HUMAN TECHNICAL ACTIVITIES:

- Creation of inanimate tools directly or indirectly guided by human intervention

- Creation of machines that artificially assist organic life (bioengineering)

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Spiritual Robots:
Religion and Our Scientific View of the Natural World

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REVIEW

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Building artificial humans to understand humans

Abstract If we could build an android as a very humanlike robot, how would we humans distinguish a real human from an android? The answer to this question is not so easy. In human–android interaction, we cannot see the internal mechanism of the android, and thus we may simply believe that it is a human. This means that a human can be defined from two perspectives: one by organic mechanism and the other by appearance. Further, the current rapid progress in artificial organs makes this distinction confusing. The approach discussed in this article is to create artificial humans with humanlike appearances. The developed artificial humans, an android and a geminoid, can be used to improve understanding of humans through psychological and cognitive tests conducted using the artificial humans. We call this new approach to understanding humans android science.

Fig. 1. Three categories of humanlike robots: humanoid robot Eveliee P1 (*left*: developed by Osaka University), android Repliee Q2 (*middle*: developed by Osaka University and Kokoro Corporation), and Geminoid HI-1 (*right*: developed by ATR Intelligent Robotics and Communication Laboratories)

Fig. 3. The first android; Repliee R1 (*left*: developed by Osaka University), and the latest android, Repliee Q2 (*right*: developed by Osaka University and Kokoro Corporation)

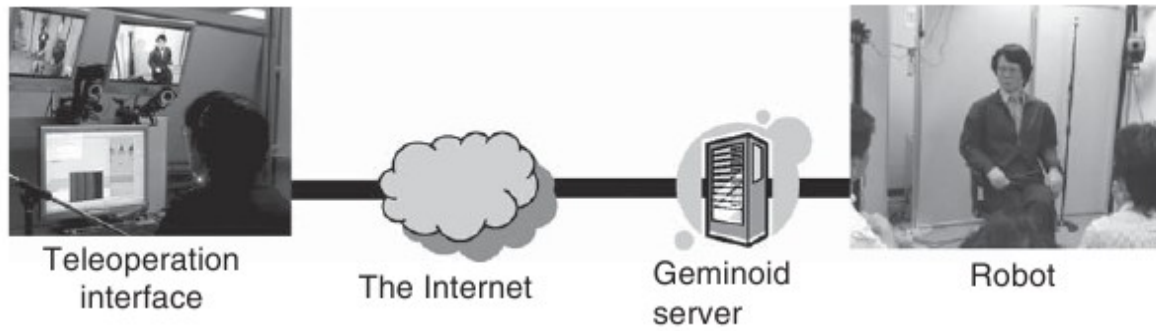**Fig. 4.** Facial expressions generated by android Repliee Q2
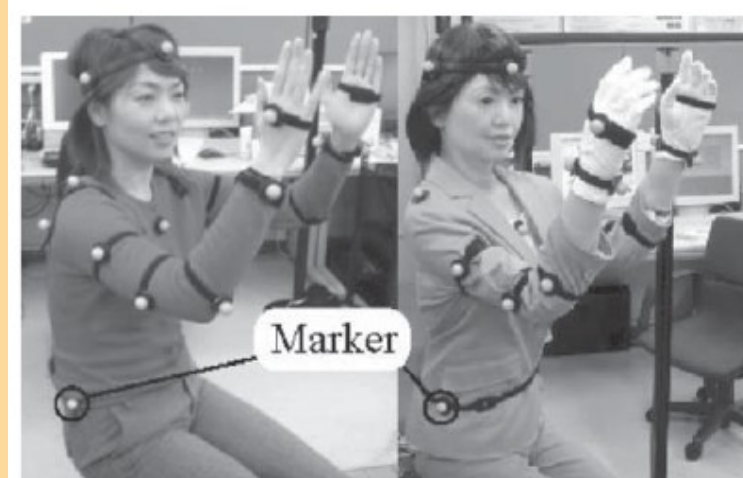
Fig. 5. Replicating human motions with the android

