ICDAR 2019

15th International Conference on Document Analysis and Recognition
20-25 September 2019 | International Convention Centre Sydney, Australia

Advance Program of Main Conference (23-25 Sep., 2019)

Ver. 2019/08/20

Timetable
(Main Conference)

	Sunday, 22 September
18:00-19:00	Welcome Reception (Yots Waterside – Australian Maritime Museum)

	Oral Room A	Oral Room B	Cockle Bay Foyer
Monday, 23 September			
9:00-9:20	Opening Ceremony		
9:20-10:20	ICDAR Award Speech: Prof. Andreas Dengel		
10:20-10:50	Coffee Break		
10:50-12:30	Oral Session 1: Handwritten Text Recognition	Oral Session 2: Document Image Processing	
12:30-14:00	Lunch Break		
14:00-16:00	Oral Session 3: Document Understanding	Oral Session 4: Table Analysis	
16:00-18:00	Future of DAR Workshop (17:00-18:00)	Competition Session (16:20-17:40)	Poster Session 1 / Coffee Break
Tuesday, 24 September			
9:00-10:00	Keynote Speech 1: Dr. Qiang Huo		
10:00-10:30	Coffee Break		
10:30-12:30	Oral Session 5: Document Understanding	Oral Session 6: Table Analysis	
12:30-14:00	Lunch Break		
14:00-15:40	Journal Session 1	Journal Session 2	
15:40-17:40			Poster Session 2 / Coffee Break
17:40-18:20	TC10/TC11 Joint Meeting		
19:00-22:00	Conference Dinner (Luna Park – Grand Ballroom)		
Wednesday, 24 September			
9:00-10:00	Keynote Speech 2: Prof. Enrique Vidal		
10:00-10:30	Coffee Break		
10:30-12:30	Oral Session 7: Layout Analysis	Oral Session 8: Application of Document Analysis	
12:30-14:00	Lunch Break		
14:00-15:20	Oral Session 9: Script Identification and Authentication	Oral Session 10: Signature Verification	
15:20-17:00			Poster Session 3 / Coffee Break
17:00-18:00	Future of DAR Panel		
18:00-18:10	Closing		

Registration desk opens every day at 8:30am.

Presentation Instructions

Instructions for Oral Presentations

- For oral presentations, all presenters should be in the conference room and must report to the session chair no later than 10 minutes before the start of the session.
- The length of oral presentations is 20 minutes, which must include time for Q&A. Hence, your presentation should last no longer than 17 minutes, to allow the audience at least 3 minutes for their questions. This is a hard deadline that will be enforced, so please practice and time your talk to meet this requirement.
- A public laptop (Windows 10 with the latest updates. MS PowerPoint 2016 is installed. Adobe Reader is also available) will be available in each conference room with MS PowerPoint installed. You can use either the public laptop (if so, bring your presentation on a memory stick), or your own laptop. There will be a 4-port display switcher to switch between laptops. To save time, presentations should be pre-loaded before the start of the session, hence the need for you to check in with your session chair in advance of the start of the session. If you have hardware questions about the conference room facilities or you have special needs (e.g., audio playback, a live Internet connection, etc.), please contact the Local Arrangements team via: icdar2019@arinex.com.au
- The connector type of the projector is VGA (aka, DE-15 or D-sub 15). While HDMI-to-VGA converters are available, this does not completely guarantee the HDMI output of your laptop computer works.

Instructions for Poster Presentations

- The poster session will be held at the Cockle Bay Foyer. Delegates are requested to set up their posters and take them down as per the timings below as new posters are displayed every day. Velcro dots will be supplied when you register to attach your poster to the poster board. Pins securing posters are not effective as the poster boards are covered in a felt material. Please note that the Conference

Managers or the venue will dispose of your poster if it is not removed by the specified time.

- Poster Session 1:
  Monday 23 September, Posters to be displayed from 2 pm till 6 pm.
- Poster Session 2:
  Tuesday 24 September, Posters to be displayed from 11 am till 6 pm.
- Poster Session 3:
  Wednesday 25 September, Posters to be displayed from 11 am till 5.30 pm.

- Posters should be A0 Portrait size, printed in portrait mode (the poster board is 90 cm wide by 210 cm high, which translates to 35 inches wide by 83 inches high).
- One of the co-authors must be present at the poster to interact with attendees during the assigned session. So that poster presenters can have a chance to see the other posters presented in their same session, it is permissible to leave your poster for short periods of time, but for no more than a total of 20 minutes. It is not necessary to be at the poster at other times during the conference.

Keynote Speeches

ICDAR Outstanding Achievement Award Speech / September 23

Prof. Andreas Dengel

German Research Center for

Artificial Intelligence (DFKI)

Time: 9:20-10:20
Location: Room A
Chair:

Title: **From Hindsights to Insights – 30 Years in Document Analysis and Recognition**

Abstract: We are using text and graphic editors or other technical means, such as cameras, recorders, as well as messaging channels, all of which allow us to produce a document, i.e. a resource for furnishing information evidence or proving the information authenticity. As a result, we obtain an artifact. that may become a subject of study and interpretation. This could be a printed photograph or a sheet of paper with printed text, graphics, or writings, all of which in their specific and individual combination bear the original or legal form of something. When we take this attempt of a definition, then a document is associated with surfaces, which capture the information, the more we think about this very traditional view to a document, the more we are faced with raising challenges that are caused by the way we communicate these days that confronts us with the question: What is a document and what would

document evolution mean for the field of document analysis and recognition? This formulation was a guiding motivation throughout my scientific endeavors, which began in the mid-1980s. During this time, I have gone through all phases of a scientific career, starting as a young scientist who asked curious questions, his own team of students, successfully launched research projects and started to establish and develop DFKI, which today is the largest AI research center in the world. In my talk, I will give insights into these more than 30 years with a special focus on my findings, initiatives, and contributions to the field of document analysis and recognition.

Bio: Andreas Dengel is the Site Head at the German Research Center for Artificial Intelligence (DFKI) in Kaiserslautern and the Scientific Director of the Smart Data & Knowledge Services Research Department at DFKI. In 1993, he became a Professor at the Computer Science Department of the University of Kaiserslautern. Since 2009, he further holds a Professorship (kyakuin) at the Dept. of Computer Science and Intelligent Systems, Graduate School of Engineering of the Osaka Prefecture University. Andreas was program/technical chair of many international conferences, acts as an editorial board member of international journals and book series. He has written or edited 13 books and is author of more than 350 peer-reviewed scientific publications, several of which received a Best-Paper Award. He supervised more than 250 PhD, master and bachelor theses. Moreover, he is founder, initiator and mentor of many successful start-up companies, two of which received a "Pioneer Spirit Award" as well as the "Cebit Innovation Award". For his contributions, he was honored by the prize "Founding Promoter of the Year". Furthermore, Andreas is a Fellow of the International Association for Pattern Recognition (IAPR) and the Chairman of the Flexible Factory Partner Alliance (FFPA). He serves as an advisor for academic institutions, research programs as well as ministries, national and international. For his scientific findings, beside others, Andreas received one of the most prestigious personal scientific award in Germany, the Alcatel/SEL Award on Technical Communication and was appointed as "Distinguished Honorary Professor" (tokubetu eiyo kyoju) at the Osaka Prefecture University, an honor only five researchers received within 135 years. His main research interests are in the areas machine learning, pattern recognition, immersive quantified learning, data mining, and semantic technologies.

Keynote Speech 1 / September 24

Dr. Qiang Huo

Microsoft Research Asia

Time: 9:00-10:00
Location: Room A
Chair:

Title: OneOCR For Digital Transformation

Abstract: Optical Character Recognition (OCR) or more broadly Document Analysis and Recognition (DAR) is an important enabling technology that empowers people and organizations to do more and achieve more. In a mobile-first world, we have cameras everywhere, which makes "OCR in the wild" very common in our everyday life. In Microsoft, we have been developing a new generation OCR engine (aka OneOCR), which can detect both printed and handwritten text in an image captured by a camera or mobile phone, and recognize the detected text for follow-up actions. Our unified OneOCR engine can recognize mixed printed and handwritten English text lines with arbitrary orientations (even flipped), outperforming significantly other leading industrial OCR engines on a wide range of application scenarios such as document, invoice, receipt, business card, slide, menu, book cover, poster, GIF/MEME, street view, product label, handwritten note and whiteboard. Empowered by OneOCR engine, Computer Vision Read capability and Cognitive Search capability of Azure Search are generally available, and a Form Recognizer with Receipt Understanding capability is available for preview, all in Azure Cognitive Services, to democratize OCR technologies. In this keynote talk, I will demonstrate the capabilities of Microsoft's latest OneOCR engine, highlight its core component technologies, and

explain the roadmap ahead. I will argue that now is the best time for ICDAR community to make a big impact by developing better technologies and solutions for page object (especially table) detection, table structure recognition, extraction of entities and key-value pairs in forms and receipts, which can power enterprise workflows and Robotic Process Automation (RPA) to spur digital transformation.

