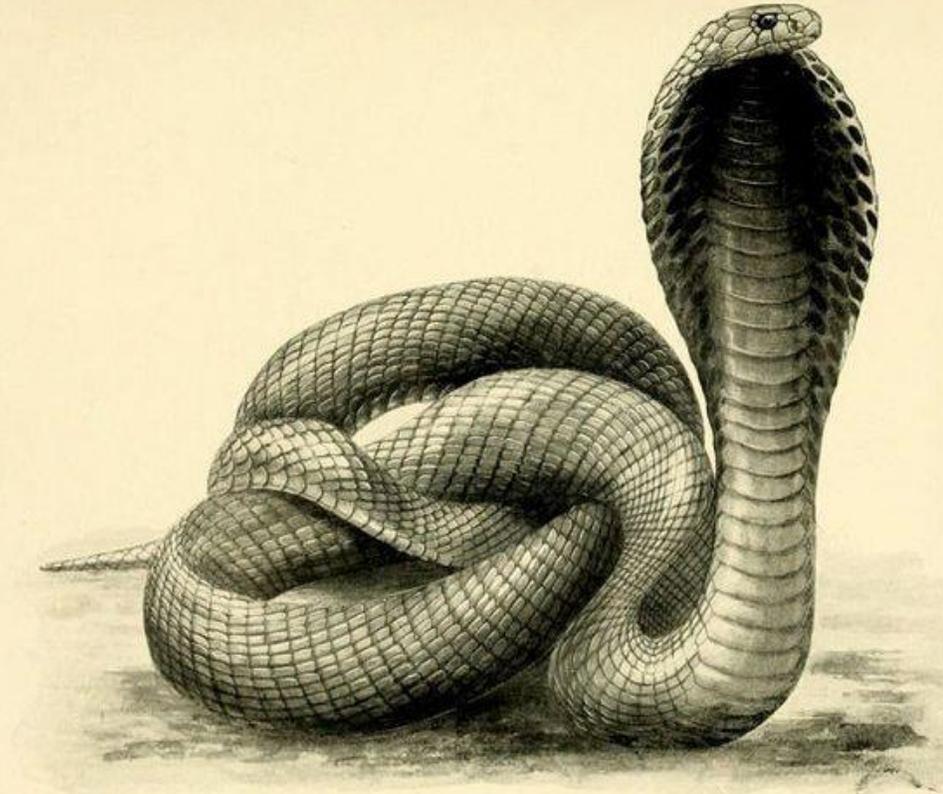
Perdita progressiva di competenze/abilità (preziose)

E' una "loss of skill" che si ritengono importanti per risolvere problemi non banali, o fronteggiare situazioni nuove e/o in condizioni di variabilità e incertezza.



