



Joint Congress of IFCARS, ISCAS, CAR, CMI, CAD, IPCAI

CARS 2020 Preliminary Program

**CARS 2020 Computer Assisted Radiology and Surgery
34th International Congress and Exhibition**

Tue-Thu, June 23-25, 2020: Hanns-Seidel-Stiftung, Conference Center Munich, Germany

Fri-Sat, June 26-27, 2020: Klinikum rechts der Isar der TUM, Munich

www.cars-int.org

CARS 2020 Opening Ceremony

Tuesday, June 23, 2020

18:00 Opening Ceremony

Hubertus Feussner, MD, President of CARS 2020

Keynote Lectures:

The Impact of Biomedical Engineering on Future Surgery

Ines Gockel, MD; MBA, DFNWC

Director of Department of Visceral, Transplant, Thoracic and Vascular Surgery, University Hospital of Leipzig (DE)

Paging the Surgeons: Curriculum at the Cutting Edge

Jeffrey H. Siewerdsen, PhD, FAAPM, FAIMBE

John C. Malone Professor and Vice-Chair, Department of Biomedical Engineering; Co-Director, The Carnegie Center for Surgical Innovation, The I-STAR Lab; Johns Hopkins University
Baltimore, MD (US)

19:30 CARS 2020 Reception

CARS 2020 Preliminary Program

34th International Congress and Exhibition on Computer Assisted Radiology (CAR)

Chair: Ulrich Bick, MD (DE)

Wednesday, June 24, 2020

8:30 Medical Imaging

Single-energy CT-based perfusion imaging in thoracic and abdominal region based on the convolution neural network

Y. Yuasa, T. Shiinoki, K. Fujimoto, H. Tanaka, Yamaguchi Univ., Ube (JP) [77]

Multimodal registration of US and MRI scans for vascular fetal surgeries

E. Monfort, B. Lalande Chatain, V. Comte, E. Eixarch, M. A. Gonzalez Ballester, M. Ceresa, Univ. Pompeu Fabra; Fetal i+D Fetal Medicine Research Center, Barcelona (ES) [175]

An approach towards 4 times super-resolution processing for SPECT images by deep learning technique

R. Hashimoto, Y. Okura, M. Yamamoto, H. Yamanaka, Hiroshima International Univ., Higashihiroshima (JP) [63]

A 3D Slicer module for calibration of spatially tracked 3D ultrasound probes

F. von Haxthausen, S. Ipsen, H. Schwegmann, R. Bruder, F. Ernst, V. García-Vázquez, Univ. of Lübeck (DE) [103]

Deep-learning based reconstruction of ultrasound images from raw channel data

H. Strohm, S. Rothlübbers, K. Eickel, M. Günther, Fraunhofer-Inst. for Digital Medicine MEVIS, Bremen (DE) [20-00029]

Digital subtraction angiography using semantic segmentation model of deep learning technique to reduce motion artifacts

H. Yamanaka, M. Yamamoto, Y. Okura, R. Hashimoto, H. Kawata, N. Yamamoto, Hiroshima International Univ.; Kurume Univ. Hospital (JP) [62]

Automatic quality measurement of aortic contrast-enhanced CT angiographies for patient-specific dose optimization

R. Pallenberg, M. Fleitmann, K. Soika, H. Handels, A. Bischof, J. Barkhausen, A. Fürschke, J. Gerlach, A.M. Stroth, Univ. of Lübeck; Universitätsklinikum Schleswig-Holstein (DE) [20-00091]

A visual SLAM based bronchoscope tracking scheme for bronchoscopic navigation

C. Wang, M. Oda, Y. Hayashi, B. Villard, T. Kitasaka, H. Takabatake, M. Mori, H. Honma, H. Natori, K. Mori, Nagoya Univ., Graduate School of Information Science; Aichi Kogyo Daigaku; Sapporo Minami Sankyo Hospital; Keiwakai Nishioka Hospital (JP) [20-00086]

Wednesday, June 24, 2020

Imaging Informatics – Segmentation

An application of multi-organ segmentation from thick-slice abdominal CT volumes using transfer learning

C. Shen, M. Oda, H. Roth, H. Oda, Y. Hayashi, K. Misawa, K. Mori, Nagoya Univ.; Aichi Cancer Center, Nagoya; National Inst. of Informatics, Tokyo (JP), NVIDIA, Maryland (US) [217]

Fast interactive medical image segmentation with weakly-supervised deep learning method

K.B. Girum, G. Crehange, R. Hussain, A. Lalande, Univ. of Bourgogne; Centre Hospitalier Universitaire, Dijon; Centre Georges-Francois Leclerc (FR) [20-00061]

Label cleansing and propagation for improved segmentation performance using fully convolutional networks

T. Sugino, Y. Suzuki, T. Kin, N. Saito, K. Mori, Y. Nakajima, Tokyo Medical and Dental Univ.; The Univ. of Tokyo; Nagoya Univ. (JP) [20-00076]

ADAGSS: Automatic dataset generation for semantic segmentation

L. Palladno, B. Maris, P. Fiorini, Univ. of Verona (IT) [51]

Speckle gan: a learnable speckle generator to augment training data for ultrasound image processing

L. Bargsten, A. Schlaefer, Technische Universität Hamburg (DE) [20-00034]

Training of head and neck segmentation networks with shape prior on small datasets

E. Tappeiner, S. Pröll, K. Fritscher, M. Welk, R. Schubert, UMIT - Private Univ. for Health Sciences, Medical Informatics and Technology GmbH, Hall in Tirol (AT) [20-00107]

DeepSeg: Deep neural network framework for automatic brain tumor segmentation using magnetic resonance flair images

R. A. Zeineldin, M. E. Karar, J. Coburger, C. R. Wirtz, O. Burgert, Hochschule Reutlingen; Ulm Univ. (DE) [20-00092]

Enhanced registration of ultrasound volumes by segmentation of resection cavity in neurosurgical procedures

L. Canalini, J. Klein, D. Miller, R. Kikinis, Fraunhofer-Inst. für Digitale Medizin MEVIS, Bremen; Univ. Hospital Knappschafts-Krankenhaus Bochum (DE); Harvard Medical School (US) [20-00027]

Artificial intelligence in detection and segmentation of internal auditory canal and its nerves using deep learning techniques

J. Singarayan, C. Sreelakshmi, K. Ram, R. Rangasami, M. Sivaprakasam, Indian Inst. of Technology Madras, Chennai; Sri Ramachandra Inst. for Higher Education and Research (IN) [20-00068]

Automatic CT image segmentation of maxillary sinus based on VGG network and improved V-Net

J. Xu, S. Wang, Z. Zhou, J. Liu, X. Chen, Shanghai Jiao Tong Univ. (CN) [20-00082]

Segmentation of cervical intervertebral disks in videofluorography by CNN, multi channelization and feature selection

A. Fujinaka, K. Mekata, H. Takizawa, H. Kudo, Univ. of Tsukuba Daigaku, Ibaraki; Kobe Red Cross Hospital (JP) [20-00010]

Toward optimal reliable automatic liver and tumor segmentation using convolutional neural network based on 2.5D models

G. Wardhana, H. Naghibi, B. Sirmacek, M. Abayazid, Univ. of Twente, Enschede (NL) [20-00047]

Classification of hepatic hemangiomas and blood vessels from ultrasonography by deep learning

N. Koizumi, K. Kusahara, Y. Nishiyama, T. Imaizumi, R. Saito, S. Yagasaki, N. Matsumoto, M. Ogawa, The Univ. of Electro-Communications, Tokyo; Nihon Univ. (JP) [20-00072]

Liver segmentation from pediatric CT volumes using fully convolutional network with shape regularization by conditional statistical shape model

Y. Tanaka, A. Saito, M. G. Linguraru, A. Shimizu, Tokyo Univ. of Agriculture and Technology (JP); Children's National Health System, Washington (US) [124]

Estimating 3-dimensional liver motion using deep learning and 2-dimensional ultrasound images

N. Koizumi, S. Yagasaki, Y. Nishiyama, R. Kondo, T. Imaizumi, N. Matsumoto, M. Ogawa, K. Numata, The Univ. of Electro-Communications, Tokyo; Nihon Univ.; Yokohama City Univ. Medical Center (JP) [20-00070]

Virtual cleansing by unpaired image translation of intestines for detecting obstruction

M. Oda, K. Nishio, H. Oda, T. Kitasaka, Y. Tamada, H. Amano, A. Takimoto, K. Chiba, Y. Hayashi, H. Itoh, A. Hinoki, H. Uchida, K. Mori, Nagoya Univ.; Aichi Inst. of Technology, Toyota (JP) [82]

Unravelling the effect of data augmentation transformations in polyp segmentation

L.F. Sanchez-Peralta, A. Picon, F. M. Sanchez-Margallo, J. B. Pagador, Jesús Usón Minimally Invasive Surgery Centre; Tecnalia Research & Innovation (ES) [20-00024]

Bladder cancer segmentation from cystoscopic images by encoder-decoder network

A. Umehara, K. Morooka, J. Mutaguchi, S. Kobayashi, S. Miyauchi, R. Kurazume, M. Eto, Kyushu Univ., Fukuoka (JP) [74]

The segmentation of bladder tumors based on voxel-based features and transductive support vector machine model

H. Zheng, X. Xu, X. Zhang, Y. Liu, Fourth Military Medical Univ., Xi'an City (CN) [60]

Simultaneous process of skeleton segmentation and hot-spot extraction in a bone scintigram

M. Hara, A. Saito, J. Kawabe, S. Higashiyama, H. Daisaki, A. Shimizu, Tokyo Univ. of Agriculture and Technology; Osaka City Univ. (JP) [94]

Generative approach for data augmentation for deep learning-based bone surface segmentation from ultrasound images

S. Joung, A. Zaman, S. H. Park, H. Bang, C.-W. Park, I. Park, Kyungpook National Univ.; Daegu Gyeongbuk Inst. of Science and Technology (KR) [20-00028]

Automated preoperative segmentation of temporal bone: Paving the way to augmented reality

C. Athayde Neves, E. D. Tran, N. Blevins, Univ. of Brasilia (BR); Stanford Univ. (US) [207]

Whole-body surface muscle recognition efficiently obtained with limited training images using 3D U-Net based on selective voxel patch generation in whole-body CT images

N. Kamiya, A. Oshima, X. Zhou, K. Azuma, H. Kato, T. Hara, T. Miyoshi, M. Matsuo, H. Fujita, Aichi Prefectural Univ., Nagakute; Gifu Univ.; Univ. of Occupational and Environmental Health (JP) [20-00008]

Automatic fetal structure segmentation in MRI scans: A deep learning approach requiring very few annotated datasets

L. Joskowicz, G. Dudovitch, D. Sourani, L. Ben Sira, D. Ben Bashat, The Hebrew Univ. of Jerusalem; Tel Aviv Sourasky Medical Center (IL) [47]

