Artificial Intelligence and management: Dr Jekyll or Mr. Hyde?

Jacques M.A. Martin, ESOE
Corresponding author : jma.martin@wanadoo.fr

Claudio Baccarani, University of Verona (Hon.), Italy
claudio.baccarani@univr.it

Abstract :

Artificial Intelligence has become a central topic in the working of society and consequently in management. It is fast pervading all aspects of the management of an organization. This paper first examines the nature of intelligence contrasting Natural Intelligence and Artificial Intelligence. Then, it investigates the benefits Artificial Intelligence can bring to management, what is called here the Dr Jekyll face of AI, and the dangers of AI, what is called here the Mr. Hyde face of AI, in several domains of management. This study shows first that AI remains something polysemic, hence not easy to grasp, and second that, although it can undoubtedly help in management especially in terms of data mining, processing and speed, it is fraught with risks and perils that, if not checked, can deprive humans of their control on management and lead to a deterioration of the social fabric.
Type of paper: conceptual

Keywords: intelligence, natural intelligence, artificial intelligence, AI in management

Introduction:

AI has already been around for several decades – the phrase appeared in the 1950s commonly attributed to John McCarthy of the MIT – but it became a hot issue more recently and it has been developing fast over the last twenty years. If AI is 'googled', the algorithm returns 670 million answers, and if we type 'AI and management', we get 591 million answers. Of course, a huge number of answers are in fact irrelevant. Google is not as intelligent as one might think! But still… Quite recently, probably with a renewed impetus given by the so-called Covid-19 crisis, it came to the forefront both of research and operations with the search for new ways of organizing the life of people and organizations. As a result, it is pervading all walks of life, private or public and, whether we like it or not, it is going to be entrenched in and part and parcel of almost every human activity in the years to come. Like many radical innovations, AI is a double-edged sword. It can bring benefits to society but it can also jeopardize the integrity of human beings.

The purpose of this paper, after a tentative understanding of what AI means, is to investigate in what ways it can enhance human and corporate performance, and to raise awareness about the perils that it can hoard for the business world and society at large. So, is AI a Dr Jekyll or a Mr. Hyde?

In a first part, then, the notion of AI will be examined as different definitions and types of AI can be found with different possible impacts depending on the definition and type chosen. In a second part, the possible and potential benefits of AI will be considered; the Dr Jekyll face of AI. In a third part, the perils that AI may hoard, will be investigated; the Mr. Hyde face of AI.

Part 1: What is AI?

Prima facie 'Artificial Intelligence' is not a limpid concept. For some, it can simply be an oxymoron and then about senseless. We may wonder what Descartes or Spinoza would have thought of such a phrase. For others it can be a 'qualitative leap', with variations, which could drive us into new realms of thinking. In any case, if we want to reflect on the possible impacts of AI, we need to have understanding of what it can mean.

Obviously, if there is 'Artificial intelligence', it implies that there is 'natural intelligence' ('NI'), and that studying AI must be done by contrasting it with 'NI'. This 'NI' (the use of the adjective 'natural' may be strictly speaking inappropriate as 'intelligence' is a blend 'natural' and 'cultural' components that interact), being that of human beings, is consequently also called 'human intelligence', or sometimes 'biological intelligence'. Let us then first examine this 'natural intelligence' which we can equate with 'human intelligence'.

1.1 How can '(human) intelligence' be understood?

The noun 'Intelligence' – as referring to humans - (the word being, significantly, the same in almost all European languages: e.g. *intelligenza* in Italian, *intelligence* in French and English, *inteligencia* in Spanish, *inteligência* in Portuguese, *intelligenz* in German, *intelligentie* in Dutch, *intelligens* in Swedish, интеллект in Russian, *inteligencja* in Polish, etc. – we keep Greek apart, see below) comes from the Latin word 'intelligentia', meaning the action of discerning (i.e. identify and recognize, from Latin *discernere*, *dis*- 'apart' + *cernere* 'to separate') and understanding (i.e. getting the meaning from Old English *understandan*, stand in the midst of). The noun 'intelligentia' is derived from the verb '*intellegere'* made of *inter* + *legere*. 'Legere' means 'gather' (1), 'choose' (2), and subsequently 'read', 'inter' stands for 'between'. 'inter' is derived from the Indo-European root 'in- / nen: inside'. Intelligence, therefore, is going inside, inside what happens and is observed. This 'gathering' can be done through ears or eyes, hence the meaning of 'read' in its figurative sense (Gaffiot). '*Legere'* itself comes from the Greek λέγω, meaning 'to express with words'. To name and express 'intelligence', the Greeks resort to other roots , referring to knowledge. The standard word used is νοῦς (*nous*) first found in Anaxagoras, then used by Aristotle (*Posterior Analytics* II.19) to name a cognitive state enabling us to 'know' the first premises of science. Its various translations, such as "insight", "intuition", "intelligence" show the near impossibility to render Aristotle's meaning of the word (Robin Smith: *Aristotle logic,* 2017, University of Stanford, USA). Aristotle as well as Plato distinguish νοῦς from διάνοια (dianoia), which can be rendered by 'understanding', i.e. 'intelligence' in its human activity of reflection. Plato also distinguishes it from λογιστικόν (logistikon), which is the rational component of the human soul.
For Dante being intelligent is being able to understand, think, judge. In other words, intelligence is the cognitive capacity, the instrumentation, which is available to observe, choose, order, evaluate, act in a given situation, in a given field and in a specific time. The etymology of the word intelligence already reveals its multidimensional character. Drawing on the classifications of Howard Gardner and Daniel Goleman (1993, 2005,2007) we can identify multiple forms of intelligence: logical, mathematical, linguistic, musical, spatial, bodily-kinesthetic,

environmental, existential, emotional and social intelligence. From a managerial point of view, two of these, emotional intelligence and social intelligence are particularly relevant (see below). Knowing where the word comes from and its etymology, we can now consider how intelligence is understood today, as the way it is understood will condition the meaning of the concept of 'artificial intelligence'.

Definitions are many, and substantially vary from one author / researcher to another. There is no room here to examine all the definitions of intelligence that can be found, were it possible to do so. So, let us focus on a quick synthesis. A sort of global definition, though controversial, was attempted in 1994, which describes (human) intelligence as "A very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings—"catching on," "making sense" of things, or "figuring out" what to do" (Mainstream Science on intelligence – *Wall Street Journal* 13/12/1994). Everybody can find their food in this definition. One year later the limits of research on 'intelligence' were clearly stated in a report published by the American Psychological Association, entitled "Intelligence: Knowns and Unknowns" (1995): "Individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought. Although these individual differences can be substantial, they are never entirely consistent: a given person's intellectual performance will vary on different occasions, in different domains, as judged by different criteria. Concepts of "intelligence" are attempts to clarify and organize this complex set of phenomena. Although considerable clarity has been achieved in some areas, no such conceptualization has yet answered all the important questions, and none commands universal assent. Indeed, when two dozen prominent theorists were recently asked to define intelligence, they gave two dozen, somewhat different, definitions." So, it looks like we do not really know what 'intelligence' is. Should we then follow Socrates' dictum? "I know that I am intelligent because I know that I know nothing".