Sono solo due manifestazioni della cosiddetta

Cobra AI



# MACHINES WE TRUST

Perspectives on  
Dependable AI

edited by Marcello Pelillo and Teresa Scantamburlo

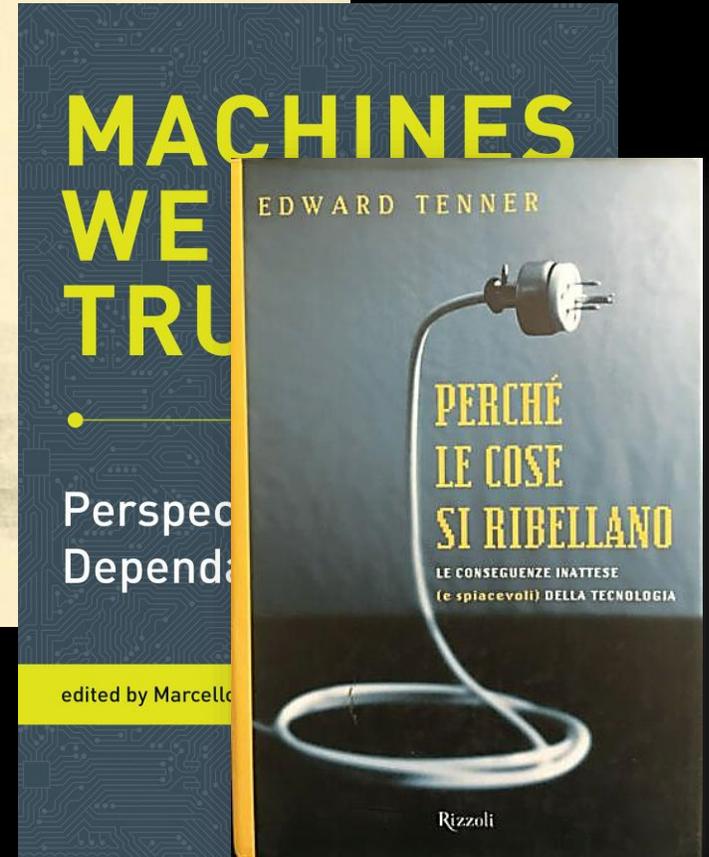


The MIT Press

**Sono solo due manifestazioni della cosiddetta**

## **Cobra AI**

**Una AI che si ritorce contro  
chi pensa di «governare»  
un certo contesto.**



# AUTOMATION BIAS



# AUTOMATION BIAS

L'Automation bias si verifica quando un essere umano si affida eccessivamente ad un supporto tecnologico e si fida del suo suggerimento senza analizzare approfonditamente i dati disponibili

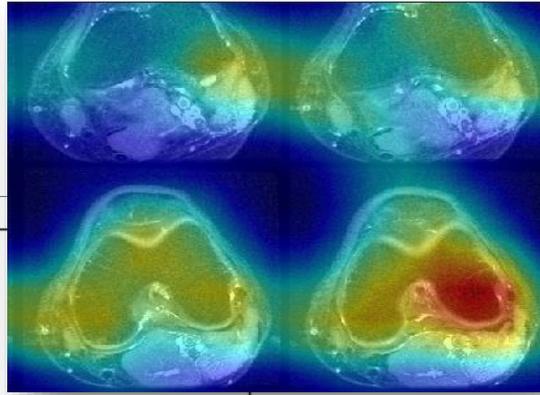
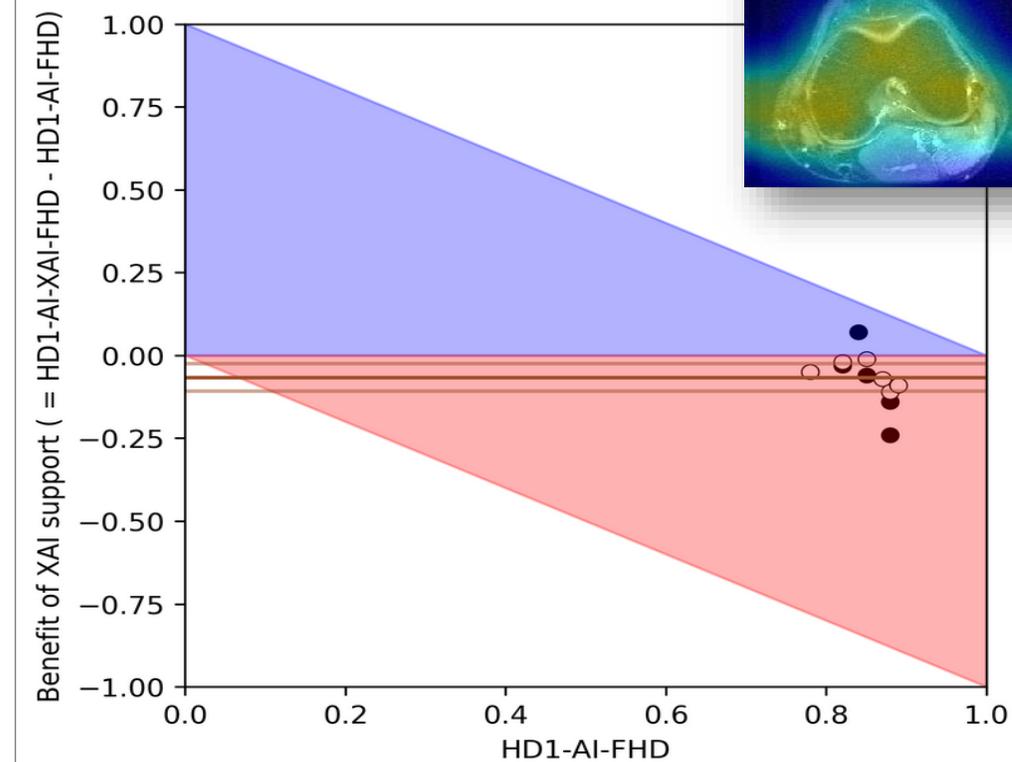
(“si fida” / “si affida”, e fallisce nel capire quando il sistema si sbaglia; fa un “errore di commissione”).