Wednesday, June 24, 2020

Imaging Informatics - Advanced Processing

TinyLoss: Loss function for tiny image difference evaluation and its application to unpaired non-contrast to contrast abdominal CT estimation

M. Oda, T. Hu, K. K. Kumamaru, S. Aoki, K. Mori, Nagoya Univ.; Juntendo Univ., Tokyo (JP) [153]

RespiTrack: patient specific real-time respiratory tumor motion prediction using magnetic tracking

Y. Özbek, Z. Bardosi, W. Freysinger, Universitätsklinik Innsbruck (AT) [20-00016]

Spatio-temporal deep learning for 4D OCT-guided motion estimation

M. Bengs, N. Gessert, M. Schlüter, A. Schlaefer, Hamburg Univ. of Technology (DE) [20-00039]

A study to quantitatively evaluate the development of fetal lung based on transfer learning deep model from ultrasound images

Y. Deng, P. Chen, Y. Chen, Y. Wang, P. He, X. Lv, J. Yu, Fudan Univ., Shanghai; Tongji Univ. School of Medicine (CN) [20-00040]

SR-CycleGAN V2: CycleGAN-based unsupervised super-resolution with pixel-shuffling

K. Mori, T. Zheng, H. Oda, T. Moriya, T. Sugino, S. Nakamura, M. Oda, M. Mori, H. Takabatake, H. Natori, Nagoya Univ.; Sapporo-Kosei General Hospital; Sapporo Minami-sanjo Hospital; Keiwakai Nishioka Hospital, Sapporo (JP) [42]

3D Siamese neural networks for matching pulmonary nodules in series of ct scans

X. Rafael-Palou, A. Aubanell, I. Bonavita, M. Ceresa, G. Piella, V. Ribas, M. González Ballester, Eurecat; BCN MedTec; Vall d'Hebron Univ. Hospital; ICREA, Barcelona (ES) [67]

MRI based 3-dimensional visualization workflow for the preoperative planning of nephron-sparing surgery in Wilms' tumor patients

M. Fitski, J. W. Meulstee, A. S. Littooi, C. P. van den Ven, A. F. W. van der Steeg, M. H. W. Wijnen, Princess Maxima Center for Pediatric Oncology, Utrecht; Radboud Univ. Medical Center, Nijmegen; Univ. Medical Center Utrecht (NL) [179]

Unsupervised domain adaptation for category prediction in fMRI brain decoding

H. Yamane, A. Kanehira, T. Harada, RIKEN, Tokyo; The Univ. of Tokyo (JP) [211]

Language-based translation and prediction of surgical navigation steps for endoscope tracking in minimally-invasive surgery

R. Bieck, K. Heuermann, M. Pirlich, J. Neumann, T. Neumuth, Univ. of Leipzig, Faculty of Medicine (DE) [20-00054]

Wednesday, June 24, 2020

CAR/CAD Joint Session on Segmentation

Automatic determination of patient-individual liver segments using neural networks

F. Thielke, G. Chlebus, A. Schenk, H. Meine, Fraunhofer-Inst. für Digitale Medizin, Bremen; Univ. of Bremen (DE) [20-00062]

Generative multi-adversarial network for striking the right balance in abdominal image segmentation

M. Rezaei, J. Näppi, C. Lippert, C. Meinel, H. Yoshida, Hasso Plattner Inst., Potsdam (DE); Massachusetts General Hospital, Harvard Medical School (US) [20-00060]

Towards statistical atlas of lung lesions

V. Kovalev, V. Liauchuk, A. Gabrielian, A. Rosenthal, United Inst. of Informatics, Minsk (BY); National Inst. of Allergy and Infectious Diseases, Bethesda (US) [35]

CARS – Computer Assisted Radiology and Surgery

Thursday, June 25, 2020

Innovations in Cardiovascular Intervention Support

Segmentation of echocardiography sequences beating-heart surgical support

R. Ellis, D. Stuart, G. Bisleri, Queen's Univ., Kingston, ON (CA) [111]

Superficial femoral artery calcification segmentation in CT angiography based on a vessel-calcification spatial and shape-aware network

W. Weng, Y. Ku, Z. Chen, H. Zheng, C. Xu, H. Ding, L. Li, G. Wang, Tsinghua Univ. School of Medicine; Capital Medical Univ., Beijing (CN) [152]

Evaluation of different target structures for motion compensation during TAVI

D. Bertsche, W. Rottbauer, V. Rasche, I. Vernikouskaya, Ulm Univ. Medical Center (DE) [151]

Anatomical 3D localization of the ablation catheter tip based on 2D fluoroscopy using U-net

I. Vernikouskaya, T. Dahme, W. Rottbauer, V. Rasche, Ulm Univ. Medical Center (DE) [80]

Deep Convolutional Neural Networks (CNN) for classification of coronary arteries

X. Lessage, M. Nedoszytko, C. Piusi, S. Mahmoudi, S. A. Mahmoudi, Univ. of Mons; CHR Hainaut Mons (BE) [176]

Virtual heart team - A machine intelligence augmented environment for evidence-based and data-driven therapeutic decision making

M. A. Cypko, V. Falk, A. Meyer, German Heart Inst. Berlin (DE) [201]

Combining visual analytics and case-based reasoning for rupture risk assessment of intracranial aneurysms

S. Saalfeld, L. Spitz, U. Niemann, O. Beuing, B. Neyazi, E. Sandalcioglu, B. Preim, Otto-von-Guericke-Univ. Magdeburg; Univ. Hospital Magdeburg (DE) [20-00025]

Interactive editing of virtual chordae tendineae for the simulation of the mitral valve in a decision support system

L. Walczak, L. Tautz, M. Neugebauer, J. Georgii, I. Wamala, S. Sündermann, V. Falk, A. Hennemuth, Fraunhofer MEVIS, Bremen; Deutsches Herzzentrum Berlin; Charité - Universitätsmedizin Berlin Campus Virchow-Klinikum (DE) [20-00038]

3D guidance including shape sensing of a stentgraft system for endovascular aneurysm repair

S. Jäckle, V. Garcia-Vazquez, T. Eixmann, F. Matysiak, F. von Haxthausen, M.M. Sieren, H. Schulz-Hildebrandt, G. Hüttmann, F. Ernst, Fraunhofer MEVIS, Lübeck; Univ. of Lübeck; Univ. Hospital Schleswig-Holstein (DE) [20-00030]

A simple, realistic walled phantom for intravascular and intracardiac applications

H. Nisar, J. Moore, R. Piazza, E. Maneas, E.C.S. Chen, T.M. Peters, Western Univ., London, ON; Robarts Research Inst. (CN); Univ. of Pisa (IT); Univ. College London (GB) [20-00088]

Usefulness and clinical application of personalised three-dimensional printed models in cardiovascular disease

Z. Sun, Y. H. Wong, C. H. Yeong, Curtin Univ. of Technology, Perth, WA (AU); Taylor's Univ., Subang Jaya (MY) [34]

X-ray image-based haptic navigation for robot-assisted percutaneous coronary intervention

J. Ryu, D. Kim, W. Choi, M. H. Jeong, Gwangju Inst. of Science and Technology; Chonnam National Univ. Hospital (CN) [20-00019]

Thursday, June 25, 2020

Computer Assisted Orthopedics

Hierarchical deep curriculum learning for the classification of proximal femur fractures

A. Jiménez-Sánchez, D. Mateus, S. Kirchhoff, C. Kirchhoff, P. Biberthaler, N. Navab, M. A. G. Ballester, G. Piella, Universitat Pompeu Fabra; ICREA; Barcelona (ES); Ecole Centrale de Nantes (FR); Klinikum rechts der Isar of TUM, Technical Univ., Munich (DE) [15]

Overnight and in-house 3D-printed patient-specific casts for non-operative treatment of distal radius fractures – a prospective randomized trial

M. Keller, A. Gübeli, P. Honigmann, Kantonsspital Baselland, Liestal (CH) [37]

Patient-specific modelling and simulation of knee joint motion using position-based dynamics

J. Georgii, I. Ludwig, E. Taghizadeh, K. Izadpanah, T. Lange, Fraunhofer MEVIS, Bremen; Univ. of Bremen; Univ. Hospital, Freiburg (DE) [85]

Minimum two-year outcomes in primary robotic-arm assisted total hip arthroplasty: an analysis of over 500 hips

B. Domb, D. Maldonado, J. Chen, C. Kyin, R. Bheem, J. Shapira, P. Rosinsky, American Hip Inst., Des Plaines, IL (US) [9]

Thursday, June 25, 2020

Pathology Informatics

The roles of deep neural network in micro CT for pathological diagnosis: case of lymph node segmentation

T. Ohnishi, A. Teplov, N. Kawata, B. Stueben, P. Ntiamoah, C. Firat, H. Haneishi, M. Hameed, J. Shia, Y. Yagi, Chiba Univ. (JP); Memorial Sloan Kettering Cancer Center, New York (US) [105]

Detecting breast cancer clusters from mass spectrometry imaging

R. Ellis, R. Theriault, B. Everitt, S. Varma, M. Kaufmann, Queen's Univ., Kingston, ON (CA) [72]

Classification of post-operative atrial fibrillation using stacked learning and mass spectrometry

R. Ellis, E. Wang, G. Bisleri, M. Kaufmann, Queen's Univ., Kingston, ON (CA) [107]

Friday, June 26, 2020

Digital Operating Room

BPMNSIX.io - a web-based surgical workflow modeling tool with ontology integration

J. Neumann, D. Vogel, T. Neumuth, Leipzig Univ. (DE) [182]

Joint surgical gesture and surgical task classification with multi-task and multimodal learning

D. Sarikaya, Univ. of Rennes 1 (FR) [190]

Surgical gesture classification with motion cues only

D. Sarikaya, P. Jannin, Univ. of Rennes 1 (FR) [199]

Manual segmentation versus semi-automated segmentation for quantifying vestibular schwannoma volume on MRI

H. McGrath, P. Li, R. Dorent, R. Bradford, S. Saeed, S. Bisdas, S. Ourselin, J. Shapey, T. Vercauteren, King's College London; UCL Ear Inst.; National Hospital for Neurology and Neurosurgery (UK) [20-00053]

The automated OR report: A realizable and useful application of the cognitive workflow OR?

