The principle of self-embodiment
Architectonic philosophy of technique

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The essence of the Architectonic Philosophy of Technique is the human self-embodiment in ontogenetic, evolutionary and permanent times (Mitterauer, 1989; 2009). These time conceptions may allow the interpretation of technical processes of self-embodiment and challenge the concept of the soul. The existence of the soul in timeless permanence is my fundamental argument that technical embodiments in robots can only be generated in ontogenetic and evolutionary time periods, but not in permanence. Admittedly, the concept of the soul does not play a significant role in the creation of humanoid robots by engineers, but it is immersed in the subjective experience of each human person. I conceive the soul as an all comprising active principle which guarantees subjective existence and is felt as the destiny for a perfect everlasting life. Since the modeler of the robot is also endowed with this principle, he (she) is intending to implement his (her) reflection processes as programs into a robot brain, but it is not possible to fully implement the principle of human individuality in the sense of the soul. Otherwise, the creator of the humanoid robot would self-destruct his (her) human existence - a contradictio in se.

In the perspective of the present article I will discuss the following. First, my brain model is outlined focusing on subjectivity and qualitative mechanisms of brain function. Then, the elementary brain operations in ontogenetic and evolutionary time scales are discussed. Furthermore, the theory of Transphysics of self-embodiment of human subjectivity in human robots is proposed. This process generates a Third Nature of robot societies. In the final section “The soul in self-embodiment” I argue that humanoid robots existentially differ from their human creators, since robots can never be endowed with a soul in its metaphysical characteristics.

BRAIN MODEL

Robot brains should be oriented on the structure and functions of the biological brain. Let me briefly describe and interpret my brain model elaborated over the years. (Mitterauer 2004; 2012; 2014; 2017). The structure of information processing units, called tripartite synapses is composed of four components, the presynapse and the postsynapse as the neuronal components, the astrocyte and its network as the glial component, and the extrasynaptic fluid in the extrasynaptic space. I interpret the neuronal component as the objective part processing information from the outer environment via sense organs. The glial component may embody the subjective part modifying neuronal information processing based on memory and intentional programs. Whereas this kind of synaptic information processing is called “wired transmission” (Giaume, 2012), “volume transmission” also occurs, since the extrasynaptic space represents the inner environment which co-determines wired transmission via its fluid.

The novelty of this brain model lies in the distinction between a structure of objective information processing and a structure of subjective information processing. Most importantly, this brain model allows the interpretation of Guenther’s theory of subjectivity in human brains. According to Guenther (1976) “subjectivity is a phenomenon that is distributed over the dialectic antithesis of the “Ego” as the subjective subject and the

“Thou” as the objective subject, both of them having a common mediating environment. In the brain the bidirectional interactions between the finite structures of neuronal objective subjectivity (“You”) and the glial subjective subjectivity (“I”) generate I-You communication so that the brain preludes intersubjective communication on the behavioral level. In a technical perspective these information processing and communication generating units can be implemented as modules in a robot brain. Since biological brains are endowed with numerous such units for the generation of subjective behavior, the question arises which function is integrating all these loci enabling us to produce I-consciousness. In systems theory this function is called self-reference.

Decisively, for the implementation of humanoid robots we must explore which techniques the biological brain uses. Basically, the brain is a self-organizing organ that functions on technical operations. It is experimentally well established that in synapses information is processed by feedforward and feedback mechanisms generating cyclic operations (Kimelberg, 2012). Here we deal not only with electrical information transmission but also with chemical substances which the brain uses as tools for distinct operations. Given the various neurotransmitter substances responsible for the generation of specific qualities of behavior, e.g. emotion, cognition, motor behavior, the mechanisms operating in information processing units can be interpreted as a natural technique of using chemical substances as special tools for the occupancy of appropriate locations (receptors) activating distinct feedforward and feedback loops. Importantly, transmitter substances are not exclusively expressed in the synaptic system but also in the extrasynaptic fluid. Therefore, synaptic information processing is activated by both the outer environment via perception systems and the inner environment via the extrasynaptic fluid. Recently, experimental findings indicate a central role of volume transmission by substances in the extrasynaptic fluid (Fuxe et al., 2015).