# AUTOMATION BIAS

# SULLA SINGOLA DECISIONE

## THE "WHITE-BOX" PARADOX

BENEFIT OF EXPLAINABLE AI (WRT AI)





DESKILLING

SUL LUNGO PERIODO

# AUTOMATION BIAS

# DESKILLING



CC BY-NC-ND 4.0 · Endoscopy  
DOI: 10.1055/a-1770-7353

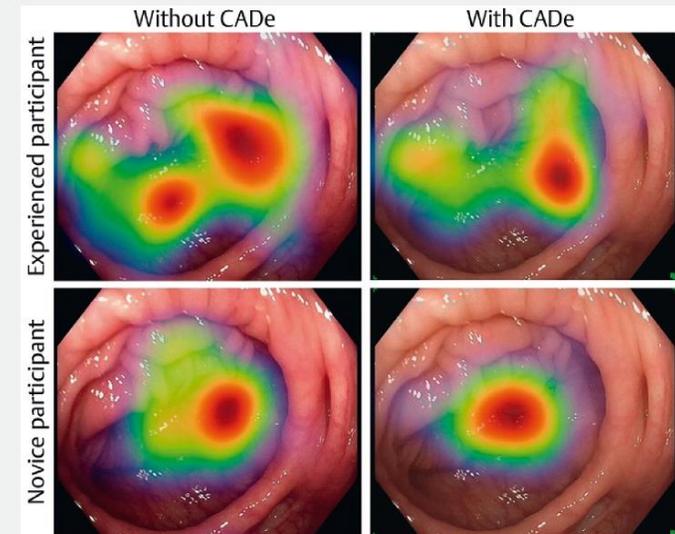


## Innovations and brief communications

### The influence of computer-aided polyp detection systems on reaction time for polyp detection and eye gaze

Joel Troya <sup>1</sup> <sup>✉</sup> <sup>\*</sup>, Daniel Fitting <sup>2</sup> <sup>✉</sup> <sup>\*</sup>, Markus Brand <sup>1</sup>, Boban Sudarevic, Jakob Nikolas Kather, Alexander Meining, Alexander Hann <sup>1</sup>

**Conclusions** Results confirm that CADe systems detect polyps faster than humans. However, use of CADe did not improve human reaction times. It increased misinterpretation of normal mucosa and decreased the eye travel distance. Possible consequences of these findings might be prolonged examination time and deskilling.