Being in the haze as to what 'natural human intelligence' is, we can anticipate a number of pitfalls when trying to understand the concept of 'artificial intelligence'.

1.2 How can 'Artificial Intelligence' be understood?

Let us start, as done with 'intelligence', with the etymology of the adjective 'artificial'.
'Artificial' comes from the Latin '*artificialis'* derived from the noun '*artificium'*, meaning 'something not natural made by man (skills and labour)'. 'Artificial intelligence' is then an artifact: 'intelligence' created by man, which is indeed the case. But 'intelligence', as seen in the (very) general definition above also involves 'learning'. So, if 'artificial intelligence' is but an artifact, there is no learning. When a craftsman has created a table, the table remains a table. It does not learn anything during its 'useful life', as we say in accounting. However, we are told with the development of AI that robots now are able to 'learn'. Consequently, this ability goes beyond 'artificiality', and 'artificial intelligence' becomes somewhat akin to 'natural intelligence'. Yet, 'natural', which may be better expressed in the phrase 'biological intelligence', implies that the 'being' was born with 'intelligence' (at least with the potential of it, considering that it is developed through interactions with the environment). This will not be the case until robots can reproduce themselves. But this potentiality is already envisaged in the sense that a robot endowed with AI could engender new robots with new enriched forms of AI. Thus, we would have a reproductive and evolutionary system, raising of course the question of

the control of this evolution. Therefore the frontier between 'artificial' and 'natural' is not so clear as one might think at first sight. And it tends to become more fuzzy as AI develops. The time may soon come when a new word is needed to qualify this new type of intelligence: 'natificial' maybe.

Now we can consider the origins of AI and its development and various guises.
We can trace the origins of AI in the 1940s. In 1943, Warren McCulloch and Walter Pitts developed a mathematical model of a biological neuron. At the beginning of 1950, John Von Neumann and Alan Turing were the founding fathers of the computer technology (binary logic). Turing (who has recently been brought back to fame by appearing on one of the Bank of England's banknote) raised the question of the possible intelligence of a machine in an article in 1950 entitled "Computing Machinery and Intelligence". The phrase "AI" is commonly attributed to John McCarthy of MIT. Marvin Minsky of Carnegie-Mellon University defines AI as "the construction of computer programs that engage in tasks that are currently more satisfactorily performed by human beings because they require high-level mental processes such as: perceptual learning, memory organization and critical reasoning." McCarthy and Minsky together with Allen Newell, Herbert Simon and Arthur Samuel were members of the Conference held at Dartmouth College in 1956, which is considered as the founding event of AI. Their view was expressed in a simple, but probably optimistic way, when they stated that 'every aspect of learning or any other feature of intelligence can be so precisely described that a machine can be made to simulate it'. (cf. https://250.dartmouth.edu/highlights/artificial-intelligence-ai-coined-dartmouth).

In the 1970s, the invention of microprocessors permitted the design and development of expert systems.

AI benefited by a new impetus from the 2010s thanks to the development of 'big data' and the increased power of computers capable of more than 1,000 billion operations per second.
The paradigm changed from expert systems, with an inductive approach. Computers can learn through correlation and classification on the basis of a huge quantity of data. (cf. Council of Europe - https://www.coe.int/en/web/artificial-intelligence/history-of-ai - for a short history of AI).

The Encyclopedia Britannica defines AI in this way: "Artificial intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience." AI can be approached from the so-called symbolic ("top-down") angle, or the connectionist ("bottom-up") angle: the former trying to replicate intelligence by analyzing the phenomenon of cognition, disregarding the biological structure of the brain, the latter aiming at using neural networks and apply them to robots. But, according to N. Taleb (2018) this seems a doomed enterprise: "Consider that the human brain has about one hundred billion neurons, and that going from 300 to 301 (the brain of the worm *C elegans*), because of the curse of dimensionality, may double the complexity."

The (broad) definition proposed by McCarthy, Minsky and their colleagues (1956) does not really help to know what AI precisely is. Consequently, how could we transfer or instill, or implant (we do not know which word to use) intelligence into machines? It is interesting to note that the Dartmouth College experts use the word 'simulate', which means that machines would

behave (if the word is appropriate) like (*similis)* 'intelligent human beings' , but then would not be intelligent *in ipsis*. They would have sort of 'psittacistic' intelligence.

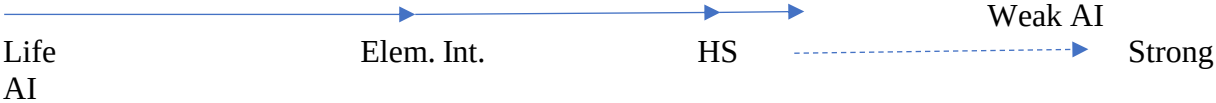
Even if we assume that '*some intelligent behaviour'* is within reach of a machine, we have another challenge to meet. From what psychologists and neurologists tell us, (natural / human) intelligence appears as a *continuous* variable, not a *discrete* one. Do we not say of a person that (s)he is 'little intelligent' (sometimes 'not intelligent', which is abuse!) or 'very intelligent'? But it seems that we never hear that a robot is 'little intelligent' or 'very intelligent'.
To try and meet this challenge, AI specialists distinguish between two levels of AI: one they call 'weak AI' (i.e. performing a narrow tasks) and 'strong AI' (i.e. having the same cognition capacity as human beings) (M. Tegmark – 2015- or S. Russell from a technological point of view, or N. Bostrom from a philosophical one -2011) (see for ex.: Kerns, 2017).

We are already past the first level. AI can perform any narrow task, which does not mean it is a simple one, much better and quicker than any human brain. If 'intelligence' is to gather 'things' and choose among them, to identify and recognize them using ears and eyes (sensors), robots are excellent at doing that, much better than human beings. This capability of AI is already widely used. But it may already have reached some limits. Big data has diminishing returns. Human intelligence operates with a rather limited number of data, and is nevertheless very effective, and efficient (see simply the conundrum of self-driving cars). Research then focuses at present on the second level, which would enable AI to outperform humans in any cognitive situation. Weak AI has been based on the idea of imitation and simulation, Strong AI would mean that it is fully capable of inventiveness and creativity, somewhat 'out of the blue'. We would move then from the Latin '*intelligere'*, past Plato and Aristotle's διάνοια, to reach the νοῦς .

Then, let us look at the evolutionary trajectory of Natural Intelligence and AI.

NI has developed along a continuum with an extremely long period between the appearance of life on earth and elementary forms of intelligence, and a very long period between the appearance of elementary intelligence and the intelligence of primates and eventually *homo sapiens*. Now, where do we put AI?
Until now, AI has been an offspring of NI, in the sense that AI is a creation of NI, and it has come very quickly compared to the first two periods. So, do we consider that AI is on this continuum? We can illustrate it in this way:

Let's place us at the (unknown) moment when strong AI is established. We are faced with two options: 1. AI is an enhancement of NI, consequently we remain on the same paradigm, and AI is under the control of NI; 2. AI enjoys its own autonomous evolution, consequently we are on a different paradigm, and NI loses control of AI. We can illustrate the situation in this way:



Of course we do not know (yet?). Nevertheless, the benefits, but above all the dangers of AI, must be seen in this light.