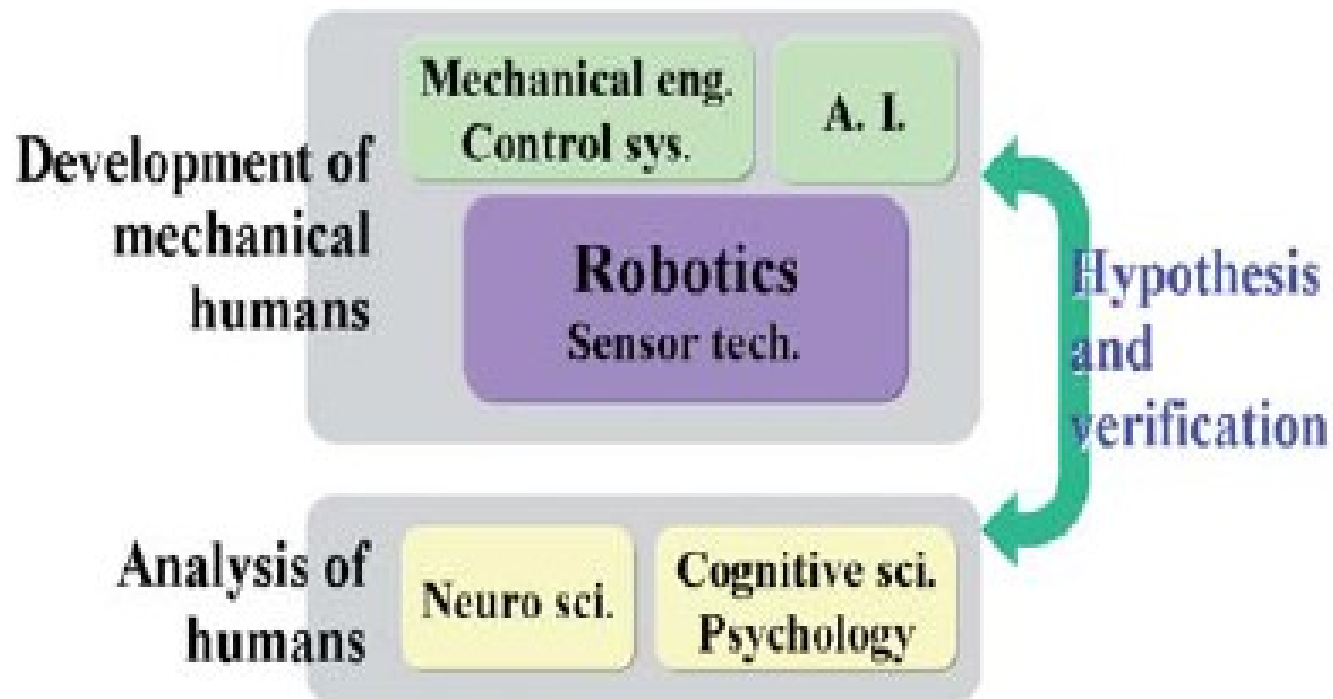**Fig. 8.** Geminoid HI-1 and its human source

Fig. 9. Overview of the geminoid system

Teleoperation interface

The Internet

Geminoid server

Robot

Fig. 10. Teleoperation interface

Fig. 2. Framework of android science. *AI*, artificial intelligence

the definition of the object must reflect its nature, distinguishing what is real, although non actual, from what is only "thinkable" but in fact not real
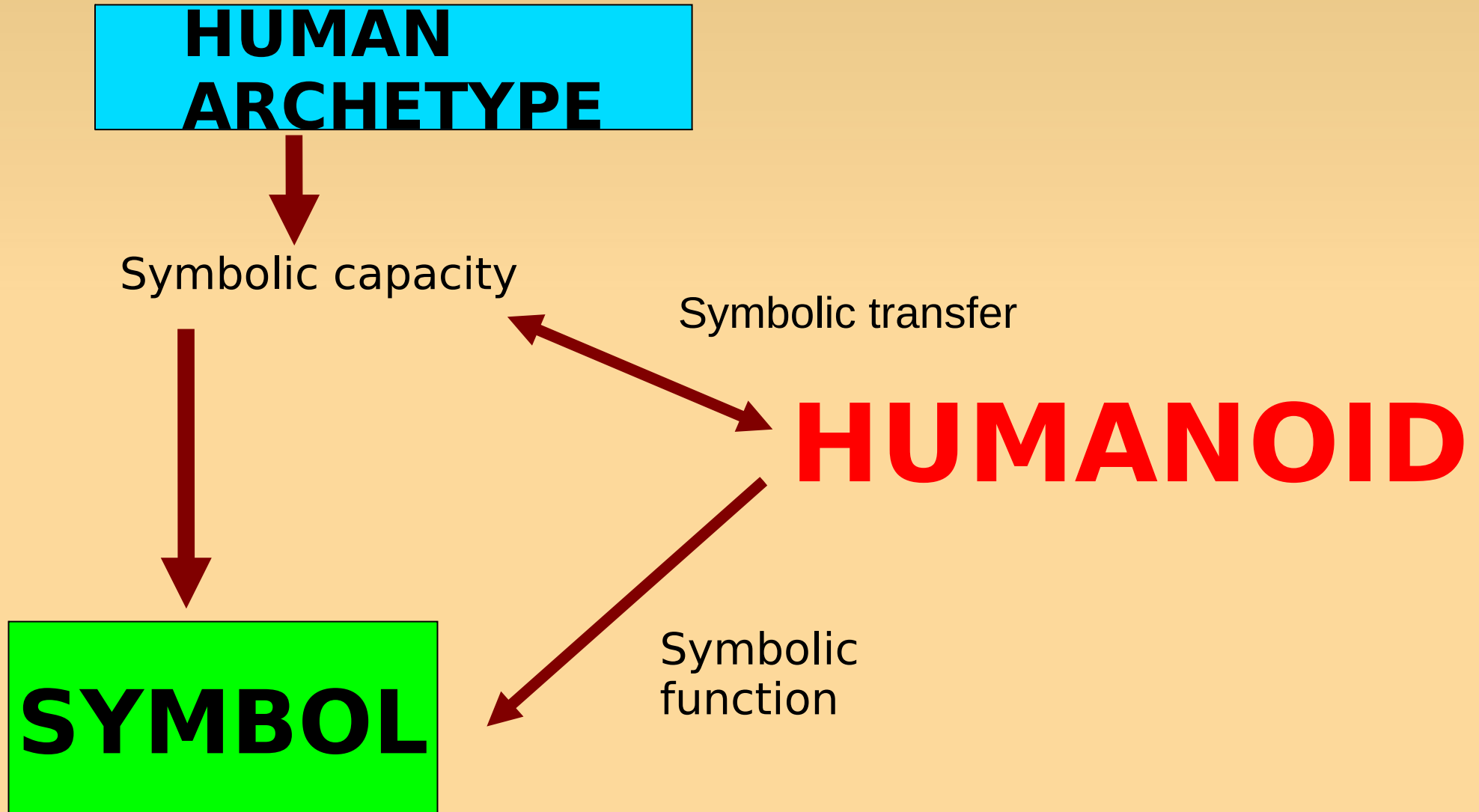
Science-fiction is not a matter for technoethics

