大阪大学 共生知能システム研究センター 第3回国際シンポジウム

The 3rd International Symposium on
Symbiotic Intelligent Systems

A New Era towards Responsible Robotics and Innovation

DATE
November 19 - 20
2020

VENUE
Virtual Symposium
on Zoom

REGISTRATION
osku.jp/p0284

英日同時通訳・参加費無料
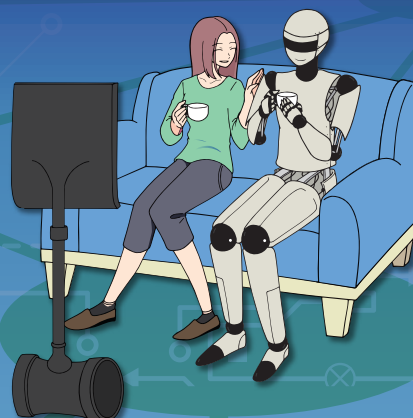
Invited Speakers

Ronald C. Arkin
Georgia Institute of Technology

Pascale Fung
Hong Kong University of
Science and Technology

Verena V. Hafner
Humboldt University of Berlin

Ryuichiro Higashinaka
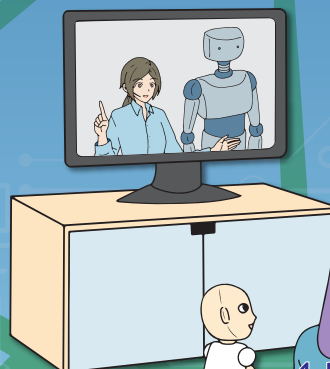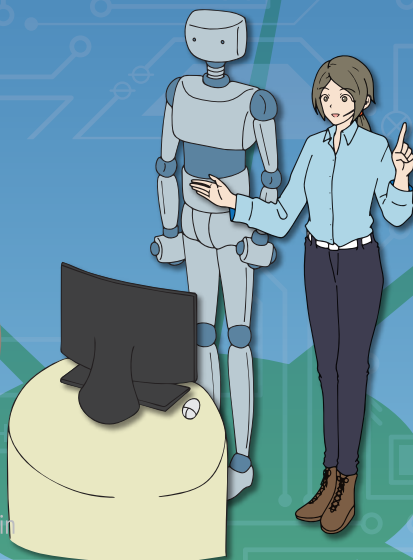Nagoya University

Hiroko Kamide
Nagoya University

Tatsuya Kawahara
Kyoto University

Atsuo Kishimoto
Osaka University

Satoshi Kurihara
Keio University

Fumio Shimpo
Keio University

Hiroaki Sugiyama
NTT Communication
Science Laboratories

Sessions

1. Responsible Robotics and Innovation
2. Symbiotic Cognitive Systems
3. Conversational AI
4. Models and Rules of Communication

Contact sisrec_symp@ams.eng.osaka-u.ac.jp
Sponsor Symbiotic Intelligent Systems Research Center, Institute for Open and Transdisciplinary Research Initiatives, Osaka University

Program for Day 1
10:00 a.m. – 5:00 p.m., November 19

9:30 – 　　　Site Open

Opening Remarks

10:00 – 10:10　**Takao Onoye**　Osaka University

10:10 – 10:30　**Hiroshi Ishiguro**　Osaka University

Session 1　Responsible Robotics and Innovation

10:30 – 11:15　**Ronald C. Arkin**　Georgia Institute of Technology

Civilized Collaboration: Ethical architectures for
enforcing legal requirements and mediating social norms in HRI

11:15 – 12:00　**Atsuo Kishimoto**　Osaka University

Towards responsible innovation:
Establishment of the "ELSI Center" at Osaka University

12:00 – 13:00　Lunch Break

Session 2　Junior Researchers' Presentations 1

13:00 – 14:15　**15 minutes × 5 presentations**

Makoto Kureha　Osaka University
Human relationships in the time of Corona:
A philosophical consideration of telepresence technology

Takumi Kawasetsu　Osaka University
Soft inductive tactile sensor using liquid metal and coils

Toshitaka Higashino, Naoki Wakamiya　Osaka University
Verification of information processing model of Model Human Processor using EEG

Chisa Ota, Tamami Nakano　Osaka University
Neural correlates of beauty retouching

Tomoyo Morita[1], Minoru Asada[1], Eiichi Naito[2]　[1]Osaka University, [2]CiNet
Does brain deactivation contribute to brain function?

