

13th IAPR International Conference on Document Analysis & Recognition

August 23-26, 2015, Prouvé Congress Center, Nancy, France

[relocated from Tunisia]

www.icdar.org

Conference Proceedings



Table of Contents

Automatic Extraction of Correlation-Entropy Features for Text Document Analysis Directly in Run-Length Compressed Domain	1
<i>Mohammed Javed, P Nagabhushan and Bidyut Baran Chaudhuri</i>	
A Polar Stroke Descriptor for Classification of Historical Documents	6
<i>Sheng He and Lambert Schomaker</i>	
Solving Substitution Ciphers for OCR with a Semi-supervised Hidden Markov Model	11
<i>Erik Scharwächter and Stephan Vogel</i>	
Co-occurrence Matrix of Oriented Gradients for Word Script and Nature Identification	16
<i>Asma Saidani, Afef Kacem and Abdel Belaid</i>	
A Recognition based Approach for Segmenting Touching Components in Arabic Manuscripts	21
<i>Nabil Aouadi, Afef Kacem and Abdel Belaid</i>	
Towards a SignWriting Recognition System	26
<i>Diego Stiehl, Luiz S. Oliveira, Cayley Guimarães and Alceu S. Britto Jr</i>	
Combination of Multiple Aligned Recognition Outputs using WFST and LSTM	31
<i>Mayce Al Azawi, Marcus Liwicki and Thomas M Breuel</i>	
Class-Adaptive Zoning Methods for Recognizing Handwritten Digits and Characters	36
<i>Donato Impedovo and Giuseppe Pirlo</i>	
Keyword spotting in handwritten documents based on a generic text line HMM and a SVM verification	41
<i>Yousri Kessentini and Thierry Paquet</i>	
Online Handwritten Tibetan Syllable Recognition based on Component Segmentation Method	46
<i>Long-Long Ma and Jian Wu</i>	
Arabic Handwritten Words Off-line Recognition	51
<i>Akram Khemiri, Afef Kacem, Abdel Belaid and Mourad Elloumi</i>	
Binarizing Complex Scanned Documents	56
<i>Rafael Lins, Gabriel Silva and Marcos Martins de Almeida</i>	
Recognition Confidence Analysis of Handwritten Chinese Character with CNN	61
<i>Meijun He, Shuye Zhang, Huiyun Mao and Lianwen Jin</i>	
Multi-Strategy Tracking Based Text Detection in Scene Videos	66
<i>Ze-Yu Zuo, Shu Tian, Wei-Yi Pei and Xu-Cheng Yin</i>	
Recognition of Urdu Ligatures - A Holistic Approach	71
<i>Israr Uddin Khattak, Imran Siddiqi, Shehzad Khalid and Chawki Djeddi</i>	
Cost-sensitive MQDF Classifier for Handwritten Chinese Address Recognition	76
<i>Shujing Lu, Xiaohua Wei and Yue Lu</i>	
Framewise and CTC Training of Neural Networks for Handwriting Recognition	81
<i>Théodore Bluche, Hermann Ney, Jérôme Louradour and Christopher Kermorvant</i>	
The LIMSI Handwriting Recognition System for the HTRtS 2014 Contest	86
<i>Théodore Bluche, Hermann Ney and Christopher Kermorvant</i>	

Text-independent Writer Identification Using SIFT Descriptor and Contour-directional Feature	91
<i>Yu-Jie Xiong, Ying Wen, Patrick S.P. Wang and Yue Lu</i>	
Multi-font Printed Chinese Character Recognition using Multi-pooling Convolutional Neural Network	96
<i>Zhuoyao Zhong, Lianwen Jin and Ziyong Feng</i>	
Similarity-based Regularization for Semi-Supervised Learning for Handwritten Digit Classification	101
<i>Donato Barbuzzi, Giuseppe Pirlo, Seiichi Uchida, Volkmar Frinken and Donato Impedovo</i>	
Text Detection in Nature Scene Images Using Two-stage Nontext Filtering	106
<i>Qingqing Wang, Yue Lu and Shiliang Sun</i>	
Classification of Forms With Similar Layouts by Using the Mixed Gaussian Weighted Mask (MGWM)	111
<i>Simeng Wang, Liangcai Gao and Yuehan Wang</i>	
A Structural Signature Based on Texture for Digitized Historical Book Page Categorization	116
<i>Maroua Mehri, Pierre Héroux, Julien Lerouge, Petra Gomez-Krämer and Rémy Mullot</i>	
A Multiple Instances Approach to Improving Keyword Spotting on Historical Mongolian Document Images	121
<i>Hongxi Wei, Guanglai Gao and Xiangdong Su</i>	
Combining Handwriting and Speech Recognition for Transcribing Historical Handwritten Documents	126
<i>Emilio Granell and Carlos-D Martínez-Hinarejos</i>	
Seamless Stitching with Shape Deformation for Historical Document Images	131
<i>Wei Liu, Wei Fan, Li Chen, Jun Sun and Naoi Satoshi</i>	
An Open Source Testing Tool for Evaluating Handwriting Input Methods	136
<i>Liquan Qiu, Lianwen Jin, Ruifen Dai, Yuxiang Zhang and Lei Li</i>	
Using Multiple Sequence Alignment and Statistical Language Model to Integrate Multiple Chinese Address Recognition Outputs	151
<i>Shengchang Chen, Shujing Lu, Ying Wen and Yue Lu</i>	
Document Analysis by a Mobile Robot for Autonomous Indoor Navigation	156
<i>Dalia Marcela Rojas Castro, Arnaud Revel and Michel Ménard</i>	
HoG based Two-Directional Dynamic Time Wrapping for Handwritten Word Spotting	161
<i>Shunyi Yao, Ying Wen and Yue Lu</i>	
Evaluation of Neural Network Language Models in Handwritten Chinese Text Recognition	166
<i>Yi-Chao Wu, Fei Yin and Cheng-Lin Liu</i>	
Segmentation-free Handwritten Chinese Text Recognition with LSTM-RNN	171
<i>Ronaldo Messina and Jérôme Louradour</i>	
Document Image Quality Assessment based on Improved Gradient Magnitude Similarity Deviation	176
<i>Alireza Alaei, Donatello Conte and Romain Raveaux</i>	