T. Vogel, D. Ostler, A. Zapaishchykova, M. Kähler, H. Feussner, D. Wilhelm, M. Kranzfelder, Klinikum r.d. Isar of TUM, Munich (DE) [174]

Evolution of endoscopic endonasal approach brought by the next-generation operating room

T. Ogiwara, T. Nakamura, Y. Fujii, R. Hardian, T. Goto, T. Horiuchi, K. Hongo, Shinshu Univ. School of Medicine, Matsumoto (JP) [40]

Artificial intelligence CT screening for thyroid associated ophthalmopathy and application tests in accordance with the rules of clinical trials

H. Zhou, X. Song, Z. Liu, L. Li, Z. Gao, X. Fan, G. Zhai, Shanghai Jiao Tong Univ. School of Medicine; Shanghai Ninth People's Hospital; Shanghai Jiao Tong Univ. (CN) [20-00018]

Integrating autonomously navigating assistance systems into the clinic - guiding principles and the ANTS-OR approach

L. Bernhard, D. Ostler, H. Feussner, D. Wilhelm, Klinikum rechts der Isar der Technischen Universität München (DE) [20-00041]

Robotics in surgery: Chances, limitations and future applications

D. Wilhelm, D. Ostler, H. Feussner, Klinikum rechts der Isar of TUM, Munich (DE) [202]

The future of healthcare facilities: A new architectural and systems design approach

C. Amato, O.M. Ratib, Cannon Design, Los Angeles, CA (US) [223]

Friday, June 26, 2020

IHE Surgery

The knowledge model

R. Schilling, EchoPixel, Inc., Los Altos Hills, CA (US) [224]

13th CARS Clinical Day

Artificial Intelligence in Clinical Practice: Success and Challenges

Chairs: Leonard Berliner, MD (US), Eric vanSonnenberg, MD (US), Hubertus Feussner, MD (DE)

Friday, June 26, 2020

8:30 Artificial Intelligence, Radiology, and Surgery - Part 1

Session Chairs: Leonard Berliner, MD (US), Eric vanSonnenberg, MD (US)

Introduction – AI and medical imaging: why or why not?

Invited Speaker: Leonard Berliner, MD, Staten Island University Hospital – Northwell Health, Hofstra Northwell School of Medicine, NY (US)

AI, engineers in medicine, and medical school curriculum

Invited Speaker: Eric vanSonnenberg, MD, Univ. of Arizona College of Medicine, AZ; David Geffen School of Medicine at UCLA, CA (US)

Opportunities in interventional and surgical data science

Invited Speaker: Amber Simpson, PhD, Queen's Univ., Kingston, ON (CA)

Advances in PET imaging in oncology

Invited Speaker: Giuseppe Esposito, MD, Georgetown Univ. Medical Center, Washington, DC (US)

Innovative Clinical Investigations — Part 1

GPU accelerated radio frequency and microwave ablation for image-guided interventions on a web-framework

P. Mariappan, R. Flanagan, Indian Inst. of Technology Tirupati (IN); NUMA Engineering Services Ltd, Dundalk (IE) [65]

Peripheral nerve block support system guided by an ultrasonic image evaluation of needle position alert function

A. Kataoka, A. Hanafusa, M. Takagi, H. Hayashi, Shibaura Inst. of Technology, Saitama; Osaka Minami Medical Center (JP) [87]

A data-driven approach to predicting lethal temperature isotherm in MRI-guided focal cryoablation

P. Moreira, K. Tuncali, C. Tempany, J. Tokuda, Brigham and Women's Hospital; Harvard Medical School Boston (US) [184]

A convolutional neural network to detect scoliosis treatment in radiographs

L. Gajny, C. Vergari, W. Skalli, Inst. de Biomécanique Humaine Georges Charpak, Arts et Métiers ParisTech, Paris (FR) [20-00015]

Artificial Intelligence, Radiology, and Surgery - Part 2

Session Chairs: Krishna Kandarpa, MD (US), Giuseppe Esposito, MD (US)

Artificial intelligence in medical imaging: perspective from the NIH

Invited Speaker: Krishna Kandarpa, MD, PhD, National Institutes of Health, Bethesda, MD (US)

Bootstrapping deep learning for Radiology: the radiologist in the loop approach

Invited Speaker: Leo Joskowicz, PhD, The Hebrew Univ. of Jerusalem (IL)

AI for decision support in functional neurosurgery (Deep brain stimulation)

Invited Speaker: Pierre Jannin, PhD, Univ. Rennes 1 (FR)

Innovative Clinical Investigations — Part 2

Automatic linear measurements of the fetal brain on MRI scans with deep neural networks

N. Avisdris, B. Yehuda, O. Ben Zvi, D. Link Sourani, L. Ben Sira, L. Joskowicz, D. Ben Bashat, Hebrew Univ. of Jerusalem Faculty of Medicine, Jerusalem; TASMC, Tel Aviv (IL) [30]

CARS for global health: technology-driven mass casualty centers

R. Andrews, NASA Ames Research Center, Los Gatos, CA (US) [169]

Remote interventional support for emergency care application "mobile ultrasound"

M. Kranzfelder, T. Vogel, D. Ostler, D. Wilhelm, H. Friess, H. Feussner, Klinikum Rechts der Isar der TUM, Munich (DE) [220]

Panel Discussion: Artificial Intelligence in Medical Imaging

Session Chairs: Eric vanSonnenberg, MD (US), Leonard Berliner, MD (US), Hubertus Feussner, MD (DE)

Participants: Clinical Day Speakers: Leonard Berliner, MD (US), Hubertus Feussner, MD (DE), Eric vanSonnenberg, MD (US), Dirk Wilhelm, MD (DE), Krishna Kandarpa, MD, PhD (US), Amber Simpson, PhD

(CA), Giuseppe Esposito, MD (US), Leo Joskowicz, PhD (IL), Pierre Jannin, PhD (FR), Russel J. Andrews, PhD (US)

24th Annual Conference of the International Society for Computer Aided Surgery (ISCAS)

Chairs: Kensaku Mori, PhD (JP), Cristian Linte, PhD (US)

Wednesday, June 24, 2020

Modeling, Simulation and Segmentation Techniques for Image-guided Therapy

Real-time catheter tip segmentation and localization in 2D x-ray fluoroscopy using deep convolutional neural network

I. Vernikouskaya, W. Rottbauer, V. Rasche, Ulm Univ. Medical Center (DE) [5]

Fast collision detection approach for elastic embedded objects using dual graph

K. Tagawa, N. Tani, H. Tanaka, H. T. Tanaka, Aichi Univ. of Technology, Gamagori; Ritsumeikan Univ., Shiga (JP) [25]

Tool usage in open surgery video data

S. Laufer, A. Goldbraikh, A. L. D'Angelo, C. Pugh, Technion, Haifa (IL); Mayo Clinic, Rochester, Stanford Univ. (US) [109]

Computer-assisted Transanal Total Mesorectal Excision (TaTME): Real-time automatic prostate segmentation

D. Kitaguchi, N. Takeshita, H. Matsuzaki, H. Hasegawa, R. Honda, T. Oda, M. Ito, National Cancer Center Hospital East, Kashiwa, Univ. of Tsukuba (JP) [132]

Blood vessel segmentation from laparoscopic video using ConvLSTM U-Net

M. Oda, S. Morimitsu, S. Yamamoto, T. Ozawa, T. Kitasaka, Y. Hayashi, M. Ito, N. Takeshita, K. Misawa, K. Mori, Nagoya Univ.; Aichi Inst. of Technology, Toyota; National Cancer Center Hospital East, Chiba (JP) [206]

Development of multimodal ultrasound and X-ray tissue-mimicking phantoms for image-guided percutaneous interventions

E. Maneas, P. A. Patel, A. Lane, C. D. Little, A. E. Desjardins, Univ. College London (GB) [214]

Navigated tissue characterization during skin cancer surgery

N. N. Janssen, M. Kaufmann, A. Santilli, A. Jamzad, K. Vanderbeck, K.Y.M. Ren, T. Ungi, P. Mousavi, J. Rudan, D. McKay, A. Wang, G. Fichtinger, Queen's Univ., Kingston, ON (CA) [20-00051]

Needle tip force estimation by deep learning from raw spectral OCT data

M. Gromniak, N. Gessert, T. Saathoff, A. Schlaefer, Technical Univ. Hamburg (DE) [20-00046]

Wednesday, June 24, 2020

Augmented, Virtual and Mixed Realities in Image-guided Therapy

Augmented reality visualization of live ultrasound images using HoloLens for ultrasound-guided procedures

R. Shekhar, T. Nguyen, W. Plishker, X. Liu, I. Hossain, K. Sharma, A. Matisoff, Children's National Hospital, Washington; IGI Technologies, Inc., Silver Spring (US) [106]

Virtual Reality exploration for fetal surgery

M. Ceresa, M. Altaba, M. Sanchez-Fibla, J. Torrents-Barrena, E. Eixarch, E. Gratacós, M. A. Gonzalez Ballester, Univ. Pompeu Fabra; Fetal i+D Fetal Medicine Research Center, Barcelona (ES) [167]

First visualization results of intraoperative multispectral tissue differentiation

E. L. Wisotzky, A. Hilsmann, P. Eisert, Fraunhofer Heinrich-Hertz-Inst., Berlin (DE) [188]

Fast and accurate online calibration of optical see-through head-mounted display for AR based surgical navigation using microsoft HoloLens

X. Chen, S. Qichang, M. Yongfeng, Y. Rong, T. Ji, Shanghai Jiao Tong Univ.; Shanghai Jiao Tong Univ. School of Medicine (CN) [20-00111]

Wednesday, June 24, 2020

ISCAS Poster Session 1

Wednesday, June 24, 2020

Video-based Instrumentation and Image-guided Therapy

Virtual-incision based costae-independent surgical device for thoracoscopic surgery

Y. Horise, H. Suzuki, H. Iseki, K. Masamune, Y. Muragaki, Tokyo Women's Medical Univ.; Fukushima Medical Univ. (JP) [129]

Grasping and detaching force evaluation of a cassette type flexible forceps

R. Yamaguchi, R. Doine, T. Dohi, K. Kuwana,, Tokyo Denki Univ. (JP) [154]

Intra-operative detection of stapedius reflex based on a 3D digital operation microscope

L. Demaret, P. Geissler, A. Keerl, H. Kiening, E. Kögel, D. Schmitt, A. Schneider, ARRI Medical GmbH; Pripare, Munich (DE) [164]

Computer-assisted laparoscopy planning for the surgical repair of hiatal hernia

G. Gruionu, C. Ciobirca, S. Preda, S. Patrascu, A. Udristoiu, A. Soimu Iacob, E. Diaconu, K. Sapalidis, V. Surlin, L. Gruionu, Univ. of Craiova (RO); Aristotle Univ. of Thessaloniki (GR) [195]

Novel design to improve the lifespan and range of motion of 3.5 mm surgical manipulator comprises of elastic elements through stress management

S. Bandara, W. Zongpeng, W. Kajihara, J. Arata, Kyushu Univ., Fukuoka (JP) [209]

Sterility oriented drive concept for the manipulation of flexible endoscopic instruments

R. Krumpholz, L. Bernhard, D. Ostler, D. Wilhelm, H. Feußner, Y. Krieger, T. Lueth, Klinikum rechts der Isar, Munich; Technical Univ. Munich (DE) [212]

Suction-fixing surgical device for assisting liver manipulation with laparoscopic forceps

Y. Nakajima, R. Suzuki, Y. Suzuki, T. Sugino, H. Seki, T. Fujiwara, K. Ouchi, Tokyo Medical and Dental Univ. (JP) [20-00080]

