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NII Shonan Meeting Report

No. 2013-9

First International Symposium on Computer Behavioral Science

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September 26–28, 2013

National Institute of Informatics
2-1-2 Hitotsubashi, Chiyoda-Ku, Tokyo, Japan

First International Symposium on Computer Behavioral Science

Organizers:
Atsushi Nakazawa (Kyoto University)
James Rehg (Georgia Institute of Technology)
Yoichi Sato (University of Tokyo)
Akihiro Sugimoto (National Institute of Informatics)

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Preface

As one of the NII Shonan meetings, we organized the first international symposium on computer behavioral science, held during September 26-28, 2013. We invited 20 researchers from Japan, United States and China, namely, 13 people from Japan, 9 people from United States and 2 people from China.

Since the topic of this symposium is inter-disciplinary in nature, we invited a wide variety of researchers including computer vision, ubiquitous computing, psychology, physiology, robotics and medical doctors.

In this meeting, we took a unique organization style. Each speaker was provided a 10-minute self-introduction slot, and we held two breakout sessions which were used for group discussion. After the breakout sessions, we had organized sessions which summarized the respective group discussions. The meeting was quite successful and we receive a warm reception from all participants. We attach the following materials which is prepared / generated during the meeting.

People

Organizers

Atsushi Nakazawa (Kyoto University)
James Rehg (Georgia Institute of Technology)
Yoichi Sato (University of Tokyo)
Akihiro Sugimoto (National Institute of Informatics)

Participants

Agata Rozga (Georgia Institute of Technology)
Chun-li Yi (Peking University)
Kazuo Hiraki (University of Tokyo)
Wendy Stone (University of Washington)
Makio Kashino (NTT)
Shiro Kumano (NTT)
Christian Nitschke (Kyoto University)
Jinshi Cui (Peking University)
Norimichi Ukita (NAIST)
Ikuma Adachi (Kyoto University)
Lisa Parr (Emory)
Matthew Goodwin (Northeastern Univ.)
Santosh Kumar (University of Memphis)
Kenji Suzuki (University of Tsukuba)
Daniel Messinger (University of Miami)
Tetsuya Kawahara (Kyoto University)
Kuno Yoshinori (Saitama University)
Brian Scassellati (Yale University)
Masako Myowa-Yamakoshi (Kyoto University)

Objective of this Symposium

Recent advances in sensors and measurement technology, including image/video analysis, speech recognition, and wearable sensing devices, have created opportunities to measure behavior in development at an unprecedented scale and richness. For example, eye tracking studies have illuminated the development of patterns of attention, and the manner in which these patterns can be disrupted by conditions such as ASD. Wearable audio recorders and associated analysis methods, as exemplified in the LENA system, have created new opportunities for the data-driven investigation of the emergence of language. We believe that the confluence of sensing and computational modeling with experimental methodologies and behavioral theories will result in a new discipline, which we term Computational Behavioral Science.

The goal of our symposium is to work together on defining this new field and fleshing out the key research questions and issues, through a combination of presentations and discussions. The attendees of this meeting are drawn from a wide range of disciplines, including psychology, computer science and engineering, neuroscience, and robotics. A significant number of attendees study social and cognitive development, as well as the disruptions in development which arise in conditions such as autism. We will use this common interest to focus our discussion. But at the same time, we want to remain open to a broad range of topics and ideas at the intersection of technology and behavior.