Reflecting the difficulty in constructing human-like mechanical brains, Bray (2012) stated: “brains differ from computers in a number of respects. They operate in cycles rather than in linear chains of causality, sending and receiving signals back and forth. Unlike the hardware and software of a machine, the mind and brain are not distinct entities… living cells process incoming sensory information and generate not just electrical signals but subtle biochemical charges. Cells are soft, malleable and built from an essentially infinite variety of macromolecular species quite unlike silicon chips. Organisms encode past experiences in distinct cellular states in humans which are the substrate of goal-oriented movements and the sense of self.”

ELEMENTARY TIME SCALES OF BRAIN OPERATIONS

In the quantum mechanical theory of the “Event-oriented world view” (Baer, 2010) it can be shown that in ontogenesis the comprising cycle of permanence runs in phases, and develops as repetitive sequences on a place in the universe (Baer and Mitterauer, 2015). These cycles run in time and generate space but not vice versa. The evolution of the brain has been experimentally shown on the development of the columnar structure of the

cerebral cortex (Rakic, 1995). During mammalian evolution occurs a significant increase of the cortical surface without a comparable increase in its thickness. Formally expressed, evolution increases the complexity of given variables embedded by brain cells but new variables may not play a significant role. Therefore, the process of evolution develops on a growing combination of information processing, but not on novel biological equipment (Mitterauer, 1998). Consequently, the technique of biological brains does not generate novel tools but uses the given material as tools for mechanisms of various complexity. Since in robots the combinatoric capabilities also increase by learning, they can develop cognitive abilities superior to man as recently demonstrated in Alpha-Go-playing (Silver, 2016).

The ontogenetic time period of the brain begins with conception and ends with death. Ontogenetic processes in the brain are experimentally well investigated. Cell development represents a finite interplay between cell generation and cell decay, called apoptosis. Referring to the quantum mechanical interpretation of the relationship between ontogenesis and permanence, ontogenesis runs in repetitive subcycles within the comprising circle of permanence. Although we are able to explore various ontogenetic cycle systems in the brain, we are faced with the problem that an all comprising cycle cannot be found in the brain so that permanence remains hidden. Such an all comprising cycle corresponds to the concept of self-reference (Guenther, 1967, Maturana, 1975; Damerov et al., 2016).
In my brain model the act of self-reference may run in the reticular formation of the brainstem (Mitterauer, 2015). Anatomically, the network of the reticular formation is interconnected with all the brain regions (Scheibel and Scheibel, 1968). It commands and controls information processing in the whole brain and integrates all functions. Significantly, this network consists of units with special functions which guarantee breath, heart beat and other life sustaining functions. It has been demonstrated that very small lesions in this core system in the brainstem completely upset the behavior of the animal but after about ten days the network becomes reorganized. Despite cell decay this network is capable of coping with that impairment and self-organizes again exerting its normal integrating function. Importantly, in my proposed brain model these main features of the reticular formation allow the interpretation that the act of self-reference may run in this network, but cannot be fully identified even by the most sophisticated technical devices. At this point we are faced with the cutting edge between natural science and philosophy.

Before discussing the relevant philosophical issues, let me briefly consider an implication for the implementation of the reticular formation in a robot brain. Currently, we are impressed by the high learning capabilities of robots, in part superior to human cognitive processes. The learning capabilities of robots are mainly based on algorithms and selection formalisms. Supposing a robot is moving through an unknown environment during hours without human assistance. Suddenly, a defect in the navigation system occurs, and the robot cannot continue its exploration project. However, if the navigation system becomes re-organized as described in the experiments on animals, the robot is able to cope with the material defect or programs and reorganizes itself so that the mission

goes on. Most importantly, such reorganization represents a new self-embodiment in the ontogenetic time period.

