CHAPTER 3

Digital Humanism: Epistemological, Ontological and Praxiological Foundations

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Introduction

It seems a common agreement that due to certain progress made in Artificial Intelligence (AI) and related fields mankind is facing a blurring of the human and the machine such that humanism is put under pressure. Is humanism outdated and can it be renounced? Or does it only need an update? And if so, an update in which direction?

There is discussion abound with pros and cons concerning technological, military, sociological and philosophical aspects of AI, Trans- and Post Humanism (Hofkirchner and Kreowski 2020). And there is a candidate for updating humanism – Digital Humanism.

This term popped up in a Gartner Special Report published in April 2015. The report had the title 'Digital Business: Digital Humanism Makes People Better, Not Technology Better' and its summary makes clear what Digital Humanism was supposed to be about and what it is was not supposed to be about: 'Digital humanism is the recognition that digital business revolves around people, not technology. CIOs and business leaders who recognise that digital business revolves around people's value will see employee capabilities translate

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into product, service and market gains.' The term did not refer to humanism as a philosophical tradition.

This is in stark contrast to the intentions of German philosopher and former minister Julian Nida-Rümelin who had used the term for a long time in lectures before he published, together with Nathalie Weidenfeld, a book with the title 'Digitaler Humanismus' (2018), for which the authors received the Bruno Kreisky Prize from the Karl-Renner-Institut, Wien. The German term inspired Hannes Werthner, the then Dean of the Faculty of Informatics at the Vienna University of Technology (TU Wien), to translate it into English when he convened a workshop in April 2019 that ended with a manifesto – the Vienna Manifesto on Digital Humanism.

> This manifesto is a call to deliberate and to act on current and future technological development. We encourage our academic communities, as well as industrial leaders, politicians, policy makers, and professional societies all around the globe, to actively participate in policy formation. Our demands are the result of an emerging process that unites scientists and practitioners across fields and topics, brought together by concerns and hopes for the future. We are aware of our joint responsibility for the current situation and the future – both as professionals and citizens.
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> …
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> We must shape technologies in accordance with human values and needs, instead of allowing technologies to shape humans. Our task is not only to rein in the downsides of information and communication technologies, but to encourage human-centered innovation. We call for a Digital Humanism that describes, analyzes, and, most importantly, influences the complex interplay of technology and humankind, for a better society and life, fully respecting universal human rights.

Given these quotations from the manifesto (Vienna Manifesto on Digital Humanism n.d.), Digital Humanism, meaning an update of humanism – of the image of man – in the age of digitalisation, promises to become a label for an answer to the questions raised above in a direction worth supporting, a direction not technology-driven but aiming at promoting a humane digitalisation.

This chapter at hand intends to contribute to philosophical, in particular, philosophy of science aspects such as praxio-onto-epistemology developed from the author elsewhere (Hofkirchner 2013), as sound foundations for such an updated humanism. It aims at clarifying the following problem:

How can a relation between human and machine be established in thinking and acting such that fallacies in theorising are avoided?

There are three ways of framing, modelling and designing the human and the machine, in particular, computer, cyber technology, digitalisation, in relation. One way is conflation – the false assertion of identity of what is different. Another way is the disconnection – the false assertion of a difference of what

Table 3.1: Frames, models and designs in the perspective of conflations, disconnections and combinations.

	Conflations		**Disconnections**			**Combination**
	Anthropo-morphism	Techno-morphism	Anthropo-centrism	Techno-centrism	Man-machine-hybridity	TechnoSocial Systemism
Frames	Cross-disciplinary		Mono- and multi-/inter-disciplinary			Transdisci-plinary
	Sociological colonisation	Technologi-cal takeover	Sociologism	Techno-logism	Methods mix	Systemic complements
Models	Monistic		Dualistic			Dialectical
	Anima	Mechanism	Pride of creation	Post-human	Man-machine-hybrids	Systems of systems
Design	Assimilative		Segregative			Integrative
	techno sapiens	homo deus	Supremacy	Singulari-tarianism	Man-machine-hybridisation	TA and design loop

is identical. And the last but not least way is the combination – the exercise to find out what is identical (what do both sides have in common though they might differ in some respects) and what is different (though they might have something in common). This is the only way with the prospect of transgressing falsehood.

