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Uncertainty for Safe Utilization of Machine Learning in Medical Imaging, and Perinatal Imaging, Placental and Preterm Image Analysis

3rd International Workshop, UNSURE 2021
and 6th International Workshop, PIPPI 2021
Held in Conjunction with MICCAI 2021
Strasbourg, France, October 1, 2021
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UNSURE 2021 Preface

The Third Workshop on Uncertainty for Safe Utilization of Machine Learning in Medical Imaging (UNSURE 2020), was prepared as a satellite event of the 24th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2021).

With an ever-increasing diversity in machine learning techniques for medical imaging applications, the need to quantify and acknowledge the limitations of a given technique has been a growing topic of interest in the MICCAI community over the last few years. Since its inception, the purpose of this workshop has been to develop awareness and encourage research in the field of uncertainty modeling to enable safe implementation of machine learning tools in the clinical world.

The proceedings of UNSURE 2021 include 13 high-quality papers that were selected from 18 submissions following a double-blind review process. Each submission of 8 to 10 pages was reviewed by three members of the Program Committee, formed by 29 experts in the field of deep learning, Bayesian modeling, and Gaussian processes.

The accepted papers cover the fields of uncertainty quantification and modeling, as well as their application to clinical pipelines, notably focusing on uncertainty in out-of-distribution and domain shift problems as well as questions around annotation uncertainty. Two keynote presentations, from experts Ender Konukoglu, ETH Zurich, Switzerland, and Roland Wiest, University Hospital Bern, Switzerland, further contributed to placing this workshop at the interface between methodological advances and clinical applicability.

We hope this workshop highlighted both theoretical and practical challenges in communicating uncertainties, and further encourages research to (a) improve safety in the application of machine learning tools and (b) assist in the translation of such tools to clinical practice.

We would like to thank all the authors for submitting their manuscripts to UNSURE 2021 as well as the Program Committee members for the quality of their feedback and dedication to the review process.

August 2021

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PIPPI 2021 Preface

The application of sophisticated analysis tools to fetal, infant, and paediatric imaging data is of interest to a substantial proportion of the MICCAI community. The main objective of this workshop is to bring together researchers in the MICCAI community to discuss the challenges of image analysis techniques as applied to the fetal and infant setting. Advanced medical image analysis allows the detailed scientific study of conditions such as prematurity and the study of both normal singleton and twin development in addition to less common conditions unique to childhood. This workshop brings together methods and experience from researchers and authors working on these younger cohorts and provides a forum for the open discussion of advanced image analysis approaches focused on the analysis of growth and development in the fetal, infant, and paediatric period.

The papers in this volume constitute the proceedings of the 6th International Workshop on Perinatal, Preterm and Paediatric Image Analysis (PIPPI 2021), held in conjunction with MICCAI 2021, the 24th International Conference on Medical Image Computing and Computer-Assisted Intervention. The conference was planned to take place in Strasbourg, France, but changed to an online event due to the COVID-19 pandemic. The 14 contributions from the PIPPI 2021 workshop were carefully reviewed and selected from 20 submissions. We would like to thank everyone involved in this year's workshop and we hope that we can meet again in person at the next PIPPI event.

August 2021

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