Author Identification by Automatic Learning.....	181
<i>Jordan Frery, Christine Largeron and Mihaela Juganaru-Mathieu</i>	
A Syntax Directed System for the Recognition of Printed Arabic Mathematical Formulas.....	186
<i>Kawther Khazri, Afef Kacem and Abdel Belaid</i>	
Text Line Extraction in Document Images	191
<i>Liuan Wang, Hiroshi Tanaka, Wei Fan, Jun Sun and Satoshi Naoi</i>	
An Improved Artificial Immune Recognition System for Off-line Handwritten Signature Verification.....	196
<i>Yasmine Serdouk, Hassiba Nemmour and Youcef Chibani</i>	
Benchmarking discriminative approaches for word spotting in handwritten documents	201
<i>Gautier Bideault, Luc Miulet, Clément Chatelain and Thierry Paquet</i>	
Object Proposals for Text Extraction in the Wild	206
<i>Lluis Gomez and Dimosthenis Karatzas</i>	
Topological Simplification of Electrical Circuits by Super-component Analysis.....	211
<i>Paramita De, Sekhar Mandal, Partha Bhowmick and Bhabatosh Chanda</i>	
A Direct Approach for Word and Character Segmentation in Run-Length Compressed Documents with an Application to Word Spotting	216
<i>Mohammed Javed, P Nagabhushan and Bidyut Baran Chaudhuri</i>	
Using histogram representation and Earth Mover's Distance as an evaluation tool for text detection .	221
<i>Stefania Calarasanu, Jonathan Fabrizio and Séverine Dubuisson</i>	
A Bottom-up Method Using Texture Features and a Graph-based Representation for Lettrine Recognition and Classification.....	226
<i>Maroua Mehri, Petra Gomez-Krämer, Pierre Héroux, Mickaël Coustaty, Julien Lerouge and Rémmy Mullot</i>	
Machine-Readable Region Identification from Partially Blurred Document Images.....	231
<i>Qinwen Wang, Yixue Wang, Chenyang Wang, Jufeng Yang, Tao Li and Kai Wang</i>	
Stretching Deep Architectures for Text Recognition.....	236
<i>Yuchen Zheng, Yajuan Cai, Guoqiang Zhong, Chherawala Youssouf, Yixin Shi and Junyu Dong</i>	
Robust Score Normalization for DTW-Based On-Line Signature Verification	241
<i>Andreas Fischer, Moises Diaz, Réjean Plamondon and Miguel A. Ferrer</i>	
A proposal of a document image reading-life log based on document image retrieval and eyetracking	246
<i>Olivier Augereau, Koichi Kise and Kensuke Hoshika</i>	
The Eye as the Window of the Language Ability: Estimation of English Skills by Analyzing Eye Movement While Reading Documents	251
<i>Kazuyo Yoshimura, Kai Kunze and Koichi Kise</i>	
Bagging by Design for Continuous Handwriting Recognition Using Multi-Objective Particle Swarm Optimization	256
<i>Mahdi Hamdani, Patrick Doetsch and Hermann Ney</i>	