The next three sections discuss these three ways in more detail. Frames, models and designs are dealt with. They refer to epistemological, ontological and praxiological issues respectively, (see Table 3.1).

Conflations

It is conflation if what is widely known as anthropomorphism is the case – the assertion of a human property in a realm where it is not an essential property. But there is also a second kind of conflation – the assertion of a machine property in a realm where it is not an essential property, which might, in analogy to the term anthropomorphism, be labelled technomorphism. Both kinds of conflation should not be conflated. They belong to different ways of thinking and acting and yield different results. Anthropomorphism is based upon a projection, while technomorphism is based upon a reduction. A projection projects higher complexity onto lower complexity so as to simulate higher complexity, while a reduction reduces higher complexity to lower complexity so as to simulate lower complexity. In the first case, you have an upgrading of complexity, whereas, in the second case, you have a downgrading.

Let's now turn to the discussion of how the anthropomorphic and technomorphic conflations work when framing, modelling and designing the relation of human and machine, one by one.

Cross-disciplinary Frames

Both anthropomorphism and technomorphism claim to use a common epistemology, a general frame of investigation for both human and machine.

But in the case of anthropomorphism, that frame is different from the technomorphic frame. Anthropomorphism extends the frame normally used in social sciences and humanities to information technology. It does so on the underlying assumption that those frames that are apt for social phenomena are also apt to investigate phenomena that are technical. That is, it looks upon technical phenomena as if they were social ones and in doing so it carries over to them expectations that they would show what social phenomena are showing. Thus, anthropomorphism is open to apply the term intelligence when speaking of artificial phenomena that shall be compared with human intelligence. Attempts to establish electronic personhoods for AI applications are examples of our inclination to anthropomorphising.

In the case of technomorphism, the situation is reversed. Methodologies that are usually built for technological research cover social phenomena. Thus, they convey expectations of technicality when applied in inquiries into social phenomena. Social phenomena are deemed engineerable. Human intelligence can be researched as if a phenomenon of an artefact. The human brain project of the EU pertains to this kind of fallacy.

In any case, the respective frame cuts across social as well as technological phenomena. The different disciplines of science are conflated – either to a social science take of technical phenomena or a technological take of social phenomena.

The current dominant approaches in social, human and arts research, on the one hand, and in natural science and technology, on the other hand, are still suffering from the divide between the two cultures as batptised by C. P. Snow (1998) in the last century. The first culture has been laying the emphasis on a qualitative methodology, while the second culture has been fixing a quantitative methodology as a must. Of course, there have been transgressions of the boundaries; ecology, pharmaceutics, or parts of physics have partly become friends with anthropomorphisations – one step towards esotericism; psychology, economics, or empirical social research are accustomed to performing as if belonging to natural sciences – one step forward to their computerisation and technisation as might be the case of computational social science.

Though the intent to find a general methodology for research in humans and machines is commendable, neither attempt to let methodology stretch across its own boundaries is a solution, as long as they are not taken up with a third culture.

By applying a method of generating knowledge you will not get findings other than those that are due to the method applied. The method applied is the necessary condition on which a particular model is based.

Monistic Models

Both anthropomorphism and technomorphism come up with a monistic ontology. Being a human and being a machine are assumed to be identical. However, the identity is constituted on the basis of their different framing ways.

Anthropomorphism is prone to stating that any machine resembles essentially a human. Technomorphism is in favour of saying that any human resembles essentially a machine. Anthropomorphism projects essential human features – like disposing of intelligence – onto machines. Technomorphism reduces essential human features – like disposing of intelligence – to features of machines.

Projection and reduction follow a stepwise order of mediation.

The anthropomorphic projection runs through the following steps:

- In a first step, the essential features of sociality of humans, namely, that they live in society governed by social relations, are projected onto the individual actor, thereby making her a social being.
- In a next step, the essential features of this individual actor as social being are projected onto the human body of the individual as a living being, by which she is viewed as a bio-social being.
- In a further step, the essential features of this bio-social being are projected onto the physical substrate of the bio-social being so as to yield a physico-bio-social being.
- In a final step, the essential features of this physico-bio-social being are projected onto any mechanistic compartment of the physico-bio-social being, so as to blur the distinction between the human and the machine.