Bio: Dr. Qiang Huo is a Partner Research Manager of Speech Group in Microsoft Research Asia (MSRA), Beijing, China. Prior to joining MSRA in August 2007, he had been a faculty member at the Department of Computer Science, The University of Hong Kong for about ten years. Many of his students have become leaders in both academia and industry. From 1995 to 1997, Dr. Huo worked on speech recognition for the world's first spoken language translation system at Advanced Telecommunications Research Institute (ATR) in Kyoto, Japan. In the past 30 years, he has been doing research and making fundamental contributions in the areas of speech recognition, handwriting recognition, OCR, gesture recognition, biometric-based user authentication, hardware design for speech and image processing. Many core technologies developed by his teams have been deployed widely in industry, including Microsoft's products and services such as Windows, Office, Azure Cognitive Services, and Bing.

Keynote Speech 2 / September 25

Prof. Enrique Vidal

Universidad Politecnica de Valencia

Time: 9:00-10:00
Location: Room A
Chair:

Title: Text Search and Information Retrieval in Large Historical Collections of Untranscribed Manuscripts

Abstract: Despite recent great advances in handwritten text recognition technology, accurate transcription of large historical manuscript collections remains elusive. In most cases, however, transcripts are only or mainly needed to enable textual search in the documents considered. In this talk we show how plain-text search and many other usual tasks of Information Retrieval and big-data Text Analytics can be accomplished without any previous explicit transcription of the manuscript images.

To this end, some years ago we drew from Lexicon-Free, Word-Segmentation-Free, Query by String, Keyword Spotting concepts and ideas to develop a Probabilistic Indexing approach aimed to support arbitrary textual queries on unconstrained text images. In this approach, a layout-agnostic, pixel-level "heat map" (called posteriorgram) is produced for each text image and each character string which proves sufficiently likely to constitute a real word written in the image. Posteriorgrams are huge, but they are simplified and pruned into manageable lists of promising hypotheses of character strings, along with their corresponding image locations (bounding boxes) and probabilities. Finally, these lists are indexed to allow extremely efficient

confidence-threshold-controlled text search and retrieval at query time.

Using this approach, several very large collections of historical manuscripts have been recently indexed and made available for real, effective textual search: Chancery (82,000 page images of Latin/French manuscripts, 14th-15th c.); TSO - Spanish Golden Age Theatre (41,000 page images of Spanish comedies, 16th-18th c.); Bentham Papers (90,000 page images, of mostly English text, 18th-19th c.); Finnish Court Records (102,000 images of about 140,000 pages of Swedish text, 18th-19th c.); Carabela and CaraabelaFull - manuscripts of interest to underwater archaeology (31,000 images, of Spanish documents, most written in abstruse scripts, 15th-16th c.).

Probabilistic Indexing allows us to go beyond basic word spotting. Specifically, we will explain how they can be used for more complex tasks such as searching for hyphenated words, and for words described by wildcards or approximate spelling. Moreover, these indexes enable probabilistic versions of typical Natural Language Processing and Text Analytics tasks, such as estimating the evolution of word usage, estimating the vocabulary or the number of running words of a manuscript or a collection, computing estimated Zipf curves, etc. Finally, we will explain how Probabilistic Indexes also allow for more content-oriented, "semantic" Information Retrieval concepts and tasks such as Boolean (AND/OR/NOT) and Sequence (phrase) queries, layout-agnostic, SQL-like "database queries" in handwritten table images, content-based image classification, or even searching for melodic patterns in images of handwritten music notation.

On-line, live demonstrators of these capabilities can be found in http://transcriptorium. eu/demots/KWSdemos .

Bio: Enrique Vidal is a professor emeritus of the Universitat Politcnica de Valncia (Spain) and former co-leader of PRHLT research center in this University. He has published more than two hundred and fifty research papers in the fields of Pattern Recognition, Multimodal Interaction and applications to Language, Speech and Image Processing and has led many important projects in these fields. Dr. Vidal is a member of the IEEE and a fellow of the International Association for Pattern Recognition (IAPR).

Monday, September 23

9:00-9:20 Opening Ceremony

Location: Room A

9:20-10:20 ICDAR Outstanding Award Speech

Location: Room A

Chair:

From Hindsights to Insights – 30 Years in Document Analysis and Recognition

Prof. Andreas Dengel (DFKI)

10:20-10:50 Coffee Break

10:50-12:30 Oral Session 1: Handwritten Text Recognition

Location: Room A

Chair:

OS1-1 **Training Full-Page Handwritten Text Recognition Models without Annotated Line Breaks**

Chris Tensmeyer, Curtis Wigington

OS1-2 **Deep Network with Pixel-level Rectification and Robust Training for Handwriting Recognition**

Shanyu Xiao, Liangrui Peng, Ruijie Yan, Shengjin Wang

OS1-3 **A Scalable Handwritten Text Recognition System**

R. Reeve Ingle, Yasuhisa Fujii, Thomas Deselaers, Jonathan Baccash, Ashok C. Popat

OS1-4 **A Fast and Accurate Fully Convolutional Network for End-to-end Handwritten Chinese Text Segmentation and Recognition**

Dezhi Peng, Lianwen Jin, Yaqiang Wu, Zhepeng Wang, Mingxiang Cai

OS1-5 **Dissecting Multi-Line Handwriting for Multi-Dimensional Connectionist Classification**

Martin Schall, Marc-Peter Schambach, Matthias O. Franz

10:50-12:30 Oral Session 2: Document Image Processing

Location: Room B

Chair:

OS2-1 **MTRNet: A Generic Scene Text Eraser**

Osman Tursun, Rui Zeng, Simon Denman, Sabesan Sivapalan, Sridha Sridharan, Clinton Fookes

OS2-2 **Document Binarization via Multi-Resolutional Attention Model with DRD Loss**

Xujun Peng, Chao Wang, Huaigu Cao

OS2-3 **Graphical Object Detection in Document Images**

Ranajit Saha, Ajoy Mondal, C. V. Jawahar

OS2-4 **An End-to-End trainable framework for joint optimization of document enhancement and recognition**

Manoj Sharma, Anupama Ray, Avinash Upadhyay, Megh Makwana, Ajay Pratap Singh, Akkshita Trivedi, Anil Saini, Santanu Chaudhury

OS2-5 **Learning 2D Morphological Network for Old Document Image Binarization**

Ranjan Mondal, Deepayan Chakraborty, Bhabatosh Chanda

12:30-14:00 Lunch Break

14:00-16:00 Oral Session 3: Document Understanding

Location: Room A

Chair:

OS3-1 **Multimodal Document Image Classification**

Rajiv Jain, Curtis Wigington

OS3-2 **Decipherment of Historical Manuscript Images**

Xusen Yin, Nada Aldarrab, Beáta Megyesi, Kevin Knight

OS3-3 **Training Convolutional Autoencoders with Metric Learning**

Yosuke Onitsuka, Wataru Ohyama, Seiichi Uchida

OS3-4 **A meaningful information extraction system for interactive analysis of documents**

Julien Maitre, Michel Ménard, Guillaume Chiron, Alain Bouju, Nicolas Sidère

OS3-5 **Table-of-Contents generation on contemporary documents**
Najah-Imane Bentabet, Rémi Juge, Sira Ferradans

OS3-6 **Making Two Vast Historical Manuscript Collections Searchable and Extracting Meaningful Textual Features Through Large-Scale Probabilistic Indexing**
Alejandro H. Toselli, Verónica Romero, Enrique Vidal, Joan Andreu Sánchez

14:00-16:00 Oral Session 4: Table Analysis
Location: Room B
Chair:

OS4-1 **Deep Splitting and Merging for Table Structure Decomposition**
Christopher Tensmeyer, Vlad Morariu, Brian Price, Scott Cohen, Tony Martinez

OS4-2 **Table Detection in Invoice Documents by Graph Neural Networks**
Pau Riba, Anjan Dutta, Lutz Goldmann, Alicia Fornés, Oriol Ramos, Josep Lladós

OS4-3 **TableNet: Deep Learning model for end-to-end Table detection and Tabular data extraction from Scanned Document Images**
Shubham Paliwal, Vishwanath D, Rohit Rahul, Monika Sharma, Lovekesh Vig

OS4-4 **Deep Visual Template-Free Form Parsing**
Brian Davis, Bryan Morse, Scott Cohen, Brian Price, Chris Tensmeyer

OS4-5 **Rethinking Table Recognition using Graph Neural Networks**
Shah Rukh Qasim, Hassan Mahmood, Faisal Shafait

OS4-6 **Breaking the Code on Broken Tablets: The Learning Challenge for Annotated Cuneiform Script in Normalized 2D and 3D Datasets**
Hubert Mara, Bartosz Bogacz