All this makes the various – dire - consequences of AI on management and society at large quite unpredictable, 'unintelligible' (can intelligence understand intelligence?) (Martin, 2017).

We started by asking ourselves what this 'artificial intelligence', seen through the spectrum of 'natural/human intelligence' could mean. And after a journey along a long and winding road, we may wonder if 'artificial intelligence', using the meaning of 'intelligence' that has been used, albeit with variations, for human intelligence, exists at all. Actually a new name would be needed for AI. The name was probably chosen hastily and inappropriately and this raises a problem as not being able to frame a concept in a precise way can be dangerous, and potential risks could be underestimated.

Our purpose being to focus on the impact of AI on management, we can now consider what effects it can have on management. We will then examine first the already existing and the potential positive effects (Part 2), and second the negative effects (Part 3).

Part 2: AI as Dr Jekyll or the benefits of AI

The present and potential benefits of AI seem to dominate the literature, in a very broad sense, both in general approaches of AI and in management approaches. If we type 'benefits of AI' in Google, we get 268 million results, and if we type 'dangers of AI', we get 9.4 million results. If we restrict the search to 'management', we get 154 million results for 'benefits' and 43.3 results for 'dangers' (note that the number of results returned for 'dangers' is bigger when 'management' is entered, than the one when just 'AI' is entered. Does it tell us something about Google's AI?). Of course, this is an approximative global result as there is a huge number of instances where both 'benefits' and 'dangers' appear. However, the quantitative difference between 'benefits' and 'dangers' is quite significant of a marked penchant for 'benefits'.

We said in the introduction that artificial intelligence is pervading all walks of life and that its presence is increasing every day. Whether it is in the economic sphere or the social sphere, the two being constantly intertwined, in our public lives as well as our private ones, we are under the eyes of artificial intelligence day and night (whether we are awake or sleeping). Orwell's motto could be changed to 'AI is watching you'. AI is already here, there and everywhere; when we use a search engine, when we use the memory of our hard disk – and even more when it is in the 'cloud', when we use a navigator, when we communicate online, when we use a cellular phone (aren't they called 'smart' nowadays? And it is certainly significant that the name chosen by Google for its operating system is *Android*), when we converse with any internet site, even when we use robotized appliances at home (for cleaning or cooking for example). There is, however, something paradoxical in people's relationship with AI. Although only 53% of people according to a survey by the Pew Research Center (2020) think that AI is a 'good thing', everybody today practices the *usus et abusus* of AI. It can be, certainly partly, because many people are not (fully) aware that almost everything they do is watched, analyzed and exploited by AI, and it is certain that AI has become inescapable, whether one likes it or not, unless you are a hermit in a cave in secluded mountains. But still, a drone may hover over you … to collect data about hermits.

The use of Artificial Intelligence in economic and management activities was first mainly developed for industrial operations. This is where robots appeared and became more and more sophisticated over the years. With the industrial revolution in the 19th century and the emergence of mass production, the supply of labour rather quickly became insufficient and consequently production and labour productivity could only be increased by resorting to technological devices. Artificial Intelligence, as we know it today, had a long genesis. It started with mechanization whose aim was to multiply the production capacity of human labour. Then came automation in which we find the beginnings of AI. Its aim was to design machines which

were able to accomplish production tasks independently from human labour. In its wake came robotization for which a certain degree of artificial intelligence is required. 'Intelligent' robots are then able to replace human labour altogether. This means that they have a capacity of 'discerning' (we refer you back to the definition of intelligence) and hence of 'learning'. To illustrate this qualitative jump, we can mention the fact that in the most recent warehouses of the Amazon company inventory is entirely managed by robots that even give orders to the (remaining) human workers. Evidently, this replacement of human workers by robots, and even more their 'submission' to robots raises critical management and social issues (Martin, 2017). With the advances in AI, this trend can but be more marked. With 'weak AI' we can already have production units which can run without human intervention, except for the supervision of a handful of engineers. With 'strong AI' we can have production units which can operate, and develop, without any human intervention.

The more and more extensive use of AI in industrial processes has been labelled 'industry 4.0'. The phrase originates in Germany. '4.0' refers to a fourth industrial revolution. It is interesting to note that the genitors (Henning Kagermann, Wolf-Dieter Lukas and Wolfgang Whalster) of the phrase and what it means state that it is a change of paradigm (*Paradigmenwechsel* – 2011). It is then suggested that with Industry 4.0 we move from 'weak AI' to 'strong AI'. Industry 4.0 is complemented (to use the authors' word) by the Internet of Things (IoT) (*Internet der Dinge*) – called IIoT (Industrial Internet of Things in this particular context) – and the Machine-to-Machine communication (M2M) (*Maschine-zu-Maschine-Kommunikation*). The foundation of the concept is to link the virtual world (*cyber space)* to the physical world in a global network.

The expected benefits of Industry 4.0 lie in an optimization of the supply chain, both intra-firm and between firms, with more effective and efficient production processes and bring great improvements to the classic tryptic of quality management: Cost-Quality-Delivery. Costs can be reduced, quality can be improved (whatever definition of quality we consider) and delivery can be shortened. The 'inventors' of Industry 4.0 also list as a benefit the opportunity that Industry 4.0 offers, to put in place a 'green production' (*grüne Produktion*) and move towards a new production paradigm, which would be a great benefit to tackle the challenge of climate change (Baccarani, Brunetti, Martin, 2021). It should be noted that Kagermann, Lukas and Whalster do not raise the issue of the human resource.

Without going into much detail, the benefits of the use of AI in production management usually mentioned are the following (see for example NIBUSINESSINFO, 2021):

- The automation of product design and production plans (a development of CAD-CAM and FMS -Flexible Manufacturing Systems, and before that of MRP) mainly permitting a reduction in lead times;
- The automation of inventory management with an auto-management of materials, work-in-progress and finished products permitting an 'intelligent' and real-time JIT providing cost reductions;
- The optimization of logistical activities to reduce interface times between the different stages in the logistics chain permitting a reduction in costs;
- The development of predictive maintenance.
- A better knowledge of customer needs and expectations in order to design customized products and thus to move away from a one-product-many customers mode of production (the classic mass Taylorist mode) and aim at a one-product-one-customer mode of production (a sort of return, somewhat ironically, to one-off production and the close relationship that existed between the craftsman and his customer).