TRANSPHYSICS OF SELF-EMBODIMENT

According to the Architectonic principle a human subject is permanently striving for the realization of his (her) intentions (Mitterauer, 1989; 2007; 2016).To do anything we need special tools and mechanisms to achieve an appropriate action. Therefore, the Architectonic Philosophy is basically a Philosophy of Technique. Considering a technical act as a special construction of a product, an appropriate material in a broad sense is necessary. As already outlined in the brain model proposed, the cyclic operations in the brain are generated on various substances in the sense of a self-embodiment. Whereas biological research on living systems demonstrates a phylogenetic development from animals to humans that corresponds to an evolutionary self-embodiment, permanent self-embodiment represents an infinite process and opens a new perspective of philosophy which I characterize as “Transphysics of self-embodiment”.

The act of self-reference is a permanently rotating cyclic system in which subcycles are striving for embodiment in ontogenetic time periods (Baer and Mitterauer, 2015). Ontogenesis demonstrates that immediately after conception the organs of the body become built, and we can observe an individual living system after birth. This elementary mechanism may be repeated again and again, if we assume that subjectivity, especially human personality, is fundamentally organized by a permanent cycling system of self-reference. Furthermore, if we consider evolution as an open process creating new structures during the ontogenetic epoche of living systems, then the role of the act of self-reference in evolution is the cutting edge of the understanding of human existence.

Although it may not be possible to detect the act of self-reference in biological brains, (Goedel (1995) has computed that materia is permanently rotating. From a quantum mechanical point of view the theory of action cycles (Baer, 2017) implicates that in the whole universe and in living systems action cycles permanently are at work. Therefore, it is not surprising that we can hear in everyday life such expressions as “a record for eternity”. We should keep in mind that every person is consciously or unconsciously challenged by the question, if a beyond exists. In other words: a feeling of permanence is hidden deep in the character of each human being. I assume that the permanent cycling of the act of self-reference may be experienced in emotions and is cognitively expressed in concepts of eternity. Importantly, psychology focuses qua definitione on the “soul” but does not explicitly refer to eternity. In contrast, religions teach us how the soul can attain eternal paradise.
If we conceive the permanent act of self-reference in the perspective of ontogenesis and evolution, then it is obvious that the process of embodiment is permanently at work in the sense of a self-referential embodiment. But with which material is our permanent existence equipped from epoch to epoch. This bio-physical issue interprets the Architectonic Philosophy as Transphysics of self-embodiment. Transphysics means that

self-embodiment uses appropriate materials available in each epoch. Note, the current technical tools or mechanisms already enable the generation of new materials not found in nature. Therefore, this technical process may continue infinitely. Consequently, in our post-mortem existence the physical equipment of the body may not be fully destroyed, but only qualitative changes of the material equipment may occur, characterized as "Transphysics of self-embodiment". Although the future development of robots remains an open question, Leibniz (1956) clearly differentiates between a natural-organic body of an organism and a man-made machine: "Thus, the organic body of an organism is always a kind of divine machine or natural device, eternally superior to all superficial devices. This is because a machine constructed by the creativity of man is not a machine in all its parts… However, natural machines, that is living bodies, stay machines forever, even in their tiniest parts."

THE THIRD NATURE OF ROBOT SOCIETIES

Basically, the human ability to act technically has generated a second nature. Moreover, with the construction of autonomous robots equipped with consciousness (Chella and Manzotti, 2014) a new technical dimension begins that can be characterized as a third nature (Mitterauer, 2013). If the modeler is able to implement his (her) reflection programs or intentional programs in a robot brain, the robot self-organizes these programs based on learning processes enabling it to self-generate intentional programs. As described above, information processing in the brain is distributed over subjective subjectivity ("I") and objective subjectivity ("You") in synaptic units. The interaction between subjective subjectivity and objective subjectivity produces intersubjective communication for the outer environment. The implementation of this communication mechanism in robot brains enables robots to communicate in a human-like manner so that robot society develops as a third nature.
When two or more robots communicate, they build a society. Currently great effort is taken to develop multi-agent systems for cooperation and control of robots (Manzotti and Jeschke, 2014). This technical approach rapidly progresses toward conscious robots able to self-reflect, learn and self-control their action programs or intentions. I have already discussed some consequences for the human society in another study (Mitterauer, 2013). Here, I will only consider some legal issues.