16:00-18:00 Poster Session 1 & Coffee Break
Location: Cockle Bay Foyer

PS1-01 **OCR On-the-Go: Robust End-to-end Systems for Reading License Plates and Street Signs**
Rohit Saluja, Ayush Maheshwari, Ganesh Ramakrishnan, Parag Chaudhuri, Mark Carman

PS1-02 **Sub-word Embeddings for OCR Corrections in highly Fusional Indic Languages**
Rohit Saluja, Mayur Punjabi, Mark Carman, Ganesh Ramakrishnan, Parag Chaudhuri

PS1-03 **DeepHSV: User-independent Offline Signature Verification Using Two-Channel CNN**
Feng Lin, Chuang Li, Zhiyong Wang, Gang Yu, Liou Yuan, Haiqiang Wang

PS1-04 **Generating Realistic Binarization Data with Generative Adversarial Networks**
Chris Tensmeyer, Mike Brodie, Daniel Saunders, Tony Martinez

PS1-05 **TH-GAN: Generative Adversarial Network based Transfer Learning for Historical Chinese Character Recognition**
Junyang Cai, Liangrui Peng, Yejun Tang, Changsong Liu, Pengchao Li

PS1-06 **Data Augmentation via Adversarial Networks for Optical Character Recognition**
Victor Storchan, Jocelyn Beauchesne

PS1-07 **BAGS: An automatic homework grading system using the pictures taken by smart phones**
Xiaoshuo Li, Tiezhu Yue, Xuanping Huang, Zhe Yang, Gang Xu

PS1-08 **Detecting Named Entities in Unstructured Bengali Manuscript Images**
Chandranath Adak, Bidyut B. Chaudhuri, Chin-Teng Lin, Michael Blumenstein

PS1-09 **Target-Directed MixUp for Labeling Tangut Characters**
Guangwei Zhang, Yinliang Zhao

PS1-10 **DeepText: Detecting Text from the Wild with Multi-ASPP-Assembled DeepLab**
Qingqing Wang, Yue Lu, Xiangjian He, Wenjing Jia, Michael Blumenstein, Ye Huang, Shujing Lyu

PS1-11 **Transductive Learning for Reading Handwritten Tibetan Manuscripts**
Sivan Keret, Lior Wolf, Nachum Dershowitz, Eric Werner, Orna Almogi, Dorji Wangchuk

PS1-12 **Learning Free Line Detection in Manuscripts using Distance Transform Graph**
Majeed Kassis, Jihad El-Sana

PS1-13 **Segmentation-Free Bangla Offline Handwriting Recognition using Sequential Detection of Characters and Diacritics with a Faster R-CNN**
Nishatul Majid, Elisa H. Barney Smith

PS1-14 **Toward online handwriting recognition system based on Reinforcement learning theory**
Ramzi Zouari, Houcine Boubaker, Monji Kherallah

PS1-15 **Cascaded Detail-Preserving Networks for Super-Resolution of Document Images**
Zhichao Fu, Yu Kong, Yingbin Zheng, Hao Ye, Wenxin Hu, Jing Yang, Liang He

PS1-16 **Sub-word based Mongolian Offline Handwriting Recognition**
Fan Daoerji, Guanglai Gao, Wu Huijuan

PS1-17 **EATEN: Entity-aware Attention for Single Shot Visual Text Extraction**
He Guo, Xiameng Qin, Jiaming Liu, Junyu Han, Jingtuo Liu, Errui Ding

PS1-18 **Can One Deep Learning Model Learn Script-Independent Multilingual Word-Spotting?**
Mohammed Al-Rawi, Ernest Valveny, Dimosthenis Karatzas

PS1-19 **Semi-Synthetic Data Augmentation of Scanned Historical Documents**
Romain Karpinski, Abdel Belaid

PS1-20 **Attention after Attention: Reading Text in the Wild with Cross Attention**
Yunlong Huang, Canjie Luo, Lianwen Jin, Qingxiang Lin, Weiying Zhou

PS1-21 **A Teacher-Student Learning based Born-Again Training Approach to Improving Scene Text Detection Accuracy**
Zhuoyao Zhong, Lei Sun, Qiang Huo

PS1-22 **Versatile Layout Understanding via Conjugate Graph**
Animesh Prasad, Hervé Déjean, Jean-Luc Meunier

PS1-23 **DeepER: A modern OCR Engine Based on Deep Learning**
Marcin Namysl, Iuliu Konya

PS1-24 **Fast Distributional Smoothing for Regularization in CTC Applied to Text Recognition**
Ryohei Tanaka, Soichiro Ono, Akio Furuhata

PS1-25 **Oracle Character Recognition by Nearest Neighbor Classification with Deep Metric Learning**
Yi-Kang Zhang, Heng Zhang, Yong-Ge Liu, Qing Yang, Cheng-Lin Liu

PS1-26 **Template-Instance Loss for Offline Handwritten Chinese Character Recognition**
Yao Xiao, Dan Meng, Cewu Lu, Chi-Keung Tang

PS1-27 **Urdu-Text: A Dataset and Benchmark for Urdu Text Detection and Recognition in Natural Scenes**
Asghar Ali, Mark Pickering

PS1-28 **Attend, Copy, Parse - End-to-end information extraction from documents**
Rasmus Berg Palm, Florian Laws, Ole Winther

PS1-29 **Aiding Intra-Text Representations with Visual Context for Multimodal Named Entity Recognition**
Omer Arshad, Ignazio Gallo, Shah Nawaz, Alessandro Calefati

PS1-30 **WiSe - Slide Segmentation in the Wild**
Monica Haurilet, Alina Roitberg, Manuel Martinez, Rainer Stiefelhagen

PS1-31 **Symmetric Inkball Alignment with Loopy Models**
Nicholas R. Howe, Ji Won Chung

PS1-32 **No Padding Please: Efficient Neural Handwriting Recognition**
Gideon Maillette de Buy Wenniger, Lambert Schomaker, Andy Way

PS1-33 **Integrating Coordinates with Context for Information Extraction in Document Images**
Zhaohui Jiang, Zheng Huang, Jie Guo, Weidong Qiu, Yunrui Lian

PS1-34 **Text Line Segmentation in Historical Document Images Using an adaptive U-Net Architecture**
Olfa Mechi, Maroua Mehri, Rolf Ingold, Najoua Essoukri Ben Amara

PS1-35 **TextEdge: Multi-oriented Scene Text Detection via Region Segmentation and Edge Classification**
Chen Du, Chunheng Wang, Yanna Wang, Zipeng Feng, Jiyuan Zhang

PS1-36 **Extraction of Math Expressions from PDF Documents based on Unsupervised Modeling of Fonts**
Zelun Wang, Donald Beyette, Jason Lin, Jyh-Charn Liu

PS1-37 **Bigram Label Regularization to Reduce Over- Segmentation on Inline Math Expression Detection**
Xing Wang, Zelun Wang, Jyh-Charn Liu

PS1-38 **Automatic synthetic document image generation using generative adversarial networks: application in mobile-captured document analysis**

Quang Anh Bui, Salvatore Tabbone, David Mollard

PS1-39 **Selective Super-Resolution for Scene Text Images**
Ryo Nakao, Brian Kenji Iwana, Seiichi Uchida

PS1-40 **Modality Conversion of Handwritten Patterns by Cross Variational Autoencoders**
Taichi Sumi, Brian Kenji Iwana, Hideaki Hayashi, Seiichi Uchida

PS1-41 **Adversarial Feature Enhancing Network for End-to-End Handwritten Paragraph Recognition**
Yaoxiong Huang, Zecheng Xie, Lianwen Jin, Yuanzhi Zhu, Shuaitao Zhang

PS1-42 **A Character Attention Generative Adversarial Network for Degraded Historical Document Restoration**
Kha Cong Nguyen, Cuong Tuan Nguyen, Seiji Hotta, Masaki Nakagawa

PS1-43 **Towards Automated Evaluation of Handwritten Assessments**
Vijay Rowtula, Subba Reddy Oota, C.V. Jawahar

PS1-44 **Digital Auditor: A Framework for Matching Duplicate Invoices**
Himanshu Bhatt, Shourya Roy, Lokesh Bhatnagar, Chetan Lohani, Vinit Jain

PS1-45 **Text Siamese Network for Video Textual Keyframe Detection**
Hao Song, Hongzhen Wang, Shan Huang, Pei Xu, Shen Huang, Qi Ju

PS1-46 **On the Ability of a CNN to Realize Image-to-Image Language Conversion**
Kohei Baba, Seiichi Uchida, Brian Kenji Iwana

PS1-47 **Parameter-free table detection method**
Laiphangbam Melinda, Chakravarthy Bhagvati

PS1-48 **Table Rows Segmentation**
Jean-Luc Meunier, Hervé Déjean

PS1-49 **Discourse descriptor for document incremental classification, Comparison with Deep Learning**
Vincent Poulain D'Andecy, Aurélie Joseph, Joaquin Cuenca, Jean-Marc Ogier

