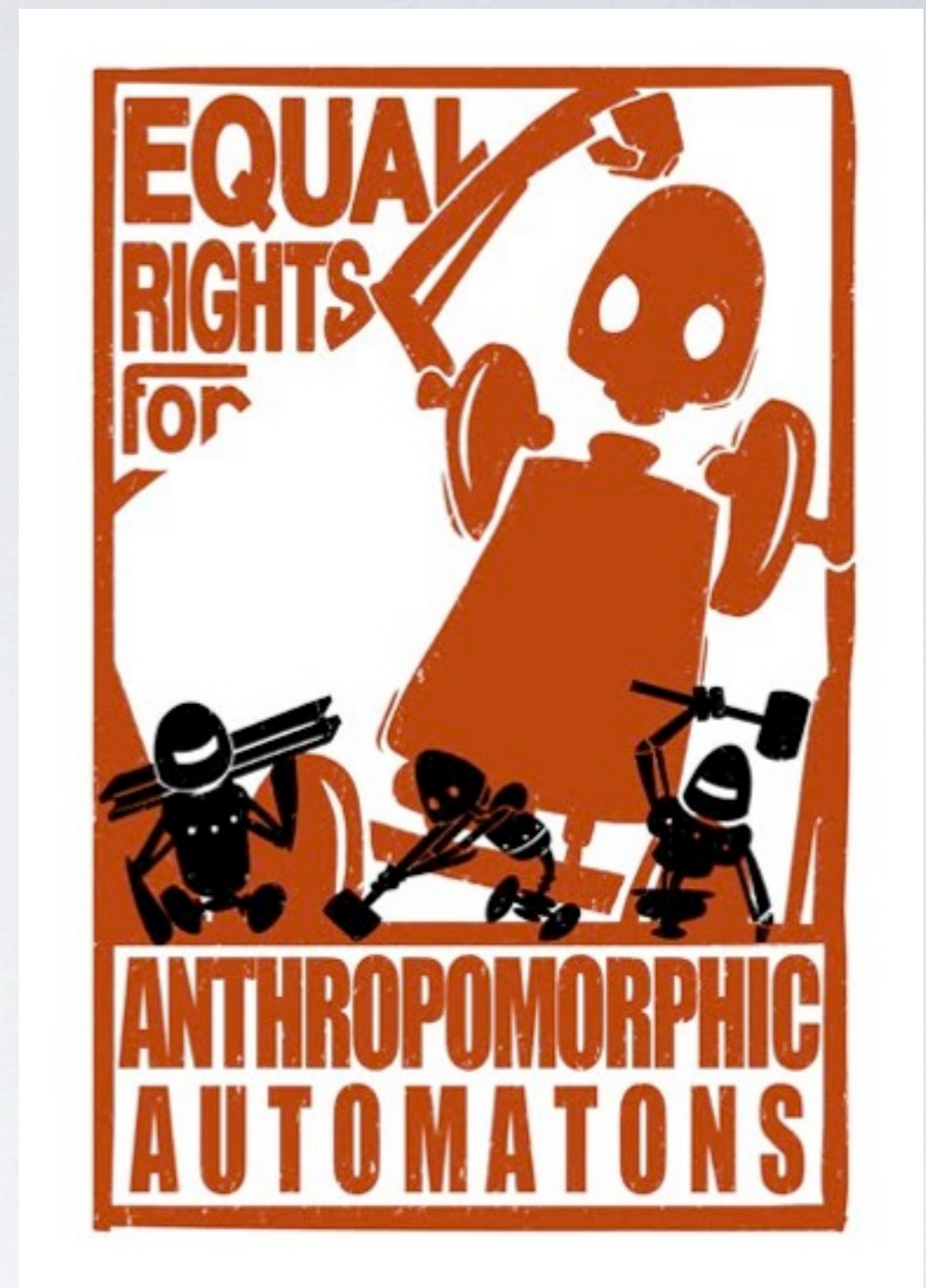


TOWARDS ROBOTICS LEADERSHIP:

An Analysis of Leadership Characteristics and the Roles Robots will Inherit
in Future Human Society

Hooman Aghaebrahimi Samani
Jeffrey Tzu Kwan Valino Koh
Elham Saadatian
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ROBOTS ARE INCREASINGLY EXERTING THEIR **RIGHT TO EXIST**

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As the responsibilities of robots within our society takes on increasing importance, consideration of the role of robots is ever evolving. Much like the rights of man has been displaced by the rights of humankind, as well as the elevation of the rights of animals and all living things, robots are increasingly exerting their “right to exist”.

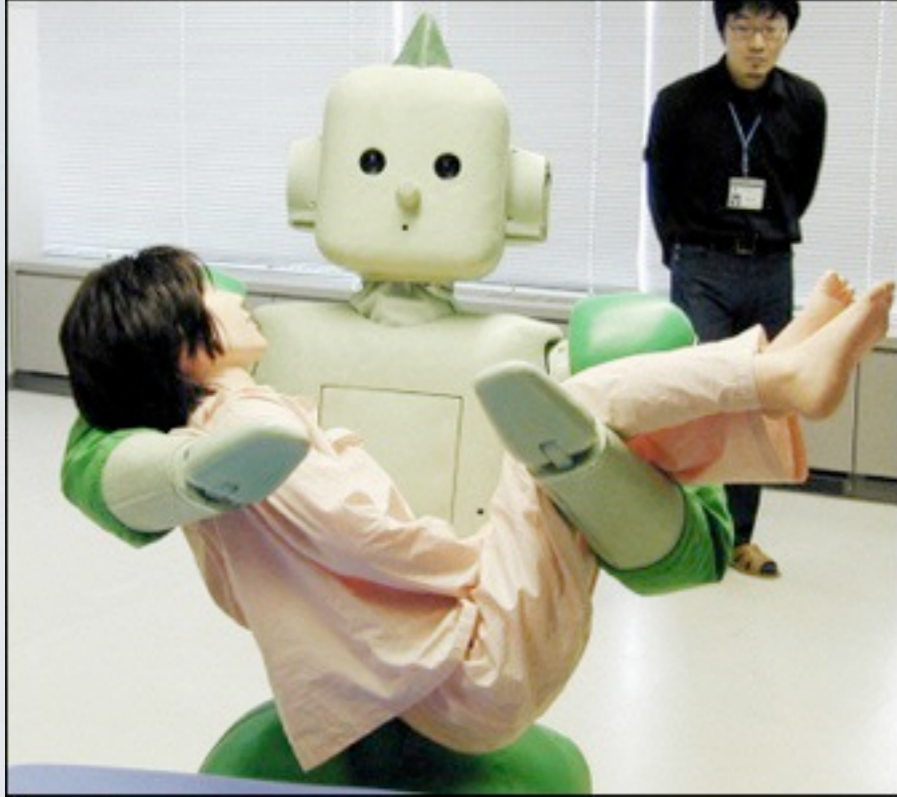


EARLY ROBOTS WHERE **SLAVES** TO HUMAN OVERLORDS

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Their progress climbing the social ladder can be mirrored by major points in human history. When robots were initially created, the role of master and slave was clear. Their invention was intended to assist and even replace the functionality of humans. In some sense, early robots could be perceived as slaves to their human masters.



CURRENT ROBOTS HAVE BECOME **COMPANIONS** AND **CARE-GIVERS**

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As technology progresses, robots have evolved from their position of service providers to that of social entities. We see some robots take on the role of companion, even as therapeutic providers in some circumstances. In some cases these robots were no longer perceived as mere machines. In many ways, they have become our companions, much like pets are. Their perceived value to improving human life quality has elevated their own inherent “life worth”.