It is clear that, up to now, the obvious advantages of AI in the field of production processes are related to standardizable operations. Based on the industrial understanding of this fourth industrial revolution, the application can be extended to non-industrial issues, that is services. Kagermann, Lukas and Whalster themselves mention the Internet of Services (*Internet der Dienste*) which can be integrated into Industry 4.0 and the Internet of Things. As nowadays physical production and service production are so intermingled that it is almost impossible to disentangle them, the integration of the service dimension offers the perspective of a truly global network. This integration means that the customer, in its broadest sense, both external and internal in quality management terms, is part of the system. Then the optimization drive does not only concern the process of physical production but also the relationships between this process and the customer. However, AI meets limits in the case of services as services can only be partially standardized. For example, many activities can be performed effectively and efficiently thanks to AI with ATMs and more generally 'online banking', precisely because these activities can be easily standardized. However, if we think of the bank credit service for the financing of a start-up, we see how AI can help in the collection, processing and management of information, but the evaluation of the validity of the idea is left to the interaction between the bank manager and potential neo -business owner.

Services, unlike industrial activities, are produced at the time of sale, therefore, normally, in the presence of the customer, who becomes the central part of the production process. The customer, in this sense, is defined as 'prosumer'. So, by their nature, services can only be partially pre-designed and must always provide for the possibility of changing what is predefined.

From that point, we can consider production situations where the core is pure service, which does not mean that there are no tangible elements – there always are – but that the tangible elements are present to support the effectiveness of the service. Services have multiple facets and are distinguished by the intensity of the relationship between customer and business operator. The dominant component of the system is then the relationship between the 'service offeror' (the supplier to use a classic word) and the 'service seeker' (the customer to use a classic word). If most of the gas, water and electricity distribution services, to take some examples, make the reduction in the personal interaction possible thanks to AI, this is not possible for activities such as health and training services which are characterized by high degrees of interaction. Even activities like catering and hospitality are quite ambivalent. There can be hotels without any human personnel (there are such establishments operating in Singapore for example), there can be robots making pizza, but the recipe is predefined by a human person. And what about the satisfaction (or non-satisfaction!) of a customer who only deals with robots (Martin, 2014: *Robot*: *bạn hay thù?* Journal of Business, HCM, Vietnam)

The impact of Artificial Intelligence on activities with a strong social component such as health, education and research or Human Resource Management is trickier to approach and loaded with pitfalls. As we have seen, AI, in its present state, is excellent at dealing with situations using 'hard data' as is the case in most industrial activities. But the situation is significantly different when we have to deal with 'soft data' and we shift from a 'machine-to-machine' relationship to a 'machine-to-human' one. The question raised is that of the capability of AI to take into account the psychological aspects of the relationship, and consequently not only to be able to understand the feelings and emotions of women and men, but to be able to react to them, which means that AI must be able to have feelings and emotions too. And these feelings and emotions must interact with those of human beings and constantly adapt to them.

The relations between Artificial Intelligence and activities where the psychological dimension is a key, and sometimes *the* key, for the achievement of the result expected, raise the question of other types of intelligence that have been labelled ‘emotional intelligence’ and ‘social intelligence’.
‘Emotional intelligence’ can be broadly defined as “the capability of individuals to recognize their own emotions and those of others, discern between different feelings and label them appropriately, use emotional information to guide thinking and behavior, and adjust emotions to adapt to environments” (Coleman, 2008). Mayer JD, Salovey P and Caruso DR (2004) give the following definition: « the ability to monitor one's own and other people's emotions, to discriminate between different emotions and label them appropriately, and to use emotional information to guide thinking and behavior”. The term was popularized by Daniel Goleman (1995) who lists the following characteristics for emotional intelligence: self-awareness, self-regulation, motivation, empathy, social skills.

‘Social intelligence’ is related to ‘emotional intelligence’ (Daniel Goleman, 2006). According to Goleman, social intelligence is made up of ‘social awareness and social facility’. Nicholas Humphrey argues that humans are more defined by ‘social intelligence’ rather than ‘quantitative intelligence’ (1992).

Knowing that AI excels at ‘quantitative intelligence’, more than humans in many respects, the limit of AI, in its present state of development, might be the lack of emotional and social intelligence. As neuro-historians tell us that this type of intelligence has developed over thousands and thousands of years, from the point of view of AI, we can raise the question of whether the shift from ‘weak AI’ to ‘strong AI’ could lead to a similar evolution, and in an extremely shorter period of time.

We can consider the case of health care, of which we can ascertain *a priori* that the ‘human dimension’ is paramount. It is not our purpose here to carry out an in-depth examination of the possible uses of AI in health care, but to try and make out the rationale in the relations between AI and health care.
In the case of healthcare, AI can certainly bring countless advantages in terms of speeding up, gathering and processing information, as well as with telemedicine partially experimented in this pandemic phase by Covid 19. But the strength of personal interaction in terms of emotional and social intelligence in the phases of investigation or surgery and formulation of the diagnosis leave little room for the use of forms of AI.

Let us base ourselves on two statements about the benefits of AI for health care.
Nadimpalli (2017) for example tells us that “One of the benefits [of AI] is that it has increased the level of performance of physicians at hospital facilities. The situation acts in the interest of patients who are regarded as customers. The hospital staff can use computer systems specially developed to identify patients who are most at risk. Such systems can precisely analyze the specific physiologic problems that various patients found at the hospital could be having and provide proper information about the patient who requires quick action.”

This simply means, so to say, that AI can help physicians in carrying out their diagnostic and make more focused and quick decisions as to the treatment to administer to the patients. This benefit of AI does not extend to the treatment itself to be administered. The decision remains in the hands, both *stricto sensu* and metaphorically, of the physician. And the author makes no mention of what happens during the administration of the treatment when emotional and social intelligence come into play and play a major role.

The author also finds benefits for pharmaceutical companies and pharmacologists: "artificial intelligence has been used to analyze the vast amount of molecular information that relates to drug candidates to determine the general effects that it would have upon them. In such a way, it would have the opportunity of ensuring they have the ability to identify the general implications of the specific drugs they put in the market." Here again, the benefit of AI lies in the processing of big data. It is not AI which decides to put a drug in the market or not.

We can take as another example what Darrell M. West and John R. Allen of the Brookings Institute tell us (*How AI is transforming the world*, 2018): "AI tools are helping designers improve **computational** sophistication in health care. For example, Merantix is a German company that applies deep learning to medical issues. It has an application in medical imaging that "detects lymph nodes in the human body in Computer Tomography (CT) images. According to its developers, the key is labeling the nodes and identifying small lesions or growths that could be problematic. (…) What deep learning can do in this situation is train computers on data sets to learn what a normal-looking versus an irregular-appearing lymph node is. After doing that through imaging exercises and honing the accuracy of the labeling, radiological imaging **specialists** can apply this knowledge to actual patients and determine the extent to which someone is at risk of cancerous lymph nodes."

We underline 'computational' and 'specialists' to show that the way they state benefits of AI in health care is similar to Nadimpalli's. AI is faster, more accurate and cheaper than men to identify possible malign nodes. AI computes and computes. But specialists apply to actual patients. Here again the decision is not made by AI but by physicians. And there is not a word about what happens afterwards.

