

IEEE-RAS Technical Committee on Roboethics

Honest assessment of TC over past 3 years and goals for next 3 years

Because Roboethics is a transdisciplinary subject which only very recently entered in the global area of interest of robotics engineering – and often still regarded as exoteric - we can honestly say that the whole activity on the Ethical, Legal, and Societal issues of Robotics promoted by our TC over the last three years attained its original goals.

The cultivated society in Europe, United States, Japan, and the related stakeholders, responded with interest and complacency to our activity. In Korea and in Japan, the respective governments have set up ad hoc Committee on Roboethics, inspired by our activity. In Europe, the European Commission has opened up an official line of studying.

Given the novelty of the subject, tough, it is not striking that the engineering milieu were slow in activating on the subject, and this should be one of the goal of the TC' next three years.

On the other side, from the many instances coming from society related to the often dramatic issues concerning ethical questions in advance robotics, esp. in the field of biorobotics and in robotics applied to warfare, we can say that the analysis, work, and publications promoted by the TC on Roboethics filled a vacuum, rightly and properly.

List of activities during past three years

- ICRA 2005, Workshop on Roboethics, Barcelona, Spain, April 18th, 2005
- ICRA 2007, Workshop on Roboethics, Rome, Italy, 14 April 2007
- ICRA 2009, Workshop on Roboethics, Kobe, Japan, 17 May 2009

List of outreach activities outside the RAS

- 1st Ethicbots Workshop (Emerging Technoethics of Human Interaction with Communication, Bionic and Robotic Systems), Naples, Italy, 17-18 October, 2006
- Track “Philosophy and Ethics of Robotics” of ECAP07, European Computing and Philosophy Conference, June 21-23, 2007 University of Twente, Enschede, The Netherlands.
- 2nd Ethicbots Workshop (Emerging Technoethics of Human Interaction with Communication, Bionic and Robotic Systems), Bonn, Germany, September 17/18th, 2007
- International Symposium “Robotics: New Science”, Thursday February 20st, 2008, Accademia dei Lincei, Rome – Italy
- Track “Robots, Cyborgs and Artificial life” of SPT 2009: Converging Technologies, Changing Societies, July 7-10, 2009, University of Twente, the Netherlands
- Track “Roboethics” of the Fifth Asia-Pacific Computing and Philosophy Conference, October 1-2, 2009, University of Tokyo, Japan

List of important publications over past 3 years in TC area.