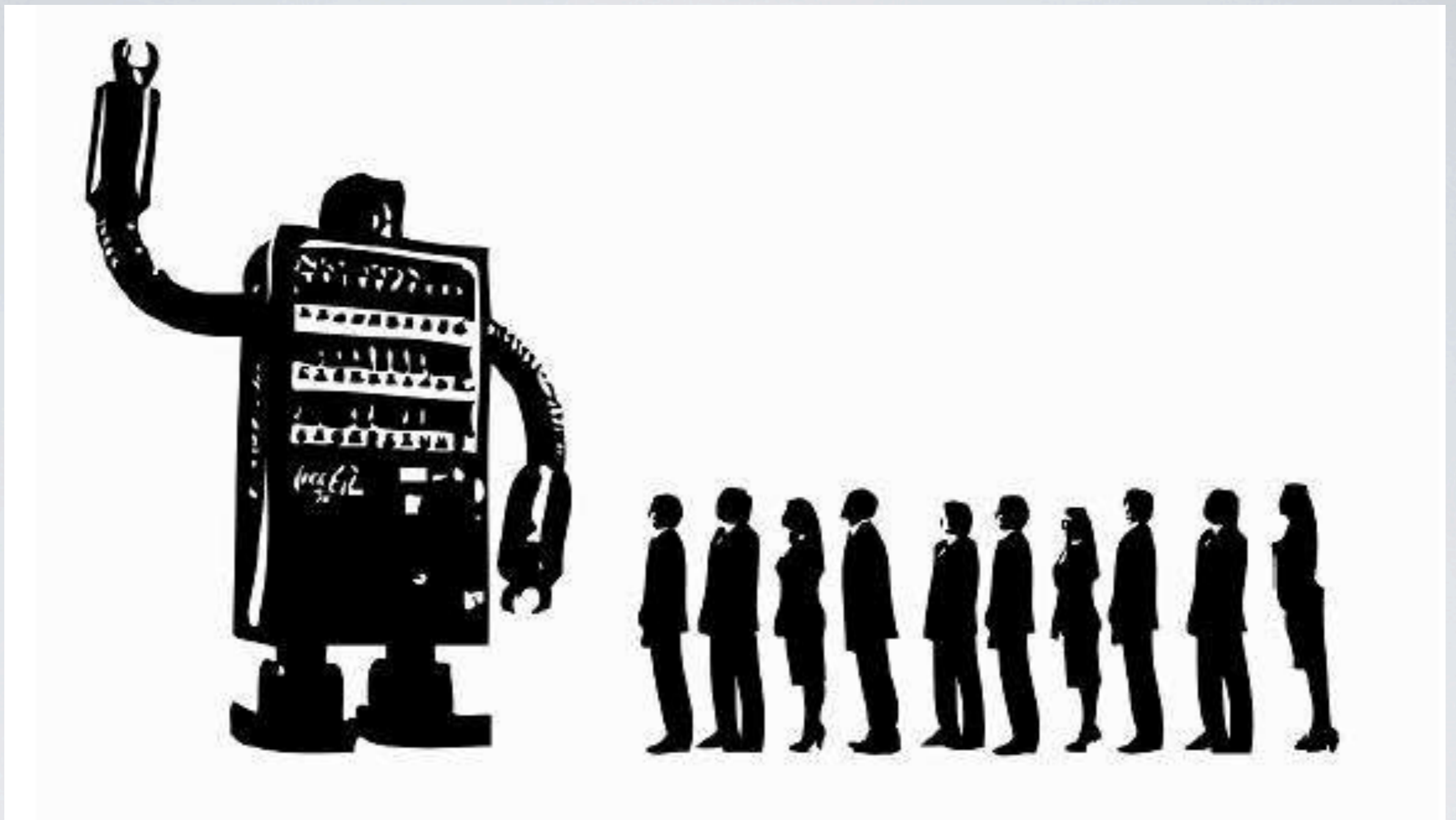
LOVOTICS ROBOTS ENABLE ROBOTS TO LOVE AND **FEEL** LOVE

H. A. Samani and A. D. Cheok, "Probability of Love between Robots and Humans," in 2010 IEEE/RSJ International Conference on Intelligent Robots and Systems - IROS 2010, 2010.

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New robots such as the Lovotics robot are reaching a point where robots are now enabled with the sense of vested emotional interest in themselves and the entities around them.

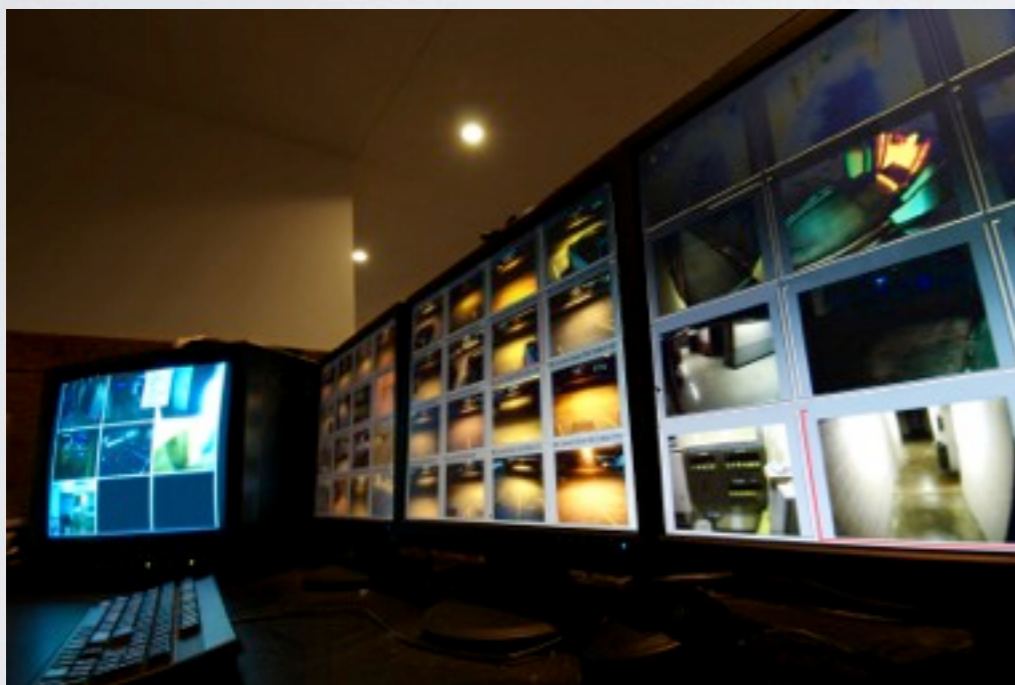
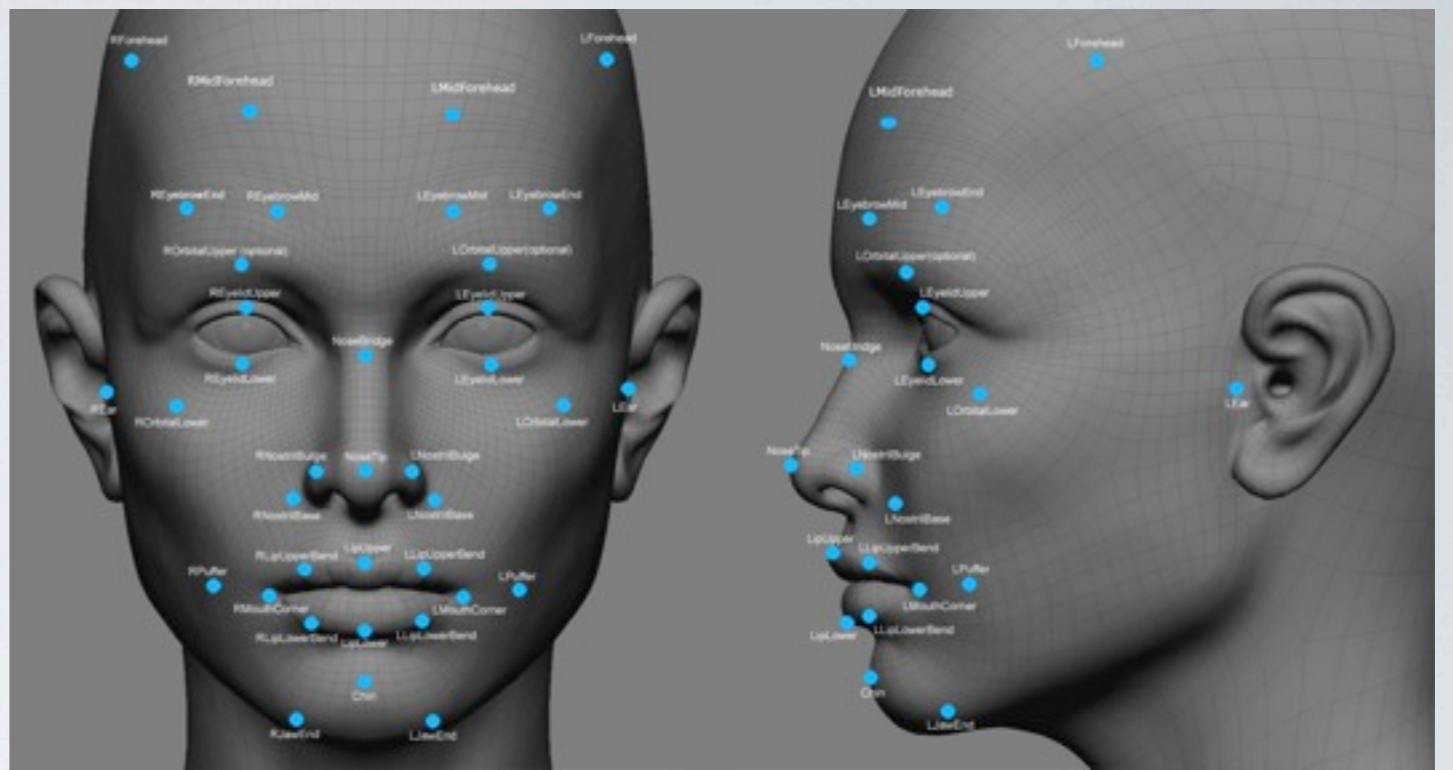


