

Challenges

LNCS 13166

Marc Aubreville  
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# Biomedical Image Registration, Domain Generalisation and Out-of-Distribution Analysis

**MICCAI 2021 Challenges: MIDOG 2021,  
MOOD 2021, and Learn2Reg 2021  
Held in Conjunction with MICCAI 2021  
Strasbourg, France, September 27 – October 1, 2021  
Proceedings**



Springer

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ISSN 0302-9743                      ISSN 1611-3349 (electronic)  
Lecture Notes in Computer Science  
ISBN 978-3-030-97280-6              ISBN 978-3-030-97281-3 (eBook)  
<https://doi.org/10.1007/978-3-030-97281-3>

LNCS Sublibrary: SL6 – Image Processing, Computer Vision, Pattern Recognition, and Graphics

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# Preface

This volume comprises in total 27 scientific papers (18 long papers and nine short papers) that have all undergone peer review from the following three biomedical image analysis challenges at MICCAI 2021: the Mitosis Domain Generalization Challenge (MIDOG 2021), the Medical Out-of-Distribution Analysis Challenge (MOOD 2021), and Learn2Reg (L2R 2021). Our challenges share the need for developing and fairly evaluating algorithms that increase accuracy, reproducibility, and efficiency of automated image analysis in clinically relevant applications.

The MIDOG 2021 challenge aimed at finding domain-generic solutions for mitosis detection in histopathology images, a task commonly performed by pathologists in breast cancer diagnosis and grading. For this, 300 cases of breast cancer were digitized using six different microscopy scanners, two of which were completely unknown to the participants. Participants submitted dockered algorithms using the [grand-challenge.org](http://grand-challenge.org) platform. The proceedings of MIDOG include five long papers followed by nine short papers.

The Learn2Reg competition's aim was to provide three complementary, clinically relevant tasks for medical image registration. Abdominal CT-MR fusion, respiratory motion estimation in CT, and whole-brain inter-subject alignment in MRI were addressed by a great variety of methods with considerable advances over previous state-of-the-art performance. The challenge was organized using the [grand-challenge.org](http://grand-challenge.org) website as a point of contact for data sharing, submission of displacement fields and dockers, and evaluation.

With the MOOD 2021 challenge the goal was to provide a first standardized benchmark and challenge for out-of-distribution detection and localization on radiological imaging data. The challenge encompassed two publicly available training datasets and evaluation on the respective hidden test sets via docker submission and automated evaluation using the [synapse.org](http://synapse.org) platform.

The chairs of the organizing committees would like to express their sincere gratitude to the members of the organization committees and to the MICCAI challenges team.

January 2022

Marc Aubreville  
MIDOG 2021 General Chair

David Zimmerer  
MOOD 2021 General Chair

Mattias Heinrich  
Learn2Reg 2021 General Chair

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