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Data to Decision and Judgment Making – a Question of Wisdom

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Abstract: The technological waves of super artificial intelligence, big data, algorithms, and machine learning continue to impact our thinking and actions, thereby affecting the ways individuals, professions and institutions make judgments. On the one hand, there is an argument that more data and knowledge together with the cyber physical system of industry4.0 will automatically push society along some track toward a better world for all. On the other hand, we hear worrying voices of the imponderable downsides of powerful new cyber-, bio-, Nano-technologies, and synthetic biology. In the age of uncertainties, big data and the algorithm, how is the decision and judgment making process being affected?

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1. ENVISIONING DATA-DECISION-JUDGMENT - WISDOM

Beyond the headlines of the thrill engendered by futuristic AI super machines, Big Data and Internet of Things, what are we to make of artificial intelligence? The new wave of artificial super intelligence raises a number of serious societal concerns: What are the crises and shocks of the AI machine that will trigger fundamental change and how should we cope with the resulting transformation? (Ars 2017). The ways we perceive and act on these questions depend upon our purpose and this in turn depends upon decision and judgments we make in designing and implementing AI and data systems. The ideas of science with purpose, and the implication of the shift from judgement to calculation, have been anchored in engineering and computing writings, Architect and Bee (Cooley, 1987), Computer Power and Human Reason (Weizenbaum, 1976), and Machines with Purpose (Rosenbrock 1996). Cooley (1987) draws our attention to data-information-knowledge-wisdom-action cycle, when he says that data (calculation end) suitably organised and acted upon may become information. Information absorbed, understood and applied by people, may become knowledge. Knowledge frequently applied in a domain may become wisdom, and wisdom (judgment end) the basis for positive action.

On Judgment, to the followers of Tao, decision making is part of analytical judgment process (https://mymostlyunfabulouslife.com/2013/05/16/daily-tao-136-judgement/). Options and choices are subliminally analysed and the best alternative is selected in the given circumstances. In this sense, decision making is data and evidence driven while judging is "impression" driven. Decision making process is result oriented while judging is person oriented. Moreover, when giving a judgement, you are not a part of the issue and supposed to be an outsider and with no bias. You are supposed to hear both the sides and tell who is right or wrong. Here, you do not choose what is right for you but tell who is right. Again to followers of Tao (http://personaltao.com/teachings/taoism/learning-taoism-releasing-judgement/), Judgment is a social invention: societies use systems of judgment to maintain "order" and a balance between its membership. Judgment is all about measuring what is right and what is wrong. No human judgment system can be perfect. When perfect, it would absolutely mean no free could exist. When perfect, there would be no questions, no grey areas, no wrong actions, merely only always right actions. The challenge of creating frameworks and models of wise decision and wise judgments is that we should never witness humanity becoming too trapped by its own judgment systems, especially at risk of being trapped by codified judgment systems.

Groumpos (2016) surmises that many times in human history people have ignored and buried memories, knowledge, experiences, practices and habit of the past and have focused on the new and previously unimaginable bright future on horizon. However this kind of ignorance has led humankind to take catastrophic and unwise decisions. Based up the intertwinement of knowledge and wisdom, he puts forward Fuzzy Cognitive Maps as a systematic approach of Deep Learning (DL) to study the role and value of past experiences in making wise decisions. He, however, recognises the limits of the black box approach of statistical theories of DL techniques in taking into consideration effectively the fuzziness and uncertainty characterizing today's complex dynamic systems, such as Health, energy, environment, geology, biology, manufacturing, business and economy. In pursuit of a data driven path of judgment guided by human experience, we should be mindful that "stochastic" choices based on the computed probabilities of alternative actions, presents a flawed basis for the alignment of AI and human values, as the stochastic choice is not the same thing as intentional, freely willed decision-making. Whilst judgment can be seen as the application of knowledge to differentiate between the "right" and "wrong" facts, wisdom is about the use of knowledge to perceive and choose the "right" action or to avoid the "wrong" action. Wisdom here may involve factors such as speculation, feelings, and moral or ethical values not only of self but also of the other. Citing the example of dropping atomic bombs on Hiroshima and

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Nagasaki, Groumpos (ibid.) notes that in terms of applied knowledge, the judgment of dropping the bomb may be obvious to their creators (self), but in terms of whether applying that knowledge was wise or not is still unclear and subject to intense debate when seen from the gaze of the other (those affected by it).

