# Introduction

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In the era of Computer Science and Artificial Intelligence, the philosophical analysis of the qualitative might serve, on the one hand, as the basis for carrying out a qualitative applied ontology and, consequently, be useful for designing automated information systems; on the other hand, it would permit a more accurate representation of human actions and natural language, which would be useful in performing complex tasks.

The present issue aims at stressing both the epistemic and the ontological aspects of the qualitative in order to explore the challenges posited, first of all, by projecting automated ontologies, computerized taxonomies or electronic databases, and secondly, by programming robots that simulate human qualitative features. Moreover, the issue paves the way for a philosophical analysis of the application of new computer technologies to visual experiences and human cognition.

The challenges thrown up by recent studies of robotics can no longer neglect the topic of the qualitative dimension (*Silvano Zipoli Caiani*). There are many reasons for this: in particular, the fact that studies of robotics are more and more called up to take account of tasks and behaviours which may manifest relational actions based on self-control and intelligence. These last qualities stand at the foundation of human action in the social context, of the use of emotional intelligence, flexibility, openness and adaptability to the environment (tolerance of noise and of errors, interaction with other computers and with the environment). Indeed, adaptability and learning are showing themselves ever more clearly to be two sides of the same coin.

We know that the ability to fulfil certain aims or to realize predetermined objectives is shared by human intelligence and by the intelligence operating in machines. So what is it that distinguishes the learning of living systems from that of machines? The attempt to answer this and other questions has led to the designing of artificial systems such as robots, capable of dynamic, interactive, and integrated relationships whose frameworks may be able to reproduce

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ever more refined models of cognition and human affection, with the possibility of evolving, adapting, and even of changing their own functioning.

The perspective of computing as a mathematical function has been replaced by adaptive and common-sense computational models, able to incorporate the performative aspect of linguistic use and if taking into account, in a consistent way, the ever more urgent problems concerning robo-ethics, such as consciousness, autonomy, decision making, free will, and the emotional dimension.

In this context, the contribution of this issue will be of particular relevance since it focuses on the use of robotics by attempting to figure out how robotics can benefit from an interplay between philosophy and engineering (Konno), while also offering an interesting case study of the growing use of applications from intelligent robotics in medicine, especially in the Italian context (*Giovagnoli, Crucitti & Dodig-Crnkovic*). The contribution of *Giovagnoli*, *Crucitti & Dodig-Crnkovic* in particular provides a great example of robotics applied to surgery, by demonstrating how robotics combines many scientific disciplines and has important social, ethical and economic effects.

The new orientation requires a formal language that is sufficiently rich and capable of describing the structure of the human body; one in which attempts to elaborate a modal mereotopology and a neighbourhood semantics (*Graziani & Tagliaferri*) are inserted into the general setting of a new conception of the relationships between human beings and technology.

As Orilia asserts, "In information technology there is a more and more widespread recourse to applied ontologies" (Guarino, Oberle and Staab 2009), or "controlled vocabularies for representing the entities in a given domain" (Arp, Smith and Spear 2006, p. 6), for example in biology and medicine, social organizations, geography or history. An applied ontology codifies information in a formal language that is meant to be rigorous and unambiguous, for purposes of automated search and processing.

In the field of robotics above all, it is ever more necessary for studies of Applied Ontology to be conceived in the light of an immersion or incorporation of technology in the human and humanoid environment. This leads us to speak of an AI no longer understood as Artificial Intelligence, but as Ambient Intelligence (*Kanemitzu*), and of technologies which take the human being as their starting point, configuring not only an exterior but also an interior environment, which makes it ever more difficult to delineate a sharp distinction between technology and (human) nature.

Thus, technological objects are configured not so much as "quasi-other" (machines) as "another other" (robots) which, besides their independence and interaction, also add influence on human behaviour and the transformation of human actions. In the light of these new challenges, intersubjectivity appears

in the form of a technologically mediated intersubjectivity. In this connection, *Kanemitsu* presents an interesting study on the "otherness" of robots from a post-phenomenological perspective. The author uses postphenomenological theory in order to show how the introduction of robots can reshape the way we live our intersubjectivity; in particular, by introducing a clear distinction between machines as "quasi-others" and robots as "another-others". The reason for this distinction lies in the fact that, unlike machines, robots call for interactions. A devil's advocate could disagree, pointing out that even a car calls for interactions. For example, when the tank is almost empty, a red light lights up, calling for a precise action. The devils' advocate could go even further, saying that this signal sent by the car is a sort of "cry" or "call for help" expressing its need to be fed. Indeed, in the case of new car models, the entire engine is supported by high advanced computing operations which could be seen as a kind of AI interacting with the driver, as in the case of the new concept car by Toyota Concept-I. This example could be stretched even further and it could be applied to the famous Japanese dolls からくり人. Should they be considered "quasi-others" or "another-others"?

Certainly, we take for granted that there is a difference between "cars" and "robots"; moreover, this difference is changing our way of living by shaping the intersubjectivity underlying our society. The use of robots shapes how we perceives others, and we should keep an eye on this effect. Could we ever claim that the robot is perceiving the reality as "another me" or "another-other"? Skeptics can claim that being able to perform actions, reproduce gestures or react to impulses would not qualify as "intersubjectivity": intersubjectivity is that kind of relation which wields the everlasting power to recreate the world, in every experiential moment, understood as a shared symbolic horizon.

Could a child believe in "Kaspar" as a real friend of him/her? Could we expect spontaneous or unexpected gestures from robots? Certainly, the dimension of the another-other offers us the possibility of a reflection on otherness which cannot be reduced to human or animal otherness: in this sense, it seems to offer us new and significant openings which are both philosophical and anthropological in nature.

Perhaps one of the most interesting aspects of this topic is that we discover more questions to think about and consider.

Among these, probably, the very concept of human being.