An argument for the impossibility of Human-Robotic Communication

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"I propose to consider the question,
"Can machines think?" This should begin with
definitions of the meaning of the terms
"**machine**" and "**think**.""

(Turing 1950).

The key notions we have to define are:
‘**Intelligent System**’ and
‘**Communication**’.

Prerequisites

An appropriate definition of *Robotic Intelligence* requires it to be independent of both human constructability and of any human characteristics which might limit its functions or development over time.

Definition

A system, S, is intelligent if and only if:

a) It possesses sensors.

b) It is able to act on its environment.

c) It possesses its *own* representational system R_s, i.e., R_s is independent of the language of another kind of system S^*.

d) It is able to connect sensory, representational, and motor information.

e) It is able to communicate with other systems within its *own* class.

To define Communication requires one to define Understanding.

Definition of (the-end-result-of) Understanding

An entity E has understood something, S,

if and only if,

E can present S in terms of a system of *own* primitives.

Definition of Communication

An entity E_1 has communicated with E_2 on a topic S if, and only if:

E_1 has understood S -symbol: $U(E_1, S)$.

E_2 has understood S -symbol: $U(E_2, S)$.

$U(E_1, S)$ is presentable to and understood by E_2.

$U(E_2, S)$ is presentable to and understood by E_1.

Conditions for Human-Robotic Communication

A human H and a robot R can communicate iff either $\Pi_H = \Pi_R$, or Π_H and Π_R can be described in terms of each other.

Précis of the Argument

Since linguistic primitives are reducible to sense primitives except if they are purely linguistic, one needs human sense primitives to understand human linguistic primitives *and*, at the same time, human linguistic primitives to describe the human sense primitives. Hence, Π_H and Π_R could not be described in terms of each other. In other words, human-robotic communication is impossible.

Human Cognition and the emerging Robotic Cognition are fundamentally different.