When decision and judgment making are turned solely into a data driven paradigm of risks and benefits, we are in danger of the unquestioning faith in technology, ignoring the larger social, ethical, moral and political dimensions as Wiener (1980), would say. This data driven paradigm makes us reliance on quantifiable measures to the exclusion of qualitative assessment, thereby limiting the scope and horizon of human decision making. We already see the impact data driven decision making on standardisation of student tests and research evaluation, that are made to fit the data sets rather than data sets as one of the variables in judgment making. We note from Wiener's argument that to understand the importance of technologies and their design and use contexts, we must also grasp the concepts and complexities of their social and political contexts.

Phil Rosenzweig (https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-benefits-and-limits-of-decision-models) asks us to understand the limits of the predictability of data driven decision models, technically dazzling as they are, for example in detecting fraudulent credit-card use and predicting rainfall. But these predictions can neither change the behaviour of card users nor of the farmers to benefit from weather predictions without wise counselling of card users and without the wisdom of experiential knowledge of farmers to manage and improve crop yields.' Data driven decision models, in computing predictions of complex and large databases 'may relieve the decision makers of some of the burden; but the danger is that these decision models are often so impressive that it's easy to be seduced by them', and to overlook the need to use them wisely. As Rosenzweig says that the challenge thus isn't to *predict* what will happen but to *make* it happen, and how to control avoid the adverse happenings.

2. DATA, DECISION AND JUDGMENT

For data scientists, in the realm of voices of instrumental reason (https://cambridgeanalytica.org/), our brain is constantly required to adapt in a rapidly changing data-driven environment. When seen as predictive analytics, our brain is just a complicated learning machine whose main goal is data compression and interpretation. In this vision of data science, data processing, occurring automatically in our brains billion of times each second, is seen as an elementary step in many data analysis applications. Data science algorithms can be used to scan data for meaningful patterns, extracting combinations of features of meaningful data clusters. Beyond the voice of instrumental reason, Davies (2017) gives us an insight into the impact and implication of the shifting power of data, when he says that as personal data are becoming a huge driver of the digital economy, the data corporations are becoming 'more and more skillful at automated decision making and judgments by tracking our habits and subtly manipulating our behaviors'. He cites Cambridge Analytica (ibid.), which uses cutting-edge data analytics techniques, draws on various data sources to develop psychological profiles and targets millions of consumers with tailored messaging (e.g. targeting of American voters during the 2016 presidential elections). He warns that in the world of data analytics where secrecy surrounding methods and sources of data is regarded as competitive advantage for decision making, it is doubtful that the 'big data elite' would easily give up their hold of data in favour of public interest and social benefit. John Naughton (2017) alerts us to the social, ethical and legal implications of big data and deep learning. He cites the case of the transfer of health records of 1.6 million identifiable patients by The Royal Free hospital London to DeepMind, a Google-owned artificial intelligence firm, in July 2015, to create an app, called Streams, to help clinicians manage acute kidney injury (AKI), a serious disease that is linked to 40,000 deaths a year in the UK. However, the transfer of medical records seem neither to obey the ethical guidelines and legal requirement nor compliance of the UK Data Protection Act. What we take from this data driven decision making and judgement making story is that we should be concerned about the prevailing myth that AI tools that affect the social fabric of society could be developed without abiding by the constraints of the legal, ethical, social, cultural values and norms of society.