14:15 – 14:30　Break

Session 3　Symbiotic Cognitive Systems

14:30 – 15:15　**Hiroko Kamide**　Nagoya University

Psychological evaluation of a sense of security on robots

15:15 – 16:00　**Satoshi Kurihara**　Keio University

Emergent approach for symbiotic framework in creative work

16:00 – 16:15　Break

16:15 – 17:00　**Verena V. Hafner**　Humboldt University of Berlin
Robots with a self

Takao
Onoye

Hiroshi
Ishiguro

Ronald
C. Arkin

Atsuo
Kishimoto

Satoshi
Kurihara

Verena
V. Hafner

Program for Day 2 10:00 a.m. – 5:00 p.m., November 20

Session 4 Conversational AI

10:00 – 10:45 **Tatsuya Kawahara** Kyoto University
Spoken dialogue system (SDS) for conversational android ERICA

10:45 – 11:30 **Pascale Fung** The Hong Kong University of Science and Technology
Deeper conversational AI

11:30 – 12:45 Lunch Break

Session 5 Junior Researchers' Presentations 2

12:45 – 14:00 **15 minutes × 5 presentations**

Kazuki Sakai[1], Yutaka Nakamura[2], Yuichiro Yoshikawa[1], Hiroshi Ishiguro[1] [1]Osaka University, [2]RIKEN
Development of discussion system by using multiple robots

Takahisa Uchida[1,2], Takashi Minato[3,2], Hiroshi Ishiguro[1,2] [1]Osaka University, [2]ATR, [3]RIKEN
Autonomous robots for daily dialogue based on preference and experience models

Yusuke Hirota[1], Noa Garcia[1], Mayu Otani[2], Chenhui Chu[3], Yuta Nakashima[1], Ittetsu Taniguchi[1], Takao Onoye[1] [1]Osaka University, [2]CyberAgent, Inc., [3]Kyoto University
How far can we go with scene descriptions for visual question answering?

Kazuki Miyazawa[1], Takato Horii[1], Tatsuya Aoki[1], Takayuki Nagai[1,2]
[1]Osaka University, [1]The University of Electro-Communications
Formation of object concepts using self-attention

Masaya Iwasaki[1], Tatsuyuki Kawamura[2], Hideyuki Nakanishi[1]
[1]Osaka University, [2]Kyoto Innovation, Inc.
Crowdsourced robot control: State-transition modeling and gamification
of human–robot interaction for novice operators

14:00 – 14:15 Break

Session 6 Models and Rules of Communication

14:15 – 15:00 **Ryuichiro Higashinaka** Nagoya University
Integrating understanding and generation modules for adaptive dialogue systems

15:00 – 15:45 **Hiroaki Sugiyama** NTT Communication Science Laboratories
Building and utilizing "personalities" for communicative intelligent systems

15:45 – 16:00 Break

16:00 – 16:45 **Fumio Shimpo** Keio University
The principal Japanese AI and robot strategy
— Significance and legal implications

Closing Remarks

16:45 – 17:00 **Minoru Asada** Osaka University

Tatsuya Kawahara

Pascale Fung

Ryuichiro Higashinaka

Hiroaki Sugiyama

Fumio Shimpo

Minoru Asada

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Symbiotic Intelligent Systems Research Center
Institute for Open and Transdisciplinary Research Initiatives, Osaka University
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Session 1   Responsible Robotics and Innovation

Civilized Collaboration:
Ethical architectures for enforcing legal requirements and mediating social norms in HRI

Ronald C. Arkin
College of Computing, Georgia Institute of Technology

The ways in which we treat each other, typically underpinned by an ethical theory, serve as a foundation for civilized activity. Bounds and requirements are established for normal and acceptable interactions between humans. If we are to create robotic systems to reside among us, they must also adhere to a set of related values that humans operate under. This talk first describes the importance of such conventions in human-robot interaction, then outlines a way forward including the difficult research questions remaining to be confronted in ethical human robot interaction (HRI). In particular, examples involving architectures using ethical governors, moral emotions, responsibility advisors and theories of mind are described in two quite different contexts: warfare and the maintenance of human dignity in healthcare. Even the role of deception must be considered as an important adjunct to HRI, as it may yield more effective intentional and autonomous social robots if properly deployed. Finally, time permitting, we can consider how robots may eventually be able to engineer more socially just human beings via nudging and the ethical questions associated with using such devices.