Schedule

Day One

	Welcome address
09:00 – 09:15	James Rehg (Georgia Tech)
	Atsushi Nakazawa (Kyoto Univ.)
	Yoichi Sato (Univ. Tokyo)
	Akihiro Sugimoto (Nat. Inst. of Informatics)
	Self - Introductions
09:15 – 09:25	Agata Rozga (Georgia Tech)
09:25 – 09:35	Chun-li Yi (Peking Univ.)
09:35 – 09:45	Kazuo Hiraki (U. Tokyo)
09:45 – 09:55	Wendy Stone (U. Washington)
09:55 – 10:10	Break
10:10 – 10:20	Makio Kashino (NTT)
10:20 – 10:30	Shiro Kumano (NTT)
10:30 – 10:40	Christian Nitschke (Kyoto Univ.)
10:40 – 10:50	Jinshi Cui (Peking Univ.)
10:50 – 11:00	Norimichi Ukita (NAIST)
11:00 – 11:15	Break
11:15 – 11:25	Ikuma Adachi (Kyoto Univ.)
11:25 – 11:35	Lisa Parr (Emory)
11:35 – 11:45	Matthew Goodwin (Northeastern Univ.)
11:45 – 11:55	Santosh Kumar (U. Memphis)
11:55 – 12:05	Kenji Suzuki (U. Tsukuba)
12:15 – 13:45	Lunch
	Breakout Session
13:45 – 14:00	Organize break-out sessions
14:00 – 15:30	Breakout Session One
15:30 – 16:00	Break
16:00 – 17:00	Report back to group, discussion
	Dinner

Day Two

	Self - Introductions
09:00 – 09:10	Daniel Messinger (U.Miami)
09:10 – 09:20	Tetsuya Kawahara (Kyoto Univ.)
09:20 – 09:30	Kuno Yoshinori (Saitama Univ.)
	Project Presentations
09:30 – 09:55	Expedition in CBS
	James Rehg (Georgia Tech)
09:55 – 10:20	Expedition in Socially Assistive Robotics
	Brian Scassellati (Yale Univ.)
10:20 – 10:30	Break
10:30 – 10:55	MEXT Project, Constructive Developmental Science
	Masako Myowa-Yamakoshi (Kyoto Univ.)
10:55 – 11:20	CREST Project, Sensing and manipulation of visual attention
	Yoichi Sato (U.Tokyo) and Akihiro Sugimoto (NII)
11:20 – 12:00	Sign up for afternoon breakouts
12:00 – 13:30	Lunch
	Breakout Session
13:45 – 14:00	Organize break-out sessions
14:00 – 15:30	Breakout Session Two
15:30 – 16:00	Break
16:00 – 17:00	Report back to the group, discussion
	Dinner

Day Three

09:00 – 09:30	**Summary of Discussions**
	James Rehg (Georgia Tech)
	Atsushi Nakazawa (Kyoto Univ.)
	Yoichi Sato (Univ. Tokyo)
	Akihiro Sugimoto (Nat. Inst. of Informatics)
09:30 – 12:00	**Informal Working Group meetings**
12:00 – 1:30	Lunch

Presentation style

A goal of our meeting is to be able to introduce all attendees to each other in the morning of Day One, so that we will begin to know each others interests and research work and can work effectively as a group. To accomplish this, we ask each attendee to prepare a Self-Introduction Talk lasting 10 minutes, described in more detail below. In addition, we will have a small number of Project Presentations on the morning of Day Two. These presentations will describe existing larger funded research efforts in the CBS area, and can provide additional context for our discussions. Self-Introduction Talks We ask each attendee to prepare a 10 minute self-introduction talk. Please spend the first 5 minutes of your talk giving the audience an overview of who you are and what you work on (e.g. your appointment, educational background, research interests, etc.) Please spend the last 5 minutes of your talk describing a single research topic or project. Please focus on one topic only, so that you can describe it in sufficient detail. Here are some illustrative examples: Researchers in behavior science may want to focus on one study or finding that could provide an interesting application area for CBS. Alternatively, they may want to describe a key enabling capability which, if they had it, would allow them to ask an interesting research question. Researchers on the technology side may want to focus on a particular project or technology that they believe may have application to the behavioral sciences. Speakers could also spend their last 5 minutes presenting a particular viewpoint on what CBS is or should be. In order to fit all of the 10 minute talks into a single morning session, we will need to minimize the transition time between talks. We will provide specific instructions prior to the meeting.