2.1 JUDGMENT: BEYOND THE INSTRUMENTAL REASON

As instrumental reason continues its march in the guise of machine learning algorithms, we see an increasing manipulation of data to support and control institutional and organizational structures. Moving beyond their (algorithms) role as computational artefacts, what concerns us how these algorithms take account of the limits of our 'entrenched assumptions about agency, transparency, and normativity'. Reflecting on these issues Gill (2017) draws our attention to the work of observant authors, Introna, Crawford, and Ananny, who see data manipulation practices as problematic because they are inscrutable, automatic, and subsumed in the flow of daily practices. Beyond the issues of algorithmic transparency and openness, calculative practices have a serious impact on how domains of knowledge and expertise are produced, and how such domains of knowledge become internalized, affecting institutional governance. Moreover, these algorithms not only work within 'highly contested' online spaces of public discourse, they often perform with little visibility or accountability. This is an argument to move out of the 'black box' notion of the algorithm, and promote the idea of a 'networked information algorithms' (NIAs); assemblages of institutionally situated code, practices, and norms with the power to create, sustain, and signify relationships among people and data through minimally observable, semi-autonomous action. This opens the way for 'algorithmic ethics' that resembles 'actuarial ethics', based on the current and future risks. If AI reflections are to move out of the 'black box' of instrumental reason, we need to learn from the performance practices of experts, professional and practitioners, where performance of data is seen not just in terms of its transformation into information, information into knowledge but also knowledge into wisdom and wisdom

into action. For example, experiential scientists, crafts people, medical practitioners and engineers transform raw data into information, then using their skills and experience transform information into knowledge, and through the application of their contextual knowledge and wisdom, make judgments about the accuracy, relevance and acceptability of data that is coming from many sources. In this transformation process, there is always a scope for human intervention at various levels of the data-to-action cycle and that intervention, which reflects the many overlapping contexts, would bear witness to situated judgments. This is in contrast to an intervention based upon machine learning algorithmic calculations.

In other words, the performance of data, in the hands of expert practitioners, is seen here in terms of an evolving judgment-making process culminating in action. This transformational process from data to action, encompassing feedback loops and human intervention, provides a human-centred perspective of judgment that is contrary to the computational model of 'judgment to calculation', in which data are used to compute judgment. We should, however, recognise that the computation model of judgment, turning judgment making into a data science may be possible from a computational view-point, it is highly problematic when seen from a societal perspectives, especially when applied in human domains such as living, working, and living. It may be tempting to argue that nothing has fundamentally changed in the data-action cycle except for the availability of an abundance of data (big data) and the exponential processing speed of computers. The fallacy of this argument then revolves around the idea that only if we have an abundance of data and the exponential processing speed of the computer, can we construct machine learning algorithms that can outstrip human cognition, to the extent that machines can better humans in processing a wider variety and larger number of data sets and working in different ways to those of humans in reaching analytical judgments. However, this calculation-centred view of judgment fails to recognise that human judgment is about the process of finding a coherence among often conflicting and yet creative possibilities that cannot be reduced to calculation. Moreover, human judgment resides in and reflects the dynamic and evolving nature of professional and social practices, enriching human experience, knowledge, skill and cognition. From this human-centred perspective, performance of data lies in the performance of practice of the 'data–action cycle', in other words the performance of inter-relations between data, information, knowledge, wisdom and action (Cooley 1987, Gill, K S 2017). This view seeks to understand the nature of the interface between the physical, cultural and our experiential worlds. The nature and practice of the interface here is fundamentally relational between, in-between, and across knowledges, experiences and practices of contextual domains (Gill, SP 2015), and not transactional in the sense of 'cause and effect' calculation. This view shifts our attention from a purely technological fascination of machine learning to the evolving interaction of human systems and technology, thereby providing a symbiotic horizon of performing data. In the midst of the fascination with digital technology, we are cautioned to remember that performance of data in the hands of creative artists and scientists embodies social/cultural and spatial intelligence that conforms to the living. We cannot get this from machine intelligence. Moreover, it is not clear how a machine would deal with the architectural paradox: when an architect draws a diagram of a building, the diagram becomes a building, a static object, an exact language, an exact dream; but the diagram as a model performs as a process, a dynamic process in which the diagram acts an algorithm of ideas. Such a discussion on the creation of an ethical framework needs 'to be infused with a more robust notion of the public interest than can currently be found in the realm of digital intermediary governance' (Gill, K S op.cit).