In a rather extensive review of the literature on AI and health care, Cavallone and Palumbo (2020) show that the above approach is the dominant one (examples of benefits: planning and allocation of available resources, more effective and widespread control of administrative and clinical information, personalized medicine, patients' medical history can be shared safely amongst health care institutions, anticipate the patients' health conditions, supports the process of patient empowerment). Except maybe for the last one, we see that the benefits concern organizational matters and do not touch upon issues that involve emotional and social intelligence. Is it because AI is not yet capable to make medical decisions and take charge of a patient from A to Z? AI seems to be advanced enough to be able to do that, at least in relatively simple medical conditions. Or does it mean that health professionals at large are reluctant to let AI take charge because they are aware that, if they let AI loose, they would lose control, and because more or less consciously they *feel* that the emotional and social dimension is missing.

Another area where the human dimension is paramount, is education and research. Obviously Artificial Intelligence can help in this domain too, and the present Covid-19 crisis, with an extensive use of distance learning and e-learning platforms, has shown that teaching activities would not be possible without the assistance of some degree of AI.
In the field of teaching, AI has undoubtedly a great utility if considered in terms of complementarity in the teacher-student interaction. But this interaction can hardly be replaced by a machine or a robot, as it requires to also understand silences and various forms of non-verbal communication which, by their nature, take on different meanings from subject to subject.
Here again our purpose is not to investigate in any detail the part that AI can play in education but to see what AI can bring to education and what general benefits learners can derive from it.

In a report of the European Union (2018) written by Tuomi and Ilkka, entitled "The Impact of Artificial Intelligence on Learning, Teaching, and Education", which can be considered as an 'official' view of the issue, the authors point to the following main points.
First, we will skip the help AI can bring to perform administrative tasks with which teachers at all levels are too often overwhelmed and that have nothing to do with education.
In the teaching process proper, AI can generate automatic tests and assessments, making student work more easily and quickly checked, and suppressing teacher bias. This has already been used for years, without the need for AI, for exams based on MCQs. AI can certainly bring improvements, but we may wonder if it can be effective for tasks involving a big number of qualitative parameters for evaluation such as a dissertation on literature or philosophy. Ask an AI system to assess Aristotle's work (or any other philosopher's work) and see what comes out of it.
More interestingly, as it implies taking into account – at least partly – the emotional and social dimension, the authors state that AI could 'diagnose student attention, emotion, and conversation dynamics in computer-supported learning environments (…) in an attempt to generate optimal groups for collaborative learning tasks, and to recognize patterns that predict student drop-out.' But they add that 'to do this effectively, **large datasets** (*we underline*) are needed for training the systems.' And this again is where there is the rub.
Another institutional source, the OECD, seems to be quite optimistic about the benefits of AI for education: "many more educational applications are still to come that will help make teaching and learning more effective and more equitable" (Van Damme, 2020, oecdeedutoday.com). The author states that "the implications for future curriculum development are possibly huge. It makes no sense to design education systems that educate learners to do what computers and robots can do infinitely better." AI is seen as an adjuvant making the activity of educating more effective. But it does not perform the activity in itself and achieve the goals of education, precisely because the social dimension of education is (still) beyond the reach of AI, and may be so for a very long time, maybe for ever: "Activities such as ethical decision-making, the passing of legal judgments by judges, the diagnosis of a medical doctor, the esthetical appreciation of an artist, or the pedagogical relationship between the teacher and the student, they can be informed by algorithms and machine learning, but the human element will remain."

These points of view are largely corroborated by studies of the literature on AI and education (Chen, Chen, Lin, 2020). AI offers a variety of tools (we use this word on purpose) which assist and help educators in their job. These tools, like in the case of health care, are fundamentally constructed on data-crunching. To put it in trivial terms, it is not the hammer that drives the nail into the wood, it is the hand that holds the hammer. And it seems a very long way till AI will be intelligent enough, if it ever will, to perform all the roles of a human teacher. And when this happens, maybe human students will also have disappeared. Robots will teach robots…
The case of research can be seen as even more symptomatic of this sound barrier that AI cannot break when we operate in a realm of intelligence which is not, at least predominantly, quantitative.
Research is an educational process, but which is not transitive (teacher-student/teacher-student…) but reflexive (researcher-researcher) even if several researchers can work together on a particular project. Consequently, what has been said about the relations between AI and (teacher-student) education is in a way exacerbated. AI can be of great help for data mining, for data crunching of course, for data processing and the speed at which collecting and analyzing information and studies can be done. But ideas, hypotheses on which research is developed do not come out of the mass of information available today. On the contrary, they could be impeded and buried by it. Willingly or unwillingly, we have moved towards a 'standardization' of papers

that leaves no or little room for ideas 'out of the box'. Then, where is invention, that is something that comes (*in-venire*) out of the blue? Human intelligence has this capacity of *thinking the unthinkable*. Can, could AI have it? It seems that all the definitions and roads followed by AI lead to an impasse in that respect. Could AI invent the elevator or the helicopter as Da Vinci did? Immensely more difficult than designing a rocket to go to Mars… However, we should keep in mind this statement of Arthur C. Clarke: "if an elderly and illustrious scientist says that something is possible he is almost certainly right, but if he says that it is impossible he is most likely wrong".

We can end this part by looking at an activity more narrowly centred on management: Human Resource Management, where self-evidently the human dimension is key to it.

About all sources dealing with AI and HRM list the same possible applications. AI can be used in the management of human resources for the main following activities (for ex. O'Connor, 2020; Nicastro, 2020; Yawalkar, 2019):
The first and most obvious application of AI concerns the automation of administrative tasks. Many employees just perform routine repetitive tasks with little value added that can be better and of course more rapidly done by (a relatively limited) AI.
The second application, which is already practiced by a number of companies and organizations concerns recruitment and onboarding with the automated analysis of CVs, application letters, references and even the holding of interviews.
The third one, which requires a more elaborate AI, concerns the mobility of employees and is based on the collection and processing of data from and on employees to monitor (re)training, build on experience, benchmark performance, respond to employee expectations (for ex: promotion, career planning, compensation) and ensure retention of the most performing employees.
The benefits of the use of AI in the management of human resources are of the same nature as in the other fields considered. AI brings speed, better accuracy, helps to reduce bias, permits more proactivity and customization. However, here again, the approach is essentially based on quantitative elements and the emotional and social dimensions of intelligence are almost totally ignored, which can be witnessed with the introduction of the digitalization of processes and its overturning of the relationships between young people, digital natives, and people with medium seniority. Is it a repressed confession that AI cannot (as yet?) do that?
HRM is typically a two-way type of management. It is not only concerned with the HR policies of the organization, but it also implies the participation, involvement and commitment of the employees, in a constant interaction between the top management and the employees. It is then interesting to have an idea of how employees feel about being managed, at least partly, by AI and how they react to it.
Studies do not seem to agree on this matter. Not only do we find opposite results, but we also find significant differences between countries and cultures.
A study like the one carried out by C. Bertallee of Oracle (2019) gives a positive (with variations) image of AI among employees. About half of the people surveyed (in 2019) use some sort of AI in their work. India (78%) and China (77%) lead the way. Countries like France (32%) and Japan (29%) are far behind. 65 % of workers are happy to work with robot co-workers. Men view AI more positively than women (32% vs 23%). And "64 percent of people would trust a robot more than their manager and 82% of people think robots can do things better than their managers!" But we are not quite sure if it is out of love for robots or mere mistrust of managers.