Breakout Sessions

In order to facilitate discussion among the participants, we will have two afternoons of breakout sessions. During these periods, the attendees will be divided into small groups of 5-6 participants. Each group will discuss a particular set of topics among themselves, and will try to reach a collective understanding about the issues they are discussing. Each breakout group will nominate a scribe, a person in the group who will agree to take notes during the discussion and prepare a summary of the groups conclusions. The summary will take the form of a small set of powerpoint slides. After the breakout session is over, the group will re-assemble in the main meeting area. The scribe from each group (or an alternative group member) will then give a presentation of the groups findings to the rest of the meeting. This report-back period, in which each group reports their findings in turn, will allow all of the attendees to benefit from the discussions in each of the groups. This organization into breakout groups will allow all of the attendees to participate in the discussion and learn from each others insights. We would like to structure the breakout sessions as follows: In the first day, the breakout topics will cover a broad set of questions designed to encourage interaction between the group members and promote discussion. We will assign participants to specific breakout groups, ensuring that each group contains representatives from each of the disciplines and geographic areas that characterize our meeting. We hypothesize that certain themes and topics of broad interest to the group will emerge from these discussions. In the second day, we will propose a wider set of more focused topics, and allow people to

choose the breakout topics which most interest them.

Breakout Session One

The goal of this first session is to start a dialog around the basic relationships between technology and the science of behavior which define our topic of interest. Each group will be asked to discuss the following broad sets of questions:

1. What are some key technical challenges in the measurement, modeling, and analysis of behavior? In what areas of behavioral science has computing had the biggest impact? In what areas are computational methods the least well-developed? What are the lowest-hanging fruit in terms of areas of behavioral study in which existing technologies could be immediately applied?

2. What are some key constructs of social-communicative behavior that can be addressed with a computational approach to sensing and modeling? How can such a computational approach shed light on the link between cognition and action? Are there new directions in experimental behavioral research which could be enabled by anticipated advances in technology? What are the most promising clinical applications of computational behavioral science?

We dont expect each group to address all of the questions, please feel free to choose the subset of questions of the greatest interest to the group, or pose alternative questions instead.

Breakout Session Two

The organizers will generate a list of discussion topics in the evening of Day One, based on presentations and discussions during the day, and suggestions from the attendees. Attendees will have the opportunity to sign up for the sessions which most interest them during the morning presentation period.

Overview of Talks

Modeling developmental trajectories in autism: Opportunities for CBS

Agata Rozga, Georgia Institute of Technology, USA

Abstract In this short talk I hope to demonstrate the advantage of a developmental approach to untangling the heterogeneity of outcomes in autism, and to demonstrate opportunities for computational behavioral science to contribute to this approach. I will illustrate this point by briefly reviewing research that shows how children's emerging capacity to share attention with others vis-a-vis objects and events - joint attention - predicts language development in children with autism.

Biography Agata Rozga is a Research Scientist in the School of Interactive Computing at Georgia Institute of Technology. She is a developmental psychologist and an autism researcher, with a particular interest in early social-communicative development of children on the autism spectrum. Her current research spans the areas of Developmental Psychology, Human-Computer Interaction, and Computational Behavioral Science, with an aim toward building new tools to measure behaviors that are relevant both to identifying early signs of autism, and to predicting developmental trajectories and outcomes in this population.

How to help the parents understand the behaviour of autistic child

Chunli Yi, Peking University, China

Abstract "The parents and other adults confused with autistic child, but I found most behaviour of autistic child was reasonable, I helped the parents understand what the child told the parents.Principle of therapy:
1. Decrease the anxiety of the parents
2. Educate the parents how to interpret the behavior, make the parents accept the child.
3. Create the child a safe environment, which was the base of attachment relationship
I will provide some Video to show how to capture and interpret the signal that the child give us."

Yet another approach to developmental science

Kazuo Hiraki, University of Tokyo

Abstract Progress in cognitive science requires a balance between divergence and convergence of approaches. As an interdisciplinary and integrated field for scientific understanding of the human mind, cognitive science has incorporated diversified approaches such as computer modeling and brain imaging. These approaches brought us not only new findings but also new problems where the findings of different approaches are sometimes in conflict with each other. For example, the advances of infant looking-time methodologies (e.g. Baillargeon, 1986, Ahmed and Ruffman, 1998) have led to claims that infants know far more about the physical world than previously credited them based on studies using more traditional methodologies (Piaget, 1954). The current novel emphasis on electrophysiological methodologies such as EEG or ERP, add another layer of complexity. As a result, cognitive scientists have had to develop new models of the mind that can integrate empirical evidence across multiple methodologies (e.g., Munakata, 2001) in order to converge on a unified model of cognitive functioning. In my talk, I would like to introduce yet another approach to clarify the underlying mechanism of self-other recognition and communication.

