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Jens Petersen · Raúl San José Estépar · Alexander Schmidt-Richberg · Sarah Gerard · Bianca Lassen-Schmidt · Colin Jacobs · Reinhard Beichel · Kensaku Mori (Eds.)

Thoracic Image Analysis

Second International Workshop, TIA 2020 Held in Conjunction with MICCAI 2020 Lima, Peru, October 8, 2020 Proceedings



Editors Jens Petersen University of Copenhagen Copenhagen, Denmark

Alexander Schmidt-Richberg Philips (Germany) Hamburg, Hamburg, Germany

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Reinhard Beichel University of Iowa Iowa City, IA, USA Raúl San José Estépar Harvard Medical School Boston, MA, USA

Sarah Gerard D Harvard Medical School Boston, MA, USA

Colin Jacobs D Radiology and Nuclear Medicine Radboud University Medical Center Nijmegen, Gelderland, The Netherlands

Kensaku Mori D Graduate School of Informatics Nagoya University Nagoya, Japan

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Preface

The Second International Workshop on Thoracic Image Analysis (TIA 2020) was held as an entirely online satellite event of the Medical Image Computing and Computer-Assisted Intervention Conference (MICCAI 2020). Building on the history of the workshop and the Pulmonary Image Analysis workshop, a roughly biannual event at MICCAI going back more than 10 years, the workshop aimed to bring together medical image analysis researchers in the area of thoracic imaging to discuss recent advances in this rapidly developing field. The COVID-19 pandemic has brought much attention to lung imaging, and the role of CT imaging in the diagnostic workflow of COVID-19 and its clinical resolution has been an important research topic. In addition to that, cardiovascular disease, lung cancer, and chronic obstructive pulmonary disease, three diseases all visible on thoracic imaging, are among the top causes of death worldwide. Many imaging modalities are currently available to study the pulmonary and cardiac system, including X-ray, CT, PET, ultrasound, and MRI. We invited papers that dealt with all aspects of image analysis of thoracic data, including but not limited to: image acquisition and reconstruction, segmentation, registration, quantification, visualization, validation, population-based modeling, biophysical modeling (computational anatomy), deep learning, image analysis in small animals, outcome-based research, and novel infectious disease applications (e.g., COVID-19, TB, etc.). We particularly welcomed novel work focused around the need for new methodologies for predisposition, diagnosis, staging, and resolution assessment of COVID-19 infections as an emerging disease as well as good-sized independent validation studies on the use of deep learning models in the area of thoracic imaging, despite having possibly little technical novelty.

The 16 papers submitted to the workshop were reviewed in a double-blind manner with at least three reviewers per paper, whose affiliations and recent publications were checked to avoid conflicts of interest. The review process included a blind review followed by a meta-review done by consensus by three committee members that evaluated the reviews and the papers as a whole. All of the submitted papers were long format (8-12 pages). Out of the submitted papers, 15 were accepted for presentation; however, 1 paper was withdrawn after acceptance for inconsistencies in the reported results. The remaining papers were grouped into four topics, which are reflected in the structure of these proceedings - Image Segmentation (5), Computer-Aided Diagnosis and Localization (4), Image Translation and Inpainting (3), and Image registration (2). Deep learning techniques continue to expand with 15 out of the 16 submissions using some elements of deep learning. We were pleased to see that the workshop has helped bring focus to COVID-19 research with no less than three works covering the analysis and detection of this disease. The imaging modalities used were a good mixture of 2D X-ray, 3D CT, 4DCT, DECT, and MRI, demonstrating the complementary information brought together by different modalities used to study the thoracic system. We believe that thoracic image analysis keeps on playing a crucial role in the understanding of chronic and infectious diseases with high morbidity and mortality as reflected by the works submitted to this workshop.

We want to express our gratitude to all the authors for submitting papers to TIA 2020 and everyone involved in the organization and peer-review process.

September 2020

Jens Petersen Raúl San José Estépar

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