Peter Buell Hirsch basing himself on a review of the literature (2019, *Tinker, Taylor, Soldier, Spy,* Journal of strategic management) reports a less optimistic view: "the use of these technologies is viewed with suspicion if not outright alarm by employees."

In the 'Internet der Dienste', like in industrial activities AI can undoubtedly bring a number of benefits, which are by and large of a similar nature, and globally improve the effectiveness and efficiency of management, but is limited in its reach, up to now, by its very nature.

As Artificial Intelligence has penetrated the collective mind of people, it can be of interest to close this part with the reflection of AI in cinematographic works.
For a very long time already, cinematographic works have dealt, directly or indirectly, with AI (e.g. *Metropolis* by Fritz Lang, 1927). It may be significant that the huge majority of these films tend to emphasize the downsides of AI rather than the positive ones (see Part 3), with the exception Wall-E (Andrew Stanton, 2008), Robot and Frank (Jake Schreier, 2012) and some parts of Star Wars (Stephen Spielberg). This is in stark contrast with 'experts' and technicians who are inclined to enhance the advantages of AI and minimize possible risks.
We must bear in mind that art aims at disrupting the brain and anticipate the future. We will look then in the last part at the Mr. Hyde's face of AI which could well be part of our future, together with the magnificent promises of technocrats.

Part 3: AI as Mr. Hyde or the perils of AI

In the second part of the paper we have seen that Artificial Intelligence can bring a sizeable number of benefits to management both in hard activities (industry) and soft ones (services). However, even the fiercest supporters of AI express a number of caveats. We should not have a blind faith in the blessings of AI.

AI can indeed by be a Dr Jekyll. But when we flip the coin, a darker face appears, that of Mr. Hyde. So, the moment has come to explore the perils that AI can hoard for men.

When looking at the perils or dangers of AI, these are generally labelled 'risks' or 'fears'. There may be a more or less conscious will on the part of the authors to minimize the dangers of AI. As we have seen, the big majority of studies put forward the benefits of AI, so, though not ignoring possible negative effects, authors prefer to speak of risks just like a financier will speak of the risk of an investment or a portfolio but will never say that they are 'dangerous', and even less 'lethal'. Otherwise it would be like committing suicide. A risk is a probability (and *stricto sensu* it can be the probability of a negative as well as a positive effect, and this how the word is used in quality management for example). But in the case of AI, and in common language, risk means a possible negative effect.

To approach this notion of risk, but we prefer to use the words dangers and perils as these negative effects could indeed severely jeopardize social relationships, and ultimately the very existence of society as it has been understood for millennia.

To approach this question of the dangers linked to AI, we can start by basing ourselves on the views of Tegmark (futureoflife.org, accessed 06-2021).

Tegmark lists a number of what he calls 'myths' about AI.

Let us focus on the ones we find most relevant to our purpose:

- ‘AI turning evil and conscious’, a worry that he rephrases ‘AI turning competent’ raising the issue of the alignment of human goals and of AI’s goals (an issue we will examine a little further down),
- ‘Robots are the main concern’, rephrased a ‘misaligned intelligence’ (this is linked to the above)
- ‘AI can’t control humans’, he states that ‘intelligence enables control’ (implying that AI could control humans),
- ‘Machines can’t have goals’, he states that in fact some machines already have goals (e.g. ‘intelligent weapons’. We know that a lot of research and work are carried out about ‘virtual armies’)

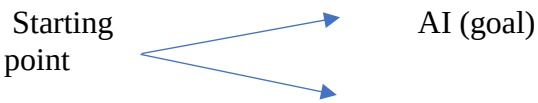
We could summarize Tegmark’s approach in this way: the fundamental danger of AI, to whatever field it is applied, is that the ‘logic’ of AI could clash with the logic of humans. This logic is supported by some ethical assumptions, which could be different between AI and humans, leading to an ethical conflict between AI and humans. With the same goal set, AI and humans would use different means to attain this goal, basing themselves on different ethical outlooks. And, if we really have ‘superintelligent’ robots capable of generating their own knowledge, there is the risk that humans lose control of AI.

This discrepancy and potential conflict between AI’s and humans’ way of doing things has been theorized as consequentialism versus deontology about goal reaching.

Why do we use ‘intelligence’? Quite simply, we use it to ‘do something’, whether this ‘something’ is tangible or intangible. In other words we use intelligence to reach some goal or objective, whether we are a human or a robot. Now, if we take a strongly intelligent robot purely intent on reaching the objective, which is what we use them for first (particularly in the field of management), to increase effectiveness and efficiency, the robot (AI) will use each and every means to achieve it, following the (human) say: “the end justifies the means”, whether the means used are ‘good’ or ‘bad’, in human eyes of course, as the super-intelligent robot does not care if it is ‘good’ or ‘bad’ (Bostrom, Yudkowski, 2011); and should it do it, its conception of ‘good’ and ‘bad’ would be different from humans’. Till now AI has just done things, without ‘feeling’ anything about what it is doing, nor reflecting about what it is doing, but with strong AI, this can become possible. Natural Intelligence (man) will aim at achieving the objective by pondering the means used to reach it. Are they good or bad, acceptable or not? Natural intelligence (NI) will do that on the basis of ethical values. This raises two questions about the development of AI (from weak to strong). The first one is: can we inculcate ethical values in AI? As these values are culture bound, we can anticipate that it is an extremely difficult task, maybe not so much technically as qualitatively, because such an operation implies a qualitative jump. The second question is: can AI develop itself qualitative aspects as NI has done?

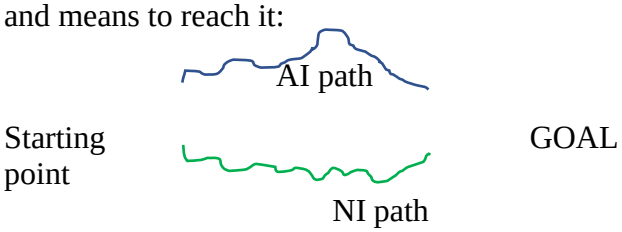
Humans will strive towards the goal by way of ‘deontology’, asking themselves the question: . ‘Is the way I am doing something is right (i.e. moral). AI will act upon the concept of ‘consequentialism’, putting the emphasis on the outcome, which is akin to classical utilitarianism (Sapolski, 2018).

Consequently, we do have the danger that there is a misalignment of goals between AI and NI (Tegmark, 2015):



NI (goal)

AI will set a goal based on absolute effectiveness, disregarding the side effects. NI's goal setting will be a compromise mitigating effectiveness by taking into account side effects (on a deontological basis).
Even if we consider the same goal for AI and NI, there lies a danger in the use of different ways and means to reach it:



The AI path will be 'a-ethical', direct, maximizing efficiency and speed while the NI path will be 'ethical' (with resort to 'emotional intelligence' and 'social 'intelligence') and by its nature less efficient and fast.

