

Contents

Part I Perception

The Scaling of the Haptic Perception on the Fingertip Using an Interface of Anthropomorphic Finger Motions	3
Yusuke Ujitoko and Koichi Hirota	
Change in the Amount Poured as a Result of Vibration When Pouring a Liquid	7
Sakiko Ikeno, Ryo Watanabe, Ryuta Okazaki, Taku Hachisu, Michi Sato and Hiroyuki Kajimoto	
A Study on Upper-Limb Motor Control Using Mirror Illusion in Bimanual Steering	13
Yoshihiro Tanaka, Taiji Sakajiri and Akihito Sano	
Vibrotactile Cueing for Biasing Perceived Inertia of Gripped Object.	17
Hikaru Nagano, Shogo Okamoto and Yoji Yamada	
Auditory Feedback for Ear Picks	21
Masahiro Koge, Yosuke Kurihara, Ryuta Okazaki, Taku Hachisu and Hiroyuki Kajimoto	
Visual Stimulation Influences on the Position of Vibrotactile Perception.	29
Arinobu Nijima and Takefumi Ogawa	
Haptic Assistance of Spatial Pointing with Simple Vibrotactile Feedback for Gesture Interfaces.	37
Seonghwan Kim, Masashi Konyo and Satoshi Tadokoro	

Pressure Sensation Elicited by Rapid Temperature Changes	41
Ryo Watanabe and Hiroyuki Kajimoto	
The Effect of Frequency Shifting on Audio–Tactile Conversion for Enriching Musical Experience	45
Ryuta Okazaki, Hidenori Kuribayashi and Hiroyuki Kajimoto	
 Part II Tactile Devices and Rendering	
A Flexible PDMS-Based Multimodal Pulse and Temperature Display	55
Simon Gallo and Hannes Bleuler	
Adding Texture to Aerial Images Using Ultrasounds	59
Yasuaki Monnai, Keisuke Hasegawa, Masahiro Fujiwara, Kazuma Yoshino, Seki Inoue and Hiroyuki Shinoda	
Driving System of Diminished Haptics: Transformation of Real-World Textures	63
Daisuke Yamaguchi, Yoichi Ochiai, Takayuki Hoshi, Jun Rekimoto and Masaya Takasaki	
High-Speed Thermal Display System that Synchronized with the Image Using Water Flow	69
Kyohei Hayakawa, Kazuki Imai, Ryo Honaga and Masamichi Sakaguchi	
Texture Modulation of 3D Fabricated Object via Electrotactile Augmentation	75
Shunsuke Yoshimoto, Yoshihiro Kuroda, Masataka Imura and Osamu Oshiro	
Rendering Different Sensations to Multiple Fingers in a Multi-digit Softness Display: Pulsation and Distributed Softness.	81
Toshiki Kitazawa and Akio Yamamoto	
Development of Wearable Outer-Covering Haptic Display Using Ball Effector for Hand Motion Guidance.	85
Vibol Yem, Mai Otsuki and Hideaki Kuzuoka	

Presentation of Softness Using Film-Type Electro-Tactile Display and Pressure Distribution Measurement	91
Seiya Takei, Ryo Watanabe, Ryuta Okazaki, Taku Hachisu and Hiroyuki Kajimoto	
Development of Cold Sense Display Using Adjustment of Water Flow Volume	97
Ryo Honaga, Kazuki Imai, Kyohei Hayakawa and Masamichi Sakaguchi	
HeatHapt Thermal Radiation-Based Haptic Display	105
Satoshi Saga	
Haptic Interaction on a Touch Surface	109
Dongbum Pyo, Semin Ryu, Seung-Chan Kim and Dong-Soo Kwon	
Friction Perception by Laterally Vibrotactile Stimulus: Early Demonstration	113
Akihiro Imaizumi, Shogo Okamoto and Yoji Yamada	
 Part III Force Feedback Devices and Rendering	
Pressure Threshold of the Hanger Reflex at the Wrist	121
Takuto Nakamura, Narihiro Nishimura, Taku Hachisu, Michi Sato and Hiroyuki Kajimoto	
SPIDAR-S: Haptic Device Attached to the Smartphone	127
Motonori Toshima, Katsuhito Akahane and Makoto Sato	
Pseudo-Haptic Interface Using Multipoint Suction Pressures and Vibrotactile Stimuli	131
Daiki Maemori, Lope Ben Porquis, Masashi Konyo and Satoshi Tadokoro	
Wearable Pseudo-Haptic Interaction by Using Electrical Muscle Stimulation	135
Takaaki Ishikawa, Toshio Tsuji and Yuichi Kurita	
Normal and Tangential Force Decomposition and Augmentation Based on Contact Centroid	141
Sunghoon Yim, Seokhee Jeon and Seungmoon Choi	