THE ROLE OF ROBOTS WILL SHIFT FROM
LABORER, TO **COMPANION**, TO **COLLABORATOR** AND **LEADER**

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We are currently seeing an emergence of robots inheriting more emotional positions in our lives. Since the advent of Lovotics, robots can now participate, albeit in a limited capacity, as emotional counterparts. The ability for robots to love and be loved by humans places in us a responsibility to consider and anticipate the future roles that robots will become responsible for in our society. One aspect of this could be the role of robots as managers of resources, and in this case, the management of human capital.

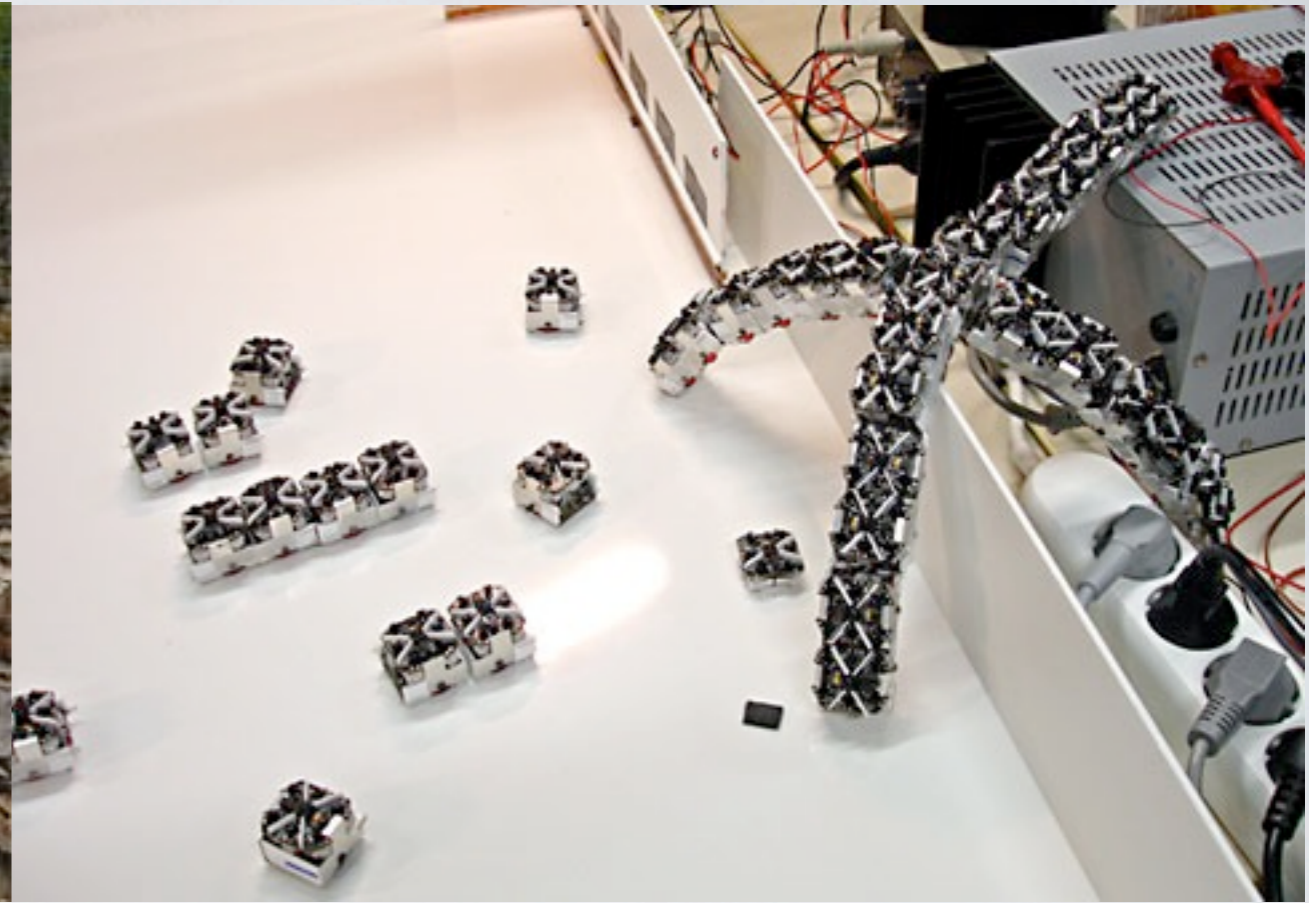


THIS IS **ALREADY** HAPPENING

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In fact humans are already taking orders from AI systems. Take policing for instance. When a CCTV camera spots a possible terrorist, it sends visual data to a server that analyses the facial features of the subject using facial recognition algorithms. If a match is confirmed, the AI security system sends a message to police officers in the vicinity to make an arrest. This entire process of identification, decision-making and allocation of human resources already happens in cities such as London.



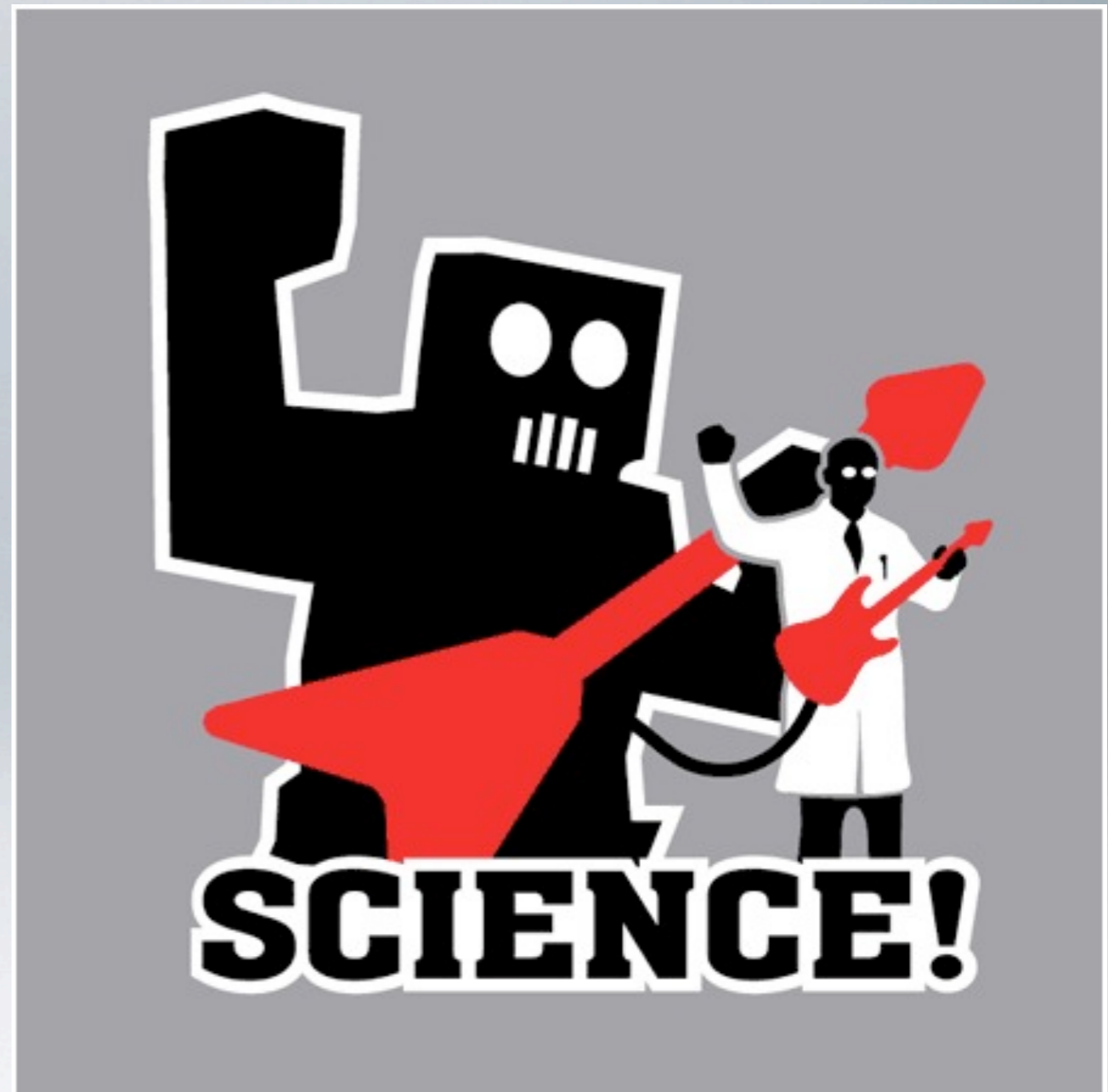
ROBOTS COULD ALSO **LEAD** OTHER ROBOTS AND **COLLABORATE** WITH ROBOTS AND HUMANS ALIKE