Softness sensing probe with multiple acoustic paths for laparoscopic surgery

T. Ukai, Y. Tanaka, T. Fukuda, T. Kajikawa, H. Miura, Y. Terada, Nagoya Inst. of Technology, Graduate School of Engineering; Akita Univ. (JP) [20-00064]

Wednesday, June 24, 2020

Image-guided Interventions and Therapy

Analysis of pitch distortion in continuous time for cochlear implantation surgery

M. Ceresa, S. Mantzagriotis, N. Mangado, M. A. Gonzalez Ballester, Universitat Pompeu Fabra, Barcelona (ES) [185]

Image guidance for fetoscopic laser photocoagulation in twin-to-twin transfusion syndrome fetal surgery

M. Ceresa, J. Torrents-Barrena, R. López-Velazco , E. Eixarch, B. Valenzuela-Alcaraz, G. Piella, E. Gratacós, M. A. González Ballester , Univ. Pompeu Fabra; Fetal i+D Fetal Medicine Research Center, Barcelona (ES) [187]

Surgical tracking characterization and registration performance assessment for image-guided renal interventions

P. Jackson, R. Simon, C. Linte, Rochester Inst. of Technology (US) [204]

Digitizing rhinoplasty: a web application for three dimensional preoperative planning

O. Topsakal, M.I. Akbas, D. Demirel, B. Smith, M. F. Perez, M.M. Celikoyar, Florida Polytechnic Univ., Lakeland, FL; Embry-Riddle Aeronautical Univ. (US); Istanbul Bilim Univ. (TR) [20-00067]

Air flow simulation in the nasal valve may optimize surgical intervention

M. Berger, M. Pillei, A. Mehrle, W. Recheis, F. Kral, M. Kraxner, W. Freysinger, Medical Univ. of Innsbruck; MCI Innsbruck; Kardinal Schwarzenberg Hospital, Schwarzach im Pongau (AT); Friedrich-Alexander-Univ. Erlangen-Nürnberg (DE) [68]

Thursday, June 25, 2020

Image-guided Orthopedic Interventions and Applications

4D-CT assessment of carpal kinematics after replacing the scaphoid by a patient specific prosthesis

P. Honigmann, M. Haefeli, J. Rueegg, M. G. de Roo, J. G. Oonk, G. J. Strijkers, J. G. Dobbe, S. D. Strackee, G. J. Streekstra,, Kantonsspital Baselland, Liestal; Hospital Graubünden, Chur; Medartis AG, Basel (CH); Univ. of Amsterdam (NL) [110]

Improving accuracy in intertrochanteric osteotomy for patients with slipped capital femoral epiphysiolysis with 3D printed surgical guides

V. Lagerburg, S. Besseling, J. Schoutsen, M. Witbreuk, OLVG, Amsterdam (NL) [131]

Optimizing bone alignment in the application of an oblique double-cut rotation osteotomy

I. Dobbe, S. Strackee, G. Streekstra, Univ. of Amsterdam (NL) [133]

A novel drilled surface image for evaluating the contact anatomy and contact bone volume of implanted screws in spinal fusion surgery

C.-T. Shih, Y.-W. Chen, H.-M. Huang, S.-L. Peng, T.-C. Chen, Chung Shan Medical Univ., Taichung; Asia Univ.; China Medical Univ. Hospital (TW) [20-00073]

Thursday, June 25, 2020

Image-guided Neuro-interventions and Applications

Overlay of brain structure and estimated brain function position onto microscopy using pre- and intra-operative MRI in awake surgery for glioma

A. Sato, I. Sato, K. Ohshima, Y. Fujino, K. Kusuda, Y. Horise, M. Tamura, Y. Muragaki, K. Masamune, Future Univ. Hakodate; Tokyo Women's Medical Univ. (JP) [96]

Intraoperative outcome evaluation in craniostylosis reconstruction surgery using 3D photography

D. García-Mato, M. García-Sevilla, S. Ochandiano, R. Moreta-Martinez, J. V. Darriba-Allés, R. García-Leal, J. I. Salmerón, J. Pascau, Univ. Carlos III of Madrid; Inst. de Investigación Sanitaria Gregorio Marañón, Madrid (ES) [102]

A prototype for video-based hemodynamic analysis in neurosurgery implemented on a mobile augmented reality system

E. Léger, R. Vassallo, T. Popa, T. Peters, Y. Xiao, M. Kersten-Oertel, Concordia Univ., Montréal; Western Univ., London (CA) [112]

Boring biopsy method: development of an innovative technique and device of biopsy for brain lesions

Y. Fujii, T. Ogiwara, T. Goto, J. Nitta, K. Hongo, T. Horiuchi, Shinshu Univ., Matsumoto; Kobayashi Neurosurgical Hospital, Nagano (JP) [123]

A method for estimation of brain function positions based on the standard brain model using retrospective information in awake surgery for glioma

K. Ohshima, I. Sato, A. Sato, Y. Fujino, K. Kusuda, Y. Horise, M. Tamura, K. Masamune, Y. Muragaki, Future Univ. Hakodate; Tokyo Women's Medical Univ. (JP) [134]

Diffusion Weighted Imaging (DWI) tractography filtering tools for Stereotactic Electro-Encephalography (SEEG)

A. Higuera-Esteban, I. Delgado-Martínez, L. Serrano, A. Principe, M. González Ballester, R. Rocamora, L. Serra, G. Conesa, Galgo Medical S.L.; Univ. Pompeu Fabra; Hospital del Mar, Barcelona (ES) [170]

Path planning for laser ablation in neurosurgery; exploring the advantages of a curved insertion path in retrospective data

S. Frisken, C. Mirabel, P. Juvekar, T. Kato, S. Drouin, T. Noh, V. Chavakula, W.I. Essen, D. Segar, G. R. Cosgrove, A.J. Golby, Harvard Medical School, Cambridge, MA; Brigham and Women's Hospital; Canon USA (US); École de Technologie Supérieure (CA) [20-00043]

Thursday, June 25, 2020

Surgical Workflow Assessment

Recognition and segmentation of surgical gestures

P. Krishnan, A. Raffin, J. Klodmann, R. Triebel, Deutsches Zentrum für Luft- und Raumfahrt, Weßling (DE) [48]

Surgical phase recognition using laparoscopic videos

A. Guédon, S. Meij, K. van Stralen, M. Grimbergen, Q. Eijsbouts, J. van den Dobbelsteen, A. Twinanda, Spaarne Gasthuis, Hoofddorp; Delft Univ.; Cosmonio, Groningen (NL) [95]

Improvement of attitude measurement for surgical navigation by integration of a position sensor and a gyroscope

S. Onogi, R. Nakadate, Y. Nagao, M. Eto, Kyushu Univ., Fukuoka (JP) [121]

Recognizing workflow tasks in central venous catheterization using convolutional neural networks and reinforcement learning

R. Hisey, B. Chen, D. Camire, J. Erb, D. W. Howes, G. Fichtinger, T. Ungi, Queen's Univ., Kingston, ON (CA) [180]

Towards generalizable surgical activity recognition using spatial temporal graph convolutional networks

D. Sarikaya, P. Jannin, Univ. of Rennes 1 (FR) [20-00101]

Thursday, June 25, 2020

Surgical Instrumentation and Robotics

Automatic synthesis of an adaptive compliant forceps for safe manipulation in minimally invasive surgery

Y. Sun, D. Zhang, T. C. Lueth, Technical Univ. of Munich, Garching (DE) [59]

Design of a novel dexterous continuum manipulator for medical application using compliant rolling-contact joint

D. Zhang, Y. Sun, T. C. Lueth, Technical Univ. of Munich, Garching (DE) [91]

Robotic electromagnetic and optical navigation bronchoscopy

L. Gruionu, C. Constantinescu, C. Ciobirca, A. Soimu Iacob, A. Udristoiu, A. Saftoiu, G. Gruionu, Univ. of Craiova (RO); Restore Surgical LLC, Arlington (US) [125]

Design and modeling of pneumatic tracheal intubation actuator

Z. Liang, H. Miao, X. Wang, X. Zhu, T. Pan, Q. Cao, Shanghai Jiao Tong Univ. (CN) [165]

A cable-driven mechanism for single-port surgery

Y. Wang, X. Zhu, Q. Cao, Shanghai Jiao Tong Univ. (CN) [20-00103]

A handheld flexible manipulator system for frontal sinus surgery

S. Coemert, R. Roth, G. Strauss, P.M. Schmitz, T. C. Lueth, Technical Univ. Munich, Garching; IRDC GmbH Leipzig (DE) [20-00049]

Thursday, June 25, 2020

Robot-assisted Image-guided Therapy

A novel, intelligent and navigated robot-assisted biopsy assistance system for minimally invasive radiological interventions

P. Schüle, A. Keller, T. Zimmermann, S. Diehl, M. Vetter, Univ. of Applied Sciences Mannheim; Univ. of Heidelberg (DE) [98]

Development of an integrated robotic dual-arm system for image-guided interventions

J. Berger, J. Keller, M. Unger, L. Landgraf, A. Melzer, Univ. of Leipzig (DE) [148]

Motion control study based on kinematic and dynamic analysis of a novel minimally invasive surgical robot

Z. Zhang, P. Wang, Y. Yang, G. He, Y. Wang, Q. Cao, Shanghai Jiao Tong Univ., Shanghai (CN) [20-00079]

A contact state adjustment method to enhance organ motion compensation performance for a bed-type ultrasound diagnostic and therapeutic robot

N. Koizumi, K. Kobayashi, Y. Sasaki, T. Kobayashi, Y. Watanabe, J. Zhou, A. Otsuka, Y. Nishiyama, H. Tsukihara, N. Matsumoto, H. Miyazaki, K. Numata, H. Nagaoka, T. Iwai, H. Iijima, The Univ. of Electro-Communications, Tokyo; The Univ. of Tokyo; Nihon Univ.; National Center for Global Health and Medicine (JP) [20-00071]

Towards 3D-printed, customizable robotic manipulators for minimally invasive surgery

Y.S. Krieger, D. Ostler, K. Rzepky, H. Feussner, D. Wilhelm, T.C. Lueth, Technical Univ. Munich, Garching; Technical Univ. School of Medicine, Munich (DE) [20-00063]

Robotic hip arthroscopy surgery system with force feedback for teleoperation grinding

Y. Yang, Z. Zhang, P. Wang, Q. Cao, Y. Feng, H. Shi, Shanghai Jiao Tong Univ.; Shanghai Sixth Peoples Hospital (CN) [20-00044]

22nd International Conference on Computer-Aided Diagnosis and Artificial Intelligence (CAD-AI)

Chairman: Hiroyuki Yoshida, PhD (US)

Thursday, June 25, 2020

Brain AI

Survival-relevant high-risk subregion identification for glioblastoma patients using multi-modality MRI and multiple instance learning approach