# SUL LUNGO PERIODO





# THE GLASS CAGE

AUTOMATION AND US

NICHOLAS CARR

*New York Times* best-selling author of *THE SHALLOWS*



Una ricerca in corso sul rischio di  
sovradipendenza (anche  
medicina difensiva) e deskilling  
(anche «inizione all'upskilling»)  
in ambito medico



Fondazione IRCCS Ca' Granda  
Ospedale Maggiore Policlinico



I.R.C.C.S. Ospedale  
Galeazzi - Sant'Ambrogio

Gruppo San Donato

Con il prof. Massimo Miglioretti  
(psicologo del lavoro) e il  
Dott. Demis Luppò





## + Decision Support

Riduzione rischio di errore

Riduzione variabilità / arbitrarietà

Mitigazione rischi turnover

Efficientamento / ottimizzazione

Maggiore controllo



## + Decision Support

## + Decision Overdependence

Riduzione rischio di errore

Riduzione variabilità / arbitrarietà

Mitigazione rischi turnover

Efficientamento / ottimizzazione

Maggiore controllo

Perdita di skills

Impatto su processi apprendimento

Aumento rischio di sovraaffidamento

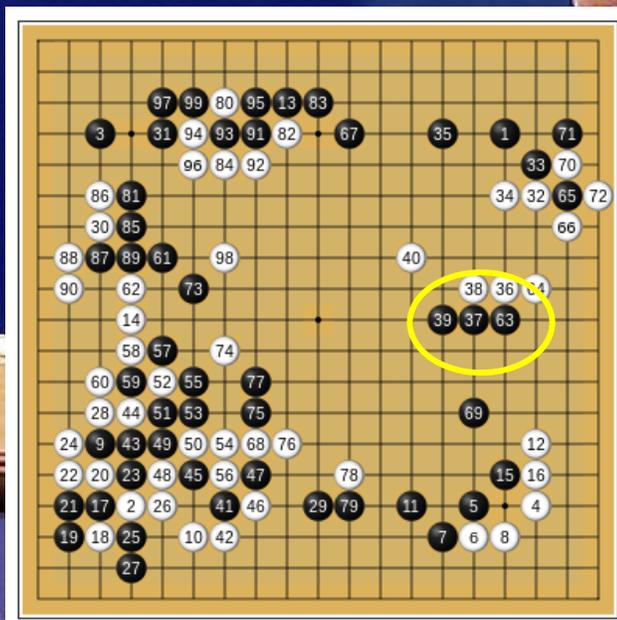
Aumento fenomeni opportunistici

Minore iniziativa e flessibilità

Non è un noi contro loro



Non è un noi contro loro



Non ci sarebbe stata la mossa 78 di Sedol in 4° partita senza la 37 in 2à di AlphaGo

**IL MODELLO CENTAURO**



# AUGMENTAZIONE

INTUIZIONE  
CREATIVITÀ  
EMPATIA

IL MODELLO CENTAURO



RECUPERO INFORMAZIONI  
IDENTIFICAZIONE PATTERN  
CALCOLO PARALLELO

# The Kasparov's Law



academic research, was proposed by Garry Kasparov in [24]. His position was first presented in an influential 2014 book by Brynjolfsson and McAfee [5] and it is often summarized in terms of the so-called Kasparov's law and rendered in the following schematic and composite way [24][p. 236]:

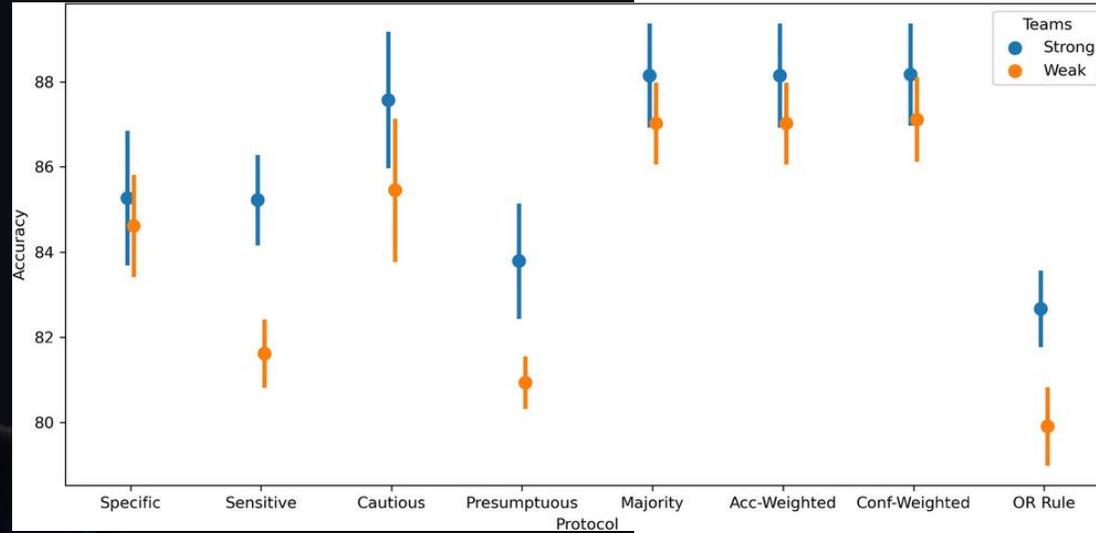
1. Weak Human + Machine + Better Process > Strong Machine;
2. Weak Human + Machine + Better Process > Strong Human + Machine + Inferior Process

where the inequality sign can have different but related meanings, like “is superior to” to some respect, or “beats” (in some game, like in free-style chess, where any arrangement of humans and computers are allowed), or just “is better than” according to some quality criterion.



# Observing the Kasparov's law in Human-AI collaboration protocols: the case of medical double reading

Federico Cabitza · Andrea Campagner · Luca Maria Sconfienza



artificial In-  
 ly been ad-  
 efficiency  
 eless, little  
 g the best  
 ative tasks,  
 dependent

the-art AI can significantly outperform it if their judge-  
 ments are aggregated by majority voting (in concordance  
 with the first part of the Kasparov's law); small ensem-  
 bles of significantly weaker readers can significantly  
 outperform teams of stronger readers, supported by the  
 same computational tool, when the judgments of the  
 former ones are combined within "fit-for-use" protocols  
 (in concordance with the second part of the Kasparov's  
 law).

retrospec-  
 certified  
 rary means of  
 simulated  
 ng models

**Conclusion:** Our study shows that good interaction  
 protocols can guarantee improved decision performance  
 that easily surpasses the performance of individual  
 agents, even of realistic super-human AI systems. This  
 finding highlights the importance of focusing on how to  
 guarantee better co-operation within human-AI teams,  
 so to enable safer and more human sustainable care  
 practices.

with humans in eight double-reading protocols. Inspired  
 by the so-called Kasparov's Laws, we investigate the  
 presence of significant differences among these different  
 processes.

**Keywords** Kasparov's Law · Interaction Protocols ·  
 Double Reading · Collective Intelligence · Hybrid  
 Intelligence

**Results:** We discuss two main findings: groups of hu-  
 mans who perform significantly worse than a state-of-

F. Cabitza  
 Università degli Studi di Milano-Bicocca  
 Viale Sarca 336, 20126, Milano, Italy  
 E-mail: federico.cabitza@unimib.it

A. Campagner  
 IRCCS Istituto Ortopedico Galeazzi, Milan, Italy

L.M. Sconfienza  
 University of Milan, Milan, Italy and  
 and IRCCS Istituto Ortopedico Galeazzi, Milano, Italy

## 1 Introduction

The integration of computational systems endowed with  
 some form of Artificial Intelligence (AI) into medical  
 practices is advocated for several reasons, the main ones  
 being the promises to bring more efficiency (e.g., [19])  
 and effectiveness to those practices. Although efficiency

