



# ECAP10

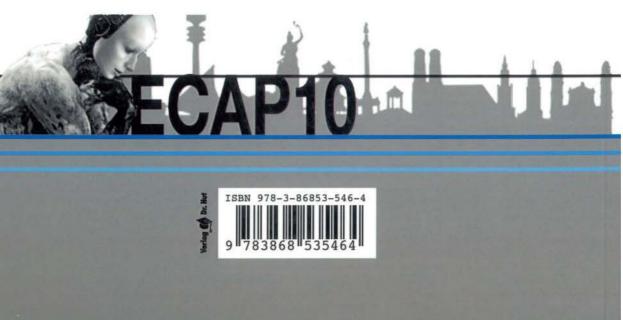
## VIII European Conference on Computing and Philosophy



General Editor: Klaus Mainzer

The interdisciplinary conference ECAP10 is devoted to the foundations and limits of man-machine interaction. Our thoughts and actions, our perception, imagination, and experience depend more and more on informational, computational, and robotic systems with increasing complexity and autonomy. What are their epistemic, ethical, and societal challenges for the future of mankind? ECAP10 will promote scholarly dialogues on all aspects of this computational & informational turn of society and the use of computers and robots in the service of philosophy.

ECAP10 is the eighth conference in the annual series. From Monday 4th to Wednesday 6th October, 2010 the European Conference on COMPUTING AND PHILOSOPHY (ECAP10) will be held at the TUM - Technische Universität München. ECAP is the European conference on Computing and Philosophy, the European affiliate of the International Association for Computing and Philosophy (IACAP).



## ECAP10 VIII European Conference on Computing and Philosophy

4 – 6 October, 2010 TU München



Track I Philosophy of Computer Science	21
Specification and Artifact	24
Raymond Turner	
Formalizing correctness and interaction in typed programming languages	25
Giuseppe Primiero	
A Scientific Realist Perspective for Computer Science Inquiry	29
Janyl Jumadinova	
Deepak Khazanchi	
And the Winner is	34
Andreas C. Pietz	
Software development: Out of the black box	38
Lindsay Smith	
Vito Veneziano	
Paul D. Wernick	
The Integration of Ontological Categories and Domain Concepts	
in Applied Ontology	44
Stefano Borgo	
Intepreters as computational mechanisms	52
Javier Oscar Blanco	
Renato Cherini	
Martin Diller	
Pio García	
Computer science must be naturalized effectively!	56
Denis Chetwynd	
From Ability to Capability	66
ways to epistemology	
John G. Geske	



70
76
80
81

	-		- 1
1.1	- X	g	
1.1	1.1	202	
	24		. 1
100	- 22	- C	
	. 15		
	1.5	11.1	
1.5	1.4	3 U.S.	1
		- 61	
164		A	
79		Sea.	. 1
1.0		- 125	
	1.1		
	C 6424	0.44	

Track II Philosophy of Information and Cognition	88
Levels of Cognitive Extension	92
Holger Lyre	
The Role of Causally Relevant Properties in an Informational Theory of	
Causality	95
Christoph Schulz	
Technical Agency - A minimal Theory of Mind	99
Gerhard Chr. Bukow	
There's Plenty of Boole at the Bottom! How to Overcome	
Information Entropy	103
Francesco Berto	
Jacopo Tagliablue	
Quantum Computational Complexity in a Quantum Complex Universe	110
Vincent Paul Russo	
REPRESENTATION AND INFORMATION	114
A TWO-LEVEL ANALYSIS	
Hilmi Demir	

