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Rhetorical issues in robotics

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ABSTRACT: The words used to describe robots are very familiar to our own human body (*autonomy, decision, intelligence*, etc.). In the meanwhile, machines seem to challenge the typical way of acting of the living organisms. Is it obvious to describe the robots within these terms? How is our conception of language reflected in our perception of robotics? We clarify this problematic by revisiting our rhetorical heritage and the bond between movement, action and language. In this sense, we aim to enlighten the rhetorical issues that occur from this relation.

KEYWORDS: robotics, robots, movement, action, logos, language, Aristotle, rationality.

1. INTRODUCTION

The company ABB Robotics developed a robotic arm that sorts sausages. The machine is able to identify the position of each sausage on the belt, to choose the sausages according to the required size (defined by an operator), to adapt its movement in order to be able to grasp the sausages lying on the belt, then to place the sausages in a package without interfering with another sorting arm. Thanks to its sensors which give a feedback on the situation, the robotic arm is able to adapt to its environment. The algorithm determines the path of the robotic arm in order to reach the sausages. It also defines the strength and direction to be maintained for each sausage. In other words, the sorting arm *decides* which sausage to grab and how to grab it.¹

So far, in our modern and occidental culture, machines and automatics are spontaneously combined. However, we talk nowadays about *intelligent* machines that show *autonomy*, can make *decisions*, can *learn*, etc. and one thing leading to another, the status of these words which are *a priori* exclusive to humans and/or living organisms, is disputed. This questioning is based on representations that combine fascination and fear rather than facts, but it remains crucial to understand how we come to formulate the problem in this way. Why and how the machines that are part of the history of technology challenge humans to the point of being thought (in the most extreme case) as the next

¹ ABB Robotics, *Picking and packing salami snacks* - <https://www.youtube.com/watch?v=aPTd8XDZOEK>

step of evolution? Besides, this question is largely grasped by disciplinary fields such as philosophy, sociology, or anthropology that describe this vast and complex phenomenon from a specific point of view. In this paper, we propose a linguistic approach in order to question the role of language in our representations of robots; on one hand, discourses about robot performances are spontaneously judged as inadequate or even misleading by experts in robotics; on the other hand, these discourses are based on a spontaneous use of language that is not essentially condemnable. How is our conception of language reflected in our perception of robotics?

We suggest firstly to consider the lexicon shared by the livings and the field of robotics (words such as *autonomy*, *decision*, *intelligence*, *conscience*, *judgment*, *learning*, etc.). We observe that these words are used in the field of robotics, not only for humorous purpose or to popularize knowledge. We notice the discomfort of the experts in robotics towards this lexicon and clarify it by revisiting our rhetorical heritage. Secondly, we aim to dispel the allegations that are made against persuasion as we consider the case of the agentive language in robotics and its bond to our ability to represent moving objects. We refute the idea of persuasion as a risk for rationality based on the Aristotelian model of rhetoric and on cognitive aspects.

2. A LEXICON FOR ROBOTS AND LIVING ORGANISMS

In the media, occurrences that belong to the lexicon shared by living organisms and robots are easy to find (*autonomy*, *decision*, *intelligence*, etc.). In *Le Monde*, the topic of artificial intelligence was mentioned in 200 articles in 2017 (almost 15% more than in 2016).² Robotics fascinates the society and the agentive lexicon is more than frequent when it comes to report events involving robots, or to describe technological innovation developed by public or private laboratories.

In July 2017, the surveillance robot K5 designed by *Knightscope* for an American shopping center ended up crashing into one of the fountains of the store. Internauts and journalists made comments: “In the United States, a security robot throws itself into a fountain”(Sciences et Avenir, 18 July 2017)³, “Did the android commit suicide by throwing himself into a pool? Security robots are supposed not to feel bored. Yet, one of them seems to have voluntarily dived into a fountain in a Washington mall.” (*Le Monde*, 19 July 2017)⁴, “It's ok security robot. It's a stressful job, we've all been there.” (*Twitter*)⁵.

² Morgan Tual, *Enquête au cœur de l'intelligence artificielle, ses promesses et ses périls*, Le Monde, mars 2018

³ Sarah Sermondadaz, *Aux États-Unis, un robot de sécurité disjoncte et se jette dans une fontaine*, Sciences et Avenir, 18 Juillet 2017

⁴ Lina Rhrissi, *L'androïde s'est-il suicidé en se jetant dans un bassin ?*, Le Monde, 19 Juillet 2017

⁵ Comment of Brendan@SparkleOps, pic.twitter.com/LQbnnbCRm, 17 Juillet 2017

The company *Knightscope* answered to these comments on Twitter with a *prosopoeia*:

🐦 Breaking news: “I heard humans can take a dip in the water in this heat, but robots cannot. I am sorry” said K5 in an official statement. (23:17 - 18 JUL 2017 - Milpitas, CA)

While it is obvious that the agentic lexicon is widely used in the media to describe a situation involving a robot (sometimes with humour), these words are not only used to popularize or amuse. The researchers in robotics also describe spontaneously the actions of robots in these same terms, even in daily conversations between experts in a professional situation: “I did the test this morning and HRP-2 was not *disturbed* when I pushed his leg or tried to move it.” (Andrea, post-doc. student at LAAS-CNRS, announces to a PhD student that they succeeded in changing the humanoid robot’s control from a position control to a force control). Or, “I was really annoyed, [the robot] Pyrène didn’t *want* to move his right arm in front of the group of visitors during the demo [...]” (Olivier, research director at LAAS-CNRS). Referring to this matter, Denis Vidal makes an interesting comment in *Towards a new anthropomorphic pact*, while he describes a working session with a roboticist who tries to improve a robot performance in terms of vision: “So we can already understand that even in this purely professional context, where the main part of the conversation is explicitly focused on the technical characteristics of the robot and on the tests that can be carried out with it, two ways of talking about the robot have constantly intertwined. Robots have sometimes been considered as simple artifacts (...), but the researchers have also referred to them as real “people”.”⁶

Although experts in robotics spontaneously use these words, the agentic lexicon is often accused of initiating, or at least encouraging, the fantasies of laymen about robots. Indeed, if they (researchers and engineers who have acquired advanced knowledge in the field of robotics) are able to consider this lexicon as rhetorical figures, they worry about the confusion of the public regarding the status of these words (*intelligent* machines, *autonomous* machines, etc.) and by association of ideas, a confusion towards machines themselves. The concern of experts is not surprising as we observe the results of an experiment conducted by Van Duuren and Scaife in 1995 with the aim of understanding how the public represents the notion of intelligence applied to robots: “After interacting with a robot, adults and children seem to treat it as an intelligent entity, but intelligent in a particular sense, unique. A different meaning from the one used to describe living entities, and also different from the one used to describe objects.”⁷ Facing this observation, some scientists therefore opt for the solution of

⁶ Denis Vidal, *Vers un nouveau pacte anthropomorphique. Les enjeux anthropologiques de la nouvelle robotique*. Gradhiva. Revue d’anthropologie et d’histoire des arts, 2012, no 15, p. 60

⁷ M.A. Van Duuren and M. Scaife, *How do children represent intelligent technology?* European Journal of Psychology of Education, 10, 289-301, 1995.

avoiding, or even forbidding, the use of the agentive lexicon. They describe it as being *ambiguous* or even *misleading* or *manipulative* as the words *supposedly* describe an action of the robot (the machine decides,...), or a disposition (this machine demonstrates autonomy,...): “I always tell my students to not use the words “intelligent machine”, a machine is not intelligent.” (Andrea, post-doctoral fellow at LAAS-CNRS). Anyhow, the relation of experts to this agentive language clearly expresses a discomfort. Gentiane Venture, roboticist and research director at the *Tokyo University of Agriculture and Technology*, shared her point of view at the workshop on “Wording Robotic”, LAAS-CNRS Toulouse: “I deal with robots all the time, I talk about robots all the time, I do presentations with robots all the time and I found myself using “he” (and not “it”) for the robot. I say things like: “Oh look at this cute guy, he is doing something here”, and if the robot suddenly says “battery drained” and does[like it has no energy anymore], I say: “The robot is tired”. When I found myself saying that, I think: “Oh damn, what did I just said! I shouldn't do that because I'm just playing in this game of the “artificial intelligence” and the agency,... and [people] are gonna actually think that yes, the robot is tired because he has been talking and walking too much,... But it's just out of battery. [...] This is making the way of talking about robots very complex.”⁸

This testimony outlines a common judgement expressed by roboticists about this lexicon: on one hand, it offers a fast and obvious access to the concepts, and on the other hand, it involves the risk of a confusion about the status of the robots. If the example of the robot *being tired* does not appear particularly problematic, the case of the humanoid robot HRP-2 which is not *disturbed* or the one of the sorting arm which *decides* what to do with the sausages, brings undoubtedly more questions for a non-expert reader. Consequently, some researchers in robotics start to support the idea that because of its powerful efficiency, the agentive lexicon that robots and living organisms have in common should not be provided to anyone. As for the European Parliament, the public and especially vulnerable people and children,⁹ would be too easily inclined to uncritically follow its fascination for robots. This statement mirrors the European Institution's intuition of a universal audience, described by Perelman and Olbrechts-Tyteca: all rationale beings, all normal, all adults.¹⁰

⁸ Gentiane Venture, *Speaking about robots: my trilingual daily challenge*, Wording Robotics, the 4th Workshop of Anthropomorphic Motion Factory, LAAS-CNRS, wordingrobotics.sciencesconf.org, 30nov-1dec 2017

⁹ Resolution of the European Parliament with recommendations to the Commission on Civil Law Rules on robotics (2015/2103(INL)), 16 février 2017

¹⁰ Chaïm Perelman and Lucie Olbrechts-Tyteca (1958), *Traité de l'Argumentation : la nouvelle rhétorique*, Bruxelles, Editions de l'Université Libre de Bruxelles, reed. 2008.