Biography Visiting Researcher, Birkbeck College, University of London, 2004-2005.
Associate Professor, Department of Systems Science,The University of Tokyo, 2000-2006.
Researcher, ETL(Electrotechnical Laboratory), MITI, 1993-2000.
Degrees:
Ph.D. Computer Science, Keio University, 1993.
M.S., Behavioral Science, Hokkaido University, 1989.
Research interests
Origins of Communicative Functions
Development of Cognition and Action
Brain Development
Pedagogical Machine
Machine Learning

Early Detection of Autism: Measuring Social Gaze in Infants and Toddlers

Wendy Stone, Univ. of Washington

Abstract Early detection and intervention for children with autism can result in dramatic gains in cognitive and behavioral skills. Because biological markers for autism have not yet been identified, diagnosis is based on behavioral observations. Decreased social interest and attention are early-emerging behaviors that are associated with a later diagnosis of autism. However, measuring and quantifying social interest – especially eye gaze – in infants and toddlers can present significant challenges. This presentation describes some current obstacles and promising future directions for refining the measurement of social gaze in infants and toddlers.

Biography Dr. Wendy Stone is Professor of Psychology at the University of Washington. Her primary clinical and research interests are in early identification and early intervention for children with autism spectrum disorders. Her research focuses on identifying the early-emerging behavioral features of autism, with the goals of understanding the developmental processes that contribute to the tremendous variability in social, learning, and behavioral outcomes for these children, and implementing interventions to optimize their outcomes. She has received federal funding for this research since 1993. Dr. Stone has authored many papers on the early identification, assessment, and follow-up of young children with autism. Her research with young children led to the development of the Screening Tool for Autism in Two-Year-Olds (STAT) and a book for parents entitled, Does My Child Have Autism? She serves on the editorial boards of Autism Research and the Journal of Autism and Developmental Disorders, and has participated in numerous work groups and review panels for NIH and autism foundations. She is a member of the Autism Speaks Baby Siblings Research Consortium and the Toddler Treatment Network, and serves on the Scientific Advisory Board for Autism Speaks and on the Autism Advisory Panel for Sesame Street/Sesame Workshop. Dr. Stone is committed to translational science, and has worked to enhance knowledge and service capacity within community settings, through training and outreach activities for families, pediatricians, teachers, and other community professionals.

Sensorimotor approach to autism

Makio Kashino, NTT Communication Science Laboratories

Abstract Our ongoing JST CREST project is based on the assumption that what we call implicit interpersonal information (IIPI), that is, interaction or resonance of unconscious body movements or autonomic responses between partners, should play essential roles in communication. We have been trying to identify a set of IIPI related to the states of emotion and communication, and to reveal neural mechanisms underlying the processing of IIPI. From this viewpoint, autism spectrum disorder (ASD) can be thought of as a set of sensorimotor impairments, which may cause problems in the processing of IIPI. For example, we found specific deficits in basic auditory processing, which are likely due to the malfunction of the brainstem. We are also examining motor and autonomic properties in ASD. The sensorimotor approach to ASD would provide objective screening methods of the disorder, promoting the transition from symptom-based to mechanism-based diagnoses.

Biography Born in 1964. Received Ph.D. in experimental psychology from the University of Tokyo in 2000. Joined NTT in 1989. Currently, Senior Distinguished Scientist / Executive Manager of Human Information Science Laboratory, NTT Communication Science Laboratories (2010-), Visiting Professor in Department of Information Processing, Tokyo Institute of Technology (2006-), and PI of JST CREST project on implicit interpersonal information (FY2010-2014). Specialized in psychophysics and systems neuroscience of auditory perception, crossmodal interaction, and communication.