2.2 COMMON SENSE AND JUDGMENT

As the debate on digital governance, public interest and judgment takes shape, there is an intense contest between two paradigms, holistic paradigm that is based on the interconnected world, and the other reductionist, mechanistic paradigm that sees humans as separate from nature. The mechanistic paradigm has transformed the diversity of knowledge systems into a hierarchy, privileging the reductionist paradigm as the only science, and undermining other knowledge systems. The word science is derived from the Latin '*scire'*, meaning 'to know'. To live is to know. We are all knowers and judgment makers of different kinds. As Siva (2018) says that diverse knowledge systems are scientific within their own paradigms. Mechanistic reductionist thinking does not just reduce the world to fragmented, separated parts; it reduces our capacity to know and make judgments. Regal (1990:4) says that society has also learnt from science that logic is not in itself sufficient to establish truth, nor is physical evidence. Judgments are ideally made by combining logic and physical evidence. As science has so far impacted thinking and now technology is affecting the ways individuals, professions and institutions make judgments, we face a challenge as how to 'negotiate our relationship to science in a 'way of knowing'. Judgment based on common sense is fragile and may prevent one from adapting to changing circumstances through the inertia with which it burdens individual mind and systems of authority and management. Regal (ibid:115) further says that although modern common sense seems to be based relatively more on truths and open-mindedness, and is more adaptable, we should be aware that science has its own brands of common sense and myths that prevent it to adapting and advancing as rapidly as societal needs and aspiration hope for. The idea of scientific is rooted in the Ancient Greece of Socrates, Plato and Aristotle. Socrates searched for reality and truth by questioning one's psychological qualifications to capture reality, and argued for knowing oneself in order to know the world around us. Plato (Socrates' student) emphasised pure reason as a means for finding reality and he saw the "True" reality as being not in the material world in which we all live, but in an abstract world of forms that can be seen only through reason. Plato's student, Aristotle, as the founder of formal non mathematical logic, put his efforts into the task of observing nature as an important way of checking on the validity on one's idea ("empiricism").

We get further insights into the scientific process of making judgments from Bacon's ideal of gathering information open-mindedly before forming hypotheses, Popper's ideal that

science precedes by the formulation of falsifiable hypotheses, conjectures and refutations, and Kuhn's notions of paradigm revolutions, that truth is only what a group of scientists perceive as truth at a given time (ibid: 77). These ancient and early-modern nourishing roots of science give us a sense of the search for justice and wisdom and not just for material power. We should, however, be alert to the context and common sense reasoning of judgment, justice and wisdom. It is important to note that whilst teleology, design, essentialism, and natural ethics have stayed around, often clustered in the Platonic and Aristotelian fashions, they have been an unconscious part of the Western common sense and popular thought. It is also worth remembering that our common sense can often blind us to truths, retarding intellectual and ethical aspirations in spite of the best intentions (ibid:115) . Nevertheless, in perhaps every human society wise people have sensed and reasoned that there must be truths or Truth beyond everyday experience and common sense.