Towards responsible innovation:
Establishment of the "ELSI Center" at Osaka University

Atsuo Kishimoto
Institute for Datability Science, Osaka University

The concept of ELSI, which was born in the United States 30 years ago, is now reviving in Japan. At the center is not life science but data business and AI. Meanwhile, The Research Center on Ethical, Legal and Social Issues ("ELSI Center") was opened at the Osaka University in Osaka, Japan in April 2020. In this talk, we will introduce the aims and activities of the "ELSI Center." I would like to mention the historical context and the relationship with Responsible Research and Innovation (RRI) in Europe.

Session 3   Symbiotic Cognitive Systems

Psychological evaluation of a sense of security on robots

Hiroko Kamide
Institute of Innovation for Future Society, Nagoya University

A psychological assessment of the sense of security for humanoids will be presented. We investigated the subjective factors for Japanese people that contribute to the sense of security of various humanoids and developed a method to evaluate the sense of security of humanoids based on these factors. We also compared the subjective evaluation of the sense of security of robots between Japanese and Americans. Finally we discuss the conditions for constructing the sense of security for robots.

Emergent approach for symbiotic framework in creative work

Satoshi Kurihara
Faculty of Science and Technology, Keio University

Purpose of today's use of AI is mainly for efficiency and reducing waste. But. it's important to note that efficiency in itself does not create anything. To the contrary, diverse perspectives (intuition), creativity, adaptability, and resourcefulness are our human unique abilities. Symbiosis with human is next step of AI evolution. In this presentation, I would like to talk about our trial of AI support for human creativity. Key point is how to construct emergent framework for urging creativity.

Robots with a self

Verena V. Hafner
Faculty of Mathematics and Natural Sciences, Humboldt University of Berlin

Studying the prerequisites for an artificial self can give insights into processes of self-construction in humans, as well as into principles of learning and development in robotics, and allow for a more intuitive human-robot interaction. In this talk, I will discuss the prerequisites for developing an artificial minimal self, namely a sense of agency and a sense of body ownership. This will be demonstrated with computational models of sensorimotor prediction and robotics experiments. In particular, internal simulations that predict the consequences of own and others' actions might play an important role in the development of a sense of agency and self-other distinction.
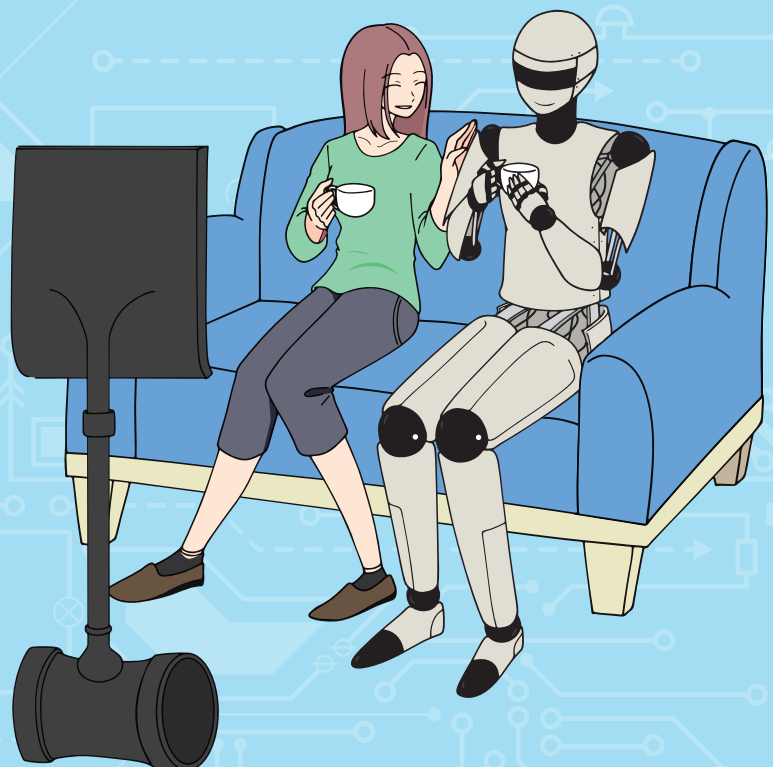
Session 4 — Conversational AI