Investigation of Segmental Conditional Random Fields for Large Vocabulary Handwriting Recognition	261
<i>Mahdi Hamdani, Mahaboob Ali Basha Shaik, Patrick Doetsch and Hermann Ney</i>	
Aligning transcript of historical documents using energy minimization	266
<i>Rafi Cohen, Irina Rabaev, Itshak Dinstein, Jihad El-Sana and Klara Kedem</i>	
Extracting Structured Data from Unstructured Document with Incomplete Resources	271
<i>Hervé Déjean</i>	
Classifier Self-Assessment: Active Learning and Active Noise Correction for Document Classification	276
<i>Dominik Henter, Armin Stahl, Markus Ebbecke and Michael Gillmann</i>	
Goal-Oriented Performance Evaluation Methodology for Page Segmentation Techniques	281
<i>Nikolaos Stamatopoulos, Georgios Louloudis and Basilis Gatos</i>	
Improving Sigma-Lognormal Parameter Extraction	286
<i>Daniel Martín-Albo, Réjean Plamondon and Enrique Vidal</i>	
Efficient Text Localization in Born-Digital Images by Local Contrast-Based Segmentation	291
<i>Kai Chen, Fei Yin, Amir Hussain and Cheng-Lin Liu</i>	
Table Structure Extraction in Handwritten Chemistry Documents	296
<i>Nabil Ghanmi and Abdel Belaid</i>	
Semantic Label and Structure Model based approach for Entity Recognition in Database Context ..	301
<i>Nihel Kooli and Abdel Belaïd</i>	
Preselection of Support Vector Candidates by Relative Neighborhood Graph for Large-Scale Character Recognition	306
<i>Masanori Goto, Ryosuke Ishida and Seiichi Uchida</i>	
A Subtractive Clustering Scheme for Text-Independent Online Writer Identification.....	311
<i>Gautam Singh and Suresh Sundaram</i>	
Automatic Annotation Extension and Classification of Documents Using a Probabilistic Graphical Model	316
<i>Abdessalem Bouzaïeni, Sabine Barrat and Salvatore Tabbone</i>	
A Multiple-Expert Binarization Framework for Multispectral Images.....	321
<i>Reza Farrahi Moghaddam and Mohamed Cheriet</i>	
Character Retrieval of Vectorized Cuneiform Script.....	326
<i>Bartosz Bogacz, Michael Gertz and Hubert Mara</i>	
Robust Text Segmentation using Graph Cut	331
<i>Shangxuan Tian, Shijian Lu, Bolan Su and Chew Lim Tan</i>	
Isolated Character Recognition using Projections of Oriented Gradients.....	336
<i>George Retsinas, Basilis Gatos, Nikolaos Stamatopoulos and Georgios Louloudis</i>	
A combined Convolutional Neural Network and Dynamic Programming approach for text line normalization	341
<i>Joan Pastor-Pellicer, Salvador España-Boquera, Maria Jose Castro-Bleda and Francisco Zamora-Martínez</i>	

A segmentation free Word Spotting for handwritten documents	346
<i>Nicole Vincent, Adam Ghorbel and Jean-Marc Ogier</i>	
Speech balloon and speaker association for comics and manga understanding	351
<i>Christophe Rigaud, Nam Le Thanh, Jean-Christophe Burie, Jean-Marc Ogier, Motoi Iwata, Eiki Imazu and Koichi Kise</i>	
Graph matching versus bag of graph for lettrines recognition	356
<i>Mickaël Coustaty and Jean-Marc Ogier</i>	
Detecting Dense Foreground Stripes in Arabic Handwriting for Accurate Baseline Positioning	361
<i>Felix Stahlberg and Stephan Vogel</i>	
Document Skew Detection Based on Hough Space Derivatives	366
<i>Felix Stahlberg and Stephan Vogel</i>	
Efficient Estimation of Character Normal Direction for camera-based OCR	371
<i>Kanta Kuramoto, Wataru Ohyama, Tetsushi Wakabayashi and Fumitaka Kimura</i>	
Content-Independent Font Recognition on a Single Chinese Character using Sparse Representation	376
<i>Weikang Song, Zhouhui Lian, Yingmin Tang and Jianguo Xiao</i>	
Inkball Models for Character Localization and Out-of-Vocabulary Word Spotting	381
<i>Nicholas Howe</i>	
Segmented Handwritten Text Recognition with Recurrent Neural Network Classifiers	386
<i>Bolan Su, Xi Zhang, Shijian Lu and Chew Lim Tan</i>	
A New Method based on Bag of Filters for Character Recognition in Scene Images by Learning ..	391
<i>Qisu Li, Tong Lu, Palaiahnakote Shivakumara, Umapada Pal and Chew Lim Tan</i>	
Scene Character Recognition using Markov Random Field	396
<i>Xiaolong Liu and Tong Lu</i>	
Study of Two Zone-based Features for Online Bengali and Devanagari Character Recognition ..	401
<i>Rajib Ghosh and Partha Pratim Roy</i>	
Building Handwriting Recognizers by Leveraging Skeletons of Both Offline and Online Samples ..	406
<i>Xiong Zhang, Min Wang, Lijuan Wang, Qiang Huo and Haifeng Li</i>	
A Context-Sensitive-Chunk BPTT Approach to Training Deep LSTM/BLSTM Recurrent Neural Networks for Offline Handwriting Recognition	411
<i>Kai Chen, Zhi-Jie Yan and Qiang Huo</i>	
A Fast Color Barcode Detection Method through Cross Identification on Mobile Platforms	416
<i>Yu Zhang and Tong Lu</i>	
Lexicon-Driven Recognition of One-Stroke Character Strings in Visual Gesture	421
<i>Fei Yin, Pai-Pai Liu, Linlin Huang and Cheng-Lin Liu</i>	
Scene Text Detection with Robust Character Candidate Extraction Method	426
<i>Myung-Chul Sung, Bongjin Jun, Hojin Cho and Daijin Kim</i>	
Reconstruction Combined Training for Convolutional Neural Networks on Character Recognition ..	431
<i>Li Chen, Song Wang, Wei Fan, Jun Sun and Satoshi Naoi</i>	
Deep Learning Based Language and Orientation Recognition in Document Analysis	436
<i>Li Chen, Song Wang, Wei Fan, Jun Sun and Satoshi Naoi</i>	

