IPCAI 2017

June 20-21, Barcelona, Spain

Program

Tuesday, June 20th

10:30 Introduction
Chairs: Cristian A. Linte & Nicolas Padoy

10:45 Short Presentations Session I: Endoscopy, Visualization and Augmented Reality for CAI
Chair: Raphael Sznitman, University of Bern, Switzerland

EVA-1 **Comparison of Optical See-Through Head-Mounted Displays for Surgical Interventions with Object-Anchored 2D Display**
Long Qian, Johns Hopkins University; Alexander Barthel, Technical University of Munich; Alex Johnson, Greg Osgood, Johns Hopkins Hospital; Peter Kazanzides; Nassir Navab, Technical University of Munich; Bernhard Fuerst, Johns Hopkins University

EVA-2 **Deep Monocular 3D Reconstruction for Assisted Navigation in Bronchoscopy**
Marco Visentini-Scarzanella, Takamasa Sugiura, Toshimitsu Kaneko and Shinichiro Koto, Toshiba, Japan

EVA-3 **SLIM (Slit Lamp Image Mosaicing): Handling Reflection Artifacts**
Kristina Prokopetc and Adrien Bartoli, Université d'Auvergne

EVA-4 **Intelligent viewpoint selection for efficient CT to video registration in laparoscopic liver surgery**
Maria Robu, Philip Edwards, João Ramalhinho, Stephen Thompson, Brian Davidson, David Hawkes, Danail Stoyanov and Matthew Clarkson, University College London

EVA-5 **Projective biomechanical depth matching for soft-tissue registration in laparoscopic surgery**
Daniel Reichard, Dominik Häntsch, Sebastian Bodenstedt, Stefan Suwelack, Karlsruhe Institute of Technology; Martin Wagner, Hannes Kenngott, Beat Müller-Stich, Medical University of Heidelberg; Rüdiger Dillmann and Stefanie Speidel, Karlsruhe Institute of Technology

EVA-6 **Real-Time Surgical Tool Tracking and Pose Estimation for Intraoperative Ultrasound Visualisation using a Hybrid Cylindrical Marker**
Lin Zhang, Menglong Ye, Imperial College London; Po-Ling Chan, Chinese Hong Hong University; Guang-Zhong Yang, Imperial College London

11:25 Short Presentations Session II: Ultrasound-guided Interventional Applications
Chair: Elvis Chen, Robarts Research Institute, Canada

US-1 **Adaptive Learning from RF to B-mode Ultrasound Data for Prostate Cancer Detection**
Shekoofeh Azizi, University of British Columbia; Parvin Mousavi, Queen's University; Pingkun Yan, Amir Tahmasebi, Philip Research; Jin Tae Kawk, Sejong University; Sheng Xu, Baris Turkbey, Peter Choyke, Peter Pinto, Bradford Wood, National Institute of Health; Purang Abolmaesumi, University of British Columbia

US-2 **First clinical use of the EchoTrack guidance approach for radiofrequency ablation of thyroid gland nodules**
Alfred Franz, Alexander Seitel, Nasrin Bopp, German Cancer Research Center; Christian Erbelding, University Hospital Frankfurt; Stefan Delorme, Dominique Cheray, German Cancer Research Center; Frank Grünwald, Hüdayi Korkusuz, University Hospital Frankfurt; Lena Maier-Hein, German Cancer Research Center

US-3 **Robust Motion Tracking in Liver from 2D Ultrasound Images Using Supporters**
Ece Ozkan, Christine Tanner, Matej Kastelic, Oliver Mattausch, Maxim Makhinya, and Orcun Goksel, ETH Zurich

US-4 **Enhancement of Bone Shadow Region Using Ultrasound Transmission Maps**
Ilker Hacihaliloglu, Rutgers University

US-5 **Geometric Modeling of Hepatic Arteries in 3D Ultrasound with Unsupervised MRA Fusion during Liver Interventions**
Maxime Gerard, Ecole Polytechnique de Montréal ; François Michaud, Alexandre Bigot, An Tang, Gilles Soulez, Université de Montréal ; Samuel Kadoury, Ecole Polytechnique de Montréal

US-6 **Model-based Registration of Preprocedure MR and Intraprocedure US**
Delaram Behnami, University of British Columbia; Alireza Sedghi, Queen's University; Emran Mohammad Abu Anas, Abtin Rasoulian, Alexander Seitel, Victoria Lessoway, University of British Columbia; Tamas Ungi, Queen's University; David Yen, Kingston General Hospital; Jill Osborn, University of British Columbia; Parvin Mousavi, Queen's University; Robert Rohling, Purang Abolmaesumi, University of British Columbia