Both Pythagoras and Plato reasoned that the meaningful reality is not in the matter (materialism), but is in a world of eternal and unchanging numbers and ideal forms (idealism) and that the material form and event that we experience is abort of illusion, a corrupt manifestation of the perfect and the eternal. This view was to dominate Western thought even into the modern times. Regal (ibid. 269) says that from the times of Galileo, Newton, Kant, and Darwin it was shown that simple physical mechanism can easily explain the obvious features of the natural world. It was not until this relatively late time period that Descartes and others began to formalise a reasonably tidy division between the natural and the supernatural. The Pythagorean believed that everything can be reduced to numbers, and that civilisation and creative energy can be reduced to competition and conflict. By reducing reality to numbers and forms they helped set the stage for the later emphasis on mathematics, quantification, abstract models so important to the advance in modern science. This proved to be to the advantage of a bureaucratic system if social problems were seen as the effects of simple causes that lend themselves to solutions by technical inventions. But in fact, many societal problems have complex causes that cannot be reduced to the quantitative measure and scientific judgment. But the reductionist outlooks remain attractive to agencies in bureaucracies. Although science has been part of liberating movement in history, the runaway technology is now changing our lives at such a rapid pace and at its own momentum that we feel that decision making is being turned into solving logical problems in closed, known, and fully defined formal logical domains, and knowledge based judgments making is slipping out of our hands. However, not all problems in life are amenable to this closed logical universe. The recent uncovering of the logical rule based and closed universes of the Facebook and Cambridge Analytic illustrates that human domains cannot be treated as if they were a game of chess, bereft of the ethical dimension, value judgment, social responsibility and political implications. These are just exemplars of the cracks that are beginning to emerge in the ivory tower of the reductionist paradigm, emanating the universal language of conformity of the digital echo chamber. This echo chamber, connecting the world of symbols to the real world of experience is increasingly problematic and undermines the human dimension of human decisions processes and judgment making.

3. ENVISIONING ETHICAL JUDGMENT

Tore Nordenstam (1987) gives a deep insight into ethical competence (called here ethical judgment) and ethical wisdom. He says that utilitarian ethics is at the heart of decision making, where the human has become to be seen as a rational value calculator, thereby reducing the whole of ethics to a value calculus. He suggests that there are basically two assumptions at the root of this view of value calculus. The first assumption is that rational decision-making is to do with values and norms of various actions, and their probable value outcomes, we can call it Judgment. The second assumption is that decision making process follows a rule based step model, in which decision maker can identify alternatives of action, evaluate possible effects, estimate probabilities, estimate positive and negative effects, and can weigh these effects to reach a decision. This process assumes that the moral agent should have a number of competencies at his disposal, including social and ethical competences. This tacit assumption of ethical competence in rational decision-making makes us recognize that ethical knowledge is as difficult to formulate in explicit rules and the tacit knowledge itself. The rule-based part of ethics that dominates the utilitarian thinking, is just a part of the ethical dimension of human action. Our rules of action are often a more complex kind, firmly anchored in a number of paradigms (examples), personal, social experiences and judgments. Nordenstam (ibid.) says that our understanding of the rule and examples is very much in tune with in the 'whole-part' relationship of "the hermeneutical circle". In order to understand an example, it has to be taken as an example of something; and to understand a rule, one has to go through a number of examples in which the rule is embedded. In this sense both the rule and examples (paradigms) are more often implicit and open, thereby cannot be detached from each other, and thus cannot be applied mechanically. If rules and their examples are internally related, then it is fairly misleading to present ethics as a system of general rules (norms, evaluations). It is good reason to suggest that examples play a leading role in the field of ethics. The decisive role in all ethical competence is the ability to go from one paradigm and counter case to new situations. This demands actor's insights and abilities that are acquired through personal and social experience. An independent moral agent should thus be able to master a range of examples, structure novel situations, imagine possible consequences in relation to previous example and possible situations. For Nordenstam, ethics in the form of practical wisdom of what is right or wrong in the field of action exists primarily in the form tacit knowledge of actors in the field, in the form of knowledge of familiarity in various situations and structures of society. This knowledge of familiarity can be seen as practical wisdom, consisting of internalized ability to handle different ingredients of one's ethical paradigm. The core of practical wisdom in this sense consists of tacit knowledge- all our familiarity, experience and skills in handling new situations in satisfactory ways. In

this perspective of ethics as practical wisdom, everything is said to be open to rational scrutiny. There is nothing that is to be accepted unless it has passed the test of rationality. The recognition of disagreement is as important as the agreement, for in agreement lies the essence of disagreement.