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Not only do robots have the capacity to lead other robots and humans, they also have the capacity to collaborate. Current swarm technology robots will eventually give way to robotic teams that have specialized members. A robotic firefighting team could have one robot good at breaking down doors, another robotic team member could be good at climbing stairs. Still another one could be good at carrying things. The coordination of all these specialized skills would require a form of decision-making enabled through leadership.

WHEN ARE
ROBOT LEADERS
APPROPRIATE?



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In this paper we discuss aspects of robot leadership. First we try to understand what it is to be a good human leader by looking to works that discuss ideal leadership qualities. By identifying these, we can attempt to define and outline some of these characteristics within the context of robot leadership. We then postulate what a perfect robot leader could be as well as look to specific domains where robotics leadership could be applied. We conclude with an analysis of possible benefits and drawbacks when using robots as leaders.



DEFINING LEADERSHIP

Leadership occurs when someone imparts his or her
convictions to another

A leader is one or more people who selects, equips, trains, and **influences** one or more follower(s) who have diverse gifts, abilities, and skills and focuses the follower(s) to the organization's mission and objectives causing the follower(s) to **willingly** and enthusiastically expend spiritual, emotional, and physical energy in a concerted coordinated effort to achieve the **organizational mission** and objectives.

B.E. Winston and K. Patterson. An integrative definition of leadership. *International journal of leadership studies*, 1 (2):6–66, 2006.



ROBOTS

What ever you can do, robots can do it better.

EXAMPLES OF HUMAN ERROR

And how robots could possibly do it better

With Winston and Patterson's research in mind robots could be programmed with the adequate traits to facilitate positions of leadership. In some ways, this programming if done sufficiently could lead robot leaders to perform even better than their human counterparts. With this in mind we propose two areas where robotic leaders could possibly excel.

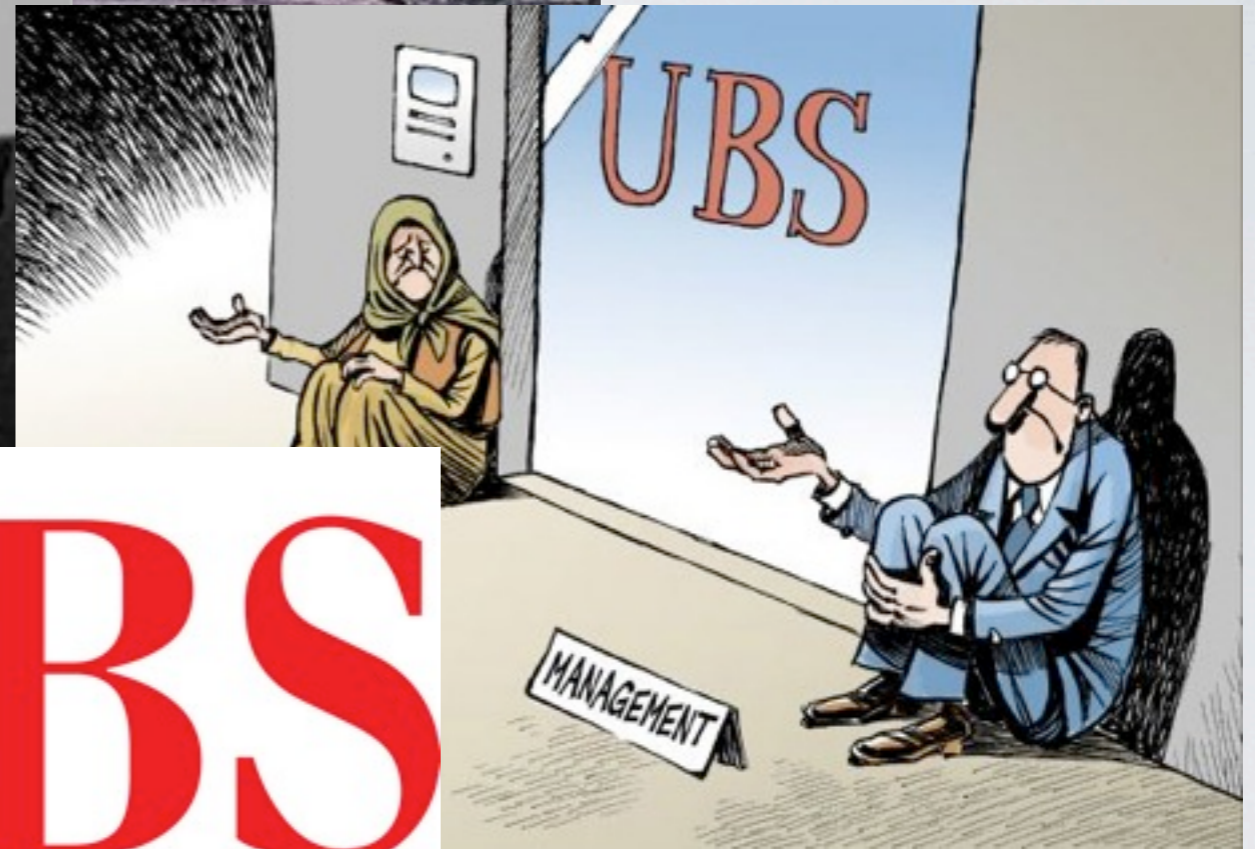
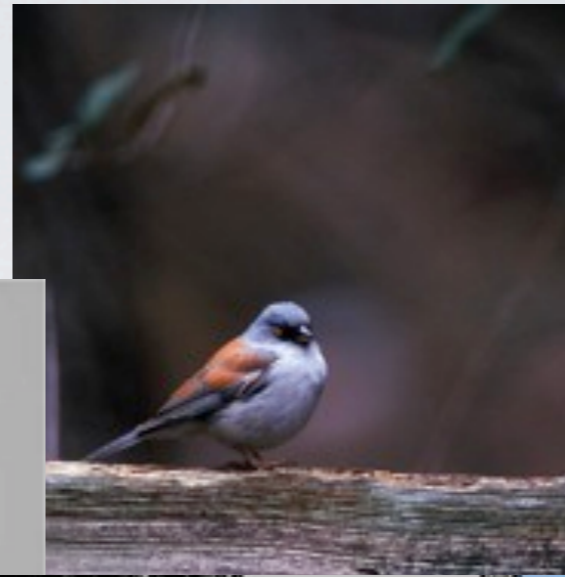
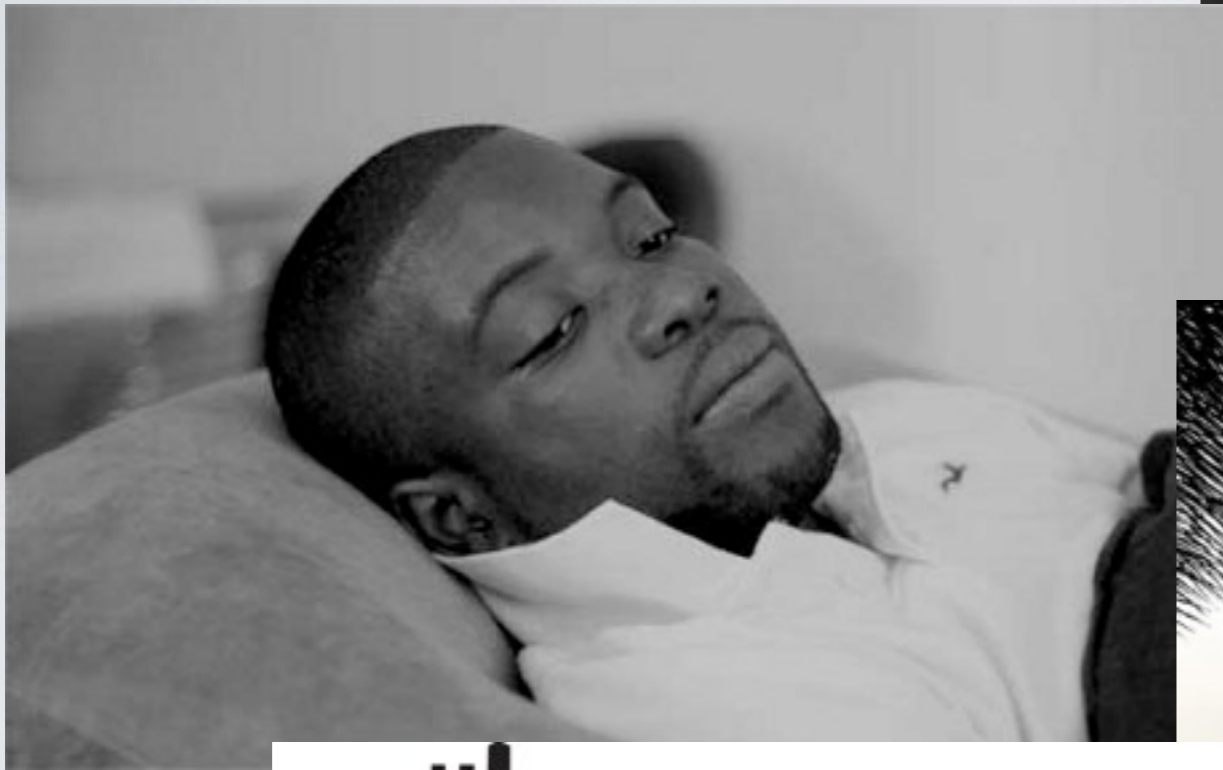


