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Martin Welk, Martin Urschler, and Peter M. Roth (eds.)

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OAGM Workshop 2018

Medical Image Analysis

May 15-16, 2018
Hall/Tyrol, Austria

Austrian Association of Pattern Recognition (OAGM)

OESTERREICHISCHE COMPUTER GESELLSCHAFT
AUSTRIAN COMPUTER SOCIETY

OAGM

Editors

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Preface

The Private University for Health Sciences, Medical Informatics and Technology (UMIT) and the Austrian Association for Pattern Recognition (AAPR/OAGM) welcome you at Hall/Tyrol for the 42nd Annual Workshop of the AAPR that takes place on May 15/16 at the UMIT campus.

The workshop provides a platform for presentation and discussion of research progress as well as current projects within the AAPR community. In this year's edition of the workshop, OAGM2018, we additionally focus on the theme of medical image analysis and applications of computer vision, image processing and pattern recognition in the medical context, with the aim to bring together Austrian and nearby located groups working on this topic for discussion and establishing potential collaborations.

From the vivid Austrian and international community in the field, a total of 24 full papers and application spotlight papers were submitted to the workshop. Prior to the workshop, the program committee has carefully reviewed all submissions. From the submitted papers, 19 papers were finally included in the conference program as oral or poster presentations. Two invited speakers, Prof. Marleen de Bruijne (Rotterdam/Copenhagen) and Prof. Bjoern Menze (Munich), will present keynote lectures on their research in Medical Image Analysis. The conference program is complemented by 8 featured presentations in which scientists from the AAPR community will showcase outstanding recent contributions accepted by leading international conferences and journals.

Combining all these, the final program represents an impressive cross-section of current research in the medical image analysis, pattern recognition and vision field in and around Austria. We look forward to lively discussions and scientific exchange during the conference.

Martin Welk, Martin Urschler, Peter M. Roth
Hall/Tyrol, May 2018

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Christopher Zach, Toshiba Research Cambridge

Awards 2017

The

OAGM Best Paper Award 2017

was awarded to the papers

Generative Adversarial Network based Synthesis for Supervised Medical Image Segmentation

by

Thomas Neff, Christian Payer, Darko Štern, and Martin Urschler

and

Using a U-Shaped Neural Network for minutiae extraction trained from refined, synthetic fingerprints

by

Thomas Pinetz, Daniel Soukup, Reinhold Huber-Mörk, and Robert Sablatnig.

The

IEEE RAS Austria Best Student Award 2017

was awarded to the paper

A Model-Based Fault Detection, Diagnosis and Repair for Autonomous Robotics systems

by

Stefan Loigge, Clemens Mühlbacher, Gerald Steinbauer, Stephan Gspandl, and Michael Reip.

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Keynote Talks

Machine learning imaging biomarkers

Marleen de Bruijne[1]
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Abstract

Quantitative analysis of medical imaging data is increasingly important in clinical studies as well as in the diagnosis, monitoring, and prognosis of disease in individual patients. Traditional techniques measure factors that are well-known to indicate disease, such as for instance the density of lung tissue, which relates to lung function, or the size of certain brain structures, which may help to predict the development of dementia. Advances in machine learning together with increased computational power now allow a new, more data-driven approach: image characteristics related to disease outcome can be learned directly from databases that combine medical imaging data with other patient data. This talk will cover different approaches to learning disease-specific models from imaging data, including techniques to address common issues in (medical) image analysis: varying scan protocols, weakly annotated data, and missing data.

[1]University of Copenhagen, Denmark

Extracting and modeling information from medical images

Bjoern Menze[1]
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Abstract

The computer based extraction of biomarkers that support the evaluation of clinical image data is an established field in diagnostic radiology. Recently, approaches and ideas that are described by terms, such as 'image phenotyping', 'imaging genetics', or 'radiomics', gained significant interest in the field. They all share a similar technical approach and aim at the direct inference of properties of the underlying disease grade and process using image information, replacing or complementing genetic and clinical descriptors in diagnostic decisions. Of particular relevance in their design and application is the identification of patient subgroups that may be susceptible to new targeted treatments. It is widely believed that this new generation of computational decision support tools has the potential to transform the quantitative analysis of clinical imaging data and the implementation of empirical diagnostic rules in the clinical workflow. Following the pipeline for a 'radiomics'-like information extraction, I will present recent work on medical image quantification, benchmarking of algorithms, and data-driven as well as physical-inspired modeling of the underlying disease process. A focus will be on applications from the field of oncological imaging.

[1]TUM Computer Science