Probabilistic Modeling of Observer Perception about Empathy between Interlocutors in Multiparty Conversations

Shiro Kumano, NTT Communication Science Laboratories

Abstract In this talk, I will introduce our research framework for understanding emotions aroused between people while interacting in conversation. By focusing on pair-wise empathy as emotional contagion, especially the process by which they are perceived by other people, we aim to develop a computational model that realizes the automatic estimation of the perceived emotions. So far we have proposed Bayesian modeling of the observer's emotion perception with regard to two factors: interlocutor behavior factor and observer factor. In my presentation, I will first explain our behavior model that relates the emotion perceived by an anonymous observer with how interlocutors nonverbal behaviors co-occur between a pair. This model is based on our key findings that the perceptions are highly affected not only by the congruence but also by the time lag of nonverbal behaviors between the pair. Then, I will talk about our observer model that explains perception tendency of a specific observer from his/her gender and personality traits. We implemented this setting in the framework of a probabilistic topic modeling.

Biography Dr. Shiro Kumano received the PhD degree in Information Science and Technology from the University of Tokyo in 2009. He is currently a research scientist at NTT Communication Science Laboratories. His research interests include computer vision, automatic meeting analysis, and affective computing, especially in facial expression recognition and emotion estimation. He received the ACCV 2007 Honorable Mention Award, and several awards in Japanese domestic conferences.

Non-Intrusive Eye Gaze Tracking

Christian Nitschke, Kyoto University

Abstract It has been shown that eye gaze data can reveal important information about a persons internal state, perception and behavior. Eye gaze tracking (EGT) is, therefore, relevant for computational behavior analysis, e.g., to identify disorder patterns. However, state-of-the-art techniques suffer from major limitations that make them impossible to be applied for meaningful tasks in real-world situations, especially when non-experts, children, elderly and disabled are involved. In this talk, I want to introduce our approach to non-intrusive, flexible and practical eye gaze tracking. What makes our work different is that we directly analyze reflected scene information at the cornea of the eye. Extracting and modeling these corneal reflections from an eye image obtains the visual information of the environment and the relation to the observer (view, gaze). Reaching beyond current techniques, this naturally enables extension towards tracking the complete field-of-view (peripheral vision) instead of just the PoG.

Biography Christian Nitschke is currently an Assistant Professor at the Graduate School of Informatics, Kyoto University. He received a Diplom (M.S.) in Media Systems (Computer Science in Media) from Bauhaus Universitt Weimar, Germany in 2006, and a Ph.D. in Engineering from Osaka University, Japan in 2011, where he continued to work as a Postdoctoral Researcher until 2013. Between 2007 and 2011 he was an R&D engineer at VIOSO GmbH, developing solutions for multi-projector displays. Christians research interest is computer science for visual data processing, with a focus on computer vision, computer graphics/visualization and humancomputer interfaces. Especially, he aims in applying corneal imaging to solve practical problems, such as non-intrusive and flexible eye gaze tracking.

Computer vision based childrens peer play observation in social dimension

Jinshi Cui Peking University

Abstract Childrens play with peers is often used as a context for observing social interaction behaviors. Free play behaviors captured by video cameras could be processed by computer vision techniques to automatically measure the extent of social withdrawal or engagement, and it has a potential benefit for diagnosis and assessment of autism. In this talk, I will show our preliminary experiments on vision based play behavior analysis in social dimension. Based on video based face pose estimation results, visual attentions are computed and play behaviors are classified into three categories: Solitary Play, Parallel Play and Group Play. Finally, challenging issues to improve the behavior analysis accuracy and to extend the study to autism domain will be discussed

Biography Jinshi Cui is an Associate Professor in the School Electronics Engineering and Computer Science at Peking University (PKU), China. She received B.E., M.E. and Ph.D. in Computer Science and Technology from Tsinghua University in 1999, 2001 and 2004 respectively. Her research interests include computer vision (CV) and intelligent systems. She has authored over 40 papers in respected CV, robotics and ITS conferences and journals, including CVPR, ECCV, ICRA, IROS, and T-ITS. Currently she is working on computer vision based childrens behavior analysis in peer-play situations, together with colleagues from psychology department of PKU.

