Newsletter of the IEEE TCH

Issue 3

IEEE TCH Executive Committee
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Editorial

Dear IEEE Technical Committee on Haptics (TCH) members:

It is our pleasure to announce the 3rd issue of the Newsletter of the IEEE TCH (NTCH). In this issue, we provide the list of award papers/demos and winners of the student innovation challenge in IEEE Haptics Symposium 2016.

NTCH is an electronic magazine to introduce the latest research and development news related to haptics science and technology. As the main professional organization for the international field of haptics, the IEEE TCH aims to integrate the diverse interests of the highly interdisciplinary haptics research community and to improve communication between the different fields.

The distribution interval of the NTCH will be approximately one issue every three months. The distribution channels of NTCH include:

- A PDF version of the newsletter distributed by email to all TCH members
- A dedicated website: https://hapticmagazine.limsi.fr/

If you have any comments about the NTCH or any suggestions for information to include in future issues, please contact us by emailing mehdi.ammi@limsi.fr. We are looking forward to your contributions to the Newsletter.

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Co-Chairs of IEEE TCH

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I. Awards in IEEE Haptics Symposium 2016

**Best Student Paper Award**

**A Wearable Fabric-based Display for Haptic Multi-Cue Delivery**
Matteo Bianchi, Edoardo Battaglia, Mattia Poggiani, Simone Ciotti, and Antonio Bicchi

**Abstract:** Capitalizing upon our previous works on grounded softness devices, in this paper we present the Wearable Fabric Yielding Display (W-FYD), a fabric-based tactile display for multi-cue delivery that can be worn by user's finger. W-FYD enables both passive and active tactile exploration. Different levels of stiffness can be reproduced by modulating the stretching state of a fabric through two DC motors. A lifting mechanism enables to convey softness stimuli to the user's finger pad. Furthermore, a sliding effect on the finger can be also induced. Experiments with humans show the effectiveness of W-FYD for haptic multi-cue delivery.

**Best Student Presentation Award**

**Tactile Paintbrush: A Procedural Method for Generating Spatial Haptic Texture**
David Meyer, Michael Peshkin, and Ed Colgate

**Abstract:** In this work, we aim to represent tactile textures in such a way that a given texture may be "œpainted" onto a selected spatial region of a tactile display. We recorded a series of fingertip swipes across eleven textures, and modeled the randomness in spectral magnitude across space with three distributions. We analyzed the quality of parameterizations using goodness of fit as well as consistency across multiple swipes of
the same texture. We found that a two-parameter Weibull model best represented the data, and propose to use this model in the Tactile Paintbrush for applying virtual textures to spatial regions.

Best Demonstration Award

The hRing as a Wearable Haptic Interface for Extra Robotic Fingers
Giovanni Spagnoletti, Irfan Hussain, Claudio Pacchierotti, Gionata Salvietti, and Domenico Prattichizzo

Abstract: The demo will show the "hRing", a wearable haptic interface able to control the flexion/extension motion of a soft robotic finger and provide haptic feedback about the forces exerted by the robotic finger on the environment. The integrated system has been devised for compensating hand function in chronic stroke patients to re-gain the grasping capabilities of their paretic hand. During the demo, users will be able to use the robotic finger and the hRing interface for activities of daily living, such as unscrewing a cap of tomato jar, opening a popcorn bag, and opening a can of beans.
Student Innovation Challenge Award

i. Overall Best Interaction Award

Real-Time Haptic Enhanced Tele-Rehabilitation System for Physical Therapy
Cristina Ramirez Fernandez, Nirvana Estivalis Green Morales, David Bonilla Castillo, and Oliver Pabloff Angeles