These considerations about agentic language in robotics reflect in fact a certain conception of language and rationality, i.e. of rhetoric, that has reached our modern societies in a caricatured form, carrying heavy *clichés* that remain vivid.¹¹ Inherited from a (simplistic interpretation of) the rhetoric of Plato, these preconceived ideas stem from a model of rationality that only encourages a reductionist view of the world. Indeed, it establishes a dichotomy between a "good" rhetoric, pure and demonstrative as it serves philosophy, and a "bad" rhetoric, manipulative even dangerous because of its bond to persuasion. In other words, if rationality stood on one side, persuasion (i.e. the trap of emotions, the one to fight in order to make a so-called rational decision), would stand on the extreme other side. Consequently, the prejudices about rhetoric as well as its bad reputation lead spontaneously humans to condemn the words as -the- problem of science, and in this case, of robotics: *manipulative language, rhetorical trap, misleading image, emotional response*, etc. would divert the public from rational judgments about robots. However, applied to language, this model of rationality is nothing else than an abstract and idealized conception of reasoning. Indeed, this model contravenes the most elementary psychology, as well as neurophysiology: the necessary bond between emotions and our ability to make decisions has been clearly established.¹²

As an alternative to this persisting myth (that pretends that rationality would be guaranteed if rhetoric and any persuasive tool would be avoided), the model of rationality that can be retrieved from Aristotle's point of view is especially useful. According to Aristotle, rhetoric is defined as "the ability to discern, in each case, what is potentially persuasive".¹³ It is an art, a technique, that focuses on efficiency: Aristotle's rhetoric fulfills a series of functions (to tell stories or testify, to criticize, to decide, to judge, to think in action, etc.) without, however, dismissing human emotions. Language is then considered as being a *pharmakon*, able of both healing or degrading according to the speaker's intentions. Rhetoric, as an extension of the "spontaneous abilities that build social [relations] through the *logos*"¹⁴, is introduced as a universal ability that covers multiple aspects of human rationality: "it is one of the many arts resulting from human ingenuity; it leads human to use its own nature and to develop its functionalities".¹⁵

From this point of view that refuses to demonize persuasion, it is therefore possible to question the function of agentic language in robotics.

¹¹ Céline Pieters, *Compte-rendu de « L'Homme rhétorique. Culture, raison, action. »*, Emmanuelle Danblon, Questions de communication, 2014, n°25

¹² Antonio R Damasio, *L'erreur de Descartes*, Odile Jacob, 2006, 416 p.

¹³ Aristote, *Rhétorique*, trad. M. Dufour et A. Wartelle, Paris, Les Belles Lettres, Coll. Des Universités de France, 2011.

¹⁴ Emmanuelle Danblon, *L'homme rhétorique*, Ed. du Cerf.Humanités, 2013, p.14

¹⁵ *Op cit.* E. Danblon, p.69

3. MOVEMENT AND AGENTIVE LANGUAGE: MAKING ACTIONS VISIBLE

In 1944, Heider and Simmel showed how humans spontaneously attribute intentions to moving geometric figures^{16,17} While the forms moved randomly, it was observed that the subjects of the experiment describe the actions of the figures in the following terms: *continue*, *attack*, *follow*, etc. The experience reveals a cognitive mechanism that reflects the natural ability of humans to tell stories (the latter being a particularly useful quality especially for memorization)¹⁸ and according to Fritz Heider, this process of attribution serves our concern for coherence in a world that is uncertain by nature.

Thanks to its representational dimension, the agentive language proves indeed to be particularly effective as we imagine the action. As reported in the news, the robot K5 “jumped” (not “fell”) into the fountain: the robot K5 goes alone towards the fountain, dives into the water and sinks. “Jumping” directly rejects other meanings in terms of representations: no one pictures the robot being pushed into the water, or falling on the ground and rolling into the bottom of the pool. This representational dimension of the agentive language produces in fact the *enargeia*, i.e. an effect of visibility or presence of the facts, which gives a fast and direct access to the action. Precisely, according to Aristotle, the primary function of any discourse is precisely the *enargeia* as firstly, the discourse must *show*. Besides, Ruth Webb explains that “the link between *energeia* with an “e” (movement, things in action) and *enargeia*, with an “a” (the life of the text, the process that consists in making the facts visible through language) is much more than a simple morphological resemblance”.¹⁹ François Hartog points out that if these two forms of presence are clearly offset, they both hold the power to show reality.²⁰ In the case of the robot K5, “throwing itself” *shows* the movement of the robot, as much as the surprising nature of the situation. From a model of rationality that explores language and perception as human tools, these two natural mechanisms are only strategies that reflect the ability of human to represent the world to its own level, rather than illusions essentially harmful.