Human(like)ness is conferred from human intelligence via mechanisms that work in the human body and might be part of human intelligence to the mechanics of artefacts. So, AI can be imagined as being humanly animated. Anthropomorphism is hence close to ideas that conceive our planet as a living organism, or the universe as ensouled or as a big natural computer.

The technomorphic reduction is carried out by a concatenation of the following steps:

- First, the essential features of the society of humans are reduced to those of the individual actor. This is an individualistic fallacy.
- Second, the essential features of the individual social actor are reduced to those of the human body. This is a fallacy of biologism, since the social features of the individual are narrowed down to biotic features.
- Third, the essential features of the human body are reduced to those of its physical substrate. This is a fallacy of physicalism, since the biotic features of the body are narrowed down to physical features.

- Fourth, the essential features of the physical substrate are reduced to those of mechanisms. This is a fallacy of mechanicism, since the physical features of the substrate are narrowed down to mechanical features. The term mechanical denotes here having the property of strict determinism. The physical world is not full of mechanisms only.

According to technomorphism, human intelligence boils down to a mere mechanical capacity that artefacts can be made capable of.

Monistic models that conflate human and machine form necessary conditions for particular design practices.

Assimilative Designs

Both anthropomorphism and technomorphism recommend an indiscriminative strategy when it comes to praxiology. Praxiology is a term that comprises those parts of philosophy that, apart from epistemology and ontology, deal with issues that are suitable for the general guidance of human practice such as values and norms; ethics, aesthetics or axiology belong to this class of philosophical disciplines. Praxeology is the name of a certain school of praxiology.

According to the conflationist suggestions, human and machine shall be treated in one and the same way. But they have different beliefs of how the activity shall be guided.

Anthropomorphism renders the humans colonised by machines, if it declares, in account with its projective ontology and epistemology, that machines shall be treated like humans. By adding to machines a value that is improper, humans become assimilated to them. The design of machines aims at producing 'techno sapiens' (Wagner 2016) – autonomous beings endowed with AI that delimits the generic autonomy of humans and ignores the fact that the evidence of intelligence that is based on the observation of behaviour only is no robust evidence at all (think of the Turing test that, actually, proves how easily human comprehension can be fooled).

The technomorphic credo runs the other way around: not machines shall be treated like humans but humans shall be treated like machines. This is at the same time the motto of transhumanism. The design aims at 'homo deus' (Harari 2016) by perfecting the species with artificial means, including the enhancement of their intelligence. Humans shall be engineered to be optimised. In that humans shall become machines themselves, humans are assimilated to machines, again.

Disconnections

Disconnections are the opposites of conflations. They come up as results of disjunctive ways of thinking and acting. The human and the machine are disjoined

and separated so much that they don't seem to have anything in common. Disconnections come in three variants – one comes as focus on the human with disregard for the machine, another as focus on the machine with disregard for the human, and a last one as focus on an interaction of disjoint humans and machines. The first disconnection is anthropocentric, the second technocentric, and the third hybrid, that is, human–machine-interactive. As to complexity, all variants presume self-contained degrees of complexity independent of any other complexity.

Let's again discuss the frames, models and designs of the three variants.

Disciplinary Frames

In epistemology, all variants agree that data of the human or data of the machine need each a frame of their own. In contrast to the cross-disciplinarity of the conflationist frames, they represent different supporters of disciplinarity. Anthropo- and technocentrism form a group of adherents of mono-disciplinarity and hybrid human-machine-interactivism follows multi- or inter-disciplinarity.

Mono-disciplinarity means intra-disciplinary research, it goes inside one discipline. Anthropocentrism claims social science and humanities methods for social and human data, technocentrism claims technological methods for technical data. Since in the first case the role of the lead science is attributed in that context often to sociology, the anthropocentric frame can thus run under the label sociologism. The technocentric frame might be called – analogically – technologism. Sociologism gives technological issues no attention. Thus, it does not care about artificial intelligence. Technologism is another methodological choice that is found at departments of computer science and others throughout the world. It is nourished by the condition of competitive excellence in one's own discipline and AI is one of the important fields and it has been diversifying into related fields like Autonomous Systems, Deep Learning etc. Both sociologism and technologism add to the existence of two cultures instead of trying to overcome them.