PS1-50 **CNN-Based Accidental Detection in Dense Printed Piano Scores**
Kwon-Young Choi, Bertrand Coüasnon, Yann Ricquebourg, Richard Zanibbi

PS1-51 **Adversarial Generation of Handwritten Text Images Conditioned on Sequences**
Eloi Alonso, Bastien Moysset, Ronaldo Messina

PS1-52 **Field typing for improved recognition on heterogeneous handwritten**

forms

Ciprian Tomoiaga, Paul Feng, Patrick Jayet, Mathieu Salzmann

PS1-53 **A Multi-Task Network for Localization and Recognition of Text in Images**

Keegan Hines, Reza Sarshogh

PS1-54 **On the Use of Attention Mechanism in a Seq2Seq based Approach for Off-line Handwritten Digit String Recognition**

Thibault Lupinski, Abdel Belaid, Afef Kacem-Echi

PS1-55 **Scene Text Detection with Feature Pyramid Network and Linking Segments**

Xi Liu, Rui Zhang, Yongsheng Zhou, Dong Wang

PS1-56 **Instance Aware Document Image Segmentation using Label Pyramid Networks and Deep Watershed Transformation**

Xiao-Hui Li, Fei Yin, Tao Xue, Long Liu, Jean-Marc Ogier, Cheng-Lin Liu

PS1-57 **Detecting Text in News Images with Similarity Embedded Proposals**

Miaotong Jiang, Jiebo Hou, Chun Yang, Xiaobin Zhu, Xucheng Yin

PS1-58 **A Stroke-based RNN for Writer-Independent Online Signature Verification**

Chuang Li, Xing Zhang, Feng Lin, Zhiyong Wang, Jun'E Liu, Rui Zhang, Haiqiang Wang

PS1-59 **CNN based Binarization of MultiSpectral Document Images**

Fabian Hollaus, Simon Brenner, Robert Sablatnig

PS1-60 **Text line adjustment based on neural network**

Ruochen Wang, Xiaojie Xia, Chunyan Zhang, Xiaoyi Yu, Jun Sun, Naoi Satoshi

PS1-61 **Hybrid DBLSTM-SVM based Beta-elliptic-CNN Models for Online Arabic Characters Recognition**

Yahia Hamdi, Houcine Boubaker, Thameur Dhieb, Abdelkarim Elbaati, Adel M Alimi

PS1-62 **Towards Document Image Quality Assessment: A Text Line Based Framework and A Synthetic Text Line Image Dataset**

Hongyu Li, Fan Zhu, Junhua Qiu

PS1-63 **Curved Text Detection in Natural Scene Images with Semi- and Weakly-Supervised Learning**

Xugong Qin, Yu Zhou, Dongbao Yang, Weiping Wang

PS1-64 **Hybrid Training Data for Historical Text OCR**
Jiří Martínek, Ladislav Lenc, Pavel Král, Anguelos Nicolaou, Vincent Christlein

PS1-65 **Training Binary-Valued Gates LSTM**
Zhe Li, Jian Cheng

PS1-66 **An End-to-end Trainable System for Offline Handwritten Chemical Formulae Recognition**
Xiaoxue Liu, Ting Zhang, Xinguo Yu

PS1-67 **Exploring Confidence Measures for Word Spotting in Heterogeneous Datasets**
Fabian Wolf, Philipp Oberdiek, Gernot Fink

PS1-68 **Cross-modal Prototype Learning for Zero-shot Handwriting Recognition**
Xiang Ao, Xu-Yao Zhang, Hong-Ming Yang, Fei Yin, Cheng-Lin Liu

PS1-69 **Multiple Comparative Attention Networks for Offline Handwritten Chinese Character Recognition**
Qingquan Xu, Xiang Bai, Wenyu Liu

16:20-17:40 Competition Session
Location: Room B

17:00-18:00 Future of DAR Workshop
Location: Room A

Tuesday, September 24

9:00-10:00 Keynote Speech 1

Location: Room A

Chair:

OneOCR For Digital Transformation

Dr. Qiang Huo (Microsoft Research Asia)

10:00-10:30 Coffee Break

10:30-12:30 Journal Session 1

Location: Room A

Chair:

JS1-1 **An Anchor-Free Region Proposal Network for Faster R-CNN based Text Detection Approaches**
Zhuoyao Zhong, Lei Sun, Qiang Huo

JS1-2 **A Two-Stage Method for Text Line Detection in Historical Documents**
Tobias Grüning, Gundram Leifert, Tobias Strauß, Johannes Michael, Roger Labahn

JS1-3 **Coarse-to-fine Document Localization in Natural Scene Image with Regional Attention and Recursive Corner Refinement**
Anna Zhu, Chen Zhang, Zhi Li, Shengwu Xiong

JS1-4 **Comic MTL: multi-task model for comic book image analysis**
Nhu-Van Nguyen, Christophe Rigaud, Jean-Christophe Burie

JS1-5 **Generalized Framework for Summarization of Fixed-Camera Lecture Videos by Detecting and Binarizing Handwritten Content**
Bhargava Urala Kota, Kenny Davila, Alexander Stone, Srirangaraj Setlur, Venu Govindaraju

JS1-6 **A comparison of local features for camera-based document image retrieval and spotting**
Quoc Bao Dang, Mickal Coustaty, Muhammad Muzzamil Luqman, Jean-Marc Ogier

10:30-12:10 Journal Session 2

Location: Room B

Chair:

JS2-1 **Boosting Scene Character Recognition by Learning Canonical Forms of Glyphs**

Yizhi Wang, Zhouhui Lian, Yingmin Tang, Jianguo Xiao

JS2-2 **Are 2D-LSTM really dead for offline text recognition?**

Bastien Moysset, Ronaldo Messina

JS2-3 **Handwritten Arabic Text Recognition Using Multi-Stage Sub-Core Shape HMMs**

Irfan Ahmad, Gernot Fink

JS2-4 **Dynamic Temporal Residual Network for Sequence Modeling**

Ruijie Yan, Liangrui Peng, Shanyu Xiao, Michael T. Johnson, Shengjin Wang

JS2-5 **On optimal stopping strategies for text recognition in a video stream as an application of a monotone sequential decision model**

Konstantin Bulatov, Nikita Razumnyi, Vladimir V. Arlazarov

12:30-14:00 Lunch Break

14:00-15:40 Oral Session 5: <u>Text Detection and Recognition</u>

Location: Room A

Chair:

OS5-1 **An End-to-end Video Text Detector with Online Tracking**

Hongyun Yu, Chengquan Zhang, Xuan Li, Junyu Han, Errui Ding, Liang Wang

OS5-2 **KuroNet: Pre-Modern Japanese Kuzushiji Character Recognition with Deep Learning**

Tarin Clanuwat, Alex Lamb, Asanobu Kitamoto

OS5-3 **A New Approach for Integrated Recognition and Correction of Texts from Images**

Jian Wei, Kai Chen, Jianhua He, Zheng Huang, Yunrui Lian, Yi Zhou

OS5-4 **On the Improvement of Recognizing Single-line Strings of Japanese Historical Cursive**

Ayumu Nagai

OS5-5 **An attention-based end-to-end model for multiple text lines recognition in Japanese Historical Documents**
Nam Tuan Ly, Cuong Tuan Nguyen, Masaki Nakagawa

14:00-15:40 Oral Session 6: Mathematical Expression and Text Recognition
Location: Room B
Chair:

OS6-1 **Residual BiRNN based Seq2Seq Model with Transition Probability Matrix for Online Handwritten Mathematical Expression Recognition**
Zelin Hong, Ning You, Jun Tan, Ning Bi

OS6-2 **Fuzzy Visibility Graph for Structural Analysis of Online Handwritten Mathematical Expressions**
Arnaud Lods, Éric Anquetil, Sébastien Macé

OS6-3 **LPGA: Line-Of-Sight Parsing with Graph-based Attention for Math Formula Recognition**
Mahshad Mahdavi, Michael Condon, Kenny Davila Castellanos, Richard Zanibbi

OS6-4 **A Cost Efficient Approach to Correct OCR Errors in Large Document Collections**
Deepayan Das, Jerin Philip, Minesh Mathew, C.V. Jawahar

OS6-5 **Using ASR methods for OCR**
Ashish Arora, Chun Chieh Chang, Babak Rekabdar, Bagher BabaAli, Daniel Povey, David Etter, Desh Raj, Hossein Hadian, Jan Trmal, Paola Garcia, Shinji Watanabe, Vimal Manohar, Yiwen Shao, Sanjeev Khudanpur

15:40-17:40 Poster Session 2 & Coffee Break
Location: Cockle Bay Foyer

PS2-01 **A Multi-oriented Chinese Keyword Spotter Guided by Text Line Detection**
Pei Xu, Shan Huang, Hongzhen Wang, Hao Song, Shen Huang, Qi Ju