Exploring the World of Fonts for Discovering the Most Standard Fonts and the Missing Fonts	441
<i>Seiichi Uchida, Yuji Egashira and Kota Sato</i>	
Learning Non-Markovian Constraints for Handwriting Recognition	446
<i>Ryosuke Kakisako, Seiichi Uchida and Volkmar Frinken</i>	
Arabic handwritten document preprocessing and recognition	451
<i>Edgard Chammas, Chafic Mokbel and Laurence Likforman-Sulem</i>	
Paragraph text segmentation into lines with Recurrent Neural Networks	456
<i>Bastien Moysset, Christopher Kermorvant, Christian Wolf and Jérôme Louradour</i>	
A Study on Effects of Implicit and Explicit Language Model Information for DBLSTM-CTC Based Handwriting Recognition	461
<i>Qi Liu, Lijuan Wang and Qiang Huo</i>	
BLSTM-based handwritten text recognition using Web resources	466
<i>Cristina Oprean, Laurence Likforman-Sulem, Chafic Mokbel and Adrian Popescu</i>	
Subspace method with multi scale wavelet for recognition of printer property	471
<i>Takeshi Furukawa</i>	
Training an Arabic handwriting recognizer without a handwritten training data set	476
<i>Irfan Ahmad and Gernot Fink</i>	
Novel Line Verification for Multiple Instance Focused Retrieval in Document Collections	481
<i>Hongxing Gao, Marçal Rusiñol, Dimosthenis Karatzas, Josep Lladós, Rajiv Jain and David Doermann</i>	
Writer Identification from Offline Isolated Bangla Characters and Numerals	486
<i>Chandranath Adak and Bidyut B. Chaudhuri</i>	
Generation of synthetic training data for handwritten Indic script recognition	491
<i>Shivansh Gaur, Siddhant Sonkar and Partha Roy</i>	
Localized Forgery Detection in Hyperspectral Document Images	496
<i>Zhipei Luo, Faisal Shafait and Ajmal Mian</i>	
Towards Query-by-Speech Handwritten Keyword Spotting	501
<i>Marçal Rusiñol, David Aldavert, Ricardo Toledo and Josep Lladós</i>	
True Color Distributions of Scene Text and Background	506
<i>Renwu Gao, Shoma Eguchi and Seiichi Uchida</i>	
Blind Versus Unblind Performance Evaluation of Binarization Methods	511
<i>Amina Djema, Youcef Chibani, Abdenour Sehad and Et-Tahir Zemouri</i>	
Representation and Reconstruction of Map Regions	516
<i>Samit Biwas, Sekhar Mandal and Amit Kumar Das</i>	
Fisher Vector Encoding of Micro Color Features for (Real World) Jigsaw Puzzles	521
<i>Fabian Richter, Christian Eggert and Rainer Lienhart</i>	
Recognizing Perspective Scene Text with Context Feature	526
<i>Anna Zhu, Yangbo Dong and Guoyou Wang</i>	
Automatic Script Identification in the Wild	531
<i>Baoguang Shi, Cong Yao, Chengquan Zhang, Xiaowei Guo, Feiyue Huang and Xiang Bai</i>	

Influence of Text Line Segmentation in Handwritten Text Recognition	536
<i>Verónica Romero, Joan Andreu Sánchez, Vicente Bosch, Katrien Depuydt and Jesse de Does</i>	
Effects of Clustering Algorithms on Typographic Reconstruction	541
<i>Elisa H. Barney Smith and Bart Lamiroy</i>	
Chinese Character-level Writer Identification using Path Signature Feature, DropStroke, and Deep CNN	546
<i>Weixin Yang, Lianwen Jin and Manfei Liu</i>	
Improved Deep Convolutional Neural Network For online Handwritten Chinese Character Recognition using Domain-Specific Knowledge	551
<i>Weixin Yang, Lianwen Jin, Zecheng Xie and Ziyong Feng</i>	
OCR performance prediction using cross-OCR alignment	556
<i>Ahmed Ben Salah, Jean-Philippe Moreux, Nicolas Ragot and Thierry Paquet</i>	
Shape-based Word Spotting in Handwritten Document Images	561
<i>Angelos P. Giotis, Giorgos Sfikas, Christophoros Nikou and Basilis Gatos</i>	
Multiresolution Approach Based on Adaptive Superpixels for Administrative Documents Segmentation into Color Layers	566
<i>Elodie Carel, Jean-Christophe Burie, Vincent Courboulay, Jean-Marc Ogier and Vincent Poulain d'Andecy</i>	
Text-Graphics Separation to Detect Logo and Stamp from Color Document Images: A Spectral Approach.....	571
<i>Amit Nandedkar, Jayanta Mukhopadhyay and Shamik Sural</i>	
A Conditional Random Field Model for Font Forgery Detection	576
<i>Romain Bertrand, Oriol Ramos Terrades, Jean-Marc Ogier, Petra Gomez-Krämer and Patrick Franco</i>	
Parallel Sequence Classification using Recurrent Neural Networks and Alignment	581
<i>Federico Raue, Wonmin Byeon, Thomas Breuel and Marcus Liwicki</i>	
One-shot field spotting on colored forms using subgraph isomorphism.....	586
<i>Maroua Hammami, Pierre Héroux, Sébastien Adam and Vincent Poulain d'Andecy</i>	
DASyR(IR) - Document Analysis System for Systematic Reviews (for Information Retrieval)	591
<i>Florina Piroi, Aldo Lipani, Mihai Lupu and Allan Hanbury</i>	
A Comparative Study of Local Detectors and Descriptors for Mobile Document Classification	596
<i>Marçal Rusiñol, Joseph Chazalon, Jean-Marc Ogier and Josep Lladós</i>	
SRIF: Scale and Rotation Invariant Features for Camera-Based Document Image Retrieval	601
<i>Quoc Bao Dang, Muhammad Muzzamil Luqman, Mickaël Coustaty, Cao De Tran and Jean-Marc Ogier</i>	
Segmentation-Free Pattern Spotting in Historical Document Images	606
<i>Sovann En, Caroline Petitjean, Stephane Nicolas and Laurent Heutte</i>	
A Complete Automatic Short Answer Assessment System With Student Identification	611
<i>Hemmaphan Suwanwiwat, Umapada Pal and Michael Blumenstein</i>	