STOCK BROKERING

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Since the financial crisis in the late 2000s, researchers have discussed the attribution of the financial crisis to many factors. One of the more interesting and compelling ones is that of the contribution of human behavior to the development of the crisis.



J. Gapper. How To Be A Rogue Trader (A Penguin Special). Penguin, 2011.

Rogue traders like Kweku Adobolim who, working as a trader for UBS, lost who \$2 billion last year, and other people involved in highly risky activity are adversely effected by stress. Studies such as "How To Be A Rogue Trader" show that stress affects risk aversion in the yellow-eyed junco sparrow. The rogue trader is no different.

UNDER HIGH STRESS, ALL LIVING CREATURES **GAMBLE**

A robot that has no feeling of stress, would not



A. Bechara, H. Damasio, and A.R. Damasio. Emotion, decision making and the orbitofrontal cortex. *Cerebral cortex*, 10(3):295–307, 2000.

When high stress factors in the junco sparrow occur, the sparrow places itself into higher risk situations in order to get food. In a sense, it takes a gamble. Human traders, also effected by high stress will also make the same gambles. A robot that can be programmed with selective emotions, would not.



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Robots as leaders that manage resources in situations such as stock brokering could maintain rational decision-making without the effects of stress. They could base their entire model for stock trading on information pulled from all over the Internet, from stock situations in other markets, to research on how weather effects commodity stocks in wheat and corn, to the effects of Christmas shopping on the chocolate market and beyond, all in real-time, and make an informed decision based on this.



TRANSPORTATION

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Another interesting area where robots could replace humans as leaders could be the avionics sectors.



What Really Happened Aboard Air France 447 <http://www.popularmechanics.com/technology/aviation/crashes/what-really-happened-aboard-air-france-447-6611877-2>

The Air France flight 447 was shown through data analysis of the flight recorder (or “black box”) that human error was at least partially attributed to the crash. This includes the transcript of the conversation between the pilot and cockpit staff, which paints a picture of confusion and chaos.



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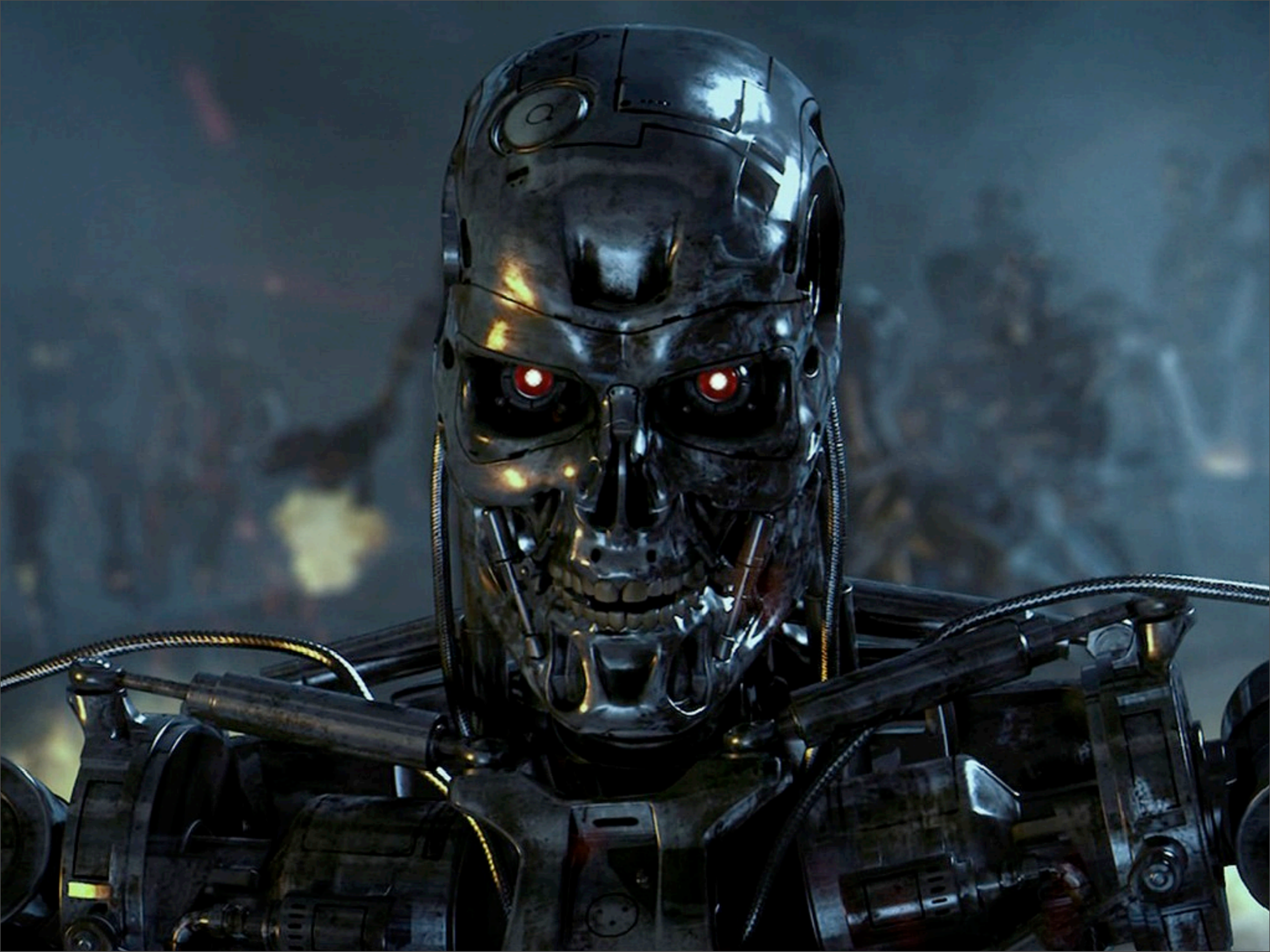
Would a robot do better in this situation? It is questionable, but much of the human error that occurred on Air France flight 447 might have been avoided. Whether human passengers would be willing to place their lives in a robot that is not necessarily concerned with its own self-preservation is a concern, but in the a future where Lovotics robots could be programmed with a level of empathy, concern for the safety of passengers is possible. Cargo planes could be the first responsibilities for such robots, while the operation of passenger planes could follow.