Abstract: Nowadays, mainly due to a combination of demographic changes, a lack of resources in the field of Public Health and technology improvements, the development of new rehabilitative practices seems mandatory in order to build sustainable models for rehabilitation from the clinical, organizational and economic perspectives. In this sense, aiming at providing remote rehabilitation to patients we propose a real-time haptic enhanced tele-rehabilitation system for physical therapy. The combination of virtual environment, the Vybe haptic gaming device and the Leap Motion gesture controller are used as tools to perform physical therapies. Firstly, the input parameters of the therapy are individualized and calibrated according to the patient characteristics. Secondly, the execution of the therapy depends on the therapist’s hands movements in the virtual environment, which generate multimodal feedback to patients (i.e. visual, vibrotactile and audible feedback). Finally, therapy results are automatically updated in the patient clinical record.

ii. Honorable Mention

MOVieVib: Vibrotactile Cues of Camera Movement in 4D Films
Jongman Seo, Jaebong Lee, and Junsuk Park

Abstract: We propose the MOVieVib: an automatic vibrotactile feedback generation system of camera movement in 4D films. Directional cues of camera motions are provided
with vibrations through this system by the Vybe which has a vibrotactile grid display and is relatively cheap. We will use the algorithm presented earlier that automatically synthesize motion effects responding to camera motion. We will use this camera estimation algorithm which is optimized to synthesizing plausible motion effects for viewers since the algorithm does not require reconstructing physically-exact camera motion. We can estimate angular velocity, linear velocity, and linear acceleration of a camera motion. Some of those parameters are considered to generate directional vibrotactile cues. These cues should be optimized for perceptually clear sensations to maximize the sense of immersiveness.

### iii. People's Choice

**Tele Teku-Teku**

Daniel Gongora, Hideto Takenouchi, Wenchao Gu, and Yoshihiro Kato

**Abstract:** Tele Teku-Teku is a shared walking experience. It is a system designed for friends wanting to go for a stroll together but unable to do so because one of them is constrained to a certain place. We use the Vybe haptic gaming pad to provide vibrotactile feedback in sync with the footsteps of a distant friend. One of the users wears vibration sensors and carries an avatar robot equipped with an IMU and a camera, the other wears a Head-Mounted Display and sits on a chair enhanced by the gaming pad. Together these technologies set the stage for a rich and engaging experience. Shall we walk?
Best Work-in-Progress Paper Award

Toward a Wearable Tactile Sensory Amplification Device: Transfer Characteristics and Optimization
Mercedes Chartier, Neha Thomas, Yitian Shao, and Yon Visell

Abstract: This project aims to create a wearable device capable of electronically enhancing touch. Our prototype device utilizes accelerometers that are worn on the finger to capture touch-induced skin vibrations, which are instrumental to haptic perception. A compact recoil actuator is used to accurately reproduce these signals to enhance the transient touch information. The frequency-domain transfer characteristics of this system were used to determine sensor and actuator locations and orientations that would increase the range of feasible amplification gains. This study may help to guide the design of sensory prostheses and haptic displays worn on the upper limb.
Attendance who ever co-chaired a Haptics Symposium (or World Haptics)
From left to right: Ed Colgate, Hong Tan, Lynette Jones, Katherine Kuchenbecker, Cagatay Basdogan, Seungmoon Choi, Marcia O'Malley, Greg Gerling

II. Upcoming Events

EuroHaptics 2016
London, UK, July 4-7, 2016
http://www.eurohaptics2016.org

Important Dates
- Papers submission: February 1, 2016
- Workshop proposals: February 1, 2016
- Acceptance notification: April 4, 2016
- Camera ready paper submission: May 2, 2016
- Demonstration and WiP submissions: May 2, 2016
- Demonstration and WiP notification: May 7, 2016
- Early registration deadline: May 9, 2016
- Workshops: July 4
- Main Conference: July 5 – 7
AsiaHaptics 2016
Kashiwanoha, Japan, Nov. 29 - Dec. 1, 2016
http://asiahaptics.vrsj.org/2016/

Important Dates
• Video proposal submission due: July 29, 2016
• Tutorial/Workshop proposals due: August 5, 2016
• Acceptance notification: August 29, 2016