PS2-02 **Cascading Modular U-Nets for Document Image Binarization**
Seokjun Kang, Brian Kenji Iwana, Seiichi Uchida

PS2-03 **OBC306: A Large-Scale Oracle Bone Character Recognition Dataset**
Shuangping Huang, Haobin Wang, Yongge Liu, Xiaosong Shi, Lianwen Jin

PS2-04 **GARN: A Novel Generative Adversarial Recognition Network for End-to-End Scene Character Recognition**
Hao Kong, Dongqi Tang, Xi Meng, Tong Lu

PS2-05 **A Text-context-aware CNN Network for Multi-oriented and Multi-language Scene Text Detection**
Yao Xiao, Minglong Xue, Tong Lu, Yirui Wu, Shivakumara Palaiahnakote

PS2-0 **Handwritten words and digits recognition using Deep Learning based Bag of Features Framework**
Najoua Rahal, Maroua Tounsi, Tarek M. Hamdani, Adel M. Alimi

PS2-07 **A Relation Network Based Approach to Curved Text Detection**
Chixiang Ma, Zhuoyao Zhong, Lei Sun, Qiang Huo

PS2-08 **An efficient off-line handwritten Japanese address recognition system**
Xiaojie Xia, Xiaoyi Yu, Wei Liu, Chunyan Zhang, Jun Sun, Satoshi Naoi

PS2-09 **A Comprehensive Study of ImageNet Pre-Training for Historical Document Image Analysis**
Linda Studer, Michele Alberti, Vinaychandran Pondenkandath, Pinar Goktepe, Thomas Kolonko, Andreas Fischer, Marcus Liwicki, Rolf Ingold

PS2-10 **GRK-Papyri: A Dataset of Greek Handwriting on Papyri for the Task of Writer Identification**
Hussein Mohammed, Isabelle Marthot-Santaniello, Volker Märgner

PS2-11 **The Pinkas Dataset**
Berat Kurar Barakat, Jihad El-Sana, Irina Rabaev

PS2-12 **Layout Analysis on Challenging Historical Arabic Manuscripts using Siamese Network**
Reem Alaasam, Berat Kurar Barakat, Jihad El-Sana

PS2-13 **Online writer identification using GMM based feature representation and writer-specific weights**
Vivek Venugopal, Suresh Sundaram

PS2-14 **ReS2TIM: Reconstruct Syntactic Structures from Table Images**
Wenyuan Xue, Qingyong Li, Dacheng Tao

PS2-15 **Automatic page classification in a large collection of manuscripts based on the International Image Interoperability Framework**

Emanuela Boros, Alexis Toumi, Erwan Rouchet, Bastien Abadie, Dominique Stutzmann, Christopher Kermorvant

PS2-16 **A GAN-based Feature Generator for Table Detection**
Yibo Li, Qinqin Yan, Yilun Huang, Liangcai Gao, Zhi Tang

PS2-17 **Enhanced EAST: Improving Network's Feature Extraction Ability and Text Complete Shape Perception**
Liu Yang, Yonghong Song, Yuanlin Zhang

PS2-18 **A Text Localization Method Based on Weak Supervision**
Jiyuan Zhang, Chen Du, Zipeng Feng, Yanna Wang, Chunheng Wang

PS2-19 **NRTR: A No-Recurrence Sequence-to-Sequence Model For Scene Text Recognition**
Fenfen Sheng, Zhineng Chen, Bo Xu

PS2-20 **A Robust Data Hiding Scheme using Generated Content for Securing Genuine Documents**
Vinh Loc Cu, Jean-Christophe Burie, Jean-Marc Ogier, Cheng-Lin Liu

PS2-21 **CASIA-AHCDB: A Large-scale Chinese Ancient Handwritten Characters Database**
Yue Xu, Fei Yin, Da-Han Wang, Xu-Yao Zhang, Zhaoxiang Zhang,Cheng-Lin Liu

PS2-22 **Manifold Mixup improves text recognition with CTC loss**
Bastien Moysset, Ronaldo Messina

PS2-23 **Selective Style Transfer for Text**
Raul Gomez, Ali Furkan Biten, Lluis Gomez, Jaume Gibert, Mar_al Rusi_ol, Dimosthenis Karatzas

PS2-24 **A YOLO-based Table Detection Method**
Yilun Huang, Qinqin Yan, Yibo Li, Yifan Chen, Xiong Wang, Liangcai Gao, Zhi Tang

PS2-25 **An Interactive and Generative Approach for Chinese Shanshui Painting Document**
Le Zhou, Qiu-Feng Wang, Kaizhu Huang, Cheng-Hung Lo

PS2-26 **Scene Text Magnifier**
Toshiki Nakamura, Anna Zhu, Seiichi Uchida

PS2-27 **Exploration of CNN Features for Online Handwriting Recognition**
Subhasis Mandal, S. R. Mahadeva Prasanna, Suresh Sundaram

PS2-28 **Universal Barcode Detector via Semantic Segmentation**
Andrey Zharkov, Ivan Zagaynov

PS2-29 **HoughNet: neural network architecture for vanishing points detection**
Alexander Sheshkus, Anastasia Ingacheva, Vladimir Arlazarov, Dmitry Nikolaev

PS2-30 **Fast method of ID documents location and type identification for mobile and server application**
Natalya Skoryukina, Vladimir V. Arlazarov, Dmitry P. Nikolaev

PS2-31 **Combination of deep learning and syntactical approaches for the interpretation of interactions between text-lines and tabular structures in handwritten documents**
Camille Guerry, Bertrand Co_asnon, Aur_lie Lemaitre

PS2-32 **A Synthetic Recipe for OCR**
David Etter, Stephen Rawls, Cameron Carpenter, Gregory Sell

PS2-33 **Synthesis of handwriting dynamics using sinusoidal model**
Himakshi Choudhury, S. R. Mahadeva Prasanna

PS2-34 **Post-OCR Error Detection by Generating Plausible Candidates**
Thi-Tuyet-Hai Nguyen, Adam Jatowt, Mickael Coustaty, Nhu-Van Nguyen, Antoine Doucet

PS2-35 **Music Symbol Sequence Indexing in Medieval Plainchant Manuscripts**
Jorge Calvo-Zaragoza, Alejandro H. Toselli, Enrique Vidal, Joan Andreu S_nchez

PS2-36 **Bi-level Masked Multi-scale CNN-RNN Networks for Short Text Representation**
Qian Li, Qiang Wu, Chengzhang Zhu, Jian Zhang

PS2-37 **Challenges in end-to-end neural scientific document OCR**
Yuntian Deng, David Rosenberg, Gideon Mann

PS2-38 **Deep Neural Networks for Text Detection and Recognition in Historical Maps**
Jerod Weinman, Ziwen Chen, Ben Gafford, Nathan Gifford, Abyaya Lamsal, Liam Niehus-Staab

PS2-39 **Woodblock-printing Mongolian Words Recognition by Bi-LSTM with Attention Mechanism**
Yanke Kang, Hongxi Wei, Hui Zhang, Guanglai Gao

PS2-40 **A Comparative Study of Attention-based Encoder-Decoder Approaches to Natural Scene Text Recognition**
Fuze Cong, Wenping Hu, Qiang Huo, Li Guo

PS2-41 **Generating Synthetic Handwritten Mathematical Expressions from a LaTeX Sequence or a MathML Script**
Minh Khanh Phan, Vu Tran Minh Khuong, Huy Quang Ung, Masaki Nakagawa

PS2-42 **RankSVM for Offline Signature Verification**
Yan Zheng, Yuchen Zheng, Wataru Ohyama, Daiki Suehiro, Seiichi Uchida

PS2-43 **Japanese Character Segmentation for Historical Handwritten Official Documents Using Fully Convolutional Networks**
Kei Watanabe, Shinji Takahashi, Yuki Kamaya, Masashi Yamada, Yoshito Mekada, Junichi Hasegawa, Shinya Miyazaki

PS2-44 **Deformation Classification of Drawings for Assessment of Visual-Motor Perceptual Maturity**
Momina Moetesum, Imran Siddiqi, Nicole Vincent

PS2-45 **OCR-VQA: Visual Question Answering by Reading Text in Images**
Anand Mishra, Shashank Shekhar, Ajeet Kumar Singh, Anirban Chakraborty

PS2-46 **DICE: Deep Intelligent Contextual Embedding for Twitter Sentiment Analysis**
Usman Naseem, Katarzyna Musial

PS2-47 **Care Label Recognition**
Jiri Kralicek, Jiri Matas, Michal Busta

PS2-48 **Deep Learning based Approach for Historical Manuscript Dating**
Anmol Hamid, Maryam Bibi, Momina Moetesum, Imran Siddiqi

PS2-49 **Binarization of Degraded Document Images using Convolutional Neural Networks based on predicted Two-Channel Images**
Younes Akbari, Alceu S. Britto Jr., Somaya Al-Maadeed, _luiz S. Oliveira