- G. Veruggio, F. Operto, "The Roboethics Roadmap", Ethics of Human Interaction with Robotic, Bionic, and AI Systems-Concepts and Policies, October 17-18, 2006 , Naples, Italy
- G.Veruggio, F. Operto, "Roboethics: a Bottom-up Interdisciplinary Discourse in the Field of Applied Ethics in Robotics", International Review on Information Ethics, Vol. 6 (12/2006).
- G.Veruggio, "The Roboethics Roadmap", Workshop on Roboethics @ ICRA07, April 14, 2007, Rome, Italy
- G.Veruggio, "The Roboethics Roadmap", IARP-IEEE/RAS/EURON 5th Workshop on Technical Challenges for Dependable Robots in Human Environments, April 15, 2007, Rome, Italy
- Arkin, R.C. and Moshkina, L., 2007, "Lethality and Autonomous Robots: An Ethical Stance" Proc. International Symposium on Technology and Society, Las Vegas, June 2007.
- G.Veruggio, Track 11 "Philosophy and Ethics of Robotics" Chair @ E-CAP'07 European Computing and Philosophy Conference, June 21-23, 2007, University of Twente, Enschede, The Netherlands
- G.Veruggio, "The Birth of Roboethics" invited talk @ E-CAP'07, June 21-23, 2007, University of Twente, Enschede, The Netherlands
- G. Veruggio, F. Operto, "The Roboethics Roadmap", CEPE2007 Seventh International Computer Ethics Conference, July 12-14 2007, University of San Diego, USA
- G.Veruggio, F. Operto, "Ethical Elements in the Dissemination of Science. The case of Robotics", 2nd Ethicbots Workshop, September 17/18th, 2007, Bonn, Germany.
- G.Veruggio, "The Roboethics Roadmap", Journées Nationales de la Recherche en Robotique, 9-12 October 2007, Obernai, France.
- G.Veruggio, F. Operto, "The Debate on Roboethics", WPE-2007 Workshop Philosophy & Engineering, 29-31 October 2007, Delft, Netherlands
- Arkin, R.C., 2008. "Governing Lethal Behavior: Embedding Ethics in a Hybrid Deliberative/Reactive Robot Architecture - Part III: Representational and Architectural Considerations", Proceedings of Technology in Wartime Conference, Palo Alto, CA, January 2008.
- Arkin, R.C., 2008. "Governing Lethal Behavior: Embedding Ethics in a Hybrid Deliberative/Reactive Robot Architecture - Part II: Formalization for Ethical Control", Proc. 1st Conference on Artificial General Intelligence, Memphis, TN, March 2008.
- Arkin, R.C., 2008. "Governing Lethal Behavior: Embedding Ethics in a Hybrid Deliberative/Reactive Robot Architecture - Part I: Motivation and Philosophy", Proc. Human-Robot Interaction 2008, Amsterdam, NL, March 2008.
- G.Veruggio, F.Operto, "Roboethics: Social and Ethical Implications of Robotics", Chapter 64 of the Springer Handbook of Robotics, Siciliano, Bruno; Khatib, Oussama (Eds.), 2008, LX, 1611 p. 1375 illus., 422 in color. With DVD., Hardcover, ISBN: 978-3-540-23957-4
- Moshkina, L. and Arkin, R.C., 2008. "Lethality and Autonomous Systems: The Roboticist Demographic", Proc. ISTAS 2008, Fredericton, CA, June 2008.
- Arkin, R.C., 2008. "On the Ethical Quandaries of a Practicing Roboticist: A first hand look", Current Issues in Computing and Philosophy, Vol. 175, Frontiers in Artificial Intelligence and Applications, Eds. A. Briggle, K. Waelbers, and P. Brey, IOS Press, 2008.
- G.Veruggio, "Roadmap für Roboethik", Lettre International, N. 81, October 2008
- Arkin, R.C., 2009. "Ethical Robots in Warfare", IEEE Technology and Society Magazine, Vol. 28, No. 1, pp. 30-33, Spring 2009.

Number of members of each year in the past three years

~ 100

Summary of top three technical innovations in the area

- **The EURON Roboethics Roadmap**

In 2005, EURON funded the Research Atelier on Roboethics, with the aim of drawing the first Roboethics Roadmap. The ultimate purpose of the project was to provide a systematic assessment of the ethical issues involved in the Robotics R&D; to increase the understanding of the problems at stake, and to promote further study and transdisciplinary research. The roadmap embodies the contributions of more than 50 scientists and technologists, in many fields of investigations from sciences and humanities. This study will hopefully be a useful aid in view of cultural, religious and ethical differences.

- **The Korean Robot Ethics Charter**

In March 2007 the Korean Government announced the establishment of a Korean Robot Ethics Charter, inspired by the Euron Roboethics Roadmap.

On April 14th 2007 in Rome, at the ICRA07 Workshop on Roboethics, Hag Bong Sim, Director of the Robot Division at the Ministry of Commerce, Industry and Energy of KOREA presented the Korean initiative.

- **The Strategic Research Agenda of the Coordination Action for Robotics in Europe.**

The Coordination Action for Robotics in Europe (CARE) is a project funded by the European Commission (Directorate Information Society and Media) under the 6th Framework Programme. Its objective is to identify research priorities and to define a Strategic Research Agenda (SRA) for robotics in Europe from 2010 to 2020, based on the SRA developed by EUROP (European Robotics Platform) in 2006. One specific CARE WP is devoted to the Ethical, Legal and Societal Issues of Advanced Robotics in Europe. The ELS issues have been listed on the basis of the protection of the principles stated and approved in the European Chart for the Human Rights and according to the risk to which humans and their environment could be exposed.

Recommendations (and alternates) for new co-chairs

To achieve a rotation of the co-chairs, without affecting the continuity of the activity, the Technical Committee proposes the following plan:

- Gianmarco VERUGGIO (old) ← confirmed as corresponding co-chair
- Ronald ARKIN (old) ← (new) Matthias SCHEUTZ in 2009 (already approved)
- Atsuo TAKANISHI (old) ← (new) Jorge SOLIS^(*) in 2009 (proposed to the TAB)

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