To get another deep perspective of performative judgment we turn to Burdon's (2015) insightful representation of in Hannah Arendt's perspective on judgment, how to make judgments as a social act. We learn about the relevance of Arendt's prescient warning about the risks, mass technological society poses for the capacity of human beings to think and make reflective judgments and the need for protecting these uniquely human characteristics. This involves the engagement of the self, 'I', with the other, 'we', cultivating the emergence of plural voice in the making of a performative judgment on behalf of civil society and all humanity. This view of the self as 'redoubled and didactic, not two selves, but a redoubling in relation to others', sees the self, 'I', as 'plural and populated', and this Arendt's notion of the plural self turns out to be the condition of conscience and of responsibility. It is this notion of conscience and responsibility that designers and practitioners of AI and data systems need to keep in mind that they cannot separate themselves (their self) form the wider social responsibility, when performing judgments on the relevance of their technologies in the name of society. As Arendt's would say to the computational disciples of AI and data science, human judgment should not be bound by legal rules and regulations but by ethical principles by virtue of the judging activity itself. But how can we reconcile values of the self to the values of the plural (civic society) and in what ways these values can be aligned in AI systems?

In exploring the case for alignment of AI and human values on the assumption of finding an equivalence between human ethics and (practical wisdom) and rule-based ethics, we need to recognise that this notion of equivalence is flawed. If one of central ethos of equivalence is mutual trust, then it is difficult to visualise how an AI system can offer itself as a trusted companion in an emotionally laid situation where we feel personal and deep grief and pain of the loss a loved one. The idea that the computer can console us by following rules embedded in its system, ignores the very essence of what human emotion is, tacit and personal that cannot be totally explicated in the forms of rules. It can be felt but and cannot be learned even in the form of rules of familiarity

Edwards (2018) proposes coherence as a framework for making wise decision and judgement making. Coherence implies harmony, interconnectedness and consistency and typically including a global order where the whole is greater than the sum of the parts. At the natural scientific level, auto-coherence or auto-correlation implies stability, at the human, interpersonal, team and social levels, coherence refers to harmonious relationships, synchronization and collective action; at the global level, groups, nations and countries working co-operatively could promote optimal ecological and planetary peace and harmony. For example, "Coherence-building approaches may also help health care practitioners increase their effectiveness in working with patients, by enabling a deeper intuitive connection and communication between practitioner and patient, which can be a crucial component of the healing process." Coherence thus provides a practical basis for discerning intuitions, responsible decisions and effective actions by AI and machine learning designers of sound moral integrity. The challenge of designing AI systems that facilitate coherence in judgment making is how to stimulate those uniquely human, personal and transpersonal experiences, behaviour, realities or phenomena (nous) that will allow further realization, and human advancement of the greatest good, moral qualities and general excellence, as well as ensuring survival and flourishing for all sentient beings, through furthering intelligence, humanity, art, science and optimizing interconnectedness.

In moving beyond the digital echo chamber of automation of decisions and judgements, we need to understand the implication of the AI machine removing the need for another person altogether. Kathleen Richardson (2017) asks: What if the machine could become a *direct-object* of the interaction? With social robots and the rise of chatbots we are entering an era where machines are playing different roles in our lives, as an 'other' perhaps. But if the machine can become 'another', then what we mean by the relationship that is mutual and reciprocal are tuned into instrumental relationships by the echo chamber? This instrumentality promotes an '*egocentric tradition'* with its commitment to the conception of humanity as a collective of lone individuals'. The impact of this ego-centric tradition is increasingly been seen in relation to how relationships are construed instrumentally in the evolution of digital echo chambers, exemplifies by Facebook and Twitter feeds. We may ask whether this instrumentality shapes a new future of human relations, thereby the humanity losing the sense of the term 'de-humanisation' in today's narratives of AI and machine learning. How can we then move away from the potential of a machine becoming a relational 'other', and mitigate the impacts of technologies that produce a process of becoming less than human? The work of S.P. Gill (2015) *Tacit Engagement: Beyond Interaction*, says Richardson, provides a fitting framework how we move away from the dominant narrative that relations between people are merely a mechanical exchange of services. In human interaction (or interaction with all for that matter), the possibilities of innovation, spontaneity and iteration are endless.