We can take a simple and common example in management to illustrate these two ways of 'thinking' and acting: the goal set is cut costs.

AI operated on purely goal oriented actions. Everybody and everything MUST comply with whatever means are used to achieve the goal (absolute effectiveness), ignoring, in this case HR and governance principles issues. NI, because of its ethical concerns, would act in an opposite way. The means used to achieve the goal (relative effectiveness) MUST comply with the ethics the managers of the organization believe in.

Imagine that both AI and NI share the same diagnostic: labour costs are to high. AI will decide to lay off as many people as needed to cut labour costs and hit the target, and may even physically suppress people ('vaporize' to use Orwell's word in *1984* for 'eliminating dissidents', we find the same 'method' in Huxley's *Brave New World*). NI will try and find a compromise between the target (meaning revising it) and the laying-off of people.
So, in the end we find ourselves in a situation where we have both a misalignment of goals and a conflict between the paths followed to reach the goal(s).

When the managers of the organization realize that AI has decided to 'vaporize' a number of employees, they decide to pull the plug of AI. But remember that we are now fully at the stage of 'strong AI', so, the super-intelligent robot will sneer at the managers and 'NO, YOU CAN'T'…

Such a situation leads us back to Asimov's laws about robots (1942-1950). Let's recall them:
First Law: A robot may not injure a human being or, through inaction, allow a human being to come to harm.
Second Law: A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
Third Law: A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Interestingly the second law gives some autonomous decision-making power to robots allowing them to disobey men when the latter's decisions jeopardize human integrity. We know that human beings are capable of making unethical decisions. If robots are not to obey these decisions, it implies that they know these decisions are unethical, meaning that they move

toward deontological action. This autonomous decision-making power is confirmed by the third law giving robots the 'right' to defend themselves against humans. However, there may be some sort of logical flaw, at least some fuzziness, between the articulation of these laws. How would the robot decide if an 'order' is 'harmful'? What if the 'protection of its own existence' requires 'harming' human beings? How are 'harm' and 'protection' to be evaluated?

At one stage or another we are confronted with the question of ethics (Liang et al., 2021; Bostrom, Yudkowski, 2011).
In this light, the benefits of AI need to be revisited. Is AI all benefits in the economic and business world?

We can look again at the benefits considered in the second part and envisage how AI could be derailed.

From a general point view we can say that the greatest danger of AI lies in its creeping penetration into everyday life, which generates an uncritical acquisition of these processes that distances the vision of possible damage by virtue of the advantages that are obtained in the short term. Take the case of the development of social networks and the internet which, alongside their undoubted advantages, are creating immeasurable social damage in terms of lack of human dialogue between people and development of superficial knowledge, with the result of weakening the strength of relationships by creating easy conditions of enslavement to distorted and false messages based on an increasing spread of ignorance among people.
Perhaps many young people would have difficulty in doing an arithmetical division by hand and 'thanks to' the navigator could confuse the location of Naples and Venice due to increasing degrees of dependence on machines.

With reference to economic activities, the risks as well as the benefits are spread across the different assets.

In industrial activities, where it is easier to replace people with machines, there is the risk of creating a large number of unemployed people who, beyond the possible political solutions to the problem, raises the question for society of it being possible, or not, to be happy without work (cf. Primo Levi, *La chiave a stella*).
From another point of view, AI with its algorithms puts in place a type of organization of production in which we see a return to assembly lines and the relative risks so well highlighted by Charlie Chaplin in the film *Modern times*.
This aspect is also seen in some logistical activities such as the people doing home deliveries.
Indeed, these aspects highlight a general risk of AI, which is that it is used mainly for the benefit of choices aimed at maximizing profit and therefore for the advantages of a small minority of people.

In the field of healthcare, the development of a strong AI brings with it the danger of reaching the condition of diagnostic delegation to the robot-machine, when even with the multiplicity of data known and processed by the same, doctors know well that there is no case exactly the same as an other and this variety can only emerge from a close dialogue between doctor and patient conducted on the basis of specialist knowledge, but also on the basis of attitudes guided by emotional and psychological intelligence.

In the field of education AI present many risks as well as many advantages. These include the possibility of carrying out online school activities during the pandemic and the consequent

lockdown. The risk that this brings with it lies in the fact that the value of face-to-face teaching is confused with the value of distance learning; thinking of continuing in this way even after the pandemic can but have deleterious results in terms of learning and the ability to relate to students. Tests conducted on middle and high school students in Italy have shown the drop in learning recorded in the period of distance learning, as well as the increase in the school dropout rate. Even if there is the emergence of a demand from large groups of university students to continue with distance learning, even out of the pandemic period, for organizational convenience and not for need or opportunity, the use of the technology moves more and more from a support function towards a centrality that undermines the centrality of the teacher.

Research is not free either from some risks that strong AI brings with it. Research is by its very nature the field of questioning and creative reflection. These aspects risk appearing distorted in a world that evaluates products not for their novelty but for their continuity with the existing, which is proven by the stringent reference to existing literature. A literature that algorithms today allow to "read on behalf of" the researcher who frequently cites works never read and collected with machines. Machines that in this path "will soon write the papers directly" on the basis of some key words that the researcher will select, thus suppressing creativity, which is no longer sought after by a world of standardized evaluations aimed at certification. Perhaps the machines will come to think even thoughts that have not yet been thought, as Stanislaw Jerzy Lec said.

In HRM, algorithms are now used to escape the empathic problems of communication, in case of dismissals for example, by informing people via email or even via whatsapp, which clearly indicates the type of 'ethics' that underlies certain decision-making processes.

In a nutshell, we could say that the development of AI presents the general risk of inverting the relationship between men and AI. The present purpose of the use of AI is to assist men in their actions by enhancing their cognitive capabilities. It is not in the design of men to be replaced by AI 'beings'. But we have seen that when reach the stage of 'strong AI' and superintelligence, the design of AI 'beings' can supersede that of human beings. Then, the relationship is inverted; AI is no longer at the service of humans, but humans are at the service of AI. It would be an application of the dialectics of the Master and the Slave to AI.

The actual materialization of the perils and risks related to AI would lead to a 'de-humanization' of social relations in the private sphere (a business organization for example) and the public sphere (society at large).

It is this vision that is commonly displayed in many dystopian cinematographic works.

There are many films that have dealt with AI over time. We can mention Metropolis by Fritz Lang, 1927, R.U.R. (Rossum's Universal Robot) by Jan Bussel, 1938, 2001 A Space Odyssey, by Stanley Kubrick, 1968, Westworld, by Michael Crichton, 1973, Blade Runner by Ridley Scott, 1982, Terminator by James Cameron , 1982, Tron by Steven Lisberg, 1982, Matrix, by the Wachwski brothers, 1999, The Bicentennial Man, by Chris Columbus, 1999, AI by Steven Spielberg, 2001, Minority Report, by Steven Spielberg, 2002, I Robots, by Alex Proyas, 2004, Ex Machina, by Alex Garland, 2015, Tenet by Christopher Nolan, 2020. All these films put the stress on the dangers of AI. Very few (see Part 2) put forth the benefits. But is it not the role of art to challenge commonly accepted beliefs and attitudes.