PS2-50 **Multi-label Connectionist Temporal Classification**
Curtis Wigington, Brian Price, Scott Cohen

PS2-51 **Zero Shot Learning Based Script Identification in the wild**
Prateek Keserwani, Kanjar De, Partha Pratim Roy, Umapada Pal

PS2-52 **ICDAR 2019 Competition on Historical Book Analysis**
Maroua Mehri, Pierre H_roux, R_my Mullot, Jean-Philippe Moreux, Bertrand Co_asnon, and Bill Barrett

PS2-53 **ICDAR2019 Competition on BAseline Detection (cBAD)**
Markus Diem, Florian Kleber, and Basilis Gatos

PS2-54 **ICDAR 2019 Historical Document Reading Challenge on Large Structured Family Records**
Rajkumar Saini, Derek Dobson, Jon Morrey, Marcus Liwicki, and Foteini Simistira Liwicki

PS2-55 **ICDAR 2019 Competition on Image Retrieval for Historical Handwritten Documents**
Vincent Christlein, Anguelos Nicolaou, Mathias Seuret, Dominique Stutzmann, and Andreas Maier

PS2-56 **ICDAR 2019 Competition on Table Detection and Recognition in Archival Documents**
Liangcai Gao, Yilun Huang, Herv_ D_jean, Jean-Luc Meunier, Qinqin Yan, Yu Fang, Florian Kleber and Eva Lang

PS2-57 **ICDAR 2019 Scanned Receipts OCR and Information Extraction**
heng Huang, Kai Chen, Jianhua He, Xiang Bai, Dimosthenis Karatzas, Shjian Lu, and C.V. Jawahar

PS2-58 **ICDAR 2019 Competition on Recognition of Documents with Complex Layouts**
C. Clausner, A. Antonacopoulos, and S. Pletschacher

PS2-59 **ICDAR 2019 Competition on Recognition of Early Indian Printed Documents**
C. Clausner, A. Antonacopoulos, T. Derrick and S. Pletschacher

PS2-60 **ICDAR 2019 Competition on Recognition of Handwritten Mathematical Expressions and Typeset Formula Detection**
Mahshad Mahdavi, Richard Zanibbi, Harold Mouch_re, Utpal Garain

PS2-61 **ICDAR 2019 Time-Quality Binarization Competition**
Rafael Dueire Lins, Ergina Kavallieratou, Elisa Barney Smith, Rodrigo Barros Bernardino, Darlisson Marinho de Jesus

PS2-62 **ICDAR 2019 Competition on Document Image Binarization**
Ioannis Pratikakis, Konstantinos Zagoris, Xenofon Karagiannis, Lazaros

Tsochatzidis and Tanmoy Mondal and Isabelle Marthot-Santaniello

PS2-63 **ICDAR 2019 Competition on Robust Text Reading from Large-scale Street View Images with Partial Labels**
Yipeng Sun, Zihan Ni, Chee-Kheng Chng, Yuliang Liu, Canjie Luo, Chun Chet Ng, Junyu Han, Errui Ding, Jingtuo Liu, Dimosthenis Karatzas, Chee Seng Chan, Lianwen Jin

PS2-64 **ICDAR 2019 RRC on Scene Text Visual Question Answering**
Ali Furkan Biten†, Rub_n Tito, Andres Mafla†, Lluis Gomez, Mar_al Rusi_ol, Minesh Mathew, C.V. Jawahar, Ernest Valveny, Dimosthenis Karatzas

PS2-65 **ICDAR 2019 RRC on Arbitrary-shaped scene text detection and recognition**
Chee-Kheng Chng, Yuliang Liu, Yipeng Sun, Chun Chet Ng, Canjie Luo, Zihan Ni , ChuanMing Fang, Shuaitao Zhang, Junyu Han, Errui Ding, Jingtuo Liu, Dimosthenis Karatzas, Chee Seng Chan, Lianwen Jin

PS2-66 **ICDAR 2019 Robust Reading Challenge on Reading Chinese Text on Signboard**
Xi Liu, Rui Zhang, Yongsheng Zhou, Qianyi Jiang, Qi Song, Nan Li, Kai Zhou, Lei Wang, Dong Wang, Minghui Liao, Mingkun Yang, Xiang Bai

PS2-67 **ICDAR 2019 RRC on Multi-lingual scene text detection and recognition**
Nibal Nayef, Yash Patel, Michal Busta, Pinaki Nath Chowdhury, Dimosthenis Karatzas, Wafa Khlif, Jiri Matas, Umapada Pal, Jean-Christophe Burie, Cheng-Lin Liu and Jean-Marc Ogier

PS2-68 **ICDAR 2019 Competition on Post-OCR Text Correction**
Christophe Rigaud, Antoine Doucet, Micka_l Coustaty and Jean-Philippe Moreux

PS2-69 **ICDAR 2019 Competition on Chart Elements Parsing**
Kenny Davila, Bhargava Urala Kota, Srirangaraj Setlur, Venu Govindaraju, Christopher Tensmeyer, Sumit Shekhar, Ritwick Chaudhry

17:40-18:20 TC10/TC11 Joint Meeting

Location: Room A

19:00-22:00 Banquet

Location: Luna Park – Grand Ballroom

Wednesday, September 25

9:00-10:00 Keynote Speech 2

Location: Room A

Chair:

Text Search and Information Retrieval in Large Historical Collections of Untranscribed Manuscripts

Prof. Enrique Vidal (Universidad Politecnica de Valencia)

10:00-10:30 Coffee Break

10:30-12:30 Oral Session 7: Layout Analysis

Location: Room A

Chair:

OS7-1 **Contextual Stroke Classification in Online Handwritten Documents with Graph Attention Networks**

Jun-Yu Ye, Yan-Ming Zhang, Qing Yang, Cheng-Lin Liu

OS7-2 **Indiscapes: Instance Segmentation Networks for Layout Parsing of Historical Indic Manuscripts**

Abhishek Prusty, Sowmya Aitha, Abhishek Trivedi, Ravi Kiran Sarvadevabhatla

OS7-3 **Article Segmentation in Digitised Newspapers with a 2D Markov Model**

Andrew Naoum, Joel Nothman, James Curran

OS7-4 **PubLayNet: largest dataset ever for document layout analysis**

Xu Zhong, Jianbin Tang, Antonio Jimeno Yepes

OS7-5 **Page Segmentation using a Convolutional Neural Network with Trainable Co-occurrence Features**

Joonho Lee, Hideaki Hayashi, Wataru Ohyama, Seiichi Uchida

OS7-6 **DoT-Net: Document Layout Classification Using Texture-based CNN**

Sai Chandra Kosaraju, Mohammed Masum, Nelson Zange Tsaku, Pritesh Patel, Tanju Bayramoglu, Girish Modgil, Mingon Kang

10:30-12:30 Oral Session 8: Applications of Document Analysis

Location: Room B

Chair:

OS8-1 **CNN-BLSTM-CRF Network for Semantic Labeling of Students' Online Handwritten Assignments**
Amirali Darvishzadeh, Thomas F. Stahovich, Amir Feghahati, Negin Entezari, Shaghayegh Gharghabi, Reed Kanemaru, Christian Shelton

OS8-2 **Serif or Sans: Visual Font Analytics on Book Covers and Online Advertisements**
Yuto Shinahara, Takuro Karamatsu, Daisuke Harada, Kota Yamaguchi, Seiichi Uchida

OS8-3 **Content Extraction from Lecture Video via Speaker Action Classification based on Pose Information**
Fei Xu, Kenny Davila, Srirangaraj Setlur, Venu Govindaraju

OS8-4 **Developing Horizon Scanning Methods for the Discovery of Scientific Trends**
Maja Karasalo, Johan Schubert

OS8-5 **Identifying the Central Figure of a Scientific Paper**
Sean T. Yang, Po-Shen Li, Lia Kazakova, Abhishek Joshi, Bum Mook Oh, Jevin D. West, Bill Howe

OS8-6 **BRIDGE: Building plan Repository for Image Description Generation, and Evaluation**
Shreya Goyal, Vishesh Mistry, Chiranjoy Chattopadhyay, Gaurav Bhatnagar

12:30-14:00 Lunch Break

14:00-15:20 Oral Session 9: Script Identification and Authentication
Location: Room A
Chair:

OS9-1 **Patch Aggregator for Scene Text Script Identification**
Changxu Cheng, Qiuhui Huang, Xiang Bai, Bin Feng, Wenyu Liu

OS9-2 **Script Identification using Across- and Within-Image Distribution Estimation**
Gregory Sell, David Etter, Daniel Garcia-Romero, Alan McCree

OS9-3 **Deep Generalized Max Pooling**
Vincent Christlein, Lukas Spranger, Mathias Seuret, Anguelos Nicolaou, Pavel