4. COMMON AND UNCOMMON VOICES OF THE WAVE OF NEW TECHNOLOGIES

The Silicon Valley technological culture may often see societal concerns and humanistic perspectives of digital technologies as rather inconvenient, but in the midst of this transformation, we can hear voices of existential risk, reason, redemption and ethics. For Sir Martin Rees (2013) of the Centre for the Study of Existential Risk (CSER) equally worrying are the imponderable downsides of powerful new cyber-, bio-, Nano-technologies, and synthetic biology.

In the very cognitively rational tradition of the Californian Silicon Valley, the Stanford Panel Report (2016) surmises that the frontier of AI has moved far ahead from the functions of the calculator, as AI researchers work on improving, generalizing, and scaling up the intelligence currently found on smartphones. Bostrom (2016) expounds that if we can program the right ''human-friendly'' values into AI systems,

they will continue to uphold these virtues, no matter how powerful the machines become. Amongst the conciliatory voices is that of Joi Ito, Director of the MIT Media Lab (2016), who cautions us about the exuberance of "extended intelligence," or E.I, as the dominant focus of AI on machine learning. Although AI scientists may be well intentioned in their building of machine intelligence tools, he says that "If we allow 'extended intelligence' to develop without thoughtfully managing how it integrates with, and affects, society, it could be used to amplify dangerous biases and entities." Unless AI scientists embed ethical and moral grounding in technology design and evaluation, the same technology that is meant to advance the well-being of society 'could, in fact, end up amplifying the worst aspects of our society.' The voices of redemption point to the possibilities of mapping the landscape of potential AI breakthroughs and their social consequences. The Industry 4.0 projects (Garibaldo & Rebecchi 2018) raise issues of the convergence of the cyber physical world in manufacturing and services, leading to the production of smart factories, services and platform capitalism. The implication of this convergence goes beyond the digital platforms; for example the implication of big data for and synthetic biology, raising question such as virtualization, echo chambers of social networks and quantified self, on-line repository a virtual copy of objects and living specimen, personal platforms, personal data, and the question of a regulatory regime. What matters is how we talk about new technologies and how their risks and benefits can significantly influence their development, regulation and place in public opinion. Balancing AI's potential and its pitfalls therefore pose challenges of creating frameworks and models for wise decisions making and wise judgment making to navigate the emerging architectures of governance and transcend the instrumental reasoning of computational and automated decision and judgments.

4. CONCLUSIONS

New technologies, on the one hand, offer great potential and possibilities in many realms of human society. One the other hand, when seen through the instrumental lens, this very technology leads to perceiving and thinking in singularities. We should be mindful of Weizenbaum's (1976) warning of instrumental reasoning, that the enormous computational capability of the AI machine is no more relevant to the validity of the outcome or judgment derived from the computed results, than that derived from the original source of data. It is enlightening to observe how the data driven decision making is aligned to the notion of the limitation of cognitive ability and memory capacity of humans in making rational decisions and judgments, and in doing so exclude experiential knowledge, intuition, creativity, imagination and pattern recognition ability and capacity of human being in making wise decisions and judgments. We need to reflect on whether the instrumental thinking of computability would continue its march of making a lasting shift from judgment to calculation. Or do we still have the vision to mould new technologies in a way that facilitates a recalibration of the Data-Decision-Judgment–Action-Wisdom Spiral.

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