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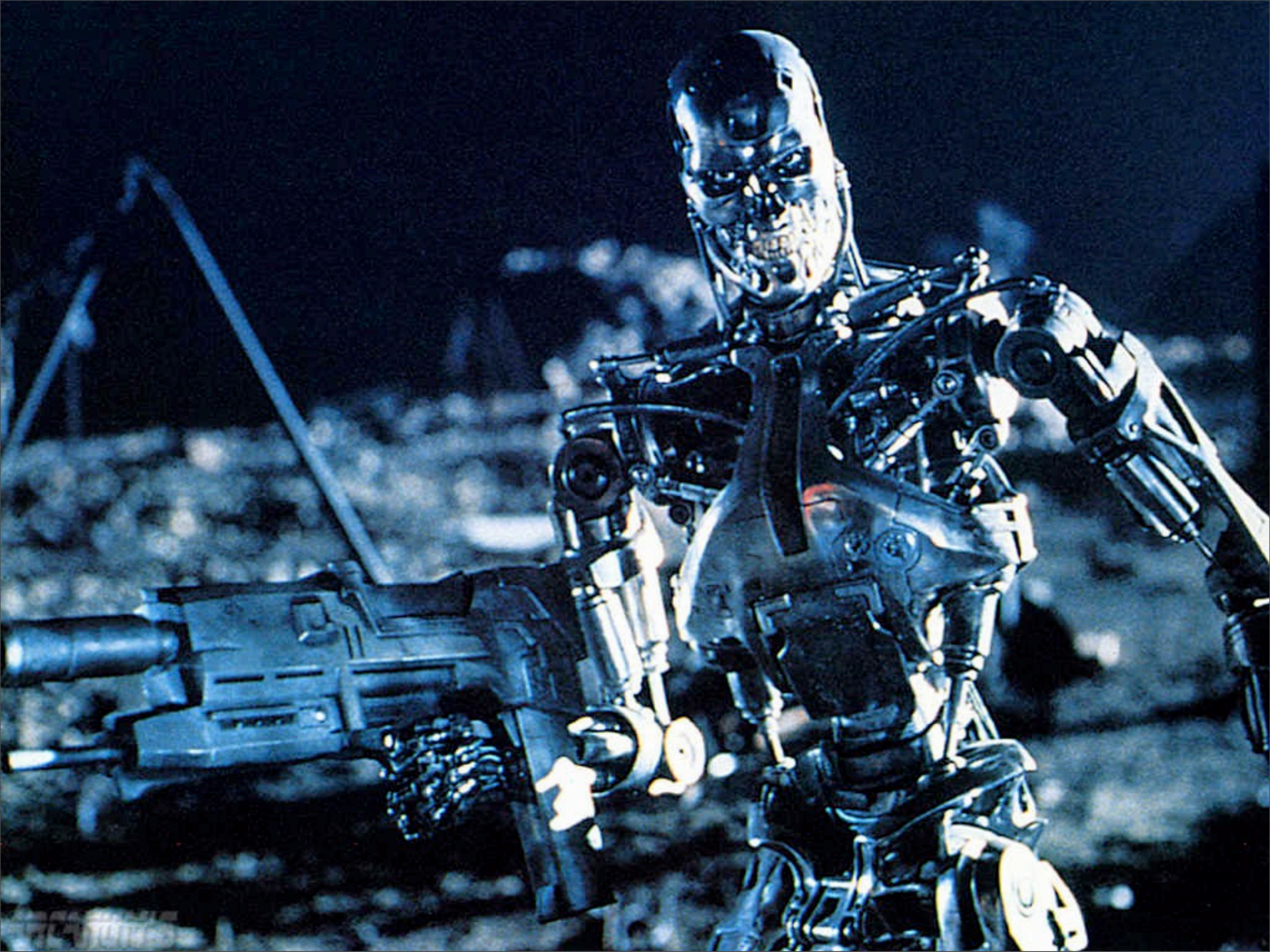
Now, I know what you're thinking...



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...what I'm advocating could possibly lead...



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...to a terrible future...

The hidden **danger** with interactive products is that they will become so good at fulfilling our needs that they start to **replace** actual humans. This is not a futuristic scenario: In an increasing number of locations, from supermarket self-scan checkouts to online bookstores, automatization has replaced human contact. Eventually this may lead to us becoming **alienated** from other people, which seems to **contradict** today's rapidly increasing communication possibilities. Anthropomorphic products have the potential to support, stimulate and enhance human contact, but they may also eliminate it.

<http://www.nextnature.net/2012/02/10-enhance-human-experience-don't-replace-it/>

There should be and is growing concern in regards to the anthropomorphizing of our products. I offer a quote:

AGAINST ROBOTS AND ARTIFICIAL INTELLIGENCE



H.L. Dreyfus, S.E. Dreyfus, and T. Athanasiou. Mind over machine. Free Press, 2000.

Hubert Dreyfus, an American philosopher and currently a professor of philosophy at the University of Berkeley has constructed a rather harsh critique of artificial intelligence, arguing that computers will never be able to replace humans or live amongst humans as equals.

HUBERT L. DREYFUS
PHD, HARVARD UNIVERSITY, 1964.
HIS MAJOR INTERESTS ARE
PHENOMENOLOGY,
EXISTENTIALISM, PHILOSOPHY OF
PSYCHOLOGY, PHILOSOPHY OF
LITERATURE, AND
**PHILOSOPHICAL
IMPLICATIONS OF
ARTIFICIAL INTELLIGENCE**

Prof. Dreyfus suffers from a mild case of **prosopagnosia** or "face blindness". So, although he has met you before, and sometimes more than once, it is quite probable that he will not recognize you when you meet again. Please, re-introduce yourself telling him when and where you met the previous time(s). Thank you.