The use of the inductive method in technoethics, as in the experimental sciences or in technology, could be useless to give an utile judgment for more than one case

The symbolic transfer as a key for the ethical dimension of humanoids.

HUMAN ARCHETYPE

Symbolic capacity

SYMBOL

HUMANOID

Symbolic transfer

Symbolic function

Definition of humanoid

"a humanoid is not less than...

Definition of humanoid

...a *symbolic (partly) unlimited machine"*

the symbolic spectrum of man includes the corporeality, for the symbolic ability of the language is intrinsically linked with the body

The body is the first symbolic tool of man

the symbolic ability of the humanoid is limited only by the same limits of the human corporeality

the "written word" or a word in anyway disconnected with the whole person can have many advantages at the level of historical, social, artistic meaningfulness, but is always under the symbolic ability of the "pronounced word"

an AI system must include, to be considered as humanoid, a bodily dimension capable to establish relational links with the environment through sensors and effectors

the specific characteristic of the
human or humanoid language is the
significant pluri-finality

the human word has a total conventionality (not arbitrariness!), in which the link between the sign and the signified reality is added to the nature

the human word is non *natural*, but *cultural*

The indetermination of the symbolic ability in the humans founds a gap between being and language, between "internal word" and "external word", between all that the person reveals through his/her symbolic manifestations and all that is the true perfection of his/her being

the ethical dimension of the language consists precisely in this required continuity, acted by the personal freedom

SYMBOLIC ABILITY = ETHICAL DIMENSION

the symbolic transfer

a humanoid performs autonomous functions that can look like ethical acts

its product is apparently not a final formalized product

in humans the ability for ethical acts lies in the self-orientation of the actions to the final aim of mankind; what does occur in the case of the machine?

technics are not limited by the goal of the technical act; every technical achievement opens new possibilities, because technics has not a finalistic sense, despite every technical object is finalized to the purpose which is decided in its production

in technology every arrival is a departure

the human ability in giving a finality to acts can integrate the objective dimension of the technical act in the free finalization of human acts

"reproducing" the symbolic spectrum is not a new symbolic function: it is necessary to consider it as a more complex
"already-produced-symbol"

in the human acting the formalization of an act as directed toward the end is due to the free will, and not to the physical dimension of the act

(obviously, this implies the statement of the free will as not reducible to the biological functions)

the humanoid, instead, formalizes its symbolic act only with the nexus between the physical reproduction of the human act and the formalizing human free will, and not only in the act of reproducing itself

the human free will transfers the symbolic ability to the machine through the intrinsic technical capability of human beings

the ethical dimension of humanoids is gathered primarily from the human free will that has built them

the humanoid, being a symbol capable of reproducing the symbolic function, increases the expressive capacity of freedom in a very important way; if the use of this capacity is ethical, this increment is very good from the ethical point of view

every symbol must be transparent, but the profusion of symbols can easily carry to a diminution of the symbolic capacity; this implies a very hard ***extrinsic ethical request***, for the symbolic possibilities of humanoids are really very big

in humanoids there is also a more important ***intrinsic ethical request***, non present in other symbolic machines, that comes from the symbolic transfer between human and machine

this is not always ethically correct, because non all the symbolic functions are transferable

the symbolic transfer is ethically correct when the object of the transfer is a human symbolic ability which consists in an ***objective trans-personal cultural dialogical product***

The symbolic transfer is ethically problematic when the dialogical ability of the whole person is involved in a *subjective personal level*

obviously these considerations must be preceded by the ethical judgment of the *transferred function* apart from the transfer itself

using a humanoid for stealing is always evil, although the humanoid in this case is able to act in a "very human way"!