Spoken dialogue system (SDS) for conversational android ERICA

Tatsuya Kawahara
Graduate School of Informatics, Kyoto University

Following the success of spoken dialogue systems (SDS) in smartphone assistants and smart speakers, a number of communicative robots are developed and commercialized. Compared with the conventional SDSs designed as a human-machine interface, interaction with robots is expected to be in a closer manner to talking to a human because of the anthropomorphism and physical presence. The goal or task of dialogue may not be information retrieval, but the conversation itself. In order to realize human-level "long and deep" conversation, we have developed an intelligent conversational android ERICA. We set up several social interaction tasks for ERICA, including attentive listening, job interview and speed dating.

Deeper conversational AI

Pascale Fung
Deaprtment of Electronic and Computer Engineering, The Hong Kong University of Science and Technology

Conversational AI systems interact with human users while completing user requests or simply chit-chat. These systems have applications ranging from personal assistance, health assistance to customer services, etc. In this talk, I will introduce the current state-of-the-art generation-based conversational AI approaches that leverage large pre-trained language models. I will discuss the challenges and shortcomings of these models such as the lack of knowledge, consistency, empathy, etc. I will highlight our current work in improving the depth of generation-based ConvAI, and possible directions for future research. I will also discuss potential ethical challenges of conversational AI systems and current efforts to address them.

Session 6 — Models and Rules of Communication

Integrating understanding and generation modules for adaptive dialogue systems

Ryuichiro Higashinaka
Graduate School of Informatics, Nagoya University

Although dialogue technologies have advanced greatly in the last decades, it is still difficult for human users to achieve tasks appropriately with dialogue systems. We consider that this is due to the system's inability to adapt to users and situations. We are tackling this problem by integrating understanding and generation modules for improving adaptiveness. We report on our data collection to examine how humans adapt their behavior depending on their conversational partners and situations, the dialogue robot competition we organize for tackling the problem with the dialogue systems community, and some preliminary results.

Building and utilizing "personalities" for communicative intelligent

Hiroaki Sugiyama

Innovative Communication Laboratory, NTT Communication Science Laboratories

Communicative intelligent systems that co-exist with humans for a long time necessarily generate consistent utterances based on their personalities. This consistency is ground to build a relationship between humans and systems. However, if a system has a single and fixed personality, it cannot continuously satisfy human wants to communicate with others. Co-existing communicative systems are also required to change their personalities and behaviors through interaction. Such systems are also necessary to consider human personalities and their social relationship when deciding their behaviors (utterances). This talk introduces our behavioral decision model estimation research group's research on how to build and utilize the system and human personalities.

The principal Japanese AI and robot strategy ― Significance and legal implications