Král, Andreas Maier

OS9-4 **A Spatio-Spectral Hybrid Convolutional Architecture for Hyperspectral Document Authentication**
Muhammad Jaleed Khan, Khurram Khurshid, Faisal Shafait

14:00-15:20 Oral Session 10: Signature Verification
Location: Room B
Chair:

OS10-1 **Deep Dynamic Time Warping: End-to-End Local Representation Learning for Online Signature Verification**
Xiaomeng Wu, Akisato Kimura, Brian Kenji Iwana, Seiichi Uchida, Kunio Kashino

OS10-2 **Capturing Micro Deformations from Pooling Layers for Offline Signature Verification**
Yuchen Zheng, Wataru Ohyama, Brian Kenji Iwana, Seiichi Uchida

OS10-3 **Offline Signature Verification using Structural Dynamic Time Warping**
Michael Stauffer, Paul Maergner, Andreas Fischer, Rolf Ingold, Kaspar Riesen

OS10-4 **Online Signature Verification by Few-shot Separable Convolution Based Deep Learning**
Chandra Sekhar Vorugunti, Rama Krishna Sai Gorthi, Viswanath Pulabaigari

15:20-17:00 Poster Session 3 & Coffee Break
Location: Cockle Bay Foyer

PS3-01 **Age Estimation using Disconnectedness Features in Handwriting**
V. Basavaraja, Shivakumara Palaiahnakote, D. S. Guru, Umapada Pal, Tong Lu, Michael Blumenstein

PS3-02 **Offline Writer Identification Based on the Path Signature Approach**
Songxuan Lai, Lianwen Jin

PS3-03 **Do You Need More Data? The DeepSignDB On-Line Handwritten Signature Biometric Database**
Ruben Tolosana, Ruben Vera-Rodriguez, Julian Fierrez, Aythami Morales, Javier Ortega-Garcia

PS3-04 **A Deep Jersey-Bib Number/Text Recognition in Sports and Marathon**

Images
Sauradip Nag, Raghavendra Ramachandra, Palaiahnakote Shivakumara, Umapada Pal, Tong Lu, Mohan Kankanhalli

PS3-05 **KeyWord Spotting using Siamese Triplet Deep Neural Networks**
Yasmine Serdouk, Véronique Eglin, Stéphane Bres, Mylène Pardoen

PS3-06 **Learning Character Recognition with Graph-based Privileged Information**
Florian Westphal, Niklas Lavesson, Håkan Grahn

PS3-07 **Simultaneous Optimisation of Image Quality Improvement and Text Content Extraction from Scanned Documents**
Shashank Mujumdar, Nitin Gupta, Abhinav Jain, Douglas Burdick

PS3-08 **Improving text recognition using optical and language model writer adaptation**
Yann Soullard, Wassim Swaileh, Pierrick Tranouez, Thierry Paquet, Clément Chatelain

PS3-09 **Multi-modal Attention Network for Handwritten Mathematical Expression Recognition**
Jiaming Wang, Jun Du, Jianshu Zhang, Zi-Rui Wang

PS3-10 **Semantic and interaction: when Document Image Analysis meets Computer Vision and Machine Learning**
Jean-Yves Ramel, Nicole Vincent

PS3-11 **Improving Text Image Resolution using a Deep Generative Adversarial Network for Optical Character Recognition**
Xiangdong Su, Huali Xu, Ying Kang, Xiang Hao, Guanglai Gao, Yue Zhang

PS3-12 **Labeling, Cutting, Grouping: an Efficient Text Line Segmentation Method for Medieval Manuscripts**
Michele Alberti, Lars Vögtlin, Vinaychandran Pondenkandath, Mathias Seuret, Rolf Ingold, Marcus Liwicki

PS3-13 **PopEval: A Character Level Approach to End-To-End Evaluation Compatible with Word Level Benchmark Dataset**
Hong-Seok Lee, Youngmin Yoon, Jang Pil Hoon, Chankyu Choi

PS3-14 **Hiding Security Feature into Text Content for Securing Documents using Generated Font**
Vinh Loc Cu, Jean-Christophe Burie, Jean-Marc Ogier, Cheng-Lin Liu

PS3-15 **A Modified Inception-ResNet Network with Discriminant Weighting Loss for Handwritten Chinese Character Recognition**
Linhui Chen, Liangrui Peng, Gang Yao, Changsong Liu, Xudong Zhang

PS3-16 **A novel procedure to speed up the transcription of historical handwritten documents by interleaving keyword spotting and user validation**
Adolfo Santoro, Angelo Marcelli

PS3-17 **Handwriting Recognition Based On Temporal Order Restored By The End-To-End System**
Besma Rabhi, Abdelkarim Elbaati, Yahia Hamdi, Adel M. Alimi

PS3-18 **Deep CNN-based Speech Balloon Detection and Segmentation for Comic Books**
David Dubray, Jochen Laubrock

PS3-19 **A New Document Image Quality Assessment Method Based on Hast Derivations**
Alireza Alaei

PS3-20 **Analysis of Unsupervised Training Approaches for LSTM-based OCR**
Martin Jenckel, Syed Saqib Bukhari, Andreas Dengel

PS3-21 **Table Structure Extraction with Bi-directional Gated Recurrent Unit Networks**
Saqib Ali Khan, Syed Muhammad Daniyal Khalid, Muhammad Ali Shahzad, Faisal Shafait

PS3-22 **End-To-End Measure for Text Recognition**
Gundram Leifert, Roger Labahn, Tobias Grüning, Svenja Leifert

PS3-23 **Amharic Text Image Recognition: Database, Algorithm and Analysis**
Birhanu Belay, Tewodros Habtegebrial, Marcus Liwicki, Gebeyehu Belay, Didier Stricker

PS3-24 **A Genetic-based Search for Adaptive Table Recognition in Spreadsheets**
Elvis Koci, Maik Thiele, Oscar Romero, Wolfgang Lehner

PS3-25 **DECO: A Dataset of Annotated Spreadsheets for Layout and Table Recognition**
Elvis Koci, Josephine Rehak, Maik Thiele, Oscar Romero, Wolfgang Lehner

PS3-26 **Evaluating Sequence-to-Sequence Models for Handwritten Text Recognition**
Johannes Michael, Roger Labahn, Tobias Grüning, Jochen Zöllner

PS3-27 **Training-Free and Segmentation-Free Word Spotting using Feature Matching and Query Expansion**
Ekta Vats, Anders Hast, Alicia Fornés

PS3-28 **Textual Description for Mathematical Equations**
Ajoy Mondal, C. V. Jawahar

PS3-29 **Recurrent Neural Network Approach for Table Field Extraction in Business Documents**
Clément Sage, Alexandre Aussem, Haytham Elghazel, Véronique Eglin, Jérémy Espinas

PS3-30 **Faster R-CNN Based Table Detection Combining Corner Locating**
Ningning Sun, Yuanping Zhu, Xiaoming Hu

PS3-31 **Weighted Direct Matching Points for User Local Stability Model in Multiple Domains: A Proposal for On-line Signature Verification**
Donato Impedovo, Giuseppe Pirlo, Moises Diaz, Miguel Ferrer

PS3-32 **DeepSignCX: Signature Complexity Detection using Recurrent Neural Networks**
Ruben Vera-Rodriguez, Ruben Tolosana, Miguel Caruana, Gustavo Manzano, Carlos Gonzalez-Garcia, Julian Fierrez, Javier Ortega-Garcia

PS3-33 **Recurrent Comparator with attention models to detect counterfeit documents**
Albert Berenguel, Oriol Ramos Terrades, Josep Lladós, Cristina Cañero

PS3-34 **Linking Art through Human Poses**
Tomas Jenicek, Ondřej Chum

PS3-35 **Thai Handwritten Recognition on Text Block-based from Thai Archive Manuscripts**
Rapeeporn Chamchong, Wei Gao, Mark D. McDonnell

PS3-36 **Brno Mobile OCR Dataset**
Martin Kišš, Michal Hradiš, Oldřich Kodym

PS3-37 **A New Parallel Detection-Recognition Approach for End-to-End Scene Text Extraction**
Jinrong Li, Zijian Zhou, Zhizhong Su, Shuangping Huang, Lianwen Jin

PS3-38 **Unsupervised OCR Model Evaluation Using GAN**
Abhash Sinha, Martin Jenckel, Syed Saqib Bukhari, Andreas Dengel

PS3-39 **A Deep Transfer Learning Approach to Document Image Quality**

Assessment
Tan Lu, Ann Dooms

PS3-40 **HITHCD_2018: Handwritten Chinese Character Database of 21K-Category**
Tonghua Su, Wei Pan, Lijuan Yu

PS3-41 **Learning Free Document Image Binarization Based on Fast Fuzzy C-Means Clustering**
Tanmoy Mondal, Mickaël Coustaty, Petra Gomez-Krämer, Jean-Marc Ogier