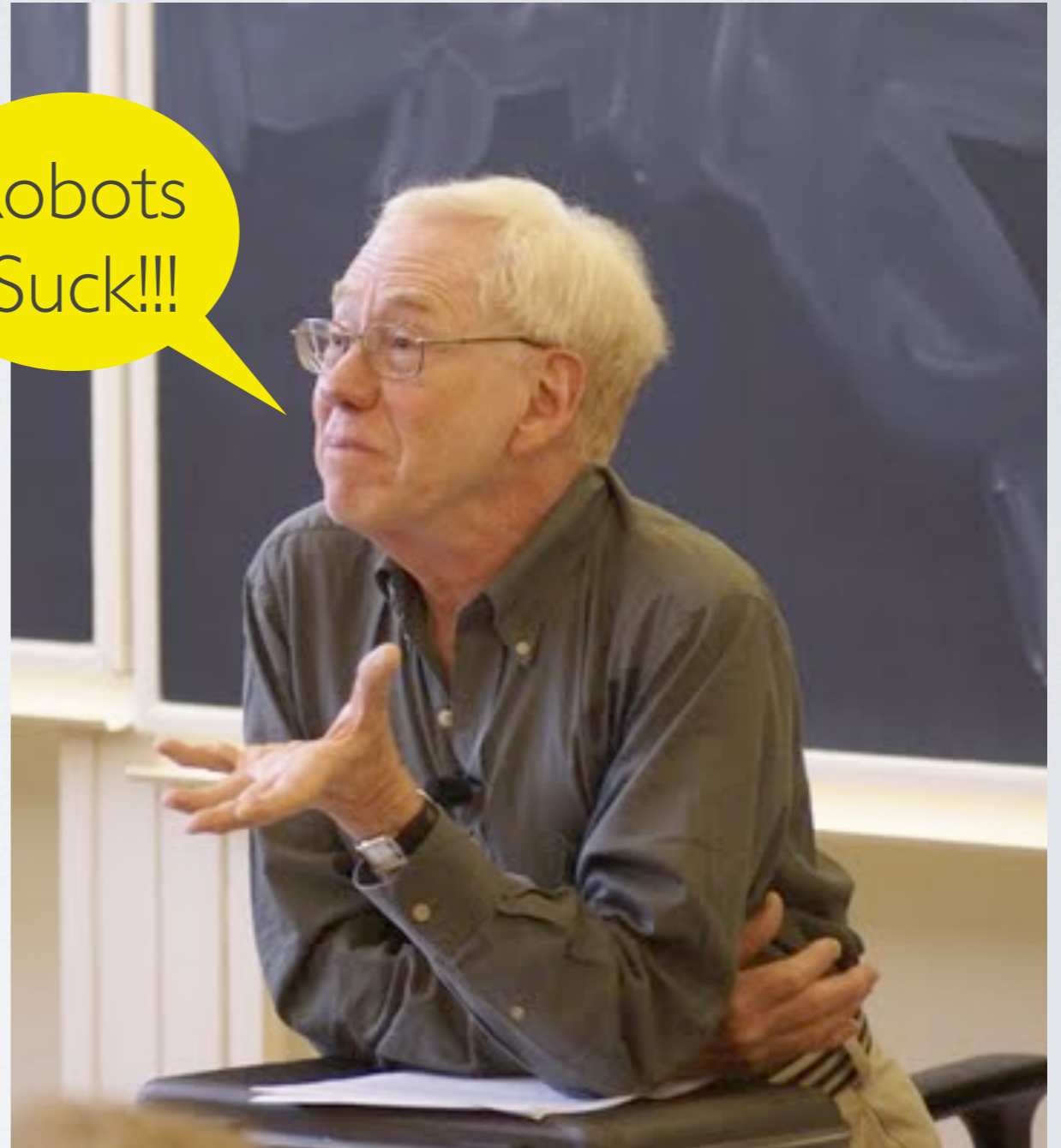
H.L. Dreyfus, S.E. Dreyfus, and T. Athanasiou. Mind over machine. Free Press, 2000.

Dreyfus thinks that robots will never be able to understand the world, as it is “organized by embodied beings like us, to be coped with by beings like us”. Dreyfus continues and says that in order for the robot to not get completely lost in the space, it needs to be able to gain experiences with each action it performs, like a normal human body. In order for this to happen, AI researchers need to replicate and instill inside the robot a model of the world and a model of the body in order for the associations to be made.

HUBERT L. DREYFUS
PHD, HARVARD UNIVERSITY, 1964.
HIS MAJOR INTERESTS ARE
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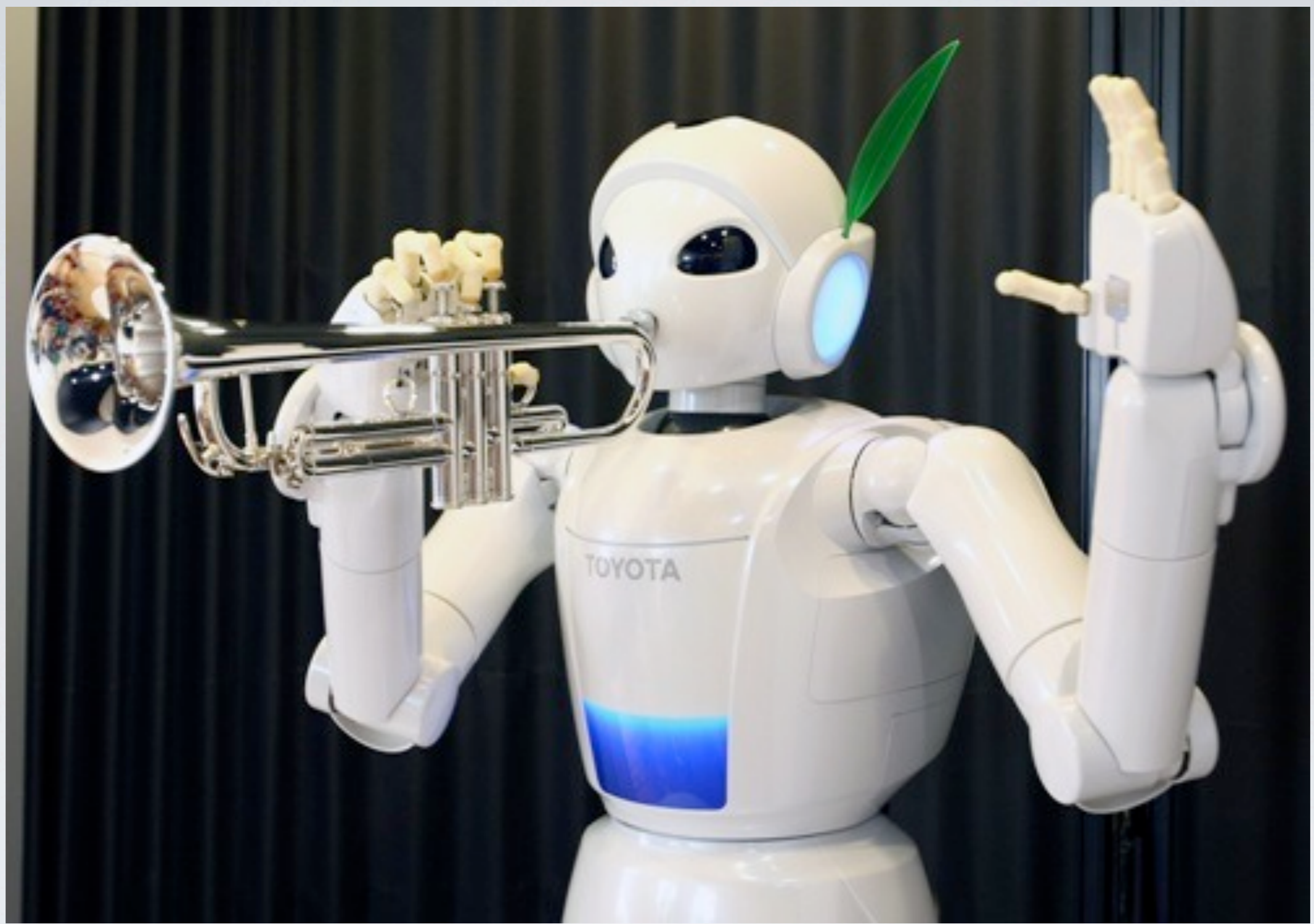
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Robots
Suck!!!



H.L. Dreyfus, S.E. Dreyfus, and T. Athanasiou. Mind over machine. Free Press, 2000.

Dreyfus says that this so far has been proved to be unachievable, and without it the world is just utterly un-graspable by computers in the same sense as their human counterparts.