Unsupervised word spotting using a graph representation based on invariants	616
<i>Quang Anh Bui, Muriel Visani and Rémy Mullot</i>	
A Semi-Automatic Groundtruthing Tool for Mobile-Captured Document Segmentation	621
<i>Joseph Chazalon, Marçal Rusiñol, Jean-Marc Ogier and Josep Llados</i>	
Hidden Markov model topology optimization for handwriting recognition	626
<i>Núria Cirera, Alicia Fornés and Josep Llados</i>	
Towards an Automatic On-Line Signature Verifier Using Only One Reference Per Signer	631
<i>Moises Diaz, Andreas Fischer, Réjean Plamondon and Miguel A. Ferrer</i>	
A Comparative Study of Features for Handwritten Bangla Text Recognition	636
<i>Ayan Kumar Bhunia, Ayan Das, Partha Pratim Roy and Umapada Pal</i>	
Towards Visual Words to Words	641
<i>Rakesh Mehta, Ondrej Chum and Jiri Matas</i>	
GRPOLY-DB: An Old Greek Polytonic Document Image Database	646
<i>Basilis Gatos, Nikolaos Stamatopoulos, Georgios Louloudis, Giorgos Sfikas, George Retsinas, Fotini Simistira, Vassilis Papavassiliou and Vassilis Katsouros</i>	
Learning Local Image Descriptors for Word Spotting	651
<i>Sebastian Sudholt, Leonard Rothacker and Gernot Fink</i>	
An Initial Study On The Construction Of Ground Truth Binarized Images Of Ancient Palm Leaf Manuscripts	656
<i>Made Windu Antara Kesiman, Sophea Prum, Jean-Christophe Burie and Jean-Marc Ogier</i>	
Segmentation-free Query-by-String Word Spotting with Bag-of-Features HMMs	661
<i>Leonard Rothacker and Gernot A. Fink</i>	
Automated Scoring of Bender Gestalt Test Using Image Analysis Techniques	666
<i>Momina Moetesum, Imran Siddiqi, Uzma Masroor and Chawki Djeddi</i>	
Hybrid Word/Part-of-Arabic-Word Language Models for Arabic Text Document Recognition	671
<i>Mohamed Faouzi Benzeghiba, Christopher Kermorvant and Jérôme Louradour</i>	
Language Identification from Handwritten Documents	676
<i>Luc Mioulet, Utpal Garain, Clément Chatelain, Thierry Paquet and Philippe Barlas</i>	
Where to Apply Dropout in Recurrent Neural Networks for Handwriting Recognition?	681
<i>Théodore Bluche, Christopher Kermorvant and Jérôme Louradour</i>	
Using Attributes for Word Spotting and Recognition in Polytonic Greek Documents	686
<i>Giorgos Sfikas, Angelos P. Giotis, Georgios Louloudis and Basilis Gatos</i>	
Writer Adaptation of Online Handwriting Recognition using Adaptive RBF Network	691
<i>Surabhi Raje, Kapil Mehrotra and Swapnil Belhe</i>	
Automatic and interactive rule inference without ground truth	696
<i>Ceres Carton, Aurélie Lemaitre and Bertrand Coïnasnon</i>	
Word Segmentation Using Wigner-Ville Distribution	701
<i>Ergina Kavallieratou</i>	
Improving OCR for an Under-Resourced Script Using Unsupervised Word-Spotting	706
<i>Adi Silberpennig, Lior Wolf, Nachum Dershowitz, Seraogi Bhagesh and Bidyut B. Chaudhuri</i>	

