

2nd International Conference on

DIGITAL PATHOLOGY & IMAGE ANALYSIS

November 15-16, 2017 San Antonio, USA

Keynote Forum

DAY 1



Digital Pathology 2017

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Daniel Racoceanu

Pontifical Catholic University of Peru, Peru

Integrative computational pathology and beyond

Histopathology examination represents a milestone of the diagnostic and therapeutic decision. Concretized by the pathology report, essential to the multidisciplinary team (MDT) meetings in hospitals. It relies on professional observation and judgment, integrating: Morphological criteria (tumor morphological identity) issued from standard and complementary (histochemistry, enzymology, hybridation in situ, scores) preparations, observations, consolidated by clinical, radiological and biological contexts - among which, molecular. The future of histopathology is obviously digital (data and images). The challenge is to conciliate, in the framework of the healthcare, various usual missions as doing the diagnosis for the patient in the present moment, warehousing the medical data for the patient record, and also feeding and structuring the research strategy - particularly in oncology. Due to it's important legal role, the pathology has a key position in the medical diagnostic. At the junction of medical imaging modalities and the omics, this medical exam represents the bottleneck enabling us to go to building a representative local database. We are initiating a program of care monitoring for which the milestones and the impact will be: The production of digital histopathology tools, the modeling of the pathway and the conceptualization of the associated massive database in Peru, with a strong wish to extend it to Andean and Latin American countries. This initiative will allow us to bring in and structure a database (whole slide images, omics, clinical data and metadata) corresponding to a very diverse population (mestizos, amerindians, european, asian-peruvian, afro-peruvians ...) coming from very different regions (coast, rainforest, highlands), with difficult access and difficult to reach, representative to Peru/Andean/Latin American regions.

Biography

Daniel Racoceanu is a Professor in Biomedical Imaging and Data Computing at the Pontifical Catholic University of Peru. Since 2016, he has a tenured Professor position at Sorbonne Université since 2011. His areas of competency are Medical Image Analysis, Pattern Recognition, and Machine Learning with his present research being mainly focused on Digital Pathology and its Integrative aspects. He has completed Dr.Habil. (2006) and PhD (1997) at University of Franche-Comté, France. He was Project Manager at General Electric Energy Products - Europe, before joining, in 1999, as a Associate Professor at the University of Franche-Comté and Research Fellow at FEMTO-ST Institute (French National Research Center - CNRS), Besancon, France. Between 2014 and 2016, he was a member of the Executive Board of the University Institute of Health Engineering of the Sorbonne Université, Paris. During the same period, he lead the Cancer Theranostics research team at the Bioimaging Lab, a joint research unit created between Sorbonne Université, CNRS and INSERM (French National Institute of Health and Medical Research). He participated in the creation of International Joint Research Unit (UMI CNRS) in Singapore, being the Director (from 2008 to 2014) of this joint research venture between the Sorbonne Université (SU), the French National Center for Scientific Research (CNRS), the National University of Singapore (NUS), the Agency for Science, Technology and Research (A*STAR), and the Univ. Grenoble Alpes (UGA), in Singapore. From 2009 to 2015, he was Full Professor (adj.) at the School of Computing, National University of Singapore (NUS).

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Tomoo Itoh

Kobe University Hospital, Japan

A validation study of WSI-based primary diagnosis for malignant lymphoma

Background: The digital pathology is an emerging technology, and its usage on routine practices is spreading worldwide rapidly. Very recently, FDA allowed marketing of first whole slide imaging (WSI) system for digital pathology, which enables us use the system even for primary diagnosis. This epoch-making achievement owes a lot to scientific evidences indicated that WSI is eligible for making accurate pathological diagnoses. However, those studies typically targeting small specimens alone and the cases requiring immunohistochemistry or special staining, such as malignant lymphoma, were excluded in many studies.

Objective: To provide an evidence of usability of WSI diagnosis for primary diagnosis of malignant lymphoma compared to conventional glass slide diagnosis and optical microscope.

Design: The cases of malignant lymphoma were retrieved from our case collection. The all slide glasses, including H&E and immunohistochemistry were digitized using a WSI scanner, NanoZoomer RS (Hamamatsu), with X40 magnification, and a well-trained pathologist for lymphoma diagnosis had reviewed and made diagnosis for the digitized cases with more than 2 months of washout time interval. Discrepancies between microscope slide and WSI diagnosis were classified into three categories; concordance, major discrepancy (defined as ones associated with significant difference in clinical treatment), and minor discrepancy (defined as ones associated with no significant difference in clinical treatment).

Result: At the time of writing this abstract, the study was still ongoing. Tentative data showed excellent concordance rate, over than 95%, and which was much better than we expected.

Conclusion: WSI is applicable for primary diagnosis of malignant lymphoma, if we make diagnoses with combination of adequate clinical information, H&E morphology, and immunohistochemistries.

Biography

Tomoo Itoh has completed his PhD at Hokkaido University Graduate School of Medicine and presently he is a Professor and Deputy Director of Diagnostic Pathology at Kobe University Hospital, Japan. He is a Board Certified Member of the Japanese Society of Pathology and Board Certified Member of the Japanese Society of Clinical Cytology. He was President of 15th Annual Meeting of Japanese Society of Digital Pathology held in Kobe in 2016, and now one of the core members of the Society.

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Manuel Filipe P C Martins Costa

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Application of neural networks to the classification of photorefraction images

Neural networks are successfully being used for many years in a large number of fields of science and technology also in medicine and virtually all fields of knowledge. Even in simple non advanced ways the results of the application of neural networks to a number of problems give good and reliable results comparable and most often better than traditional methods. In the work herein we report an application to an optometry problem: The automated classification of digital photorefraction images was obtained to characterize the refractive status of patients, mostly young children. The importance of an early evaluation of the condition of the visual system of infants is long time recognized. Non corrected optometric or ophthalmologic problems may lead to major vision and developmental non-reversible limitations in the future. Among the objective methods of refraction photorefractive techniques are specifically designed for screening young children. Over the years a number of photorefraction systems with different grades of complexity and automation were developed. One critical problem that needs to deal with in any approach of these systems is the interpretation and classification of the photorefraction images.

Biography

Manuel Filipe P. C. Martins Costa holds a PhD degree in Science (Physics) from the University of Minho (Portugal) where he works since 1985 at Physics Department teaching and performing applied research in optical metrology, applied optics, thin films and nanoscience, optometry and science education and literacy. He presented over 300 communications in international meetings and published around the same number of scientific papers, monographs and books; Editor or Member of the Editorial Board of several scientific and educational international journals. He is acting as Chairperson on 19 international conferences; Member of the Scientific Advisory Board of EOS, Member of the Board of the IberoAmerican Optics Network and Member of the Board of Stakeholders of PHOTONICS'21. He is President of the Hands-on Science Network, of the Portuguese Territorial Committee of the International Commission for Optics and of the Portuguese Society for Optics and Photonics, SPOF and Senior Member of SPIE and Fellow of European Optical Society.

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