Medical Imaging 2021

Imaging Informatics for Healthcare, Research, and Applications

Thomas M. Deserno Brian J. Park Editors

15–19 February 2021 Online Only, United States

Sponsored by SPIE

Cooperating Organizations

AAPM—American Association of I

AAPM—American Association of Physicists in Medicine (United States)
MIPS—Medical Image Perception Society (United States)
SIIM—Society for Imaging Informatics in Medicine (United States)
WMIS—World Molecular Imaging Society (United States)

Published by SPIE

Volume 11601

Proceedings of SPIE, 1605-7422, V. 11601

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Medical Imaging 2021: Imaging Informatics for Healthcare, Research, and Applications edited by Thomas M. Deserno, Brian J. Park, Proc. of SPIE Vol. 11601, 1160101 © 2021 SPIE · CCC code: 1605-7422/21/\$21 · doi: 10.1117/12.2595460

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in Medical Imaging 2021: Imaging Informatics for Healthcare, Research, and Applications, edited by Thomas M. Deserno, Brian J. Park, Proceedings of SPIE Vol. 11601 (SPIE, Bellingham, WA, 2021) Seven-digit Article CID Number.

ISSN: 1605-7422

ISSN: 2410-9045 (electronic)

ISBN: 9781510640313

ISBN: 9781510640320 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445

Copyright © 2021, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 1605-7422/21/\$21.00.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.



Paper Numbering: Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

PRECISION MEDICINE AND NOVEL IMAGING DEVICES

11601 05	Human epithelial-2 cell image classification using deep unsupervised learning and gradient boosting trees [11601-4]
11601 06	A cross-platform informatics system for the Gut Cell Atlas: integrating clinical, anatomical and histological data [11601-5]
11601 07	Substantiating the effect of DXA variables in the prediction of diabetes mellitus using machine learning [11601-6]
11601 08	Combined thermal and color 3D model for wound evaluation from handheld devices [11601-7]
11601 09	Multi-camera, multi-person, and real-time fall detection using long short term memory [11601-8]
	EX VIVO CONSTRUCTS AND PHANTOMS FOR INTERVENTION PLANNING AND GUIDANCE: JOINT SESSION WITH CONFERENCES 11598 AND 11601
11601 0A	Development of a CT-compatible anthropomorphic skull phantom for surgical planning, training, and simulation [11601-9]
11601 OB	Evaluation of challenges and limitations of mechanical thrombectomy using 3D printed neurovascular phantoms [11601-10]
	UNDERSTANDING MACHINE LEARNING
11601 0C	Annotation quality vs. quantity for deep-learned medical image segmentation [11601-11]
11601 OD	Gamification concept for acquisition of medical image segmentation via crowdsourcing [11601-12]
11601 OE	Understanding privacy risks in typical deep learning models for medical image analysis [11601-13]
11601 OF	A translational clinical assessment workflow for the validation of external artificial intelligence models [11601-14]

MACHINE LEARNING APPLICATIONS: EYE

11601 OH	Real or fake? Fourier analysis of generative adversarial network fundus images [11601-16]
11601 01	EdgeWaveNet: edge aware residual wavelet GAN for OCT image denoising [11601-17]
11601 OJ	Uncertainty aware and explainable diagnosis of retinal disease [11601-18]
	MACHINE LEARNING APPLICATIONS: BREAST AND COLON CANCER
11601 OL	An optimal machine learning model for breast lesion classification based on random projection algorithm for feature optimization [11601-21]
11601 OM	Learning knowledge from longitudinal data of mammograms to improving breast cancer risk prediction [11601-22]
11601 ON	Suspicion Map: an unsupervised middleware for analyzing digital mammograms [11601-23]
	WEB-BASED AND STREAMLINED SYSTEMS
11601 00	Making a difference, an integrated PACS workflow for evaluating longitudinal changes across serial imaging [11601-24]
11601 OP	A web client-based online DICOM browser and NRRD converter for Studierfenster [11601-25]
11601 OS	Automated video summarization and label assignment for otoscopy videos using deep learning and natural language processing [11601-28]
11601 OT	patologIA: online platform for improving image-based diagnostics applied to medical students [11601-29]
	FUTURE OR: DECISION SUPPORT, WORKFLOW CONTROL, AND SKILL ASSESSMENT: JOINT SESSION WITH CONFERENCES 11598 AND 11601
11601 OU	Development of a Smart Hospital Assistant: integrating artificial intelligence and a voice-user interface for improved surgical outcomes [11601-30]

IMAGING INFORMATICS IS ANSWERING COVID-19 11601 OX COVID-19 detection from scarce chest x-ray image data using few-shot deep learning **approach** [11601-1] 11601 OY Fully automated CT to x-ray registration of infected lung regions for COVID-19 patient **monitoring** [11601-2] **POSTER SESSION** 11601 11 Prediction of Oncotype DX recurrence score in breast cancer by integration of DCE-MRI radiomics and clinicopathologic data [11601-33] 11601 12 Validating a computer aided glaucoma screening system using RIGA 2 dataset [11601-34] 11601 14 2D vs. 3D U-Net abdominal organ segmentation in CT data using organ bounds [11601-36] 11601 15 A cloud-based centerline algorithm for Studierfenster [11601-39] 11601 16 Comparative performance of self-supervised 3D-ResNet-GAN for electronic cleansing in

single- and dual-energy CT colonography [11601-20]