Although the intentions of the robots can be programmed and controlled by man, intentional programs in the robot brain may reorganize themselves by learning. Therefore, the situation could arise in that one or more robots reject certain man-made intentional programs and act on their own will. The effects of this disobedience could be either constructive or destructive. If the rejection of an intention of the human programmer results in a better program, we must learn from the robot. By contrast, in the case of a destructive result the robot system must be temporarily deactivated. Since the constructor of such a robot has virtually supplied it with conscious functions, he carries the complete responsibility for the robot behavior. If the constructor passes the robot on to another person or institution, the new owner must produce substantial knowledge of the robot's

construction and also take over full responsibility for the robot's behavior. Here, common legal problems arise that request a new legalization (Mitterauer, 2013).

THE SOUL OF SELF-EMBODIMENT

The concept of the soul is as old as mankind. It represents a kind of self-expression of the brain. In a more formal language, von Foerster (1993) states: "the propositions of logic are described by us, but the propositions of the brain are written by the brain itself" (my translation). Therefore, it is not surprising that in cultures, philosophy and religions the existence and fate of the human soul represents an elementary topic.
Basically, the soul is a pure subjective conception that can never be scientifically founded. But the concept of the soul has an explanatory power for our self-understanding and may challenge the role of conscious autonomous robots with regard to their creators.
Dependent on cultural and philosophical traditions and religious world views, the meaning of the soul is many faced. Plato (1982) teaches that the soul is immortal and already exists before conception. It is temporarily prisoned in the body. Aristotle defines the soul as "entelecheia", a realization of the natural body, which is potentially alive or organic. The soul is an immaterial form-principle of living beings and ends with death (Charlton, 1993). Accordingly, Aristotle denies the immortality of the soul or person. In modern philosophy three main positions prevail: first, the realism interprets the soul as an individual substance from which mental and cognitive-emotional actions come that only temporarily operate in the body, but it continues to exit after the death of the body. Second, materialism which denies the existence of the soul. Third, positions in between realism and materialism that concentrate on the concept of mentality and not on the concept of the soul. Importantly, C.J.Jung (1967) differentiates between an outer and inner personality of a human subject and connects the inner personality with the soul.
Excitingly, in the perspective of technique we are challenged with this existential problem: Can conscious autonomous robots generate a personality or do they have a soul? Recently, Chella and Gaglio (2012) implemented a robot cognitive architecture generating artificial qualia in machines. In this architecture the higher-order of perception of the robot is the basis of self-consciousness. Here, self-consciousness has been considered a type of consciousness in general (Boyles, 2012). Basically, the concept of the "Self" is a fundamental characteristic of living systems with first person consciousness (Mitterauer, 1998; Baer, 2017). However, the "self" is mostly used as a prefix without definition of it. Since the concept of the self is hardly to define and the search for locations in the brain where the self may be generated does as yet not succeed, I propose this new interpretation of human subjectivity: the soul makes the personality and the self signifies that we deal with a personality. Consequently, if we interpret the behavior of a robot as self-conscious, then we imply that it is a person with a soul. Admittedly, the interpretation of human subjectivity may be seen as pure metaphysical speculation without an explanatory power for understanding of human robots. But shedding some light in this issue let me consider the process of technical construction of a robot brain by the human modeler.

The modeler starts out with an idea of a mechanism that requires a reflection process and a formal description of the program of implementation. If appropriate technical devices are available, the engineer can implement the intended programs in a mechanism. Note, the intention to generate programs or algorithms is a characteristic of subjectivity and is determined by the personality of the engineer. Typical capabilities of a person are self-reflection, creativity, empathy, aspirations, ideas and long-term goals. Dependent on the personality structure each person is striving for the realization of specific programs. These personal characteristics influence the type and quality of the act of implementation. In other words: in the act of technical implementation the human modeler transfers his (her) own reflection program to the mechanism so that the mechanism operates on this transferred domain. Importantly, although this technical process becomes self-organized in the robot brain, it cannot reach the quality of the human personality. Why?