12:05 **Short Presentations Session III: Intra-operative Robotic Systems and Applications**
Chair: Su-Lin Lee, Imperial College London, UK

RS-1 **Force Assisted Ultrasound Imaging System through Dual Force Sensing and Admittance Robot Control**
Ting-Yun Fang, Haichong Zhang, Rodolfo Finocchi, Russell Taylor, and Emad Boctor, Johns Hopkins University

RS-2 **Hand-eye calibration for surgical cameras A Procrustean Perspective-n-Point solution**
Isabella Morgan, University of Waterloo; Uditha Jayarathne, Adam Rankin, Western University; Terry M. Peters, Elvis C.S. Chen, Robarts Research Institute

RS-3 **Acoustic Window Planning for Ultrasound Acquisition**
Rüdiger Göbl, Salvatore Virga, Julia Rackerseder, Benjamin Frisch, Nassir Navab, and Christoph Hennersperger, Technical University of Munich

RS-4 **Evaluation of a novel multi-articulated endoscope: proof of concept through a virtual simulation**
Tuukka Karvonen, Kyoto University; Yusuke Muranishi, Goshiro Yamamoto, Tomohiro Kuroda, Toshihiko Sato, Kyoto University Hospital

RS-5 **On the Reproducibility of Expert-Operated and Robotic Ultrasound Acquisitions**
Risto Kojcev, Ashkan Khakzar, Bernhard Fuerst, Johns Hopkins University; Oliver Zettinig, Technical University of Munich; Carole Fakhry, Bob De Jong, Jeremy Richmon, Harvard University, Russell Taylor, Johns Hopkins University; Edoardo Sinibaldi, Italian Institute of Technology; Nassir Navab, Johns Hopkins University

RS-6 **A Gaze-Contingent Framework for Human-Robot Collaboration in the Operating Theatre**
Alexandros Kogkas, Ara Darzi, George Mylonas, Imperial College London

12:45 **Lunch**

14:15 **Keynote Presentation: Makoto Hashizume, MD, PhD, FACS, Kyushu University, Fukuoka Japan**
Chair: Dan Stoyanov, University College London, UK

15:00 **Short Presentations Session IV: Surgical Workflow and Skill Analysis**
Chair: Stefanie Speidel, Karlsruhe Institute of Technology, Germany

SW-1 **Video and Accelerometer-Based Motion Analysis for Automated Surgical Skills Assessment**
Aneeq Zia, Yachna Sharma, Vinay Bettadapura, Georgia Institute of Technology; Eric Sarin, Emory University; Irfan Essa, Georgia Institute of Technology

SW-2 **The Minimally Acceptable Classification Criterion for Surgical Skill**
Rodney Dockter, University of Minnesota; Thomas Lendvay, Seattle Children's Hospital; Robert Sweet, University of Washington; Timothy Kowalewski, University of Minnesota

SW-3 **Predicting Surgical Skill from the First N Seconds of a Task**
Anna French, University of Minnesota; Thomas M. Lendvay, Robert M. Sweet, University of Washington; Timothy M. Kowalewski, University of Minnesota

SW-4 **Addressing multilabel imbalance problem of Surgical Tool Detection using CNN**
Manish Sahu, Anirban Mukhopadhyay, Angelika Szengel, Stefan Zachow, Zuse Institute Berlin

SW-5 **Temporal clustering of surgical activities in robot-assisted surgery**
Aneeq Zia, Georgia Institute of Technology; Chi Zhang, University of Tennessee; Xiaobin Xiong, Georgia Institute of Technology; Anthony Jarc, Intuitive Surgical, Inc.

15:30 Coffee break

16:00 Short Presentations Session V: Computer-aided Decision, Planning and Modeling for IGI
Chair: Amber L. Simpson, Memorial Sloan Kettering Cancer Center, USA

DPM-1 **SLIDE: Automatic Spine Level Identification System using a Deep Convolutional Neural Network**
Jorden H. Hetherington, Victoria A. Lessoway, Vit Gunka, Purang Abolmaesumi and Robert N. Rohling, University of British Columbia

DPM-2 **Extraction of Skin Lesions from Non-Dermoscopic Images for Surgical Excision of Melanoma**
Hossein Jafari, Ebrahim Nasr-Esfahani, Nader Karimi, Isfahan University of Technology; Reza Soroushmehr, University of Michigan; Shadrokh Samavi, McMaster University; Kayvan Najarian, University of Michigan