X. Zhang, D. Lu, Y. Liu, Fourth Military Medical Univ.; Northwest Univ., Xi'an (CN) [55]

Image-based classification of children with autism spectrum disorder

S. J. MacEachern, D. Rajashekar, P. Mouches, N. C. Rowe, E. McKenna, K. W. Yeom, N. D. Forkert, Univ. of Calgary (CA); Restore Surgical LLC, Arlington; Stanford Univ., Palo Alto (US) [126]

Radiomics for estimating the genetic pattern of low-grade glioma

N. Kishimoto, Y. Uchiyama, Kumamoto Univ. (JP) [44]

A pilot study for transferring deep convolutional neural network pre-trained by local anatomical structures to computer-aided detection

M. Nemoto, Kindai Univ., Wakayama (JP) [171]

Thursday, June 25, 2020

Breast AI

One-stage tumor detection using deep convolutional network for automated breast ultrasound

R. F. Chang, Y. C. Ho, Y. S. Huang, T. Y. Chang Chien, H. Xiang, X. Lin, National Taiwan Univ., Taipei (TW); Sun Yat-sen Univ. Cancer Center, Guangzhou (CN) [32]

Computer-aided tumor diagnosis based on 3D capsule neural network in automated breast ultrasound

Y. S. Huang, T. Y. Chang Chien, C. H. Lee, X. Lin, H. Xiang, R. F. Chang, National Taiwan Univ., Taipei (TW); Sun Yat-sen Univ. Cancer Center, Guangzhou (CN) [31]

Logistic regression to predict malignancy of breast tumors using IVIM parameters

M. Statache, B. M. Maris, R. Menghini, A. Cybulski, M. Barillari, G. Zamboni, Univ. of Verona; Azienda Ospedaliera Universitaria Integrata (IT) [116]

Multi input deep learning architecture for predicting breast tumor response to chemotherapy using quantitative MR images

M. El Adoui, S. Drisis, M. Benjelloun, Univ. of Mons, Hainaut; Inst. Jules Bordet (BE) [20-00011]

Thursday, June 25, 2020

Lung AI

3D CADv System with and without CNN: comparison of nodule component measurement accuracy and differentiation in routine clinical practice data

Y. Ohno, K. Aoyagi, A. Yaguchi, Y. Kishida, S. Seki, Y. Ueno, T. Yoshikawa, Fujita Health Univ. School of Medicine, Toyoake; Canon Medical Systems Corporation, Otawara; Toshiba Corporation, Kawasaki; Kobe Univ. (JP) [70]

Discrimination of the pulmonary nodules in computed tomography image using homology method

K. Nakane, H. Numasaki, M. Yanagawa, M. Koizumi, H. Yamamoto, N. Tomiyama, Osaka Univ. Graduate School of Medicine and Health Science; Osaka Univ. (JP) [57]

Towards convolutional neural network on primary lung tumors to predict histopathological type, distant and lymph node metastasis

P. M. Azevedo-Marques, L. Lima, J. R. Ferreiro Junior, A. Fabro, F. Cipriano, A. Faccio, M. Koenigkam-Santos, Univ. of Sao Paulo, Ribeirão Preto (BR) [108]

Automatic detection of lung nodules from temporal subtraction images based on residual 3D-CNN with linear multi-shortcuts

H. Kim, Y. Yoshino, H. Lu, T. Aoki, S. Kido, Kyushu Inst. of Technology, Fukuoka; Univ. of Occupational and Environmental Health, Kitakyushu; Osaka Univ. (JP) [41]

Thursday, June 25, 2020

Radiomics in Lung and Breast

U-radiomics combined with hyper-curvature features for predicting survival of patients with idiopathic pulmonary fibrosis

H. Yoshida, T. Uemura, C. Watari, J. Näppi, M. Matsuhiro, N. Niki, H. Kim, Harvard Medical School, Boston, MA (US); Tokushima Univ.; Kyushu Inst. of Technology, Kitakyushu (JP) [49]

AI-based radiomic approach in high-resolution CT images for differential diagnosis of idiopathic pulmonary fibrosis

P. Azevedo-Marques, E. Dorileo, M. Koenigkam-Santos, A. Todorovic Fabro, Univ. of Sao Paulo, Ribeirão Preto (BR) [52]

Radiomics for predicting the pathologic complete response of breast cancer to neoadjuvant pharmacotherapy

N. Wada, Y. Uchiyama, Kumamoto Univ. (JP) [43]

Breast DCE-MRI radiomics: A robust computer-aided system based on reproducible BI-RADS features across the influence of datasets bias and segmentation methods

Y. Guo, M. Qiao, C. Li, S. Suo, F. Cheng, J. Hua, D. Xue, J. Xu, Y. Wang, Fudan Univ., Shanghai; Shanghai Cognate Artificial Intelligence Co., Ltd; Shanghai Jiao Tong Univ. School of Medicine (CN) [20-00012]

Thursday, June 25, 2020

AI in Other Organs

Deep learning using preoperative MRI information predicts early recovery of urinary continence after robot-assisted radical prostatectomy

M. Sumitomo, A. Teramoto, N. Fukami, K. Fukaya, K. Zennami, M. Ichino, K. Takahara, M. Kusaka, R. Shiroki, Fujita Health Univ., Toyoake (JP) [54]

Generative flow for data augmentation in computer-aided detection for CT colonography

J. Näppi, T. Uemura, H. Yoshida, Massachusetts General Hospital, Boston (US) [192]

Manual versus automatic classification of laryngeal lesions based on vascular patterns in CE+NBI images

N. Esmaeili, A. Illanes, A. Boese, N. Davaris, C. Arens, N. Navab, M. Friebe, Otto-von-Guericke Univ. Magdeburg; Magdeburg Univ. Hospital; Technical Univ. Munich (DE) [149]

Development of a robust endocytoscopic-image classification method towards the construction of practical CAD system in endocytoscopy - from the viewpoint of generalisation ability for non-specific hospital diagnosis

H. Itoh, Y. Mori, M. Misawa, S. –E. Kudo, K. Hotta, K. Ohtsuka, S. Saito, Y. Saito, H. Ikematsu, Y. Hayashi, M. Oda, K. Mori, Nagoya Univ.; Showa Univ. Northern Yokohama Hospital; Shizuoka Cancer Center; Tokyo Medical and Dental Univ.; Cancer Inst. Hospital of Japanese Foundation for Cancer Research (JP) [20-00094]

Intrapapillary capillary loop classification in magnification endoscopy: Open dataset and baseline methodology

L. C. Garcia-Peraza-Herrera, M. Everson, L. Lovat, H. –P. Wang, W. L. Wang, R. Haidry, D. Stoyanov, S. Ourselin, T. Vercauteren, Univ. College London, London; Wellcome Trust and EPSRC Centre for Interventional and Surgical Sciences; King's College London (GB); National Taiwan Univ.; I-Shou Univ. Kaohsiung (TW) [20-00114]

Automated diagnosis of malaria using learned AlexNet

W. Haraguchi, A. Hanafusa, M. Takagi, H. Kato, E. Hayakawa, Saitama Univ. (JP) [120]

Artificial intelligence ct screening for thyroid associated ophthalmopathy and application tests in accordance with the rules of clinical trials

X. Song, H. Zhou, X. Fan, Shanghai Jiao Tong Univ. School of Medicine (CN) [79]

Thursday, June 25, 2020

Radiomics in Brain and MSK

Radiomics for estimating 1p/19q codeletion in brain tumor using magnetic resonance imaging

N. Hirano, Y. Uchiyama, Kumamoto Univ. (JP) [46]

Features of radiography-based radiomic analysis as predictors of pulmonary metastasis in osteosarcoma patients

H. Mendonça Pereira, M. Nogueira-Barbosa, Into, Rio de Janeiro; USP Sao Paulo (BR) [203]

Radiomic biomarkers for sacroiliitis diagnosis and prediction of spondyloarthritis progression

P. M. Azevedo-Marques, A. P. M. Tenorio, M. C. Faleiros, J. R. Ferreira-Junior, V. F. Dalto, R. L. Assad, M. H. Nogueira-Barbosa, Univ. of Sao Paulo, Ribeirão Preto (BR) [162]

Machine learning models to predict axial and peripheral spondyloarthritis: A comparative radiomic study between SPAIR and STIR MRI sequences

P. M. Azevedo-Marques, A. P. M. Tenorio, M. C. Faleiros, J. R. Ferreira-Junior, V. F. Dalto, R. L. Assad, M. H. Nogueira-Barbosa, Univ. of Sao Paulo, Ribeirão Preto (BR) [163]

Thursday, June 25, 2020

CAD Poster Session

26th Computed Maxillofacial Imaging Congress (CMI)

Image-Guided Oral and Maxillofacial Surgery

Chairs: Christos Angelopoulos, DDS (US), Yoshihiko Hayakawa, PhD (JP)

Thursday, June 25, 2020

Dentomaxillofacial Imaging and Surgical Navigation 1

Preliminary application of ultrasound and CT image fusion based on optical positioning registration in craniomaxillofacial soft tissue surgery

C. Yang, J. Wu, Y. Zhang, B. Xu, G. Shen, S. Zhang, Shanghai Jiao Tong Univ. School of Medicine (CN) [6]

Development of new method for facial change prediction accuracy evaluation in the lips following orthognathic surgery

D. Kim, T. Kuang, Y. Rodrigues, S. G. F. Shen, X. Wang, J. Gateno, C. Lian, M. A. K. Liebschner, J. Xia, Houston Methodist Research Inst.; Univ. of North Carolina at Chapel Hill; Baylor College of Medicine, Houston (US); Shanghai Ninth People's Hospital (CN) [73]

Deep convolutional neural networks for automatic detection of orbital blowout fractures

L. Li, X. Song, Y. Liu, R. Sun, Y. Guo, H. Zou, H. Zhou, X. Fan, Shanghai JiaoTong Univ. School of Medicine; East China Univ. of Science and Technology, Automation; Tsingyou Computer Tech Co Ltd, Shanghai (CN) [76]

Predict surgical planning of orthognathic surgery using machine learning

Y. Sun, J. Tian, Y. Gu, J. Li, J. Van Desel, C. Politis, X. Zhang, Univ. Hospitals Leuven (BE); Tianjin Univ. (CN) [101]

Thursday, June 25, 2020

Dentomaxillofacial Imaging and Surgical Navigation 2

Correlation between radiographic findings of CBCT in OSA patients and their AHI value

M. Isaac, M. ElSaieed, A. ElSobky, W. Aboelmaaty, Delta Univ. for Science and Technology, Gamasa; Mansoura Univ. (EG); King Saud Bin Abdulaziz Univ., Riyadh (SA) [117]

Relationship between MDCT contrast to noise ratio and the as low as diagnostically acceptable dose in localization of the inferior alveolar canal

A. Al-Ekrish, R. Hörmann, G. Widmann, King Saud Univ., Riyadh (SA); Medical Univ. of Innsbruck (AT) [135]

Surgical navigation for palate carcinoma resection using a non-invasive 3D-printed reference frame