Multi-disciplinarity 'includes several separate disciplines, e.g., when researchers from different disciplines work together on a common problem, but from their own disciplinary perspectives' (Burgin and Hofkirchner 2017, 2). Multi-disciplinarity is a rather undeveloped state of working together. Inter-disciplinarity 'involves interaction and coordination between several disciplines aimed at the development of knowledge in these disciplines, e.g., when researchers collaborate transferring knowledge from one discipline to another and/or transforming knowledge of one discipline under the influence of another discipline' (Burgin and Hofkirchner 2017, 3). But despite cursory exchanges at points of intersection, disciplines keep themselves reciprocally exclusive without significant change – think of Science-Technology-Society, of

Informatik und Gesellschaft in German-speaking countries and else. Hybrid human-machine-interactivism tries a mix of particular frames. As long as a third culture will not be under consideration, a mixed frame will not transform the encounter of human intelligence and AI into a consistent approach.

Those deficient epistemological frames are a shaky premise for ontologies.

Dualistic Models

As to ontologies, anthropo-, technocentric and interactivist models are used to dualism instead of monism as in the case of anthropo- and technomorphism. Human and machine are assumed to be disjunct and to belong to different classes of the real world.

The main point of anthropocentrism is that the human is incommensurable with a machine. Humans and society are modelled as something completely different from a machine. Man is not a machine. Man is unique. Idealistic and spiritualistic positions would share such an approach. Humans are regarded as sentient, robots as corpses. Human intelligence is not mechanical.

What the anthropocentric ontology holds for the human, technocentrism holds for the machine. The machine is modelled as something that avoids human error. This makes machines unique. Technophilia as in trans- and posthumanism are examples of such a position. Machine intelligence is not human.

While the anthropocentric and the technocentric models hypostatise the uniqueness of either the human and social or the machine, the hybrid, interactivist model focuses on the interaction of both sides that enter the interaction as independent entities. But since the different degrees of complexity of both sides are not taken into consideration, a plural network is hypostatised that obscures the effective working of the interaction. This is the result of using the frames of multi- and inter-disciplinarity. Examples are the flat ontologies in Bruno Latour's Actor-Network Theory (ANT) (Latour 2006), which conceives humans and machines as 'actants', as well as sociomaterialism (Barad 2012, Suchman 2007), which conceives of generic 'intra-action' of agents with their ecologies.

Dualistic models that cannot avoid the disconnection of human and machine are the proper basis for designs that segregate.

Segregative Designs

Anthropocentric, technocentric and interactivistic designs follow the pattern of segregation. The human and the machine shall be treated in discriminative ways.

Anthropocentrism holds that the human shall be treated better than the machine. Man is the pride of creation, as theocratic beliefs have been formulating.

The human shall be perfected without resorting to technology. Social processes are placed over and against technological ones – technology is treated as trumpery, engineering might even be dangerous. AI is not needed or might devaluate the position of human intelligence.

The technocentric position is the opposite of anthropocentrism: The machine shall be treated better than the human. The machine is to be perfected to be devoid of human error. If a machine is liable to failure, then it is because of errors of the operators, that is, humans, because of programming errors that are the fault of humans, or because of material defects that are, in the end, due to faults of humans, again. Machines can, in principle, and they do so in reality, outperform humans. Intelligence of machines will render the intelligence of humans obsolescent. That is the credo of posthumanism and singularitarianism – a kind of Nietzsche's Übermensch but ex machina, that is, from the machines, robots, autonomous systems, AI.

The interactivistic position does not prioritise either side: The human and the machine shall be treated on an equal footing. However, doing so falls back into conflationist positions as to the interplay of social and technological practices. Anyway, in hybrid networks, design levels up machines or levels down humans. According to the famous saying of Latour that it is not me who shoots with the pistol but it is the pistol which (maybe better: who?) shoots with me, it is not humans who make decisions but intelligent devices whose decisions we just adapt to or execute (e.g., in the case of so-called expert systems in health care).

Combination

In contradistinction to conflations that frame, model and design human and machine on the sole basis of supposed identity of their degrees of complexity as well as in contradistinction to disconnections that do the same on the sole basis of a supposed difference of their degrees of complexity, a third way of thinking and acting orients towards the acceptance of identity and difference of their degrees of complexity at the same time – an enterprise of integration of human and machine. Integration is a combination that does justice to both what is universal and what is particular to human and machine.