# AUGMENTAZIONE?

GLI ARTICOLI

SVILUPPO  
& ORGANIZZAZIONE

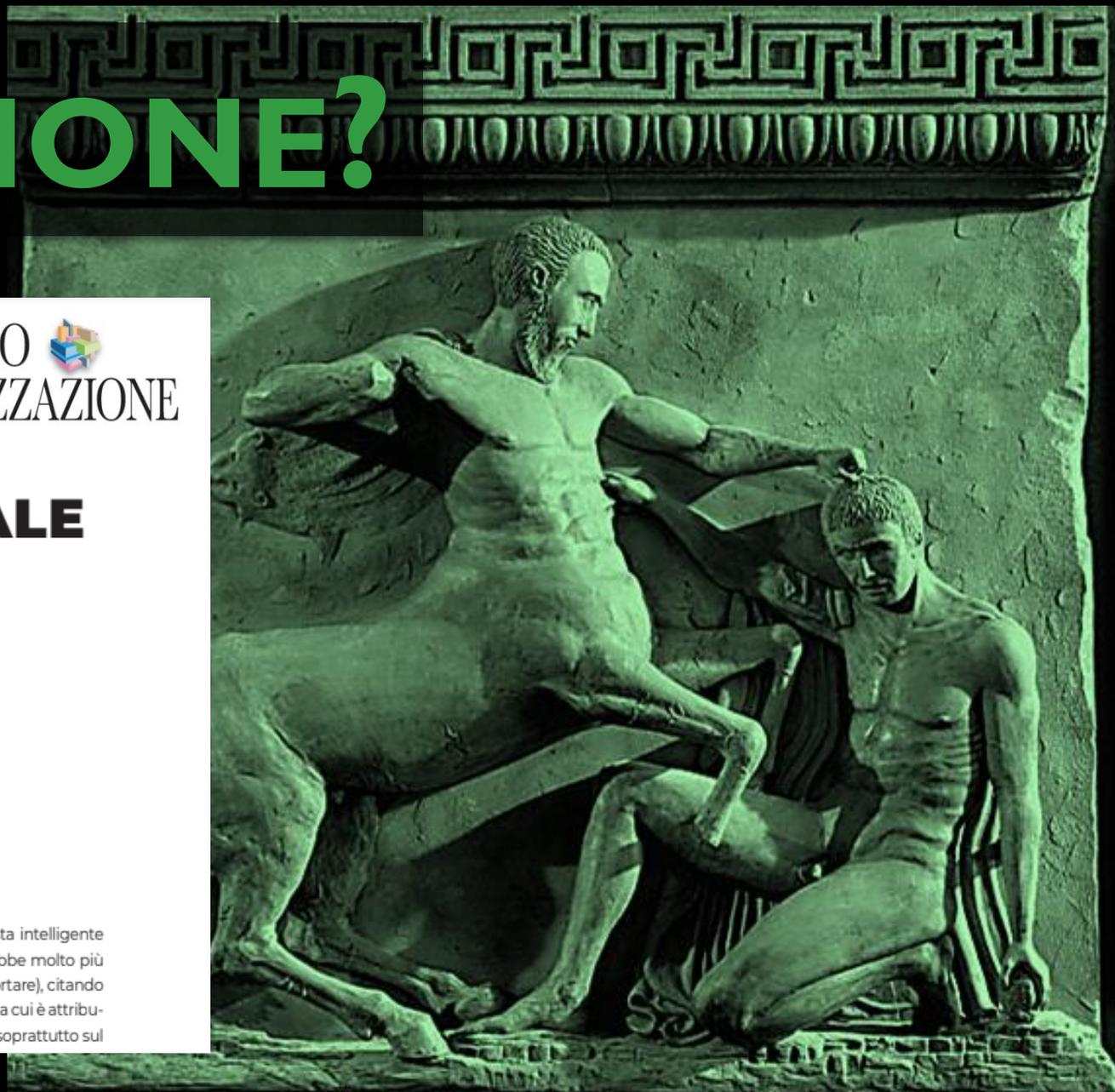
## LA CONVIVENZA TRA INTELLIGENZA ARTIFICIALE E LAVORO

di **Federico Cabitza**

Professore Associato di Interazione Uomo-Macchina e Uomo-Dato presso l'Università degli Studi di Milano-Bicocca  
Consulente Permanente in staff alla Direzione Scientifica dell'IRCCS, Istituto Ortopedico Galeazzi di Milano  
con responsabilità sulla definizione di modelli predittivi basati su Machine learning

