【Grant-in-Aid for Scientific Research(S)】

Integrated Disciplines (Informatics)

Title of Project : Studies on semi-autonomous teleoperated androids that have humanlike presence

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Research Area : Informatics
Keyword : Intelligent robot

【Purpose and Background of the Research】

The principle investigator has developed the first teleoperated android in the world as the ultimate teleoperated interactive robot. The android that has the very humanlike appearance is the ideal interactive robot since human brain has innate functions to recognize humans. We can obtain knowledge of human cognition through cognitive experiments with the androids and improve the androids' functions by using the obtained knowledge.

One of the important issues in the development of the androids is the actuator. DC servo motors and pneumatic actuators are used for the robots and androids so far. However, these actuators cannot reproduce all the properties of human muscle. The principle investigator and his colleagues have recently developed powerful electromagnetic linear actuators that are suitable for humanoids and androids. The actuator can reproduce spring property of human muscle and enables us to develop an android that can safely contact with people.

Against the technical background, this research project aims to realize semi-autonomous teleoperated androids as research platforms for research and development of teleoperated robots by extending both of the software and hardware functions (See the below figure).

【Research Methods】

This research project improve teleoperation functions of the teleoperated android and realizes more realistic and expressive interactions through multiple modalities, such as vision, audition and tactile sensation, beyond abilities of teleoperation of operators. This is an ambitious challenge to answer to the following questions. Can we represent human presence with machine? Can we accept the androids as humans in our society?

The first step is to develop an interactive android that can have humanlike interactions with people by using the electromagnetic linear actuators that can reproduce properties of human muscle. That is, we will develop androids that have not only humanlike appearance but also humanlike tactile interaction. And then, we will replace teleoperated functions in the previous androids with autonomous functions.

【Expected Research Achievements and Scientific Significance】

The principle investigator has started the android project in 2006. After that, the project is drawing people's attention and it has been well-known in the world. This research project develops more advanced social functions of the teleoperated android based on results of the previous studies and establish design policies for autonomous systems that are used in our future society. In addition, it spawns new research areas of human sociality and the applications by giving systematic viewing points to cognitive studies on human sociality.

【Publications Relevant to the Project】

・H. Ishiguro, How can we create "human"? I have been an android, Shinchosya, 2011.
・H. Ishiguro, Possibilities of the total Turing test with androids, Transaction of the Japanese Society for Artificial Intelligence, Vol. 26, No. 1, pp. 50-54, 2011.

【Term of Project】FY2013-2017

【Budget Allocation】159,200 Thousand Yen

【Homepage Address and Other Contact Information】

http://www.irl.sys.es.osaka-u.ac.jp/
http://www.geminoid.jp/ja/index.html