Illusion versus Reality in Companion Robots: A Reprise

Ronald C. Arkin
Mobile Robot Laboratory
Georgia Institute of Technology

Extended Abstract

Serving as a consultant for Sony Corporation for nearly 10 years in the development of software for the AIBO and QRIO entertainment robots has provided key insights into the development of machines intended to serve as human companions, both from an understanding of human psychology and nascent robotics technology. One intent of robots of this ilk is to tap into the rich vein of a person's ability to bond with non-human artifacts [Reeves and Nass 96], with the deliberate goal of providing long-term satisfying human-robot interaction. Insights towards achieving this end can be gleaned from a broad range of scientific communities including human ethology, sociology, psychology, and of course the field of human-robot interaction itself.

Most robotics researchers view this expanding area as an innocuous and even beneficial use of robots, possibly for the treatment of isolated elderly people, e.g., including robots such as Paro, and its "cousins". But not all agree. This research requires a deep understanding of not only a robot's capabilities but also human psychology, where the roboticist's intention is to induce pleasant psychological states in the observer/partner through specialized patterns of robot behavior and, to the greatest extent possible, to suspend the observer's disbelief by creating an illusion that the robot is seemingly alive. Specialized methods to address possible boredom in the user [Csikszentmihalyi 00], to display suitable affectionate behavior using kinesics and proxemics [Brooks and Arkin 07] or to utilize developmental robotic approaches [Weng 01] can potentially lead to the elaboration of complex and learned behavior that can all support this illusion. Even computational models of love, attachment, and friendship [e.g., Fraley and Shaver 00, Hazan and Shaver 87, Kanda and Ishiguro 04] can conceivably be brought to bear as robots move closer towards achieving intimate relationships with people. The end goal remains to establish a long-term, even lifelong, human-robot relationship.

Some view this type of research as no different than that of cinema, video games, or other forms of entertainment. Others (e.g., [Sparrow 02, Sparrow and Sparrow 06, Morgan 07]) argue that this is an intrusion into the rights of the elderly to remain in contact with the real world, where society abrogates its responsibility to their citizens, while researchers, such as myself, make excuses for its potentially deliberate unethical use, even at times hiding behind arguments based upon cultural differences and looming labor shortages. Often even alternatives that potentially favor our underlying societal responsibilities towards one another are not even considered or forwarded as viable alternatives by roboticists.

This presentation reviews the underlying arguments and counterarguments surrounding certain ethical claims regarding robotic companions, with respect to the existing aims and results of such research endeavors.

References

Brooks, A. and Arkin, R.C**.,** "Behavioral Overlays for Non-Verbal Communication Expression on a Humanoid Robot', *Autonomous Robots*, Vol. 22, No.1, pp. 55-75, Jan. 2007.

Csikszentmihalyi, M. *Beyond Boredom and Anxiety: Experiencing Flow in Work and Play,* Jossey-Bass, 25th Edition, 2000.

Fraley, R., and Shaver, P., "Adult Romantic Attachment: Theoretical Developments, Emerging Controversies, and Unanswered Questions", *Review of General Psychology,* Vol. 4, No. 2, pp. 132-154, 2000.

Hazan, C. and Shaver, P., "Romantic Love Conceptualized as an Attachment Process", *Journal of Personality and Social Psychology*, Vol. 52, No. 3, pp. 511-523, 1987.

Kanda, T. and Ishiguro, H., "Friendship Estimation Model for Social Robots to Understand Human Relationships", *Proc. IEEE International Workshop on Robot and Human Communication (ROMAN-04)*, 2004.

Morgan, J., "AI robots: plain irresponsible or actually impossible?", *The Herald*, April 26, 2007.

Reeves, B. and Nass, C., *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places,* Cambridge Univ. Press, 1996

Sparrow, R., "The March of the Robot Dogs", *Ethics and Information Technology*, 4, 305–318, 2002.

Sparrow, R., "In the Hands of Machines? The Future of Aged Care*", Minds and Machines*, Vol. 16 No. 2, pp. 141-161, May 2006.

Weng, J. McClelland, Pentland, A., Sporns, O., Stockman, I., Sur, M., and Thelen, E., "Autonomous Mental Development by Robots and Animals," *Science*, vol. 291, no. 5504, pp. 599 - 600, Jan. 26, 2001.