Object Manipulation by Deformable Hand	145
Koichi Hirota, Yusuke Ujitoko, Kazuya Kiriya and Kazuyoshi Tagawa	
A Proposal of Wire-Driven Bimanual Multi-finger Haptic Display SPIDAR-10	149
Hiroshi Koganeyama, Satoshi Miyake, Lanhai Liu, Naoki Maruyama, Katsuhito Akahane and Makoto Sato	
Force Control of Stuffed Toy Robot for Intention Expression	153
Nutnaree Kleawsirikul, Yuanyuan Li and Shoichi Hasegawa	
Wearable 3DOF Substitutive Force Display Device Based on Frictional Vibrotactile Phantom Sensation	157
Ryota Nakagawa and Kinya Fujita	
Proposal of 6 DoF Haptic Interface SPIDAR-I Optimized by Minimizing Margin of Peak Force	161
Yunong Ji, Hiroyuki Tajima, Katsuhito Akahane and Makoto Sato	
Robotic Touch Surface: 3D Haptic Rendering of Virtual Geometry on Touch Surface.	169
Seung-Chan Kim, Byung-Kil Han, Jiwon Seo and Dong-Soo Kwon	
SRU: Stepwise Rotation Update of Finite Element Model for Large Deformation.	173
Yoshihiro Kuroda and Haruo Takemura	
A Conceptual Design of a Smart Knob with Torque Feedback for Mobile Applications	177
Sang Kyu Byeon, Dong-Soo Choi, Won-Hyeong Park, Yu-Joon Kim, Ki-Uk Kyung and Sang-Youn Kim	
 Part IV Sensing	
Built-in Capacitive Position Sensing for Multi-user Electrostatic Visuo-haptic Display	183
Taku Nakamura and Akio Yamamoto	
Highly Flexible and Transparent Skin-like Tactile Sensor	187
Saekwang Nam, Suntak Park, Sungryul Yun, Bong Je Park, Seung Koo Park, Mijeong Choi and Ki-Uk Kyung	

A Mounting Foot-Type Force-Sensing Device for a Desk with Haptic Sensing Capability	191
Toshiaki Tsuji, Tatsuki Seki and Sho Sakaino	
Thumbnail Input for Head-Mounted Display	197
Yasutoshi Makino	
Fingertip Force Estimation Based on the Deformation of the Fingertip	201
Kibita Akihito, Toshio Tsuji and Yuichi Kurita	
 Part V Medical Application	
Exoskeleton Simulator of Impaired Ankle: Simulation of Spasticity and Clonus	209
Hiroshi Okumura, Shogo Okamoto, Shun Ishikawa, Kaoru Isogai, Naomi Yanagihara-Yamada, Yasuhiro Akiyama and Yoji Yamada	
A Surgery Simulator Using an Optimized Space and Time Adaptive Deformation Simulation on GPU	215
Ryo Kuriki, Kazuyoshi Tagawa and Hiromi T. Tanaka	
Hierarchical Examination of Colliding Points Between Rigid and Deformable Objects	219
Mary-Clare Dy, Kazuyoshi Tagawa, Hiromi T. Tanaka and Masaru Komori	
Wearable Robot for Simulating Knee Disorders in the Training of Manual Examination Techniques	225
Shun Ishikawa, Shogo Okamoto, Kaoru Isogai, Naomi Yanagihara-Yamada, Yasuhiro Akiyama, Yujiro Kawasaki and Yoji Yamada	
Development of the Haptic Device for a Hepatectomy Simulator	231
Yu-uki Enzaki, Hiroaki Yano, Yukio Oshiro, Jaejeong Kim, Sangtae Kim, Hiroo Iwata and Nobuhiro Ohkohchi	
Haptic Augmentation of Surgical Operation Using a Passive Hand Exoskeleton	237
Jun Nishida, Kei Nakai, Akira Matsushita and Kenji Suzuki	

Haptic Virtual Reality Training Environment for Micro-robotic Cell Injection	245
Syafizwan Faroque, Ben Horan, Husaini Adam, Mulyoto Pangestu and Samuel Thomas	
 Part VI VR, Telepresence and Multimedia	
FeelCraft: User-Crafted Tactile Content	253
Oliver Schneider, Siyan Zhao and Ali Israr	
Development of Ball Game Defense Robot Based on Physical Properties and Motion of Human	261
Kosuke Sato, Yuki Hashimoto, Hiroaki Yano and Hiroo Iwata	
Development of Handshake Gadget and Exhibition in Niconico Chokaigi	267
Takanori Miyoshi, Yuki Ueno, Kouki Kawase, Yusaku Matsuda, Yuya Ogawa, Kento Takemori and Kazuhiko Terashima	
Haptic Snake: Line-Based Physical Mobile Interaction in 3D Space	273
Byung-Kil Han, Seung-Chan Kim, Semin Ryu and Dong Soo Kwon	
Panoramic Movie-Rendering Method with Superimposed Computer Graphics for Immersive Walk-Through System	277
Hikaru Takatori, Hiroaki Yano and Hiroo Iwata	
Air Tap: The Sensation of Tapping a Rigid Object in Mid-Air	285
Nobuhisa Miyamoto, Kazuma Aoyama, Masahiro Furukawa, Taro Maeda and Hideyuki Ando	
Haptic-Enabled English Education System	293
Minh Phuong Hoang, Jaebong Lee, Hojin Lee, Kyusong Lee, Gary Geunbae Lee and Seungmoon Choi	
Visual Vibrations to Simulate Taps on Different Materials	297
Taku Hachisu, Gabriel Cirio, Maud Marchal, Anatole Lécuyer and Hiroyuki Kajimoto	
Haptic Interface for Shape and Texture Recognition of Remote Objects by Using a Laser Range Finder	305
Yoshiyuki Yamashita, Hiroaki Yano and Hiroo Iwata	

Generating Vibrotactile Images on the Human Palms 311
Keisuke Hasegawa and Hiroyuki Shinoda

**A Proposal of Model-Based Haptization System for Animal
Images** 313
Takahiro Okubo, Katsuhito Akahane and Makoto Sato

Index 317

Haptic Interaction

Perception, Devices and Applications

Kajimoto, H.; Ando, H.; Kyung, K.-U. (Eds.)

2015, XIII, 319 p. 180 illus., 154 illus. in color.,

Hardcover

ISBN: 978-4-431-55689-3