Track III Robotics, AI, and Cognitive Systems	118
Infospheres between Nanosphere and Ideospheres Jean Sallantin	121
Evolution of Biped Locomotions Using Bees Algorithm, Based On Truncated Fourier Series Ebrahim Yazdi Vahid Azizi Abolfazl T. Haghighat	125
An investigation of the reliability of fault tolerant cognitive technical systems Thierry Sop Njindam Kristin Paetzold	129
Universal Machines and Partial Isomorphisms: Models of Intelligence in Turing's Imitation Game Hans Joachim Greif	134
Semiotics as Theoretical Underpinning for Language Acquisition in Developmental Robotics Frank Förster Chrystopher L. Nehaniv	139
David Hartley in the twenty first century Detecting and categorizing patterns associatively Steve Olivecrona Dirk Derom	145
From Ability to Capability Eric Bourreau Birgita Dresp-Langley Alexandro Garrido Jean Sallantin	149
Digested Information, a Non-Semantic Motivation for Agent-Agent Interaction Christoph Salge	155

72	See
11	in a
11	TU
10	11
12	63
ROH	NO.Y

Control Mechanisms in Information Systems	159
A Logical Approach to Machine Intelligence	
Aziz Fevzi Zambak	
Concept Detection	163
Tobias Kötter	
Michael R. Berthold	
On The Other Hand: The Surprising Challenge of Co	onceptual Metaphor for
Embodied Cognition	169
Robin Zebrowski	
Uncanny Moral Behavior	173
Carson Reynolds	



Lono y	
Track IV Computational Neuroscience of Emotions	
and Consciousness	178
What does it mean to do neuroscientific research on emotions and	
consciousness and does it allow or even need a computational perspective? Prof. Dr. Günther Palm	181
A critical investigation of the foundations of informational	
structural realism	185
Thomas Christopher Dasch	
Florentin Neumann	
My Ipad as my best friend or the question: who, and if yes, where is Mary?	-
Computer and Individuality	190
Hannes Bräutigam	
Propositional Attitude Approaches in constructing Artificial Emotions in	
Androids	195
Wolfgang Gessner	
What Is It Like to Be a Human?	201
Consciousness, Free Will and Aesthetics from the Perspective of Information	
Integration	
Marcin J. Schroeder	



Track V Computational Approaches to Thoughts and Actions	208
How conscious the immune system can be? Chiara Porcelluzzi	211
Luca Albergante	
Toward a "Reading Spaces" Reification	216
Jean-Gabriel Ganascia	
The Extended Mind and the Digital Milieu Yuk Hui	222
Enacting a Cognitive Domain in the Interaction with Perceptual	
Supplementation	226
Alfonsina Scarinzi Olivier Gapenne	
Modeling Leibniz's Monade by using Multi Agent System	229
Fuki Ueno	
Yasuhiro Suzuki	
Philosophical consequences of free interaction between humans and robots.	236
Tillmann Pross	
A Model for Memory	240
Synergies in sparse matrices	
Klaus Prätor	
Simulating Science?	244
Computer Simulation versus Experiment	
Inga Bones	
Hello Dave. Shall we continue the game?	251
Questioning Man-Computer interactions	
Liesbeth De Mol	
What is a Formal Ontology?	256
Some Meta-Ontological Remarks	
Ludger Jansen	



A Social Epistemology for Epistemic Social Software Judith Simon 261

Track VI From Information to Knowledge Society	266
The Networked Self in the Information Society Philip Brey	270
Virtualized, Personalized and Ubiquitous Learning in Post-Industrial Society Andrei Kojukhov Ilya Levin	275
Surviving The Singularity Improving Psychological Adjustment in Anticipation of Change Raymond Reed Hardy	281
Communication, control and freedom For an archaeology of information technologies Teresa Numerico	285
Simulation and Application The Bilateral Relationship between Education and Artificial Intelligence Jiyou Jia	291
E-Reading Philosophical Texts: On The Tension Between Dynamic Text Comprehension and the Irreversibility of Annotations on Paper Jochen Huber Andreas Kaminski	295
Societal Dimensions of HIS as a Trading Zone Could the Informatization Really Benefit the New Medical Reform? WANG Chengwei LIN Nan	300
How to Understand the Debate on Precautionary Principle in Risk-based Decision Making LI Ping	305
Political and educational emergences in a new techno-social weaving in Colombia Rocío Rueda Ortiz	<b>310</b> 310