Fumio Shimpo

Faculty of Policy Management, Keio University

This presentation will focus on the recent Japanese AI and robot strategy and related legal rules and introducing the research activities of 'The Human-Machine Social Norms (HMSN) Research Group' at the communicative intelligent systems towards a human-machine symbiotic society research project. In the future, autonomous robots equipped with artificial intelligence (AI) will become more widespread in our society. These emerging technologies are driving the consideration of not only improvements in the development of their industrial use, but also further research into the ethical and legal issues. For example, robot acquisition of data may lead to data confidentiality issues which we are not able to solve by focusing solely on AI data acquisition issues. The HMSN research group is conducting research on establishing new social norms necessary for a society where humans and machines coexist. This research group will try to establish fundamentally new measures to meet the situations that will arise from the social implementation of communicative robots and provide new knowledge of the ethical and social systems which will be essential for the social acceptance of communicative robots. Moreover, this group aims to focus on research regarding a 'robot law' that summarizes the principles of the social norms which constitute the basis of those measures and knowledge.
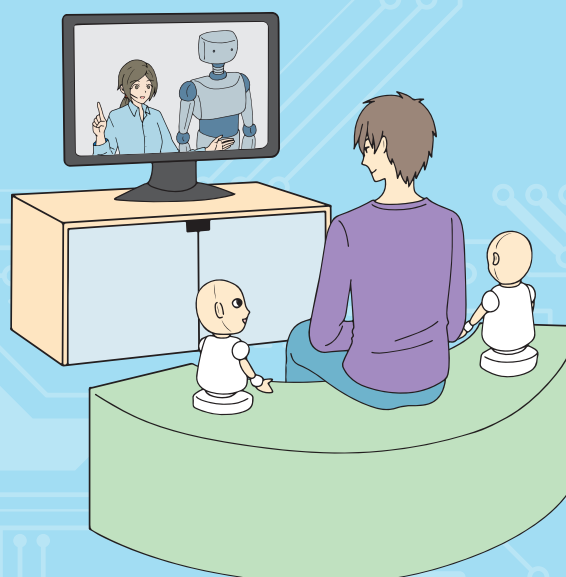
Symbiotic Intelligent Systems Research Center

Institute for Open and Transdisciplinary Research Initatives

The Symbiotic Intelligent Systems Research Center (SISReC) aims to build a future robot society, in which robots assist people in activities of daily living, as a successor to the contemporary information society. Interactive robots in particular are also regarded to be important as a next-generation information media device. Robot and media technologies are necessary for compensating for the quality of life (QOL) of people living in the low-birthrate and hyper-aging society of Japan.

In addressing problems of the hyper-aging society of Japan, Osaka University has started studying and developing interactive robots ahead of other research universities and institutes in the world, and it has founded and played a leading role in a new field in robotics, Interaction. Intelligent systems, primarily including interactive robots, are not only practically useful in providing social services for human beings but also theoretically important for offering a new research methodology for investigating engagement between human beings and robots.

The mission of the Center is to develop a society in which human beings and robots cohabit. The Center will realize this mission in the following way: by developing new intelligent systems (including intelligent robots) as a means to study the macro-level functions and properties of human beings and their societies, and more concretely, to conduct social-experimental studies for pursuing the fundamental problems of human beings, such as intelligence, embodiment, multi-modal integration, intention/desire, consciousness, and social relationships.
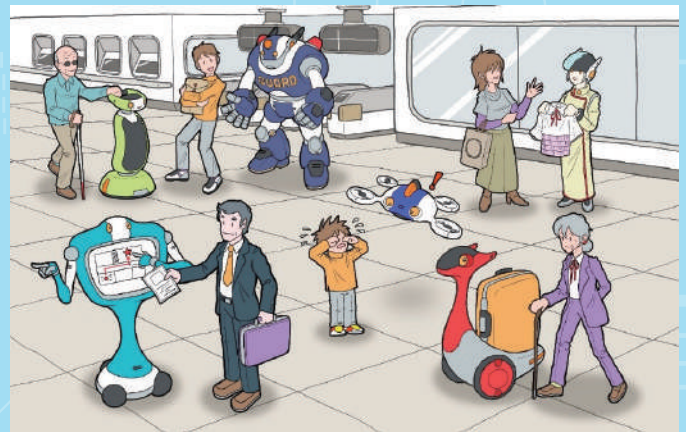
Co-Sponsors

- "Legal Beings: Electronic personhoods of artificial intelligence and robots in NAJIMI society, based on a reconsideration of the consideration of autonomy," RISTEX, JST

- "An exploration of the principle of emerging interactions in spatiotemporal diversity," CREST, JST

Cooperation

- "Communicative intelligent systems towards a human-machine symbiotic society," Grant-in-Aid for Scientific Research of Innovative Areas

- The Robotics Society of Japan

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