The term that is chosen here to characterise the combinations with regard to the epistemological, ontological and praxiological aspects is techno-social systemism.

Transdisciplinary Frames

Techno-social systemism transgresses cross-disciplinarity and disciplinarity, in particular, it needs more than multi- or inter-disciplinarity – it needs trans-disciplinarity. Transdiciplinarity 'encompasses problems from different

disciplines but goes on a higher level than each of these discipline goes. In other words, transdisciplinarity treats problems that are at once between the disciplines, across the different disciplines, and beyond any of the individual disciplines involved. It is aimed at understanding of broad spheres of the world directed at the unity of knowledge' (Burgin and Hofkirchner 2017, 3).

A transdisciplinary frame needs systemism in the methods, that is, the assumption that different disciplines are to be interrelated in a systemic framework that provides what they have in common and grants, at the same time, relative autonomy to each discipline according to their place in the overall framework. Both social science and technology need to complement each other in order to constitute the big picture. Social data, technical data and data of the techno-social interaction are needed in unison.

Systemism has the potential to combine those data by combining the disciplinary approaches in question. It gives the whole edifice of sciences a new shape, from philosophy over the formal, real-world and applied sciences further on to disciplines on sub- and sub-sub-levels. It turns the formal sciences into a systems methodology, the real-world sciences into systems sciences and the applied sciences into sciences of artificial design of those systems. In such a way, the foundation of a science of techno-social systems is laid. Social science and engineering construe a common understanding of the systemic relationship of society and technology such that social systems science informs 'engineering systems science by providing facts about social functions in the social system that might be supported with technological means'; engineering systems science provides 'technological options that fit the social functions in the envisaged techno-social system'; and social systems science investigates, in turn, 'the social impact of the applied technological option in the techno-social system and provide[s] facts about the working of technology' (Hofkirchner 2017, 7). Hence, the epistemology of techno-social systems research paves the way for an ontology of human and machine, and for a praxiology of an integrated cycle of technology assessment and technology design.

Thus, techno-social systemism claims for a single frame for social and technical data that are comprised on a systemic meta-level.

The way is open to an unfettered scientific understanding of human intelligence, artificial intelligence and their relationship.

Dialectic Models

A techno-social systems ontology cannot resort to monism nor to dualism. It requires dialectic. A dialectical relationship goes beyond duality in that sides or parts are not completely separate. And neither are they brought together by operations on the surface. They hang together intrinsically, but asymmetrically, over steps of emergence. They are evolutionary products, they give rise to evolutionary products, they are nested one in another in line with their complexity.

Techno-social systems are social systems. They emerge from social systems when technologies of any kind are inserted into the social systems so as to improve the functioning of the social systems to reach a certain goal through the mediation of these technologies. These technologies transform those very systems into techno-social ones. These technologies are devised and developed to functionalise a certain cause-effect-relationship of the real world as artificial mechanisms in which the effect becomes the goal and the cause becomes the leverage. In order to serve effectively and efficiently the attainment of the desired or needed goal, artificial mechanisms are prepared to function as strictly deterministic as possible. In this respect, artificial mechanisms resemble natural mechanisms – the latter work according to strict determinism too. An artificially prepared mechanism is what is usually known under the term machine.

Thus, techno-social systems integrate humans and machines. Humans are products of evolution, machines are products of humans. Techno-social systems integrate them in line with their ontic features according to their evolutionary history. Humans and machines share, or have distinct, physical, biotic and social features (Hofkirchner 2020).

Let's first discuss their physical features:

Humans and machines share the fact that they are entities and embrace processes that belong to the physical realm. However, they differ essentially with regards to the specifics of their being physical and behaving physically. Making use of a distinction of Rafael Capurro (2012), humans and society can be interpreted as an agens – that is something that displays agency by itself – whereas a machine can be interpreted as a patiens – that is something that does not display agency and is passive. This is indicated by the following:

- Humans and society are able to organise themselves, that is, to build up order by using free energy and dissipating used-up energy, whereas machines cannot self-organise.
- Humans and society are made up of elements that produce organisational relations that constrain and enable synergy effects and they can constitute superordinate systemic entities, whereas machines are made up of modules that are connected in a mechanical way.
- Humans and society function on the basis of less-than-strict determinacy, which yields emergence and contingency, whereas machines are strictly deterministic and cannot behave in an emergent or contingent manner.