Wireless Physiological & Physical Activity Sensing to Enhance & Accelerate Research & Practice in Individuals with Autism

Matthew Goodwin, Northeastern University

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Social Playware: Smiles of May Facilitate Social Positive Behaviors

Kenji Suzuki, Universiy of Tsukuba

Abstract In this talk, two different wearable devices for the evidence based practice are introduced, which enable behavior and affective measurements. We recently reported that the specific case studies of children with autism spectrum disorders by using the developed wearable devices, and the smiles of may facilitate social positive behaviors. The developed wearable interfaces allow us to measure the (i) smiles or (ii) behavior of children with ASD but also facilitate the their social positive behaviors. Social Playware is regarded as cyber-physical systems to support and enhance the experiences on play and social interaction among people by measuring and presenting physical contacts, spatial movement and facial expression.

Biography He is currently an Associate Professor at the Center for Cybernics Research, and also the Principal Investigator of Artificial Intelligence Laboratory, University of Tsukuba, Japan. He received the B.S. degree in Physics, M.E. and Ph.D. degrees in Pure and Applied Physics from Waseda University, Tokyo, Japan, in 1997, 2000 and 2003, respectively. He was also a visiting researcher at the Laboratory of Physiology of Perception and Action, College de France, Paris in 2009, and the Laboratory of Musical Information, University of Genoa, Italy in 1997. His research interests include Assistive and Rehabilitation Robotics, Cognitive Robotics, Biosignal Processing, and Computational Behavior Science.

Emotion, Interaction, and Autism: Timing and Development

Daniel Messinger, University of Miami

Abstract Can real-time social processes illuminate developmental achievements? A dynamic systems perspective, automated measurements, and new modeling approaches are used to understand the expression of emotion and the development of social communication in infants at risk for autism and typically-developing infants.

Biography Dr. Messinger is Professor in the Department of Psychology at the University of Miami with secondary assignments in Pediatrics and Electrical and Computer Engineering. He investigates social and emotional development of typically developing and at-risk infants and children. He is interested in using real-time behavioral processes to understand development, with emphases on facial expression, adult-child interaction, and security of attachment. His current work involves measurement of emotional dynamics, communicative development among infants at risk for autism, and the application of machine learning approaches to infant-parent interaction. Dr, Messinger is recruiting for doctoral and postdoctoral positions to model communication and behavior in typical and high-risk (ASD) samples as part of awards from the NIH and NSF.

Smart Posterboard: Multi-modal Sensing and Analysis of Poster Conversations

Tatsuya Kawahara, Kyoto University

Abstract The talk gives an overview of our project on the smart posterboard for multi-modal conversation analysis. The smart posterboard has multiple sensing devices to record poster conversations, so we can review who came to the poster and what kind of questions or comments he/she made. The conversation analysis combines speech and image processing such as head tracking, speech enhancement and speaker diarization. Moreover, we are also investigating high-level indexing of interest and comprehension level of the audience, based on their multi-modal behaviors during the conversation.

Biography Tatsuya Kawahara is a Professor in the Academic Center for Computing and Media Studies and also in the School of Informatics, Kyoto University. His research interest covers speech recognition, spoken language processing, and spoken dialogue systems. He has been conducting several speech-related projects in Japan including free large vocabulary continuous speech recognition software (http://julius.sourceforge.jp/) and the automatic transcription system for the Japanese Parliament (Diet).

Developing Service Robots Based on Sociological Interaction Analysis

Yoshinori Kuno, Saitama University

Abstract We have been working toward developing service robots through the collaborative efforts of robotics engineers and human interaction sociologists. In our research, we first analyze human-human interaction through an experimental, sociological approach. Second, we develop a robot system based on the findings. Third, we evaluate human-robot interaction, again using an experimental, sociological approach, and then modify the robot based on the results. In this symposium, we introduce our museum guide robot, care robot, and robotic wheelchair developed through this approach. Our museum guide robot observes the response of visitors to its presentations, and then displays appropriate nonverbal behaviors for attracting the visitors attention. Our care robot detects people requesting its services, and then serves them one by one while utilizing nonverbal behavior to display the service order. Meanwhile, our robotic wheelchair can move alongside a caregiver by observing his/her motion.