**S**istemi informatici che esprimono, come si dice, Intelligenza Artificiale (d'ora in avanti AI, in tributo all'espressione anglosassone Artificial Intelligence, coniata poco più di 60 anni fa negli Stati Uniti) sono sempre più disponibili sul mercato e si diffondono

Di solito evito di parlare di questa intelligente (che avrebbe molto più tempo di qu... portare), citando un noto fisico... a cui è attribuita la battuta... soprattutto sul



# 4 modalità di interazione umano-ai



**HUMAN-IN-COMMAND**



**HUMAN - AI TEAMMATES**



**HUMAN ON THE LOOP**



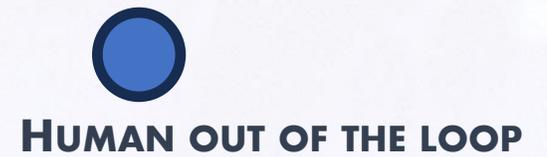
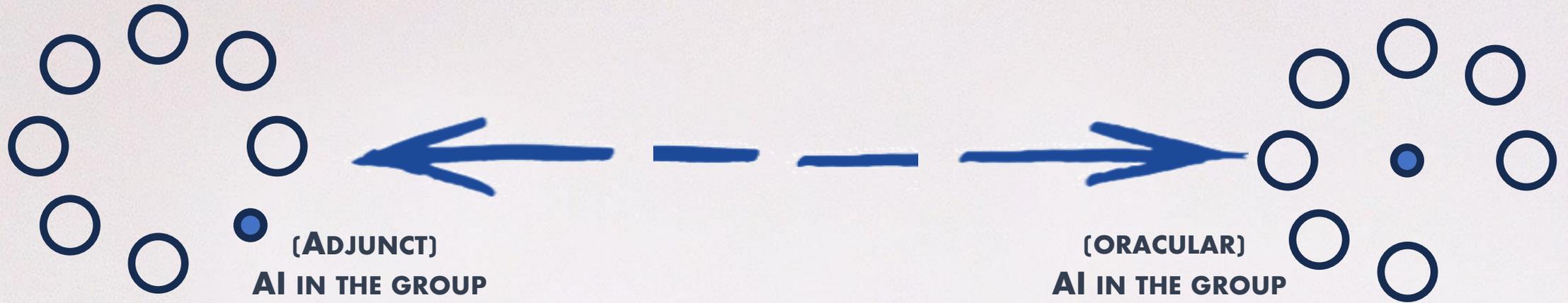
**HUMAN IN THE LOOP**