DPM-3 **Towards PCI procedure modelling: Empty catheter segmentation**
Ketan Bacchuwar, GE-Healthcare ; Jean Cousty, Université Paris-Est; Régis Vaillant, GE-Healthcare; Laurent Najman, Université de Paris Est

DPM-4 **An Efficient Cardiac Mapping Strategy for Radiofrequency Catheter Ablation with Active Learning**
Yingjing Feng, Imperial College London; Ziyan Guo, Ziyang Dong, Hong Kong University; Xiao-Yun Zhou, Imperial College London; Ka-Wai Kwok, Hong Kong University; Sabine Ernst, National Health Service; Su-Lin Lee, Imperial College London

DPM-5 **Interactive Segmentation in MRI for Orthopedic Surgery Planning: Bone Tissue**
Firat Ozdemir, Neerav Karani, ETH Zurich; Philipp Fuernstahl, University Hospital Balgrist; Orcun Goksel, ETH Zurich

DPM-6 **Automatic Anatomical Labeling of Arteries and Veins Using Conditional Random Fields**
Takayuki Kitasaka, Aichi Institute of Technology; Mitsuru Kagajo, Yukitaka Nimura, Yuichiro Hayashi, Masahiro Oda, Nagoya University; Kazunari Misawa, Aichi Cancer Center Hospital; Kensaku Mori, Nagoya University

16:40 Short Presentations Session VI: Intra-operative Navigation, Registration and Tracking
Chair: Miguel Angel Gonzalez Ballester, ICREA & Universitat Pompeu Fabra, Spain

NRT-1 **Can Real-Time RGBD Enhance Intraoperative Cone-Beam CT?**
Javad Fotouhi, Bernhard Fuerst, Wolfgang Wein, ImFusion; Nassir Navab, Johns Hopkins University

NRT-2 **Electromagnetically Tracked Personalized Templates for Surgical Navigation**
Andrew Dickinson, Queen's University; Michelle Zec, David Pichora, Kingston general Hospital; Brian Rasquinha, Randy Ellis, Queen's University

NRT-3 **Anser EMT: The first open-source electromagnetic tracking platform for image-guided interventions**
Herman Alexander Jaeger, University College Cork; Alfred Franz, German Cancer Research Center; Kilian O'Donoghue, University College Cork; Alexander Seitel, German Cancer Research Center; Fabian Trauzettel, University College Cork; Lena Maier-Hein, Pádraig Cantillon-Murphy, University College Cork

NRT-4 **Coffee: The Key to Safer Image-Guided Surgery**
Patrick Wellborn, Neal Dillon, Paul Russell, Robert Webster III, Vanderbilt University

NRT-5 **Contact-less stylus for surgical navigation - registration without digitization**
Elvis C.S. Chen, Robarts Research Institute; Burton Ma, York University; Terry M. Peters, Robarts Research Institute

NRT-6 **Pose-Aware C-Arm for Automatic Re-Initialization of Interventional 2D/3D Image Registration**
Javad Fotouhi, Bernahrd Fuerst, Alex Johnson, Russell Taylor, Greg Osgood, Nassir Navab, Mehran Armand, Johns Hopkins University

17:20 Presentation of Awards I

17:30 Poster Presentation Session I & Social Event

Dedicated to the 23 short oral presentations NOT featured as long presentations on June 21st

19:00 End of the Day

Wednesday, June 21th

08:30 Selected Oral Presentations (1/3): Endoscopy, Visualization and Augmented Reality for CAI & Intra-operative Navigation, Registration and Tracking
Chairs: Raphael Sznitman, University of Bern, Switzerland; Miguel Angel Gonzalez Ballester, ICREA & Universitat Pompeu Fabra, Spain

10:10 Coffee break

10:40 Selected long oral Presentations (2/3): Ultrasound-guided Interventional Applications & Computer-aided Decision, Planning and Modeling for IGI
Chairs: Elvis Chen, Robarts Research Institute, Canada; Amber L. Simpson, Memorial Sloan Kettering Cancer Center, USA

12:20 Lunch

13:50 Selected long oral Presentations (3/3): Surgical Workflow and Skill Analysis & Intra-operative Robotic Systems and Applications
Chairs: Stefanie Speidel, Karlsruhe Institute of Technology, Germany; Su-Lin Lee, Imperial College London, UK

15:30 Coffee break & Poster Presentation Session II
Dedicated to the 12 papers selected for long oral presentations on June 21st

16:45 Presentation of Awards II & Closing
Chairs: Nicolas Padoy & Cristian A. Linte

17:15 End of the Day

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