Biography Yoshinori Kuno received the B.S. degree, the M.S. degree, and the Ph.D. degree in 1977, 1979, and 1982, respectively, all in electrical and electronics engineering from the University of Tokyo . In 1982, he joined Toshiba Corporation. From 1987 to 1988, he was a Visiting Scientist at Carnegie Mellon University. In 1993, he moved to Osaka University as an associate professor in the Department of Computer-Controlled Mechanical Systems. Since 2000, he has been a professor in the Department of Information and Computer Sciences, Saitama University.

Socially Assistive Robotics

Brian Scassellati, Yale University

Abstract Robots have long been used to provide assistance to individual users through physical interaction, typically by supporting direct physical rehabilitation or by providing a service such as retrieving items or cleaning floors. Socially assistive robotics (SAR) is a comparatively new field of robotics that focuses on developing robots capable of assisting users through social rather than physical interaction. Just as a good coach or teacher can provide motivation, guidance, and support without making physical contact with a student, socially assistive robots attempt to provide the appropriate emotional, cognitive, and social cues to encourage development, learning, or therapy for an individual.

In this talk, I will review some of the reasons why physical robots rather than virtual agents are essential to this effort, highlight some of the major research issues within this area, and describe some of our recent results building supportive robots for teaching social skills to children with autism spectrum disorder and for teaching nutrition to typically developing children.

Biography Brian Scassellati is a Professor of Computer Science, Cognitive Science, and Mechanical Engineering at Yale University. His research focuses on building embodied computational models of human social behavior, especially the developmental progression of early social skills. Using computational modeling and socially interactive robots, his research evaluates models of how infants acquire social skills and assists in the diagnosis and quantification of disorders of social development (such as autism). His other interests include humanoid robots, human-robot interaction, artificial intelligence, machine perception, and social learning.

Development of social cognition from perinatal period: Towards new systematic understanding of its dysfunction

Masako Myowa-Yamakoshi, Kyoto University

Abstract There is a clear continuity in human sensorimotor development from prenatal to postnatal life. We have found that fetuses have some knowledge of their own bodies; they manifest a sense of knowing that their bodies are entities different from the other entities in the external environment. However, few studies have investigated sensorimotor experience in perinatal period might directly affect the later stage of cognitive development. In this talk, I will present our recent findings suggesting that preterm infants and full-term neonates actually follow different trajectories in neural information processing. Also, we will discuss the possibility that such early neural alternations in the development might be related to later difficulties with higher social-cognitive development in preterm children.

Biography Masako Myowa-Yamakoshi received her Ph.D. from Kyoto University, Japan, in 1999. From 1997 to 2002, she was a Research Fellow of the Japan Society for the Promotion of Science, Japan. From 2003 to 2007 she was a Senior Lecturer at the University of Shiga Prefecture. Since 2007, she has been an Associate Professor of Kyoto University. She is the author of over 200 publications, editorials and books in the fields of Primatology and Developmental Science. She received the Nakayama Encouragement Award from the Nakayama Foundation for Human Science, Takashima Award from the Primate Society of Japan, and the award for International Contributions to Psychology from the Japanese Psychological Association, among other awards. Her research interests include the emergence and development of human intelligence and its evolutionary foundations.

Sensing, predicting, and modeling human gaze

Yoichi Sato University of Tokyo

Abstract In this talk, I will give an overview of our research efforts in JST-CREST project Sensing and controlling human gaze in daily living space for human-harmonized information environments. In particular, I will explain our recent results in three directions: casual and calibration-free gaze sensing, predicting visual attention with visual saliency models, and gaze pattern analysis.

Biography Yoichi Sato is a professor at Institute of Industrial Science, the University of Tokyo. He received his B.S. degree from the University of Tokyo in 1990, and his MS and PhD degrees in Robotics from School of Computer Science, Carnegie Mellon University in 1993 and 1997 respectively. His research interests include physics-based vision, reflectance analysis, image-based modeling and rendering, and sensing and understanding of human gaze and gestures. He served/is serving to conference organization and journal editorial roles including IEEE Transactions on Pattern Analysis and Machine Intelligence, International Journal of Computer Vision, ECCV2012 Program Co-Chair, and IAPR MVA2013 General Chair.