Second, let's turn to the discussion of biotic features:

Humans and society are physical entities and activate processes that belong to the biotic realm. Machines may, but do not need to, have parts that belong to the biotic realm. Even in cases where they do so, they differ essentially in quality. Humans and society are agents that are autonomous in the true sense of the

word (Collier n.d.), whereas machines are heteronomous mechanisms that can thus not show any degree of autonomy, as follows:

- As with any living system, humans and society are able to maintain their organisational relations by the active provision of free energy, whereas machines cannot maintain themselves.
- As any living system, humans and society are able to make choices according to their embodiment, their embedding in a natural environment and the network of conspecifics, whereas machines cannot choose.
- As any living system, humans and society are able to control other systems by catching up with the complexity of the challenges they are faced with by the other systems, whereas machines cannot catch up with complexity and are under control by organisms.

And, third, let's discuss one last category of features – the social one:

Humans and society are not only physical and biotic, they are the only physical and biotic systems on Earth that belong to a specific, the social realm, too. They are, essentially, social agents, that is, actors. Machines are social products, artefacts, that are made by actors, but they do not possess the agency of actors. This is implied by the following:

- Humans in society constitute – by action, interaction and co-action with other actors – social agency that reproduces and transforms the structure of the social system (social relations), that, in turn, enables and constrains the social agency, whereas machines do not partake in the constitution of society but support the action, interaction and co-action of actors.
- Humans in society provide the commons as effects of social synergy, whereas machines support the provision of commons and pertain themselves to the commons.
- Humans in society are the driving force of social evolution, including the evolution of culture, polity, economy, ecology and technology, whereas machines are driven by social evolution. However, they can even play a supportive role in changing the quality of the social system.
- Humans in society reflect upon the social structure, whereas machines do not deliberate but support the thought functions of actors.
- Humans in society set off the transition into actuality of a societal option of choice out of the field of possibilities, whereas machines do not directly trigger emergence.

As to the role of AI in the context of techno-social systems, we can conclude that artificial intelligence is and will be a mediation of the collective intelligence actors are capable of but is not and will never be (a property of) an actor itself. What is labelled AI, is nothing that can become independent and achieve a life

of its own. However, it promotes the intelligence of the social system. In this vein, Francis Heylighen (2015, 2016) rejects the idea of a singularity by which a single supra-human artificial intelligence seems purportedly possible, since intelligence is and will be distributed over social actors that cyber technology merely connects, which means that the emergence of a 'global brain' remains rooted in humans. From this dialectical point of view, what is *in statu nascendi* is a social suprasystem that would be global, notwithstanding the technological infrastructure of a global brain.

Dialectic models are the proper contributions to a paradigm shift towards the third culture.

Integrative Designs

Techno-social systemism demands an integrative way of thinking and acting. It demands responsibility in two different respects: first, the responsibility for the functionality of what shall be designed – does the mechanism effectively and efficiently serve the purpose for which it shall be designed? This is a matter of fact. However, since the question of how functional technology is can be answered in a decontextualised manner from a mere technical point of view, a second respect is required: The responsibility for the meaningfulness, for the social usefulness of what shall be designed – does the purpose for which technology shall be designed also make sense, that is, does it promote a social value, does it conform with a social norm? The whole picture of praxiology can be seen only when in the context of the social. The default value of meaningful technology is to serve the vision of a good society, of individuals living a good life and of cultivating the common good. Such an alter-humanism instead of an old-fashioned humanism or post-humanism is compatible with the third culture – alter-humanism harnesses tools for conviviality (Illich 1973). This means that techno-social systems integrate humans and machines according to their appropriate treating. The check of that necessitates an integrative technology assessment and technology design.

Conclusion

A review of possible ways to establish a relation between human and machine clarifies the shortcomings, if not the stubbornness of old-fashioned humanism, on the one hand, and anti-humanism in a modern disguise, on the other, when an identity of human and machine is affirmed at the cost of their difference that is negated – done so by conflations – and when the difference between human and machine is affirmed at the cost of their unity that is negated – done so by disconnections. The way out is the establishment of a relation through affirming both the identity of, and the difference between, the two sides – as done by

combinations. Combinations provide the proper basis for a humanism that is up to the challenges of digitalisation – Digital Humanism.

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