PS3-42 **A Robust Hybrid Approach for Textual Document Classification**
Muhammad Nabeel Asim, Muhammad Usman Ghani Khan, Muhammad Imran Malik, Andreas Dengel, Sheraz Ahmed

PS3-43 **Rethinking Semantic Segmentation for Table Structure Recognition in Documents**
Shoaib Ahmed Siddiqui, Pervaiz Iqbal Khan, Andreas Dengel, Sheraz Ahmed

PS3-44 **DeepTabStR: Deep Learning based Table Structure Recognition**
Shoaib Ahmed Siddiqui, Imran Ali Fateh, Syed Tahseen Raza Rizvi, Andreas Dengel, Sheraz Ahmed

PS3-45 **Two Stream Deep Network for Document Image Classification**
Muhammad Nabeel Asim, Muhammad Usman Ghani Khan, Muhammad Imran Malik, Khizar Razzaque, Andreas Dengel, Sheraz Ahmed

PS3-46 **Speeding-up the Handwritten Signature Segmentation Process through an Optimized Fully Convolutional Neural Network**
Paloma G. S. Silva, Celso Lopes Junior, Estanislau Lima, Byron L. D. Bezerra, Cleber Zanchettin

PS3-47 **Document Domain Adaptation with Generative Adversarial Networks**
Diede Rusticus, Lutz Goldmann, Matthias Reisser, Mauricio Villegas

PS3-48 **Chemical Structure Recognition (CSR) System: Automatic Analysis of 2D Chemical Structures in Document Images**
Syed Saqib Bukhari, Zaryab Iftikhar, Andreas Dengel

PS3-49 **A Neural Approach for Text Extraction from Scholarly Figures**
David Morris, Peichen Tang, Ralph Ewerth

PS3-50 **A Quality and Time Assessment of Binarization Algorithms**
Rodrigo Bernardino, Rafael Lins, Darlisson Marinho Jesus

PS3-51 **A Study of Script Language Effects In Deep Neural Network Based Scene Text Detection**
Jiaxin Cheng, Achin Gupta, Yue Wu, Premkumar Natarajan

PS3-52 **Fast Text/non-text Image Classification with Knowledge Distillation**
Miao Zhao, Rui-Qi Wang, Fei Yin, Xu-Yao Zhang, Lin-Lin Huang, Jean-Marc Ogier

PS3-53 **A Handwritten Chinese Text Recognizer Applying Multi-level Multimodal Fusion Network**
Yuhuan Xiu, Qingqing Wang, Hongjian Zhan, Man Lan, Yue Lu

PS3-54 **OSVNet: Convolutional Siamese Network for Writer Independent Online Signature Verification**
Chandra Sekhar V, D.S. Guru, Prerana Mukherjee, Viswanath Pulabaigari

PS3-55 **Blind Source Separation based Framework for Multispectral Document Image Binarization**
Abderrahmane Rahiche, Athmane Bakhta, Cheriet Mohamed

PS3-56 **Logo Design Analysis by Ranking**
Takuro Karamatsu, Daiki Suehiro, Seiichi Uchida

17:00-18:00 Future of DAR Panel
Location: Room A

18:00-18:10 Closing
Location: Room A

Competitions

C1 **ICDAR 2019 Competition on Historical Book Analysis**
Maroua Mehri, Pierre H_roux, R_my Mullot, Jean-Philippe Moreux, Bertrand Co_asnon, and Bill Barrett

C4 **ICDAR2019 Competition on BAseline Detection (cBAD)**
Markus Diem, Florian Kleber, and Basilis Gatos

C6 **ICDAR 2019 Historical Document Reading Challenge on Large Structured Family Records**
Rajkumar Saini, Derek Dobson, Jon Morrey, Marcus Liwicki, and Foteini Simistira Liwicki

C7 **ICDAR 2019 Competition on Image Retrieval for Historical Handwritten Documents**
Vincent Christlein, Anguelos Nicolaou, Mathias Seuret, Dominique Stutzmann, and Andreas Maier

C8 **ICDAR 2019 Competition on Table Detection and Recognition in Archival Documents**
Liangcai Gao, Yilun Huang, Herv_ D_jean, Jean-Luc Meunier, Qinqin Yan, Yu Fang, Florian Kleber and Eva Lang

C10 **ICDAR 2019 Scanned Receipts OCR and Information Extraction**
heng Huang, Kai Chen, Jianhua He, Xiang Bai, Dimosthenis Karatzas, Shjian Lu, and C.V. Jawahar

C12 **ICDAR 2019 Competition on Recognition of Documents with Complex Layouts**
C. Clausner, A. Antonacopoulos, and S. Pletschacher

C13 **ICDAR 2019 Competition on Recognition of Early Indian Printed Documents**
C. Clausner, A. Antonacopoulos, T. Derrick and S. Pletschacher

C14 **ICDAR 2019 Competition on Recognition of Handwritten Mathematical Expressions and Typeset Formula Detection**
Mahshad Mahdavi, Richard Zanibbi, Harold Mouch_re, Utpal Garain

C15 **ICDAR 2019 Time-Quality Binarization Competition**
Rafael Dueire Lins, Ergina Kavallieratou, Elisa Barney Smith, Rodrigo Barros Bernardino, Darlisson Marinho de Jesus

C16 **ICDAR 2019 Competition on Document Image Binarization**
Ioannis Pratikakis, Konstantinos Zagoris, Xenofon Karagiannis, Lazaros Tsochatzidis and Tanmoy Mondal and Isabelle Marthot-Santaniello

C17 **ICDAR 2019 Competition on Robust Text Reading from Large-scale Street View Images with Partial Labels**
Yipeng Sun, Zihan Ni, Chee-Kheng Chng, Yuliang Liu, Canjie Luo, Chun Chet Ng, Junyu Han, Errui Ding, Jingtuo Liu, Dimosthenis Karatzas, Chee Seng Chan, Lianwen Jin

C18 **ICDAR 2019 RRC on Scene Text Visual Question Answering**
Ali Furkan Biten†, Rub_n Tito, Andres Mafla†, Lluis Gomez, Mar_al Rusi_ol, Minesh Mathew, C.V. Jawahar, Ernest Valveny, Dimosthenis Karatzas

C19 **ICDAR 2019 RRC on Arbitrary-shaped scene text detection and recognition**
Chee-Kheng Chng, Yuliang Liu, Yipeng Sun, Chun Chet Ng, Canjie Luo, Zihan Ni , ChuanMing Fang, Shuaitao Zhang, Junyu Han, Errui Ding, Jingtuo Liu, Dimosthenis Karatzas, Chee Seng Chan, Lianwen Jin

C20 **ICDAR 2019 Robust Reading Challenge on Reading Chinese Text on Signboard**
Xi Liu, Rui Zhang, Yongsheng Zhou, Qianyi Jiang, Qi Song, Nan Li, Kai Zhou, Lei Wang, Dong Wang, Minghui Liao, Mingkun Yang, Xiang Bai

C21 **ICDAR 2019 RRC on Multi-lingual scene text detection and recognition**
Nibal Nayef, Yash Patel, Michal Busta, Pinaki Nath Chowdhury, Dimosthenis Karatzas, Wafa Khlif, Jiri Matas, Umapada Pal, Jean-Christophe Burie, Cheng-Lin Liu and Jean-Marc Ogier

C22 **ICDAR 2019 Competition on Post-OCR Text Correction**
Christophe Rigaud, Antoine Doucet, Micka_l Coustaty and Jean-Philippe Moreux

C23 **ICDAR 2019 Competition on Chart Elements Parsing**
Kenny Davila, Bhargava Urala Kota, Srirangaraj Setlur, Venu Govindaraju, Christopher Tensmeyer, Sumit Shekhar, Ritwick Chaudhry

Social Program

Welcome Reception

Date: Sunday 22 September 2019
Time: 1800 – 1900 (subject to change)
Venue: Yots Waterside
– Australian Maritime Museum
Dress Code: Cocktail
Tickets: Inclusive for Full Registration Conference Delegates
Additional tickets: A$140 per additional guest

Join delegates, sponsors and colleagues to celebrate the 15th International Conference on Document Analysis and Recognition. Enjoy an evening overlooking Sydney's Darling Harbour accompanied by canapés and beverages. The Welcome Reception will provide delegates with the opportunity to network and engage with colleagues and industry leaders alike.

Conference Dinner

Date: Tuesday 24 September 2019
Time: 1900 – 2200 (subject to change)
Venue: Luna Park – Grand Ballroom
Dress Code: Smart Casual
Tickets: Inclusive for Full Registration Conference Delegates
Additional Tickets: A$220 per additional guest

Join us at Sydney's iconic Luna Park, after the second full Conference day, for a delightful 2-course dinner with f ine Australian beverages. Luna Park's Grand Ballroom features floor to ceiling windows and a mezzanine that deliver an idyllic view of the stunning Sydney Harbour. Enjoy an evening of networking while watching the Harbour Bridge and Opera House come to life as the sun sets.