This being said, if agentive language can be effective and its effect of visibility useful, we must not deny that the lexicon used to describe robots can also be confusing about the status of the robots. How much does the sausage sorting robot *decide* or will be

¹⁶ F. Heider and M. Simmel, *Animation*, 1944 - https://www.youtube.com/watch?time_continue=54&v=VTNmLt7QX8E

¹⁷ F. Heider and M. Simmel, *An Experimental Study of Apparent Behavior*, American Journal of Psychology. vol. 57 (2), 1944, pp. 243-259

¹⁸ Alain Berthoz, « L'espace au service de la mémoire et de l'imagination : les bases neurales des « Arts de la mémoire », *La fonction testimoniale*, Séminaire doctoral GRAL, 21 oct. 2016

¹⁹ Ruth Webb, « Mémoire et imagination : les limites de l'*enargeia* dans la théorie rhétorique grecque », in C. Lévy & L. Pernot, *Dire l'évidence*, Paris, L'Harmattan, 1997, p. 230.

²⁰ François Hartog, *Evidence de l'histoire. Ce que voient les historiens*, Paris, éd. de l'EHESS, 2005, p. 12.

able to *decide* in the future? Did the robot K5 have a reason to *jump* into the water? Did we lost control? This doubts that occur within our interpretation can be explained by the fact that the effect of visibility often comes with an effect of validity: what sounds right also sounds deeply true, correct and adequate. In this way, the bond between persuasion and validity brings a paradox: while our sensations and representations are deemed irrational (we would not dare to invoke them to justify judgments and decisions), yet, they always act and guide us.²¹ A spontaneous reaction is to avoid the use of the lexicon shared by robots and living organisms in order to try to bypass this paradox. However, we must accept that the outcome of this solution may not be beneficial over time: while the roboticist who feels uncomfortable to use these words will stop to communicate (*a priori*, the roboticist who is today “worried about doing wrong” will apply literally and strictly the principle of cautiousness in the future), the roboticist who will try to forbid the use of this lexicon and impose forcibly the idea that a machine is -not- intelligent, will only encourage the development of conspiracy theories (“The roboticists hide things from us”, “they program robots to manipulate us and make us do what they want”, etc.).

4. CONCLUSION: A RHETORICAL CULTURE

As we consider that discourses are based on a natural language concerned with coherence, the linguistic and the cognitive layers are introduced as the natural tools of a human being, and rhetoric as an extension of its nature.

If this conception of language does not mean to solve the problems that occur within the production and the interpretation of discourses about robotics, it allows to reconsider the bond between persuasion and validity and following this, to propose alternative solutions. Indeed, this point of view enables to handle the resolution of the paradox that lays between persuasion and validity in an other way than by avoiding the problem. This perspective makes indeed the dissociation of the discovery and the justification phases possible; the discovery phase provides conjectures²², hypotheses and representations of the world, while the justification phase consists in an “evaluation of the representations obtained by intuition through refutation”²³. Consequently, it is then no longer necessary to ineffectively try to banish a lexicon that is already well integrated in the language or to condemn a typically human cognitive process.

As Gilbert Simondon called on society to strengthen its technical education (which can certainly be welcome) for a better understanding of techniques and technology, there is also a need to reconnect to a model of rationality and a rhetorical culture that assume the reality of humans living in a complex world. Indeed, the rediscovery of the practice of the art of persuasion where experts and citizens meet on a

²¹ Emmanuelle Danblon, *Sur le paradoxe de la preuve en rhétorique*, Communications, Le Seuil, 2009/1 n°84, p.16

²² Karl Popper, *Conjectures and refutations: The growth of scientific knowledge*, Routledge, 2014, 412 p.

²³ *Op Cit.* E. Danblon, p.19

similar level demands to quit a model where obviousness prevails (*I believe only what I see*) for a system governed by trust in which roboticist don't fear to nourish ideas of transhumanism as they present technological innovation, and in which the audience has a strong experience in critical thinking and judgements. According to this model, the agentive language proved as a natural mechanism that is useful in the discovery phase, does not compromise the justification phase in which the criterion of validity appears: as we say that a machine *decides* about the destiny of sausages, our ability to judge the *humanity* of the robotic arm is not essentially threatened.

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