Viral Transcript Alignment	711
<i>Gil Sadeh, Lior Wolf, Tal Hassner, Daniel Stoekl and Nachum Dershowitz</i>	
Sparsely Sampled Binary Patterns for writer identification	716
<i>Anguelos Nicolaou, Andrew David Bagdanov, Marcus Liwicki and Dimosthenis Karatzas</i>	
Use Case Visual Bag-of-Words Techniques for Camera Based Identity Document Classification	721
<i>Lluís-Pere De Las Heras, Oriol Ramos Terrades, Josep Lladós, David Fernández and Cristina Cañero</i>	
Attributed Graph Grammar for Floor Plan Analysis	726
<i>Lluís-Pere De Las Heras, Oriol Ramos Terrades and Josep Lladós</i>	
Probabilistic Interpretation and Improvements to the HMM-Filler for Handwritten Keyword Spotting	731
<i>Joan Puigcerver, Alejandro Héctor Toselli and Enrique Vidal</i>	
Context-Aware Lattice based Filler approach for Key Word Spotting in Handwritten Documents	736
<i>Alejandro Héctor Toselli, Joan Puigcerver and Enrique Vidal</i>	
High Performance Query-by-Example Keyword Spotting Using Query-by-String Techniques	741
<i>Enrique Vidal, Alejandro Héctor Toselli and Joan Puigcerver</i>	
Efficient Scene Text Localization and Recognition with Local Character Refinement	746
<i>Lukáš Neumann and Jiří Matas</i>	
Multi-stage HMM based Arabic text recognition with rescoring	751
<i>Irfan Ahmad and Gernot Fink</i>	
Label Transition and Selection Pruning and Automatic Decoding Parameter Optimization for Time-Synchronous Viterbi Decoding	756
<i>Yasuhide Fujii, Dmitriy Genzel, Ashok C. Popat and Remco Teunen</i>	
Content-based Comic Retrieval Using Multilayer Graph Representation and Frequent Graph Mining	761
<i>Thanh Nam Le, Muhammad Muzzamil Luqman, Jean-Christophe Burie and Jean-Marc Ogier</i>	
Recognition of Historical Greek Polytonic Scripts Using LSTM Networks	766
<i>Fotini Simistira, Adnan Ul Hassan, Vassilis Papavassiliou, Basilis Gatos, Vassilis Katsouros and Marcus Liwicki</i>	
Document Image OCR Accuracy Prediction via Latent Dirichlet Allocation	771
<i>Xujun Peng, Huagu Cao and Prem Natarajan</i>	
Text Zone Classification using Unsupervised Feature Learning	776
<i>Nibal Nayef and Jean-Marc Ogier</i>	
Handwritten Word Spotting by Inexact Matching of Grapheme Graphs	781
<i>Pau Riba Férrez, Josep Llados and Alicia Fornés</i>	
Localized Document Image Change Detection	786
<i>Rajiv Jain and David Doermann</i>	
Overlapped-Triangle Analysis with Hierarchical Ranking of Dominance	791
<i>Xiaoqing Lu, Lu Liu, Zhi Tang, Haibin Ling and Jingwei Qu</i>	

Automated Analysis of Line Plots in Documents	796
<i>Rathin Radhakrishnan Nair, Nishant Sankaran, Ifeoma Nwogu and Venu Govindaraju</i>	
Chart Classification By Combining Deep Convolutional Networks and Deep Belief Networks.....	801
<i>Liu Xiao, Tang Binbin, Wang Zhenyang, Xu Xianghua, Pu Shiliang, Tao Dapeng and Song Mingli</i>	
A Character Degradation Model for Color Document Images	806
<i>Do Thi Luyen, Elodie Carel, Jean-Marc Ogier and Jean-Christophe Burie</i>	
Multilingual Signature Verification by Combined Segmentation Verification.....	811
<i>Wataru Ohyama, Yuuki Ogi, Tetsushi Wakabayashi and Fumitaka Kimura</i>	
Tackling Pattern Recognition by Vector Space Embedding.....	816
<i>Brian Iwana, Seiichi Uchida, Kaspar Riesen and Volkmar Frinken</i>	
MRF Based Text Binarization in Complex Images using Stroke Feature.....	821
<i>Yanna Wang, Cunzhao Shi, Baihua Xiao and Chunheng Wang</i>	
Simplifying The Reading of Historical Manuscripts.....	826
<i>Abedelkadir Asi, Rafi Cohen, Klara Kedem and Jihad El-Sana</i>	
Optical Modelling and Language Modelling Trade-off for Handwritten Text Recognition.....	831
<i>Mauricio Villegas, Joan Andreu Sanchez and Enrique Vidal</i>	
ALTID : Arabic/Latin Text Images Database for recognition research	836
<i>Imen Chtourou, Ahmed Cheikh Rouhou, Faten Kallel and Slim Kanoun</i>	
Writer Adaptive Feature Extraction Based on Convolutional Neural Networks For Online Handwritten Chinese Character Recognition	841
<i>Jun Du, Jian-Fang Zhai, Jin-Shui Hu, Bo Zhu, Si Wei and Lirong Dai</i>	
High Performance Offline Handwritten Chinese Character Recognition Using GoogLeNet and Directional Feature Maps	846
<i>Zhuoyao Zhong, Lianwen Jin and Zecheng Xie</i>	
No threshold, no parameter. A prelude.....	851
<i>Sébastien Eskenazi, Petra Gomez-Krämer and Jean-Marc Ogier</i>	
Comic Frame Extraction via Line Segments Combination	856
<i>Yongtao Wang, Yafeng Zhou and Zhi Tang</i>	
Mixed handwritten and printed digit recognition in Sudoku with Convolutional Deep Belief Network.....	861
<i>Baptiste Wicht and Jean Hennebert</i>	
Date Field Extraction from Handwritten Documents Using HMMs	866
<i>Ranju Mandal, Partha Roy, Umapada Pal and Michael Blumenstein</i>	
Joint Denoising and Magnification of Noisy Low-Resolution Textual Images	871
<i>Rim Walha, Fadoua Drira, Franck Lebourgeois, Adel M. Alimi and Christophe Garcia</i>	
Efficient Word Image Retrieval using Fast DTW Distance	876
<i>Nagendar G and C.V Jawahar</i>	
Query by string word spotting based on character bi-gram indexing	881
<i>Suman Ghosh and Ernest Valveny</i>	