M. García-Sevilla, D. García-Mato, R. Moreta-Martinez, S. Ochandiano, M. Tousidonis, C. Navarro-Cuéllar, J. Pascau, Univ. Carlos III de Madrid, Leganés Madrid; Hospital General Universitario Gregorio Marañón (ES) [147]

Workflow for planning, design and additive manufacturing of individual scaffold-like bone replacement structures in maxillofacial surgery

P. Sembdner, S. Holtzhausen, L. Kroschwald, D. Muallah, A. Hutsky, D. Ellmann, A. Schönberg, S. Heinemann, G. Lauer, R. Stelzer, Dresden Univ. of Technology; Univ. Hospital Carl Gustav Carus; Zahntechnik Schönberg, Dresden, Organical CAD/CAM GmbH, Berlin; INNOTERE GmbH, Radebeul (DE) [156]

Thursday, June 25, 2020

CMI/CAD-AI Joint Session on AI in Dentistry

Convolutional neural networks for image identification of intraoral radiographs

T. Kitano, W. Nishiyama, K. Kohinata, M. Mori, D. Fukuoka, C. Muramatsu, T. Hara, H. Fujita, A. Katsumata, Asahi Univ. School of Dentistry, Gifu; Gifu Univ.; Shiga Univ., Hikona (JP) [61]

Performance using deep learning object detection technology for detecting maxillary sinus lesions on panoramic radiographs

Y. Arijji, M. Fukuda, Y. Kise, M. Nozawa, C. Kuwada, C. Muramatsu, A. Katsumata, H. Fujita, E. Arijji, Aichi-Gakuin Univ. School of Dentistry, Nagoya; Shiga Univ., Hikone; Asahi Univ. School of Dentistry, Mizuho; Gifu Univ. (JP) [90]

Tooth numbering on dental panoramic radiographs using multiclass detection network

A. Katsumata, C. Muramatsu, T. Morishita, R. Takahashi, T. Hayashi, W. Nishiyama, Y. Arijji, X. Zhou, T. Hara, E. Arijji, H. Fujita, Asahi Univ. School of Dentistry, Mizuho; Gifu Univ.; Media Co. Ltd, Tokyo (JP) [127]

The machine estimating the contents of dental treatment by the table on which dental instruments placed

S. Oka, K. Nozaki, M. Hayashi, Osaka Univ. (JP) [198]

IPCAI 2020 - 11th International Conference on Information Processing in Computer-Assisted Interventions

Chairs: Parvin Mousavi, PhD (CA), Lena Meier-Hein, PhD (DE), Stefanie Speidel, PhD (DE)

SNAPPY: Compact Libraries for Surgical Navigation

S. Thompson; T. Dowrick; M. Ahmad; G. Xiao; B. Koo; E. Bonmati; K. Kahl; M.J Clarkson, University College London, London (GB) [2]

The Effect of Video Playback Speed on Surgeon's Technical Skill Perception

J. D. Kelly; A. Petersen; T. S. Lendvay, T. M Kowalewski, University of Minnesota, Minneapolis (US) [4]

Multimodal Mixed Reality Visualisation for Intraoperative Surgical Guidance

J. Cartucho; D. Shapira; H. Ashrafian; S. Giannarou, Imperial College London, London (GB) [5]

A deep learning method for real-time intraoperative US image segmentation in prostate brachytherapy

K. Berihu Girum; A. Lalonde; R. Hussain; G. Créhange, Université de Bourgogne, Dijon (FR) [7]

Towards Automatic C-Arm Positioning for Standard Projections in Orthopedic Surgery

L. Kausch; S. Thomas; H. Kunze; M. Privalov; S. Vetter; J. Franke; A. Mahnken; L. Maier-Hein; K. Maier-Hein, Deutsches Krebsforschungszentrum, Heidelberg (DE) [10]

Light Modelling and Calibration in Laparoscopy

R. Modrzejewski; T. Collins; A. Hostettler; J. Marescaux; A. Bartoli, IHU Strasbourg, Strasbourg (FR) [14]

Learning from Irregularly Sampled Data for Endomicroscopy Super-resolution: A Comparative Study of Sparse and Dense Approaches

A. B. Szczotka; D. Ismail Shakir; D. Ravi; M. J. Clarkson; S. P. Pereira; T. Vercauteren, University College London, London (GB) [16]

Quality Invariant Bone Surfaces Segmentation from Ultrasound Using a Local Phase Tensor Guided CNN

P. Wang; M. Vives; V. Patel; I. Hacihaliloglu, Rutgers University, Piscataway, NJ (US) [22]

LRTD: Long-Range Temporal Dependency based Active Learning for Surgical Workflow Recognition

X. Shi; Y. Jin; Q. Dou; P.-A. Heng, The Chinese University of Hong Kong, Hong Kong (CN) [27]

Light source calibration for multispectral imaging in surgery

L. Ayala.; S. Seidlitz; A. Vemuri; S. Wirkert; T. Kirchner; T. Adler; C. Engles; D. Teber; L. Maier-Hein, Deutsches Krebsforschungszentrum, Heidelberg (DE) [30]

Acoustic Signal Analysis of Instrument-Tissue Interaction for Minimally Invasive Interventions

D. Ostler; M. Seibold; J. Fuchtmann; N. Sann; H. Feussner; D.F. Wilhelm; N. Navab, Technical University of Munich, München (DE) [32]

Investigating exploration for deep reinforcement learning of concentric tube robot control

K. Iyengar; G. Dwyer; D. Stoyanov, University College London, London (GB) [48]

Estimation of boundary conditions for patient-specific liver simulation during augmented surgery

S. Nikolaev; S. Cotin, IHU Strasbourg, Inria, Strasbourg (FR) [60]

FetNet: A Recurrent Convolutional Network for Occlusion Identification in Fetoscopic Videos

S. Bano; F. Vasconcelos; E. Vander Poorten; T. Vercauteren; S. Ourselin; J. Deprest; D. Stoyanov, University of East London, London (GB) [61]

Ultrasound 3D Reconstruction of Malignant Masses in Robotic-Assisted Partial Nephrectomy Using the PAF Rail System: a Comparison Study

C. Wang; C. Komninos; S. Andersen; C. D'Ettoire; G. Dwyer; P. Edwards; A. Stilli; D. Stoyanov, University College London, London (GB) [64]

A Robotic 3D Perception System for Operating Room Environment Awareness

Z. Li, A. Shaban; J. –G. Simard; D. Rabindran; S. DiMaio; O. Mohareri, Johns Hopkins University LCSR, Baltimore, MD (US) [68]

Cardiac Point-of-Care to Cart-Based Ultrasound Translation Using Constrained CycleGAN

M. Hossein Jafari; H. Girgis; N. Van Woudenberg; N. Moulson; C. Luong; A. Fung; S. Balthazaar; J. Jue; M. Tsang; P. Nair; K. Gin; R. Rohling; P. Abolmaesumi; T. Tsang, University of British Columbia, Vancouver, British Columbia (CA) [72]

Dynamic path planning for percutaneous procedures in the abdomen during free breathing

D. Pour Arab; S. Voros; C. Essert, Université de Strasbourg, Illkirch (FR) [74]

Precise Proximal Femur Fracture Classification for an Interactive Training and Surgical Planning

A. Jimenez-Sanchez ; A. Kazi; S. Albarqouni; C. Kirchhoff; P. Biberthaler; N. Navab; S. Kirchhoff; D. Mateus, Universitat Pompeu Fabra, Barcelona (ES) [79]

Automatic intraoperative Optical Coherence Tomography Positioning

M. Grimm; H. Roodaki; A. Eslami; N. Navab, Technische Universität München, Garching bei München (DE) [80]

Learned Optical Flow for Intra-Operative Tracking of the Retinal Fundus

C. S Ravasio; T. Pissas; E. Bloch; B. Flores; S. Jalali; D. Stoyanov; J. M Cardoso; L. Da Cruz; C. Bergeles, King's College London, London (GB) [91]

Detecting the Occluding Contours of the Uterus to Automate Augmented Laparoscopy: Score, Loss, Dataset, Evaluation and User-Study

T. Francois; L. Calvet; S. Madad Zadeh; D. Saboul; S. Gasparini; P. Samarakoon; N. Bourdel; A. Bartoli, Institut Pascal, Aubière Cedex (FR) [92]

Leveraging Vision and Kinematics Data to Improve Realism of Biomechanic Soft-tissue Simulation for Robotic Surgery

J. Ying Wu; P. Kazanzides; M. Unberath, Johns Hopkins University, Baltimore, MD (US) [96]

Preclinical Evaluation of Ultrasound-Augmented Needle Navigation for Laparoscopic Liver Ablation

X. Liu; W. Plishker; T. D Kane; D. A Geller; L. W Lau; J. T.; K. Sharma; R. Shekhar, Children's National Hospital, Washington, DC (US) [98]

i3PosNet: Instrument Pose Estimation from X-Ray in temporal bone surgery

D. Kügler; J. Sehring; A. Stefanov; I. Stenin; J. Kristin; T. Klenzner; J. Schipper; A. Mukhopadhyay, DZNE Bonn, Bonn (DE) [106]

Pre-clinical evaluation of an image-guided in-situ Raman spectroscopy navigation system for targeted prostate cancer interventions

R. Shams; F. Picot; D. Grajales; G. Sheehy; F. Dallaire; M. Birlea; F. Saad; D. Trudel; C. Menard; F. Leblond; S. Kadoury, École Polytechnique de Montreal, Montreal (CA) [109]

Automatic Annotation of Hip Anatomy in Fluoroscopy for Robust and Efficient 2D/3D Registration

R. Grupp; M. Unberath; C. Gao; R. Hegeman; R. Murphy; C. Alexander; Y. Otake; B. McArthur; M. Armand; R. Taylor, Johns Hopkins University, Baltimore, MD (US) [120]

Augmented reality simulator for ultrasound-guided percutaneous renal access

Y. Mu; D. Hocking; Z. Tao Wang; G. J. Garvin; R. Eagleson; T. M. Peters, Western University, London, Ontario (CA) [132]

Automatic segmentation of the carotid artery and jugular vein from 2D ultrasound images for 3D vascular reconstruction

L. Groves; B. Vanberlo; N. Veinberg; T. Peters; E. Chen, Western University, London, Ontario (CA) [134]

Hand-eye Coordination Based Implicit Re-calibration Method for Gaze-tracking on Ultrasound Machines: A Statistical Approach

H. Zhu; S. Salcudean; R. Rohling, University of British Columbia, Vancouver, British Columbia (CA) [145]

Comparison of acoustic rhinometry, rhinomanometry and lattice Boltzmann simulation of nasal air flow

M. Berger; M. Pillei; A. Mehrle; W. Recheis; F. Kral, M. Kraxner; W. Freysinger, Medical University of Innsbruck, Innsbruck (AT) [148]

FastPathology: An open-source platform for artificial intelligence-based digital pathology