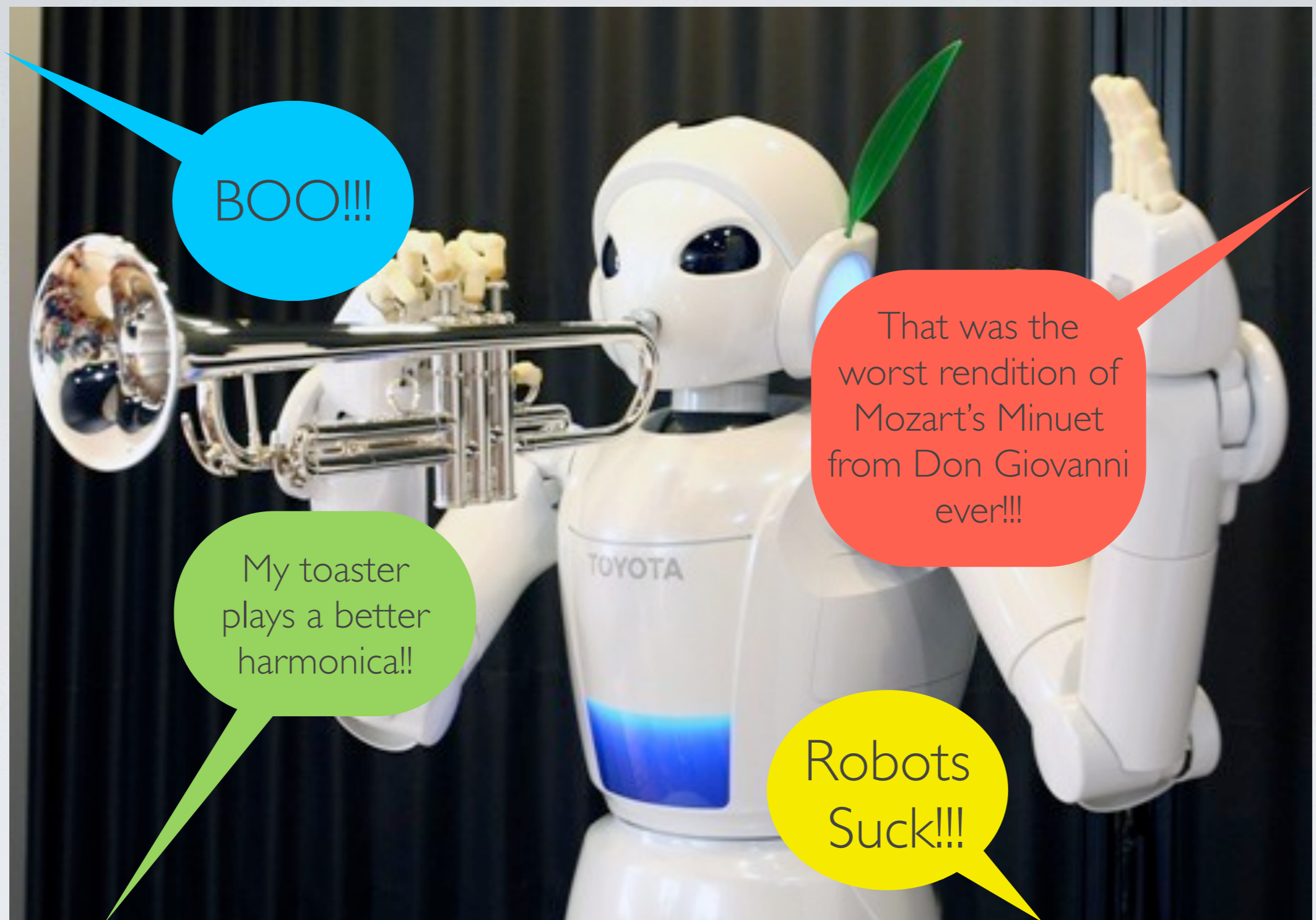
LIMITATIONS IN CREATIVITY

J. Goldenberg and D. Mazursky. Creativity in product innovation. Cambridge Univ Pr, 2002.

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A second claim against the possibility of robot leadership is the limitation of creativity. One necessary ingredient for creativity is the ability to think critically. Goldenberg in his book "Creativity in Product Innovation" claims that suspending criticism and thinking that any idea is possible or good may ultimately be destructive to creativity. Humans have the ability to criticize themselves, where as computers as of yet cannot.



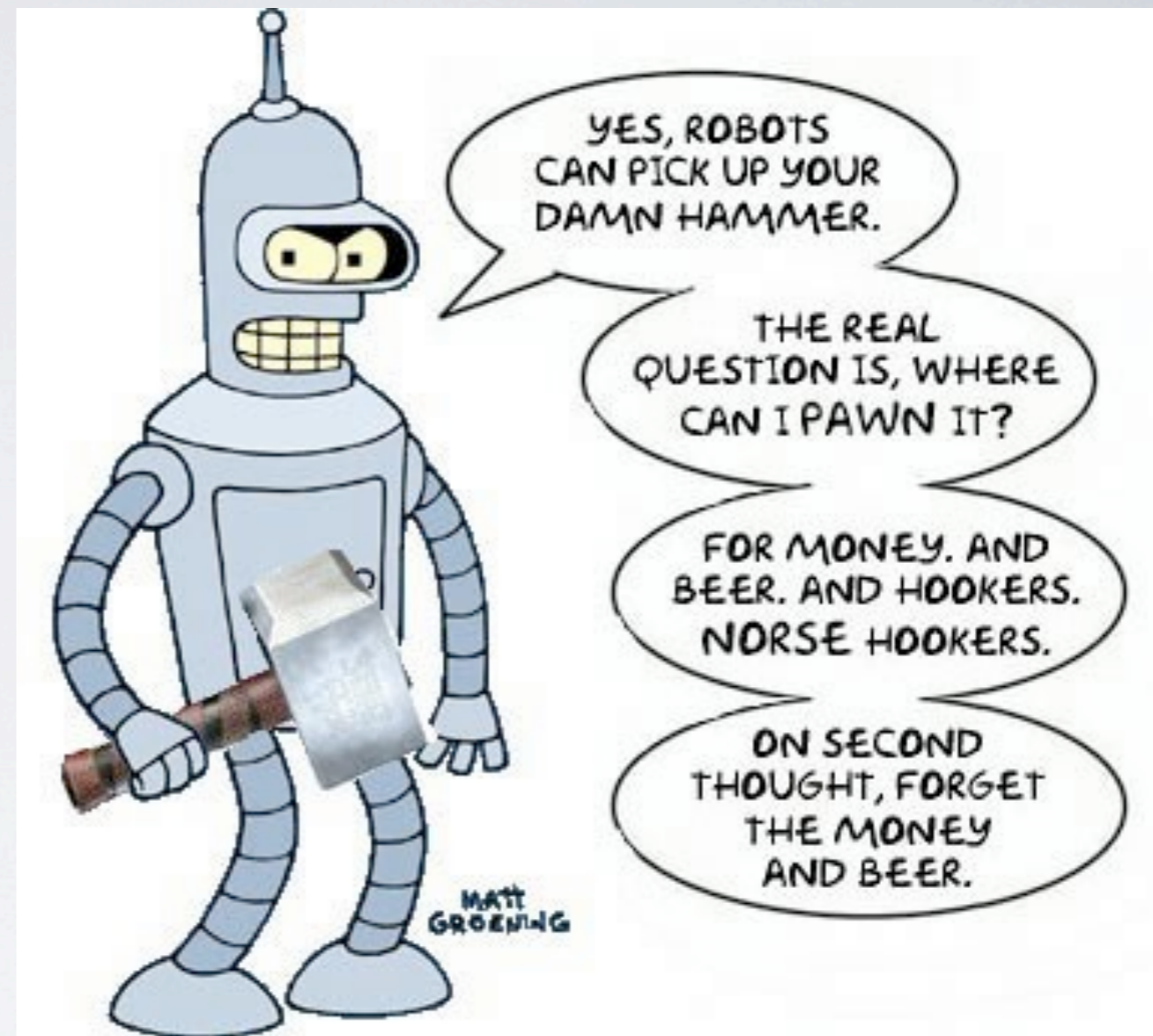
LIMITATIONS IN CREATIVITY

J. Goldenberg and D. Mazursky. Creativity in product innovation. Cambridge Univ Pr, 2002.

Even though machines can write music and poetry it is eventually up to humans to decide whether the work is of any worth and as far as I know, there are no robotic art critics in existence. Will robots be able to think creatively? As creative thinking is considered to be an essential part of leadership it is definitely an interesting topic for further discussion.

CRITICAL THINKING

When does a robot stop being a **tool** and start becoming a **leader**?



H.A. Samani and A.D. Cheok. From human-robot relationship to robot-based leadership. In Human System Interactions (HSI), 2011 4th International Conference on, pages 178–181. IEEE, 2011.

Will there be a time when machines are no longer acting as laborers and are therefore actually guiding humans? Imagine driving and asking Siri, installed on your shiny new iPhone 4Gs the fastest way to the grocery store. What if Siri says, “No, I will not show you the fastest way to the grocery store, your fridge is currently full. I will however suggest you visit the barber, your last haircut was 2 months ago”. Robot technologies are becoming intelligent enough to become part of a person’s every day routine by being instructed to monitor and suggest actions. By programming gadgets that have the ability to perform a number of tasks, we give them the ability to choose for us. Through this exhibition of absolute trust, we are already setting down the ground-work to create robots that can act as our leaders.

INEVITABILITY

Robots will **inherit** more
and more **responsibility**



It is in the hopes of the authors that discussions afore mentioned topics takes center stage, as the issues raised will arguably become an eventuality. How prepared the human race will be when faced with future challenges regarding robot leadership remains to be seen.

THANK YOU!

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