Automatic Discrimination of Text and Non-Text Natural Images	886
<i>Chengquan Zhang, Cong Yao, Baoguang Shi and Xiang Bai</i>	
Confidence Measures for Seamless Skew and Orientation Detection in Document Images	891
<i>Iuliu Konya, Stefan Eickeler and Christian Brandt</i>	
Arabic Ligatures: Analysis and Application in Text Recognition	896
<i>Yousef Elarian, Irfan Ahmad, Sameh Awaida, Wasfi Al-Khatib and Abdelmalek Zidouri</i>	
A clump splitting based method to localize speech balloons in comics	901
<i>Xicheng Liu, Yongtao Wang and Zhi Tang</i>	
Writer Identification Using VLAD Encoded Contour-Zernike Moments.....	906
<i>Vincent Christlein, David Bernecker and Elli Angelopoulou</i>	
Deep BLSTM Neural Networks for Unconstrained Continuous Handwritten Text Recognition	911
<i>Volkmar Frinken and Seiichi Uchida</i>	
Robust Seed-Based Stroke Width Transform for Text Detection in Natural Images	916
<i>Feng Su and Hailiang Xu</i>	
Interactive Content-Based Document Retrieval Using Fuzzy Attributed Relational Graph Matching	921
<i>Ramzi Chaieb, Karim Kalti and Najoua Essoukri Ben Amara</i>	
A New Wavelet-Laplacian Method for Arbitrarily-Oriented Character Segmentation in Video Text Lines	926
<i>Guozhu Liang, Palaiahnakote Shivakumara, Tong Lu and Chew Lim Tan</i>	
The ENP Image and Ground Truth Dataset of Historical Newspapers	931
<i>Christian Clausner, Stefan Pletschacher, Christos Papadopoulos and Apostolos Antonacopoulos</i>	
A hypothesize-and-verify framework for text recognition using Deep Recurrent Neural Network ...	936
<i>Anupama Ray, Sai Rajeswar and Santanu Chaudhury</i>	
Arabic handwritten texts clusterization based on feature relation graph (FRG)	941
<i>Vladislav Pavlov and Dmitry Shalymov</i>	
A Segmentation-Free Approach for Printed Devanagari Script Recognition.....	946
<i>Tushar Karayil, Adnan Ul-Hasan and Thomas Breuel</i>	
Multi-Lingual Text Recognition from Video Frames	951
<i>Nabin Sharma, Ranju Mandal, Rabi Sharma, Partha Partim Roy, Umapada Pal and Michael Blumenstein</i>	
Crossing the lines: making optimal use of context in line-based Handwritten Text Recognition	956
<i>Jafar Tanha, Jesse de Does, Katrien Depuydt and Joan Andreu Sánchez</i>	
Color Structure Recovering in Strong Specular Text Regions	961
<i>Tam Nguyen</i>	
A Sigma-Lognormal Model For Character Level handwritten CAPTCHA Generation	966
<i>Chetan Ramaiah, Réjean Plamondon and Venu Govindaraju</i>	
Noise Characterization in Ancient Document Images Based on DCT Coefficient Distribution	971
<i>Fitri Arnia, Fardian Fardian, Sayed Muchallil and Khairul Munadi</i>	