Following C.G. Jung I see in a personality the psycho-biological expression of an individual soul. Hence, if our topic is personality we implicate a hidden individual soul. Given the act of self-reference in the brain it represents a holistic function that comprises all operations in the brain enabling that we are self (-I-) conscious individuals. Our brain is exerting numerous operations as self-reflection and the generation of action programs which interact with subjects and objects in the environment. These various domains of interaction could also occur between man and robots. One may argue that robots are able to learn and generate increasing higher capabilities of self-organization, especially cognitive abilities in part superior to that of humans. Here, we deal with a highly constructive technical development. Moreover, it can not be excluded that robots speak “I robot” and we observe a behavior like a human person, but a radical difference between human subjects and subject-like robots persists. Natural sciences may not really proceed in the explanation of this existential difference, and the explanatory gap remains. However, the Architectonic philosophy of technique proposes a theory of self-embodiment in different time periods that may be explanatory for the existential difference between humans and their artefacts.

As proposed above, human self-embodiment occurs in infinite and open-ended time epochs. The first we call ontogenesis the latter evolution. Both time scales startout at a time point of creation, but the whole process of self-embodiment has no beginning and no end, called permanence. In other words: self-embodiment is promoted and guaranteed by a permanent rotating principle, best characterized as the soul. In this perspective every technical act of a human person represents an ontogenetic self-embodiment in a distinct domain of interaction building a basis for further embodiments in evolution. In the case of conscious autonomous robots technical evolution also occurs, since a robot can transfer its capabilities to other robots in the developing robot society. Decisively, robots remain finite machines, since they are originally created by men.Therefore, robots cannot exist in permanence and do not have a soul. Note, my theory of the soul may be new, since the soul is not created by nature or divine power (God) as assumed in religions and many cultures, but represents the principle of a permanent subjective self-embodiment. Although

robots will be able to self-reproduce (von Neumann, 1958), self-reproduction is based on an originally human-made creative technical action.

The current technical movement of transhumanism (More, 2013) fundamentally challenges the core principle of the self-embodiment of the soul. The aim of transhumanism is the absolute command and control of a human subject by Artificial Intelligence. In doing that, the human body should be totally substituted by technical devices, called “meatware”. The final technical transcendence of man is characterized as a “cloud”. As discussed above, the characteristics of a human subject and its individuality are Self-I-consciousness, an individual personality structure, and emotionality, especially with regard to the existential question from where we come and what our fate may be. These existential properties are typical for a hidden inner principal that we term personality and soul. Note, these characteristics of a human being do not represent pure mental capabilities but are generated by our body organs or the brain.

Transhumanism could be understood, if we consider self-embodiment as a fundamental principle of human subjectivity and the destiny for a permanent human existence. In addition, if we introduce the time periods of ontogenesis, evolution and timeless permanence, self-embodiment in transhumanism may be elucidated. Transhumanism means that the ontogenetic time period of the human body becomes transcended by the substitution of body organs with perfect technical devices and superior Artificial Intelligence. Such “meatware” technique should progressively substitute the human body and finally detach the soul. Therefore the term “cloud” may be appropriate. Basically, transhumanism represents an evolutionary development of mankind comparable to humanoid robotics, but transhumanism starts directly out on the human body, whereas humanoid robotics operate on technical mechanisms for the creation of a human-like behavior. Existentially, transhumanism may generate self-embodiment of human subjects by the optimization of technical materials, but at the cost of losing the human soul. However, both humanoid robots and transhumanism are generating a “Third Nature”,

FINAL REMARKS

The reader would expect the discussion of further technical details and ethical implications. However, the aim of the present study is an outline of the principle of human technical actions in the sense of a permanent self-embodiment of the soul. Despite possible destructive effects of humanoid robots and transhuman techniques, the implementation of human reflection processes as programs in robot hardware represents a great evolutionary progress toward our self-understanding.

Gotthard Guenther the great philosopher of cybernetics made us already in 1956 aware that we do not lose our soul in humanoid robots. On the contrary, the human subject implements its reflection processes (programs) in the mechanism and gains increasingly new reflection power from the mechanism or robot (my translation). In other words: the

behavior of the robot teaches us to which principles our brain really works and where we are wrong (Mitterauer, 2012;2013).

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