About Adaptivity, Design and Consciousness

Matthias Rauterberg

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Action Cycle ala Donald Norman

Gulfs of Execution

KIH ≠ KIW

Intention to act

Sequence of action(s)

Execution of the action sequence

The World

(Norman, 1988)
### Conditions for action control

<table>
<thead>
<tr>
<th>Condition</th>
<th>CK</th>
<th>CB</th>
<th>BC</th>
<th>AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a  Consciously knowing a (particular) goal</td>
<td>+</td>
<td>+</td>
<td>±</td>
<td>±</td>
</tr>
<tr>
<td>b  Knowing (at least) 1 solution path to reach the goal</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>c  Belief being able to go this path</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>d  Being able to go this path</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>e  Having actually accepted this particular goal</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f  Actually going this solution path</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

Input – Output relations

input \[\rightarrow\] interactive system \[\rightarrow\] output

inputs \[\rightarrow\] interactive system \[\rightarrow\] outputs

[sensor] inputs \[\rightarrow\] interactive system \[\rightarrow\] [actuator] outputs
Putting the User into the Loop

inputs → interactive system → outputs

product

user

body

action → perception

cognition
The Real Design Challenge is...

- industrial design
- designed intelligence
Five Adaptation Levels…

<table>
<thead>
<tr>
<th>Personalisation</th>
<th>Adaptation Levels</th>
<th>Services delivery dependent on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Proactive</td>
<td>History and predictions as well as user explicit</td>
</tr>
<tr>
<td>Profile</td>
<td>Responsive</td>
<td>e.g. recommender systems</td>
</tr>
<tr>
<td>Preferences</td>
<td>Perceptive</td>
<td>e.g. smart home</td>
</tr>
<tr>
<td>Identity</td>
<td>Interactive</td>
<td>e.g. brain-computer interaction</td>
</tr>
<tr>
<td>Anonymous</td>
<td>Reactive</td>
<td>e.g. thermostat</td>
</tr>
</tbody>
</table>

e.g. thermostat  
e.g. Switches/keyboards

REF: Aarts, E. & de Ruyter, B. “New research perspectives on Ambient Intelligence“  
Journal of Ambient Intelligence and Smart Environments 1 (2009) 5–14

/ industrial design  ■ designed  intelligence
René Descartes (1596-1650)

res cogitans - mind

res extensa - body, matter, etc

GOD

about 350 years later...

Karl Popper (1902-1994)

World-3: knowledge in objective sense

World-2: states of consciousness

World-1: physical objects and states

John Eccles (1903-1997)
"A sign, or representamen, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the interpretant of the first sign. The sign stands for something, its object [or referent]. It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the ground of the representamen."

(Peirce, 1931-1958, vol. 2, p. 228)
The Tao that can be spoken of is not the eternal Tao. The name that can be named is not the eternal name.

The nameless is the beginning of heaven and earth. The name is the mother of the ten thousand things.

Send your desires away and you will see the mystery. Be filled with desire and you will see only the manifestation.

"In the beginning was the Word, and the Word was with God, and the Word was God. He was in the beginning with God. All things were made through Him, and without Him nothing was made that was made. In Him was life, and the life was the light of men. And the light shines in the darkness, and the darkness did not comprehend it."

John 1:1-5

REF: Lao Tzu (400 BC) translated by Tolbert McCarroll
http://www.owlnet.rice.edu/~laotzu/text/thetao.txt
Kant, requires that we frame the epistemological problem in an entirely different way. The crucial question is not how we can bring ourselves to understand the world, but how the world comes to be understood by us. Analytic \textit{a priori} judgments include all merely logical truths and straightforward matters of definition; they are necessarily true. Synthetic \textit{a priori} judgments are the crucial case, since only they could provide new information that is necessarily true.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unity</td>
<td>Reality</td>
</tr>
<tr>
<td>Plurality</td>
<td>Negation</td>
</tr>
<tr>
<td>Totality</td>
<td>Limitation</td>
</tr>
<tr>
<td>Axioms of Intuition</td>
<td>Anticipations of Perception</td>
</tr>
</tbody>
</table>

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<tr>
<th>Relation</th>
<th>Modality</th>
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<tr>
<td>Substance</td>
<td>Possibility</td>
</tr>
<tr>
<td>Cause</td>
<td>Existence</td>
</tr>
<tr>
<td>Community</td>
<td>Necessity</td>
</tr>
<tr>
<td>Analogies of Experience</td>
<td>Postulates of Empirical Thought</td>
</tr>
</tbody>
</table>
Flores and Winograd (1990) illustrate this kind of ‘thrown-ness’: “When chairing a meeting, you are in a situation that
(I) you cannot avoid acting (doing nothing is also an action);
(II) you cannot step back and reflect on your actions;
(III) the effects of actions cannot be predicted;
(IV) you do not have a stable representation of the situation;
(V) every representation you have of the ‘situation’ is an interpretation;
(VI) you cannot handle facts neutrally; you are creating the situation you are in”.

Dorst (1997) characterizes engineering as design activities as ‘thrown’ into a design ‘situation’ (‘thrown-ness’ in German ‘Geworfenheit’).

A design situation based on ‘thrownness’, is a typical situation characterized by

(1) no possibility for ‘reflection’ (see (I), (II), and (V)), and
(2) no stable and predictable reality (see (III), (IV), and (VI)).

The designer creates and synthesizes the situation while he/she is acting in it.

The Reflective Practitioner

Why Conscious Design?

Conscious = Aware + Responsible

- ‘aware’: knowing about relationships, facts, etc.
- ‘responsible’: being committed to action of ethical value
How to achieve ‘Reflective Competence’?

REF: Courtesy of Will Taylor, Department of Homeopathic Medicine, National College of Natural Medicine, Portland, Oregon, USA, March 2007
The God’s Eye View

- The “God’s eye view” is based on the fundamental distinction between:
  - God versus the World
  - Perceiver versus Perceived
  - Subject versus Object

This is the standard view in Science
The First Person View
Phenomenology

The Primacy of ...

1600

R. Descartes

1900

M. Merleau-Ponty

2000

Paul Dourish

perception

action
cognition

emotion

perception

action
cognition

/ industrial design  ■ designed intelligence

TU/e Technische Universiteit Eindhoven University of Technology
The Primacy of Ulric Neisser...

Mind

The Cartesian Anxiety

industrial design

Richard Bernstein

Reality?
So, what’s left after Descartes?

Decrease the “God’s Eye View” perspective.

Increase the “First Person View” perspective.

Connect with the environment through action.

Find a proper balance between all three.
Designing Systems from Inside Out!

Our Future lies in OUR hands…
The End

René Magritte

Ceci n'est pas une pipe.