A. Pedersen; E. Smistad; I. Reinertsen; M. Vallat, SINTEF Digital, Trondheim (NO) [149]

Poster Sessions

Image quality of dual energy and low tube voltage CT angiography for percutaneous nephrolithotomy virtual reality simulation: A phantom study, K. Ohashi, A. Okada, Y. Hirose, H. Kasai, T. Yasui, Y. Shibamoto, Nagoya City Univ. Hospital (JP) [24]

Automatic liver venous tree segmentation from CT for planning of interventional oncology procedures, A. Landreau, Y. Rolland, L. Royer, A. Petit, F. Lalys, Therenva SAS, Rennes (FR) [178]

Improving prostate MR apparent quality using deep learning, A. Ghahramani, A. Hazan, D. Cantor-Rivera, H. Xu, K. Abhari, Ezra AI Canada, Toronto (CA) [197]

Static and moving phantom studies for texture analysis in a respiratory gated PET/CT, K. Hanaoka, S. Watanabe, H. Kaida, K. Ishii, Kindai Univ., Osaka (JP) [100]

Development of advanced deep learning DSA method for coronary artery using u-net based model with transfer learning, M. Yamamoto, Y. Okura, H. Yamanaka, H. Kawata, N. Yamamoto, R. Hashimoto, Hiroshima International Univ.; Kurume Univ. Hospital (JP) [144]

Improving the performance of non-contrast to contrast CT image regression by wavelet convolution neural network, T. Hu, M. Oda, Y. Hayashi, Z. Lu, K. K. Kumamaru, S. Aoki, K. Mori, Nagoya Univ.; Juntendo Univ., Tokyo (JP) [219]

Deformable registration of the liver using sparse intraoperative data: incorporating hepatic feature constraints from tracked intraoperative ultrasound, J. Heiselman, W.R. Jarnagin, M.I. Miga, Vanderbilt Univ., Nashville, TN; Memorial Sloan Kettering Cancer Center (US) [20-00058]

Heterogeneous large-scale CT database analysis for mining knowledge of musculoskeletal anatomy, Y. Otake, Y. Hiasa, M. Takao, Y. Tanaka, K. Aida, S. Sato, A. Nishie, N. Sugano, Y. Sato, Nara Inst. of Science and Technology; Osaka Univ.; National Inst. of Informatics, Chiyoda; Kyushu Univ., Fukuoka (JP) [139]

BERT-based few-shot learning for automatic anomaly classification from Japanese multi-institutional CT scan reports, R. Kuwabara, C. Han, K. Murao, S. Satoh, The Univ. of Tokyo (JP) [208]

Neoadjuvant chemotherapy evaluation on 3D breast tumor ultrasonography using deep learning networks, Y.L. Huang, G. T. Jiang, D. R. Chen, Tunghai Univ., Taichung; Christian Hospital, Changhua (TW) [33]

Computer assisted segmentation of the knee bones in CT images for orthopaedic surgery planning, A. Mercader, A. Bigdeli, H. Röttinger, T. C. Lueth, Technical Univ. Munich, Garching; Klinikum Süd München (DE) [20-00095]

Cardiac ventricle segmentation from cine MR images of pigs using 3D convolutional neural networks, M. Stephens, K. López-Linares, A. Santos, I. Gaitán, J. Ruiz-Cabello, I. Macía, Vicomtech, San Sebastián; Ciberes, Madrid; Universidad Complutense de Madrid; CIC BiomaGUNE, San Sebastián (ES) [17]

Extraction of blood vessel regions in liver from CT volumes using fully convolutional networks for computer assisted liver surgery, K. Mori, Y. Hayashi, C. Shen, T. Igami, M. Nagino, Nagoya Univ. (JP) [75]

Segmentation of the placenta and its vasculature in 3D power doppler ultrasound for TTTS fetal surgery planning, E. Perera-Bel, M. Ceresa, J. Torrents-Barrena, N. Masoller, B. Valenzuela-Alcaraz, E. Gratacós, E. Eixarch, M. I. González Ballester, Univ. Pompeu Fabra, Barcelona; Univ. of Barcelona (ES) [88]

Deep learning based solid and non-solid nodule segmentation in CT, Y. J. Kim, K. G. Kim, Gachon Univ., Incheon (KR) [138]

An multi-shape loss function with adaptive class balancing for the segmentation of lung structures, G. Torres, D. Gil, Univ. Autònoma de Barcelona (ES) [150]

Pulmonary function evaluation based on time-series analysis of radiographic lung density: A preliminary study, R. Tanaka, I. Matsumoto, M. Tamura, M. Takata, K. Kasahara, N. Ohkura, D. Inoue, Y. Matsuura, Kanazawa Univ.; Kanazawa Univ. Hospital (JP) [27]

Aberration correction in transcranial ultrasound imaging, D. Leonov, N. Kulberg, L. Osipov, S. Skosirev, G. Grigorev, A. Vladzimirskiy, S. Morozov, Research and Practical Clinical Center of Diagnostics and Telemedicine Technologies, Inst. of Electronic Control Computers named after I. S. Bruk, Medical Center of MGTS PJSC, Moscow (RU) [12]

3D Slicer module for semantic segmentation of ultrasound images in prostate biopsy using deep learning techniques, L. Palladno, B. Maris, P. Fiorini, Università degli studi di Verona (IT) [18]

Segmentation of tendon for rheumatoid arthritis using deep learning in ultrasonography, H. Watanabe, N. Hayashi, M. Shimosegawa, T. Ogura, M. Ogawa, N. Takagi, Gunma Prefectural College of Health Sciences, Maebashi; Teikyo Univ. Chiba Medical Center, Ichihara (JP) [84]

- The 3D Pelvic Inclination Correction System (PICS) enhanced: using machine learning for comparable pelvic interpatient image measurements**, T. Winklehner, T. Antunovic, C. Betschart, Univ. of Bern; Univ. Hospital Zürich (CH) [23]
- Single-image super-resolution of computed tomography images using a very deep super-resolution network**, Y. C. Lu, Y. H. Chou, H. C. Tseng, C. T. Shih, Chung Shan Medical Univ. Hospital, Taichung (TW) [50]
- Deep learning-based rotation frequency estimation and NURD correction for IVOCT image data**, T. R. Mieling, S. Latus, N. Gessert, M. Lutz, A. Schlaefer, Hamburg Univ. of Technology; Univ. Medical Center Schleswig-Holstein, Kiel (DE) [113]
- 4D Deep learning for real-time volumetric optical coherence elastography**, M. Neidhardt, M. Bengs, S. Latus, M. Schlüter, T. Saathoff, A. Schlaefer, Univ. of Technology Hamburg-Harburg (DE) [20-00042]
- Automatic window setting optimization for classification of intracranial hemorrhage**, C. Lee, J. Y. Lee, Y. S. Kim, Hanyang Univ., Seoul (KR) [64]
- Inter-reader variability in breast MRI radiomics**, M. Fox, A. Bitencourt, C. Saccarelli, I. Daimiel, R. Lo Gullo, K. Pinker-Domenig, P. Gibbs, Memorial Sloan Kettering Cancer Center, New York (US) [193]
- Conventional and ultrasound bronchoscopy with HoloLens**, A. Kildahl-Andersen, E. Fagertun Hofstad, H. Sorger, A. Bakke Jensen, H. O. Leira, T. Amundsen, T. Langø, J. G. Skogås, G. Kiss, St.Olavs Hospital, Trondheim; SINTEF Technology and Society; Levanger Hospital, Levanger; Norwegian Univ. of Science and Technology, Trondheim (NO); Tokyo Denki Univ. (JP) [155]
- Development of home-care support system for home-patient - development and evaluation of medical information sharing system**, A. Okawa, T. Umeda, N. Kobayashi, K. Ito, Mie Prefectural College of Nursing, Tsu (JP) [13]
- Development of security model for medical image data hidden using digital watermark and steganography technique**, T. Umeda, A. Okawa, N. Kobayashi, K. Ito, Yokkaichi Nursing & Medical Care Univ. (JP) [14]
- Effect assessment of vascular behavior on visibility in vascular virtual handling system for endovascular intervention assistance**, T. Shinohara, K. Fukata, N. Nakasako, Kindai Univ., Kinokawa (JP) [22]
- Detecting ganglion cells on virtual slide images: Macroscopic masking by superpixel**, H. Oda, Y. Tamada, K. Nishio, T. Kitasaka, H. Amano, K. Chiba, A. Hinoki, H. Uchida, M. Oda, K. Mori, Nagoya Univ.; Aichi Inst. of Technology, Toyota (JP) [38]
- Clinical value of patient-specific three-dimensional printed tumour models in preoperative planning and simulation**, Z. Sun, Y. H. Wong, C. H. Yeong, Curtin Univ. of Technology, Perth, WA (AU); Taylor's Univ., Subang Jaya (MY) [56]
- Purkinje cell somas segmentation in a two-photon microscopic volume of a mouse brain**, A. Shimizu, R. Kimizuka, A. Saito, T. Michikawa, A. Miyawaki, H. Yokota, Tokyo Univ. of Agriculture and Technology; RIKEN Center for Advanced Photonics, Biotechnological Optics Research Team, Saitama (JP) [78]
- Development of slave device of teleoperation system for catheterization with force feedback - method for measuring the collision force**, A. Hanafusa, K. Osada, M. Takagi, Univ., Saitama (JP) [92]
- Deep learning based automatic polyp detection in colonoscopy videos**, Y. J. Kim, K. G. Kim, Gachon Univ., Incheon (KR) [136]
- Introduction of an algorithm for landmark segmentation to guide the application of regional anaesthesia with ultrasound imaging**, K. Skerl, J. Pinter, M. Stingl, R. Celik, Furtwangen Univ., Villingen-Schwenningen (DE) [141]
- 3D freehand ultrasound using deep learning for the treatment of peripheral artery disease**, T. Leblanc, F. Lalys, L. Royer, A. Lucas, A. Simon, Therenva, Rennes; Univ. de Rennes 1 (FR) [172]
- Electronic messaging system for pre-operative TNM staging in laryngeal cancer: A useful communicator between radiologist and surgeon**, C. Giannitto, D. De Corzent, G. Mercante, A. De Virgilio, A. A. Esposito, F. Gaino, G. Spriano, L. Balzarini, Istituto Clinico Humanitas, Rozzano (IT) [189]
- VICTORIA - Virtual neck Curve and True Ostium Reconstruction of Intracranial Aneurysms**, S. Saalfeld, P. Berg, B. Behrendt, S. Voß, O. Beuing, B. Neyazi, B. Preim, Otto-von-Guericke-Univ. Magdeburg; Univ. Hospital Magdeburg (DE) [20-00050]
- Constraint-based optimal needle path planning with 3D signed distance field fusion**, W. Si, R. Li, J. Guo, Y. Zhang, R. Klein, P. A. Heng, Shenzhen Inst. of Advanced Technology, Chinese Academy of Sciences; People's Hospital; Shenzhen; SIAT, CAS, Shenzhen; Univ. of Hong Kong (CN); Univ. of Bonn (DE) [4]
- Master-slave selectable control system with multiple connection for locally operated surgical assistant robots in laparoscopy**, H. Karino, S. Fukui, T. Kawai, Y. Nishizawa, A. Nishikawa, N. Iwamoto, Y. Horise, K. Masamune, Osaka Inst. of Technology; Osaka Univ.; National Cancer Center Hospital East, Kashiwa; Shinshu Univ.; Tokyo Women's Medical Univ. (JP) [19]