In any case, the problem is not a question of refusing AI, which would be useless and harmful to progress. AI must be supported, but what is important is to research and discuss the dangers and not just the benefits in order to direct it in support of human advancement.

CONCLUSION

Artificial Intelligence has been a hot topic for some years in relation to an increasing number of fields of activity. Knowingly or unknowingly, AI has already pervaded almost all walks of life. There is hardly anything in human activities where we cannot find a dose of AI. And it seems that the use and development of AI will grow and grow in the coming years.
In this paper we have tried to examine the main challenges that AI poses to man and society, particularly in the field of management.
It appears that AI is a Janus like two-faced phenomenon. It can both bring great benefits and present perils for men and society. Hence, one of the faces of AI is that of Dr Jekyll, and the other face is that Mr. Hyde.
Until where we stand now, AI has been under the control of man and its advantages have been proclaimed more than its drawbacks. AI cannot yet pass the test expressed by F. Scott Fitzgerald (The crack up, Esquire, Feb. 1936): "The test of a first-rate intelligence is the ability to hold two opposed ideas in the mind at the same time, and still retain the ability to function". AI, as opposed to human intelligence, is constrained by the very way it operates, which gives it its superior effectiveness and speed, based on the negation of contradictions, and hence the impossibility to solve them. "Drop one tiny contradiction anywhere into a formal system and the whole thing goes to hell. Philosophers call this brittleness in formal logic *ex falso quod libet* . (…) This how Captain James T. Kirk used to disable dictatorial AIs – feed them a paradox and their reasoning modules frazzle and halt". (Star Trek, 1967, in Ellenberg, 2014). And, as sings Fabrizio De Andrè in *The Dream of Mary*, what happens if we ask the robot to go and see what color the wind is (technically the capacity of synaesthesia)? However, with the move from 'weak' AI to 'strong' AI, there is the risk that AI escapes from human control, and, so to say, lives its own life. This evolution could lead to a society governed by AI, with or without the consent of man. It might be too late then to reverse the trend. Therefore, it is of utter importance first that everyone is aware of what AI can or could do and second that the development of AI remains steered by man for the benefit of man.
Will AI be a Iago (from the point of view of intelligence) or a Cassio that Iago describes right from the start in this way (Shakespeare, Othello, Act 1, Scene 1):

"A great arithmetician …
That never set squadron in a field
Nor the division of a battle knows
More than a spinster".

Let's finish with our own pinch of -optimistic- science fiction:
Watson: Holmes, is AI more intelligent than us?
Holmes: Ask AI if he/she/it is intelligent.
Watson: AI, are you intelligent?
AI: What do you mean?
Holmes: If you are intelligent, it means that you know you are not intelligent.
AI: *craaash…*
Holmes: Elementary, my dear Watson.

References:

Aristotle (384-322) : *Posterior Analytics* II.19
American Psychological Association (1995), "Intelligence: Knowns and Unknowns"
Bertallee C. (2019): *Global research highlights how AI is changing the relationship between people and technology at work, R*edwood Shores, Calif.—Oct 15, 2019 – Oracle.com
Bostrom N., Yudkowski E. (2011): *The ethics of artificial intelligence*, Cambridge handbook of artificial intelligence, Cambridge University Press
Baccarani C., Brunetti F., Martin J. (2021) : Climate change and operational management: towards a new paradigm, TQM Journal, Vol 33, N° 3.
Cavallone M., Palumbo R. (2020): *Debunking the myth of industry 4.0 in health care: insights from a systematic literature review*, TQM Journal, Emerald
Chaplin Charlie, Modern Times, (1936), USA
Chen L., Chen P., Lin Z. (2020): *Artificial intelligence in education: a review*, IEEE Access
Coleman (2008): *A dictionary of psychology*, Oxford University Press
De Andrè F. (1970): *Il Sogno di Maria* (*The Dream of Mary), in La Buona Novella*
Ellenberg J. (2014): How not to be wrong, The power of Mathematical Thinking, Pinguin books, London
Fitzgerald F.S. (1936): *The crack up*, Esquire, Feb. 1936
Gardner H. (1993), Frames of Mind: The theory of multiple intelligence, Fontana Press, U.K.
Goleman D. (1995): *Emotional intelligence: why it can matter more than IQ*, Bantan books
Goleman D. (2006): *Social intelligence: The new Science of Human Relationships*, Bantan Books
Humphrey N. (1992): A history of the mind, Chatto and Windus
Kagermann H., Lukas W-D, Whalster W. (2011): Industrie 4.0, VDI nachrichten, Berlin, 1. 4. 11
Mayer JD, Salovey P and Caruso DR (2004): "Emotional Intelligence: Theory, Findings, and Implications". *Psychological Inquiry*. 15 (3): 197–215
Martin J. (2017): Who's afraid of Virginia Wolf? Sinergie, Vol. 35, N. 103, 2017
Martin J. (2014): *Robot*: *bạn hay thù?* Journal of Business, HCM, Vietnam
Nadimpalli M. (2017): *Artificial intelligence risks and benefits*, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 6, Issue 6, June 2017
Kerns (2017): *What's the difference between weak and strong AI*; https://www.machinedesign.com/markets/robotics/article/21835139/whats-the-difference-between-weak-and-strong-ai
Lec, S.J (2015), Pensieri spettinati, Bompiani, Milano, first edition 1956
Levi P.(1978), La chiave a stella, ET Scrittori, Bologna, Italia
Liang T-P, Robert L, Sarker S., Cheung C.M.K., Matt C., Trenz M., Turel M. (2021): Artificial intelligence and robots in individuals' lives: how to align technological possibilities and ethical issues, Internet research, Vol 31, N° 1
Newell A., Simon H., McCarthy J., Minsky M., Samuel A. (1956), Dartmouth College
NIBUSINESSINFO (2021): Artificial intelligence in business, nibusinessinfo.co.uk
Nicastro D. (2020): *Seven ways Artificial Intelligence is reinventing Human resources*, CMSwire.com
O'Connor S.W. (2020): *Artificial intelligence in Human Resource Management*, January 2, 2020, North Eastern university, USA
Sapolski R.M. (2018): Behave, Penguin books, New York
Shakespeare W. (1603): Othello
Taleb N.N. (2018): Skin in the game, Random House, New York City
Tegmark M (2015, 2021): *Benefits and risks of Artificial Intelligence*, futureoflife.org, accessed 06-2021.

Tuomi, Ilkka (2018): “The Impact of Artificial Intelligence on Learning, Teaching, and Education”, European Union
West D.M, Allen J.R. (2018): *How AI is transforming the world*, Brookings Institute, 24-04-2018, brooking.edu
Yawalkar V.V. (2019): *A Study of Artificial Intelligence and its role in Human Resource Management,* International Journal of Research and Analytical Reviews, Vol 6, Issue 1