Track VII IT, Cultural Diversity, and Technoscience Studies	316
Informational precaution	320
Wolter Pieters	
The Metaphysical Character of Information	326
Heidegger and Baudrillard	
Andreas Beinsteiner	
Reconfiguring the User: Raising Concerns over User-Centered Innovation	332
Diego Compagna	
(A)Normality seen by an inhuman(e) eye	337
Alma Kolleck	
Andreas Traut	
Multilingualism and Cultural Diversity in IT and TC Field	342
A short theoretical and empirical discussion	
Afsar Sohleila Sattari	
Trusting our Distrust	344
Cecile K. M. Crutzen	

3	104
J.	
6	2
RO	KO V

Track VIII Information Ethics and Roboethics	350
Information Ethics for Robotic Agents	354
Gordana Dodig-Crnkovic	
You, robot Ontology, appearance, and the linguistic construction of robots and human-robot relations Mark Coeckelbergh	358
Artificial Morality Moral Desirability vs. Computational Feasibility Linda Johansson Henrik Carlsen	360
Care Centered Value Sensitive Design a framework for the design of robots in healthcare Aimee van Wynsberghe	364
A Methodological Reflection on Converging Technologies Or, Wherein the Empirical is in Information Ethics? Pak-Hang Wong	366
SmartCCTV - Autonomous Moral Agent or Means to Ends? Andreas Traut Alma Kolleck	371
Robots, Trust and War Thomas W. Simpson	376
Just Tell Me That You Love Me The ethics of social robotics John P. Sullins	379
Empathy with Robots and its Ethical Consequences Catrin Misselhorn	384
Good and Grounded Combining the empirical and axiological turn in computer ethics Johnny Hartz Søraker	388



Should robots that interact with humans look like humans?	392
Robert Gawrylczyk	
Hybrid Anthropology	400
Non-human Actors and our Relations to them	
Markus Fath	
Techno-Security. The Case of the Body Scanner	406
Jutta Weber	
What Can the Internet Offer to Philosophy?	411
Peter Bujňák	
Uniqueness of Computer Ethics in the Analysis of Computer-Mediated	
Human Manipulation	414
Esin Ceren Ahiska	



Track IX Technological Singularity and Acceleration Studies	422
Mechanists of the Revolution: The Case of Edison and Bell	426
Anthony F. Beavers	
Brent Sigler	
Economic Implications of Software Minds	431
Steven Kaas	
Steve Rayhawk	
Anna Salamon	
Peter Salamon	
How intelligible is intelligence?	438
Implications for AI development trajectories	
Anna Welling Salamon	
Steve Rayhawk	
Janos Kramar	
From mostly harmless to civilization-threatening	443
pathways to dangerous artificial general intelligences	
Kaj Sotala	
Deriving a Safe Ethical Architecture for Intelligent Machines	451
Mark R. Waser	
Superintelligence does not imply benevolence	456
Joshua Fox	
Carl Shulman	
Implications of a software-limited singularity	463
Carl Shulman	2010
Anders Sandberg	
How the Singularity of Artificial Intelligence might be achieved, and why it	
does not matter	471
Joscha Bach	



6	
Track X Crossroads	478
Do abductive machines exist? Proposal for a multi-level concept of abduction Andreas Kaminski Sebastian Harrach (Pammer)	482
The Cognitive Assistant	488
Alexey Lunacharsky	
Are calculations on computers arguments? Claus Beisbart	492
Simulating Time with Computers: implementation and experimentations E. Kolonis Michael Nicolaidis	496
Singularity: The Anthropocene Evolutionary Mechanism Scott Mt. Yim	502
Can Machines Have an Unconscious? Would They Have To? Stefano Franchi	506
How Do Philosophers Think Their Own Discipline? Reports from a Knowledge Elicitation Experiment Michele Pasin	514
Philosophy of the Internet about the nature of the Internet	518
László Ropolyi	518
Finitism in a Formal System of Higher Order Claus Akira Horodynski-Matsushigue	522
Theatrum Scientiarum An interdisciplinary effort to connect artistic and scientific manners Ina Zimmermann Dominik Zorn	527
On Digital Beings Carl-Johan Rosén	535



