

SIGGRAPH'96 Tutorial Course #25

Life-like, Believable Communication Agents

Course Notes

Course Co-organizers

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and

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Abstract

This course is designed to give the audience a clear idea of how humans will be able to interact and communicate with computer agents of the future in a natural and life-like manner. The course first "believable" communication agents. Various kinds of state-of-the-art technologies are then presented putting emphasis on how they can be integrated with computer graphics technologies to realize these next generation agents.

Life-like, Believable Communication Agents Course Schedule

8:30 - 9:00	Introduction.....	0-1
	Ryohei Nakatsu, ATR Media Integration & Communications Research Laboratories	
9:00 - 10:00	Integration of multi-modalities	1-1
	Alex Pentland, Massachusetts Institute of Technology	
10:00 - 10:15	Break	
10:15 - 10:45	Integration of multi-modalities	1-2
	Alex Pentland, Massachusetts Institute of Technology	
10:45 - 12:00	Artistic expression of agents	2-1
	Naoko Tosa, ATR Media Integration & Communications Research Laboratories	
12:00 - 1:30	Lunch	
1:30 - 2:30	Verbal/Nonverbal communication	3-1
	Justine Cassell, Massachusetts Institute of Technology	
2:30 - 3:00	Communications by facial expressions and gestures	4-1
	Shigeo Morishima, Seikei University	
3:00 - 3:15	Break	
3:15 - 3:45	Communications by facial expressions and gestures	4-2
	Shigeo Morishima, Seikei University	
3:45 - 5:15	Reactive and improvisatorial behaviors of agents	5-1
	Ken Perlin, New York University	

Speaker Biographies

Ryohei Nakatsu received his B.S., M.S. and Ph.D. degrees in electronic engineering from Kyoto University in 1969, 1971 and 1982, respectively. After joining NTT in 1971, he mainly worked on speech recognition technology. Since 1994, he has been with ATR (Advanced Telecommunications Research Institute) and currently is the president of the ATR Media Integration & Communications Research Laboratories. His research interests include emotion extraction from speech and facial images, emotion recognition, nonverbal communications, and integration of multi-modalities in communications. He is a member of the IEEE, the Institute of Electronics, Information and Communication Engineers Japan (IEICE-J), as well as the Acoustical Society of Japan.

Kenji Mase received the B.S. degree in Electrical Engineering and the M.S. and Ph.D. degrees in Information Engineering from Nagoya University in 1979, 1981 and 1992 respectively. He has been with ATR (Advanced Telecommunications Research Institute) since 1995 and is currently the head of Department 2, ATR Media Integration & Communications Research Laboratories. He joined the Nippon Telegraph and Telephone Corporation (NTT) in 1981 and had been with the NTT Human Interface Laboratories. He was a visiting researcher at the Media Laboratory, MIT in 1988-1989. His research interests include image sequence processing of human actions, computer graphics, computer vision, artificial intelligence and their applications for computer-aided communications and multi-modal, interactive and creative human-machine interfaces. He is a member of the Information Processing Society of Japan (IPSJ), Institutes of Electronics, Information and Communication Engineers (IEICE) of Japan and IEEE Computer Society.

Alex Paul Pentland received his Ph.D from the Massachusetts Institute of Technology in 1982, began work at SRI International's Artificial Intelligence Center. He was appointed Industrial Lecturer in Stanford Universities' Computer Science department in 1983, winning the Distinguished Lecturer award in 1986. In 1987 he returned to M.I.T. and is currently Head of the Perceptual Computing Section of the Media Laboratory, a group that includes over fifty researchers in computer vision, graphics, speech, music, and human-machine interaction. He has done research in artificial intelligence, machine vision, human vision, and computer graphics, and has published more than 180 scientific articles in these areas. He has won awards from the AAAI for his research into fractals; the IEEE for his research into face recognition; and from Ars Electronica for his work in computer vision interfaces to virtual environments.

Naoko Tosa is a Media Artist & Researcher in the ATR Media Integration & Communications Research Laboratories. She is also a lecturer in the Dept. of Imaging Arts and Sciences, Musashino Art University. Her major research area is Art and Technology where she is working on the creation of film & video, computer graphics animations, and interactive arts. Her recent work includes the Neuro-Baby project, an autonomous computer agent with automatic facial expression and behavior synthesis that can respond to human voice by recognizing emotions and feelings. Her work was exhibited at Museum of Modern Art (New York), Metropolitan Art Museum, SIGGRAPH, Ars ELECTRONICA, Long Beach Museum, and other locations worldwide. Also, her works are collected at The Japan Foundation, American Film Association, Japan Film Culture Center, Nagoya Prefectural Modern Art Museum Japan, and other institutions in Japan.

Justine Cassell is faculty at MIT's Media Laboratory, where she heads the Gesture and Narrative Language Group. Previously she was National Science Foundation Visiting Professor in the Department of Computer Science, and Fellow of the Institute for Research in Cognitive Science, at the University of Pennsylvania. She holds two PhDs from the University of Chicago; one in Linguistics, and one in Psychology. Her research interests include the relationship between verbal and nonverbal behavior, autonomous animated conversing agents, and interactive storytelling systems designed for and by adults and children. Her work on integrating gesture, speech, and facial expression in autonomous animated conversing agents has been presented, among other places, at SIGGRAPH '94.

Shigeo Morishima received his B.S., M.S. and Ph.D. degrees, all in electrical engineering from the University of Tokyo, Tokyo, Japan, in 1982, 1984, and 1987, respectively. Currently, he is an associate professor of Seikei University, Tokyo, Japan. His research interests includes Model Based Image Coding, Speech Signal Processing, Speech Recognition, Image Processing, Facial Expression Recognition and Synthesis, Computer Graphics, and Media Conversion between Image and Speech. Dr. Morishima is a member of the IEEE, and the Institute of Electronics, Information and Communication Engineers Japan (IEICE-J). He was an Associate Editor of the Journal of the Pattern Recognition Society. He received the NICOGRAPH paper awards in 1988, 1990 and 1993, and the IEICE-J achievement award in May, 1992.

Ken Perlin is an Associate Professor of Computer Science and the Director of the Media Research Laboratory at the Courant Institute of Mathematical Sciences of New York University. He is also the director of the Center for Digital Multimedia, which is one of the Centers for Advanced Technology sponsored by the New York State Science and Technology. He completed his Ph.D. in 1986 from the New York University Department of Computer Science. He received his B.A. in Theoretical Mathematics at Harvard University in 1979. His research interests include graphics, animation, and multimedia. In 1991 he was a recipient of a Presidential Young Investigator Award. Dr. Perlin was Head of Software Development at R/GREENBERG Associates in New York, NY from 1984 through 1987. Prior to that he was the System Architect for computer generated animation at Mathematical Applications Group, Inc., Elmsford, NY. from 1979 to 1984. He has served on the Board of Directors of the New York chapter of ACM/SIGGRAPH. His algorithms for computer graphics have been widely used in commercials and feature films.