Statistical accuracy evaluation of a zoom-independent calibration target for AR applications using a digital surgical microscope, J. C. Rosenthal, L. Demaret, P. Eisert, Fraunhofer-Inst. fur Nachrichtentechnik Heinrich-Hertz-Inst., Berlin; ARRI Medical GmbH, Munich (DE) [58]

The distance between the bifurcations of the tumor feeding artery of oral cancer is unlikely to change with head and neck posture changes, T. Ohya, I. Sakuma, K. Yanagida, Y. Hayashi, Y. Yajima, T. Koizumi, K. Mitsudo, Yokohama City Univ. Graduate School of Medicine; The Univ. of Tokyo (JP) [97]

Anastomoses in visceral surgery- development of a transluminal system for micro invasive restoration of intestinal patency, J. Steger, S. Ficht, D. Ostler, M. Eblenkamp, D. Wilhelm, Klinikum rechts der Isar, Munich; Technical Univ. of Munich (DE) [99]

Automatic image annotation for surgical instrument segmentation, H. Matsuzaki, M. Murata, Y. Watanabe, H. Hasegawa, N. Takeshita, M. Ito, National Cancer Center Hospital East, Kashiwa (JP) [122]

In vivo test for evaluation of a 4 DOF robot system for vascular intervention, H. J. Cha, J. Woo, H. S. Song, J. Y. Won, B. J. Yi, Korea Inst. of Machinery and Materials, Daegu; Hanyang Univ., Gyeonggi-do; Yonsei Univ., Seoul (KR) [130]

Augmented reality for bone fragment positioning during craniostylosis reconstruction surgery, R. Moreta-Martinez, D. García-Mato, M. García-Sevilla, S. Ochandiano, R. García-Leal, J. A. Calvo-Haro, R. Pérez-Mañanes, J. I. Salmerón, J. Pascau, Univ. Carlos III de Madrid, Leganes Inst.o de Investigación Sanitaria Gregorio Marañón, Madrid (ES) [142]

Motion analysis of the distal radio-ulnar joint and quantification of the associated methodological error, J. Oonk, I. Dobbe, S. Strackee, G. Strijkers, G. Streekstra, Univ. of Amsterdam (NL) [157]

Patient-mounted MRI compatible robot for pain injections, K. Cleary, G. Li, N. Patel, C. Dumoulin, K. Sharma, J. Fritz, I. Iordachita, Children's National Health System, Washington; Johns Hopkins Univ., Baltimore; Cincinnati Childrens Hospital; Pittsburgh (US) [158]

Stereo calibration of non-overlapping field of view heterogeneous cameras for calibrating surgical microscope with external tracking camera, R. Hussain, A. Lalande, I. Stefanis, K. Berihu Girum, C. Guigou, D. Fofi, A. Bozorg Grayeli, Univ. de Bourgogne Franche-Comté, Dijon (FR) [161]

Virtual Reality exploration of SEEG placement for drug-resistant epilepsy planning, M. Ceresa, S. Gomez, M. Sanchez-Fibla, A. Higuera Esteban, L. Serra, M. A. Gonzalez Ballester, Univ. Pompeu Fabra; Galgo Medical SL, Barcelona (ES) [166]

Assessment framework of novel surgical technology concepts and early-designs : applied to fetal minimally invasive surgery, A. Javaux, J. Legrand, L. De Catte, R. Devlieger, L. Lewi, J. Deprest, K. Denis, P. Jannin, E. Vander Poorten, Katholieke Univ. Leuven, Heverlee (BE); Univ. of Rennes 1 (FR) [181]

Augmented reality visualization of MRI-guided presurgical planning, D. Kikinov, D. Pur, R. Eagleson, S. de Ribaupierre, Univ. of Western Ontario, London (CA) [183]

Validating automatic performance assessment of virtual temporal bone dissection, S. Sachan, M. Hoy, S. Chan, J. Dort, Univ. of Calgary (CA) [186]

Sensor-fusion of IMU and optical tracking for navigation in laparoscopic surgery, R. Hartwig, A. Dorigan, D. Ostler, D. Wilhelm, Technical Univ. of Munich (DE) [194]

Process chain for knowledge-based design and dimensioning of motion elements for individualized ankle foot orthoses, L. Mika, S. Holtzhausen, R. Stelzer, Technical Univ. Dresden (DE) [196]

Fabrication of an ultrasound and X-ray compatible phantom for image-guided liver interventions with realistic vasculature and fluid flow, E. Maneas, J. Moore, L. Groves, R. Vassallo, A. E. Desjardins, T. M. Peters, E. C. S. Chen, Univ. College London (GB); Western Univ., London, ON (CA) [200]

Stereotactic pelvic navigation surgery for recurrent rectal cancer, J. H. Lee, J. M. Kwak, J. Kim, J. M. Choo, S. W. Cho, Korea Univ., Seoul (KR) [210]

3D evaluation compared for before and after periacetabular osteotomy using of image matching method, H. Gondo, T. Shimoto, S. Hamai, Y. Nakashima, A. Ishikawa, H. Higaki, Kyushu Sangyo Univ., Fukuoka; Fukuoka Inst. of Technology; Kyushu Univ.; Kyushu Sangyo Univ., Fukuoka (JP) [213]

Single shot C-arm pose estimation using deep learning, S. Andreß, H. Esfandiari, M. Herrold, P. Guy, W. Böcker, S. Weidert, A. Hodgson, Univ. Hospital, LMU Munich (DE); Univ. of British Columbia, Vancouver (CA) [221]

Evaluation of multi-wavelengths LED-based photoacoustic imaging for maximum-safe resection of glioma: A proof of concept study, A. Ahmadian, E. Najafzadeh, H. Ghadiri, M. Alimohamadi, P. Farnia, M. Mehrmohammadi, Tehran Univ. of Medical Sciences (IR); Wayne State Univ. (US) [20-00020]

Fluoroscopic images-based aiming and targeting system with two line lasers for insertion guidance of interlocking screw, S. Joung, J. Yu, H. Song, C.-W. Park, I. Park, Kyungpook National Univ., Deagu (KR) [20-00021]

The cochlea hydro drive description of a concept for hydraulically operated, automated insertion of electrodes in cochlear implant surgery, T. S. Rau, M.G. Zuniga, R. Salcher, T. Lenarz, Hannover Medical School (DE) [20-00023]

Cloud-based three-dimensional pattern analysis and classification of proximal humeral fractures - a feasibility study, D. Baumann, A. Gerber Popp, M. Degen, D. Brodbeck, F. Coigny, T. Suter, E. Schkommodau, Fachhochschule Nordwestschweiz, Muttenz; Schulter Ellbogen Emmental; Kantonsspital Baselland; Univ. of Applied Sciences and Arts Northwestern Switzerland (CH) [20-00033]

Modular joint design of preoperative positioning manipulator for laparoscopic minimally invasive surgery robot system, P. Wang, Z. Zhang, G. He, Y. Yang, Q. Cao, Shanghai Jiao Tong Univ. (CN) [20-00045]

A novel visual guidance system for assisting during placement of an auditory brainstem implant, M. Regodic, W. Freysinger, Medical Univ. of Innsbruck (AT) [20-00081]

Proposal for an incremental learning method for CNN-based hepatic tumor CAD development, K. Abe, H. Takeo, Y. Nagai, S. Nawano, Kanagawa Inst. of Technology; National Cancer Center Hospital East, Chiba; International Univ. of Health and Welfare, Tokyo (JP) [3]

Developing high performance CAD for depression by employing image and voice information, S. Wada, Y. Maki, K. Abe, H. Takeo, Y. Nagai, Kanagawa Inst. of Technology; National Cancer Center Hospital East, Chiba (JP) [7]

Developing high performance CAD for depression by integrating multiple classifier systems, Y. Maki, S. Wada, K. Abe, H. Takeo, Y. Nagai, Kanagawa Inst. of Technology; National Cancer Center Hospital East, Chiba (JP) [8]

A preliminary study on creating a ground-truth image for deep learning-based body fat segmentation in MRI using multi-atlas segmentation, M. Takahashi, T. Takenaga, Y. Nomura, S. Hanaoka, M. Nemoto, T. Yoshikawa, N. Hayashi, S. Abe, Ibaraki Prefectural Univ. of Health Sciences, Ami town; The Univ. of Tokyo Hospital; Kindai Univ., Higashiosaka (JP) [28]

Improvement of lung nodule classification performance using gated-dilated networks, M. Tan, M. Al-Shabi, H. K. Lee, Monash Univ. Malaysia, Subang Jaya, Selangor (MY); A*STAR, Singapore (SG) [39]

Automatic detection of cervical and thoracic lesions on FDG-PET/CT by organ specific one-class SVMs, A. Tanaka, M. Nemoto, H. Kaida, Y. Kimura, T. Nagaoka, T. Yamada, K. Ushifusa, K. Hanaoka, K. Kitajima, T. Tsuchitani, K. Ishii, Kindai Univ., Kinokawa; Kindai Univ. Hospital, Osakasayama; Hyogo College of Medicine, Nishinomiya (JP) [83]

Thyroid nodule classification in ultrasound images using geometrical and morphological features to solidify tirads, E. J. Gomes Ataide, N. Ponugoti, A. Illanes, S. Schenke, M. Friebe, M. Kreißl, Univ. Hospital Magdeburg; Otto-von-Guericke Univ., Magdeburg (DE) [86]

The study of machine learning methods for the lesion differentiation on mammograms, I. Egoshin, D. Pasyukov, A. Kolchev, I. Kliouchkin, O. Pasyukova, V. Shafikulina, Mari State Univ.; Kazan Federal Univ., Yoshkar-Ola; Kazan State Medical Univ., Kazan (RU) [104]

A generalized image feature generation based on unsupervised deep learning with small scale normal dataset, K. Ushifusa, M. Nemoto, Y. Kimura, T. Nagaoka, T. Yamada, A. Tanaka, N. Hayashi, Kindai Univ., Kinokawa; The Univ. of Tokyo Hospital (JP) [81]

Deep Convolutional Neural Networks (CNN) for mammographic abnormalities detection and segmentation, S. Mahmoudi, F. Giudice, T. Weber, X. Lessage, X. Siebert, S. A. Mahmoudi, Univ. of Mons (BE) [115]

3D-ResNet-GAN for improved electronic cleansing in CT colonography, R. Tachibana, J. Näppi, T. Hironaka, H. Yoshida, National Inst. of Technology, Yamaguchi (JP); Massachusetts General Hospital and Harvard Medical School, Boston (US) [205]