Art & Science - Some Reflections Gerhard Spilgies	540
Not really a Foreword	3
Closing illustration	542
List of Authors in Alphabetic Order	544



### You, robot Ontology, appearance, and the linguistic construction of robots and human-robot relations

Mark Coeckelbergh University of Twente

#### **Extended Abstract**

Although most us think of robots as 'mere machines', empirical research shows that we sometimes treat them as if they were more than objects. We respond to them with far more affection or even unease (Mori, 1970) than one would expect. Some robots become 'social robots' or artificial companions (Breazeal, 2003; Turkle, 2006; Dautenhahn, 2005, 2007). How can we make sense of this paradox from a philosophical point of view?

Traditional Western ontologies, with their strict subject-object distinctions, their belief in intrinsic properties, and their objectivist approach, are not very helpful for understanding what goes on here. What we need instead is a social-relational and phenomenological approach to ontological status, which shows how robots can appear to us as 'quasi-others' (Ihde, 1990) within quasi-social relations. The 'machine' appearance is only one possible interpretation: the robot can have different meanings and there is 'gestalt switching' between them.

Responding to work by Ihde, Searle, and Turkle (Ihde, 1990; Searle, 1980, 1995; Turkle, 1984, Turkle et al 2006), this paper argues that the relation between subject and (more-than-) object is mediated by language. It proposes a 'linguistic turn' in philosophy of robotics that changes the focus from what robots 'are' to how robots appear to us, and from questions about what the robot can say (philosophy of early AI, e.g. Turing, 1950) to what humans say (philosophy of contemporary social robotics).

It is shown that the words we use do not only represent robots and humanrobot relations but also interpret them and even construct them. This view enables us to attend to shifts in talking about robots to talking to robots as interpretations and constructions of human-robot relations. In linguistic terms, we can observe shifts from the impersonal third-person pronoun "it" to the personal second-person "you" and sometimes even the first-person plural "we".



This makes sense of what goes on between humans and robots by revealing at least two different modes of relating to robots, which are both linguistically mediated: an 'objective' one and a 'quasi-social' one. Neither of these modes or repertoires has ontological priority.

Although more work is needed to explore its full scope and implications, this approach can contribute to a richer understanding of how we relate to robots and to other entities.

#### References

Breazeal, C. (2003). Toward sociable robots. Robotics and Autonomous Systems, 42, 167–175.

Dautenhahn, K. et al. (2005). What is a robot companion – Friend, assistant, or butler? Proceedings IROS 2005, IEEE IRS/RSJ International Conference on Intelligent Robots and Systems, August 2-6, 2005, Edmonton, Alberta Canada, pp. 1488-1493.

Dautenhahn, K. (2007). Methodology and themes of human-robot interaction: A growing research field. International Journal of Advanced Robotic Systems, 4(1), 103-108. Ihde, D. (1990). Technology and the lifeworld. Bloomington, Minneapolis: Indiana University Press.

Mori, M. (1970). Bukimi no tani - The uncanny valley (K. F. MacDorman & T. Minato, Trans.). Energy, 7(4), 33-35.

Searle, J.R. (1980). Minds, brains and programs. Behaviour and Brain Sciences, 3(3), 417-457.

Searle, J.R. (1995). The Construction of Social Reality. London: The Penguin Press.

Turing, A.M. (1950). Computing machinery and intelligence. Mind, 59, 433-460.

Turkle, S. (1984). The second self: Computers and the human spirit. New York: Simon and Schuster.

Turkle, S., Taggart, W., Kidd, C.D., & Dasté O. (2006). Relational artififacts with children and elders: The complexities of cybercompanionship. Connection Science, 18(4), 347-361.