**HUMAN OUT OF THE LOOP**

GLI ARTICOLI

**LA CONVIVENZA  
TRA INTELLIGENZA ARTIFICIALE  
E LAVORO**

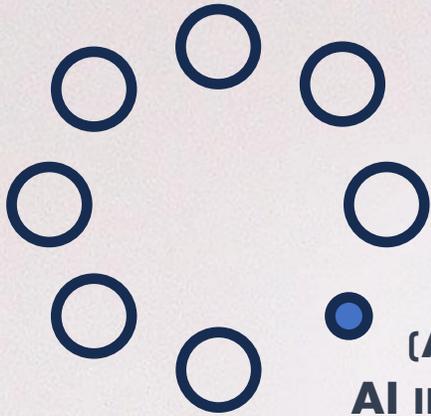
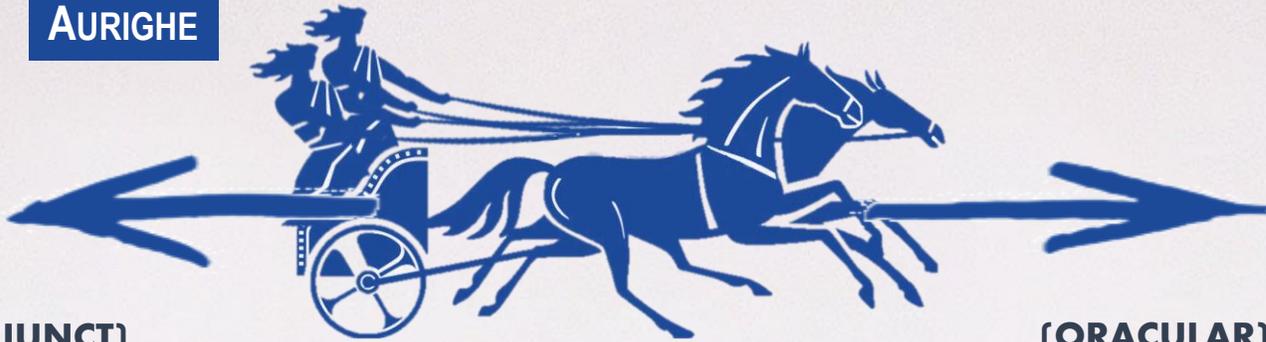


GLI ARTICOLI

**LA CONVIVENZA  
TRA INTELLIGENZA ARTIFICIALE  
E LAVORO**



**AURIGHE**



**[ADJUNCT]  
AI IN THE GROUP**

**AUGURI**



**[ORACULAR]  
AI IN THE GROUP**

**CENTAURI**



**HUMAN-IN-COMMAND**



**HUMAN - AI TEAMMATES**



**HUMAN ON THE LOOP**



**HUMAN IN THE LOOP**



**HUMAN OUT OF THE LOOP**

GLI ARTICOLI  
**LA CONVIVENZA  
TRA INTELLIGENZA ARTIFICIALE  
E LAVORO**





# AGGIUNTA!

L'AI come membro ausiliario, aggiunto ad una squadra di esseri umani che lo apprezzano per le sue qualità (e ne ascoltano il parere), ma ne diffidano anche, in quanto ne riconosce la natura decontestualizzata e priva di intelligenza interpersonale.



# AGGIUNTA!

Un elemento (periferico!) di una «knowledge community» ad alta ridondanza umana, non troppo espressivo e che non comunica molto...

Tra noi e la tecnologia che ci rende i giudizi e le decisioni più semplici, dobbiamo imparare a mantenere la giusta distanza...





**GRAZIE!**



@cabitza



federicocabitza



federicocabitza.net



These slides are not intended nor produced to be made publicly available. However, I share them to a limited readership (those who possess the Web address where the slides are stored) in an effort of disseminating scientific ideas and reflections, with no intended aim of economic gain, and to get feedback and comments on those ideas, which I expresss under a CC-BY 4.0 license.

I took the greatest possible care to identify all image copyright holders correctly. However, if I have omitted to do so in some individual instances, I would be most grateful if these copyright holders would inform me forthwith. It is my policy to immediately remove, upon notification and identification, any specific image displayed on this website for which the copyright holder deems the fair use (see below) cannot be associated. Upon request, I will remove immediately the content and update the content accordingly.

#### FAIR USE NOTICE

These slides may contain copyrighted (©) material the use of which has not always been specifically authorized by the copyright owner. Such material is made available to advance understanding of ecological, political, historical, human rights, economic, artistic expression, democracy, scientific, moral, ethical, and social justice issues, etc. It is believed that this constitutes a 'fair use' of any such copyrighted material as provided for in section 107 of the US Copyright Law. In accordance with Title 17 U.S.C. Section 107, this material is distributed without profit to those who have expressed a prior general interest in receiving similar information for research and educational purposes.

\*\* COPYRIGHT NOTICE\*\* In accordance with Title 17 U.S.C. Se