Can RNNs Reliably Separate Script and Language at Word and Line Level?	976
<i>Ajeet Kumar Singh and Jawahar C V</i>	
Visual Appearance based Document Classification Methods: Performance Evaluation and Benchmarking	981
<i>Syed Saqib Bukhari and Andreas Dengel</i>	
Adapting Off-the-Shelf CNNs for Word Spotting & Recognition	986
<i>Arjun Sharma and Pramod Sankar K.</i>	
Evaluation of Deep Convolutional Nets for Document Image Classification and Retrieval	991
<i>Adam Harley, Alex Ufkes and Konstantinos Derpanis</i>	
A Dataset for Arabic Text detection, tracking and recognition in news VideosdAcTiV	996
<i>Oussama Zayene, Jean Hennebert, Sameh Masmoudi Touj, Rolf Ingold and Najoua Essoukri Benamara</i>	
Curriculum Learning for Printed Text Line Recognition of Ligature-based Scripts	1001
<i>Adnan Ul-Hasan, Faisal Shafait and Marcus Liwicki</i>	
Gradient-Domain Degradations for Improving Historical Documents Images Layout Analysis	1006
<i>Mathias Seuret, Kai Chen, Nicole Eichenberger, Marcus Liwicki and Rolf Ingold</i>	
Page Segmentation of Historical Document Images with Convolutional Autoencoders	1011
<i>Kai Chen, Mathias Seuret, Marcus Liwicki, Jean Hennebert and Rolf Ingold</i>	
Word of Blobs	1016
<i>Jihad El-Sana and Klara Kedem</i>	
CNN Based Common Approach to Handwritten Character Recognition of Multiple Scripts	1021
<i>Durjoy Sen Maitra, Ujjwal Bhattacharya and Swapan Kr. Parui</i>	
Deep Learning and Recurrent Connectionist-based Approaches for Arabic Text Recognition in Videos	1026
<i>Sonia Yousfi, Sid-Ahmed Berrani and Christophe Garcia</i>	
Planar Markovian Approach for the Recognition of a Wide Vocabulary of Arabic Decomposable Words	1031
<i>Imen Ben Cheikh and Imen Allagui</i>	
Arabic Characters Recognition in Natural Scenes using Sparse Coding for Feature Representations .	1036
<i>Maroua Tounsi, Ikram Moalla, Adel M. Alimi and Frank Lebourgeois</i>	
Unsupervised Feature Learning for Optical Character Recognition	1041
<i>Devendra Sahu and Jawahar C. V.</i>	
A Sequence Learning Approach for Multiple Scripts Identification	1046
<i>Adnan Ul-Hasan, Muhammad Zeshan Afzal, Faisal Shafait, Marcus Liwicki and Thomas Breuel</i>	
Trajectory Recovery and Stroke Reconstruction of Mathematical Symbols	1051
<i>Behrang Sabeghi Saroui and Volker Sorge</i>	
Unconstrained Bengali Handwriting Recognition with Recurrent Models	1056
<i>Utpal Garain, Luc Mioulet, Bidyut Baran Chaudhuri, Clement Chatelain and Thierry Paquet</i>	
Online Handwriting Recognition using Depth Sensors	1061
<i>Rajat Aggarwal, Sirnam Swetha, Anoop M. Namboodiri, Jayanthi Sivaswamy and C. V. Jawahar</i>	

Evaluation of Techniques for Signature Classification from Accelerometer and Gyroscope data	1066
<i>Lukas Tencer, Marta Režnáková and Mohamed Cheriet</i>	
Supporting Early Contextualization of Textual Content in Digital Documents on the Web	1071
<i>Bahaa Eldesouky, Menna Bakry, Heiko Maus and Andreas Dengel</i>	
Evaluation Strategies for Historical Document Pre-Processing Systems	1076
<i>Ines Ben Messaoud, Hamid Amiri and Haikal El Abed</i>	
A Hybrid Approach to Discover Semantic Hierarchical Sections in Scholarly Documents	1081
<i>Suppawong Tuarob, Prasenjit Mitra and C. Lee Giles</i>	
Table information extraction and structure recognition using query patterns	1086
<i>Thotreingam Kasar, Tapan Kumar Bhowmik and Abdel Belaid</i>	
A Performance Evaluation of NSHP-HMM based on conditional zone observation probabilities: Application to offline handwriting word recognition	1091
<i>Hanene Boukerma, Christophe Choisy, Abdallah Benouareth and Nadir Farah</i>	
Text and Non-text Segmentation using Connected Component-based Features	1096
<i>Viet Phuong Le, Nibal Nayef, Muriel Visani, Jean-Marc Ogier and Cao De Tran</i>	
Scale and Rotation Invariant OCR for Pashto Cursive Script using MDLSTM Network	1101
<i>Riaz Ahmad, Muhammad Zeshan Afzal, Sheikh Faisal Rashid, Marcus Liwicki and Thomas Breuel</i>	
Word-level Script Identification for Handwritten Indic Scripts	1106
<i>Pawan Kumar Singh, Ram Sarkar, Mita Nasipuri and David Doermann</i>	
DeepDocClassifier: Deep Convolutional Neural Networks for Document Image Classification	1111
<i>Muhammad Zeshan Afzal, Samuele Capobianco, Muhammad Imran Malik, Thomas Breuel, Andreas Dengel, Marcus Liwicki and Simone Marinai</i>	
Age, Gender and Handedness Prediction from Handwriting using Gradient Features	1116
<i>Nesrine Bouadjenek, Hassiba Nemmour and Youcef Chibani</i>	
Binarization-free OCR for Historical Documents Using LSTM Networks	1121
<i>Mohammad Reza Yousefi, Mohammad Reza Soheili, Thomas M. Breuel, Ehsanollah Kabir and Didier Stricker</i>	
A new automatic framework for document image enhancement process based on anisotropic diffusion	1126
<i>Mohamed Riad Yagoubi, Amina Serir and Azeddine Beghdadi</i>	
Ink separation and visualisation in ancient manuscripts: Application of hyperspectral imaging	1131
<i>Sony George and Jon Yngve Hardeberg</i>	
Visual Graph Analysis for Quality Assessment of Manually Labelled Documents Image Database	1136
<i>Romain Giot, Romain Bourqui, Nicholas Journet and Anne Vialard</i>	
Performance Evaluation of DTW and its Variants for Word Spotting in Degraded Documents	1141
<i>Tanmoy Mondal, Nicolas Ragot, Jean Yves Ramel and Umapada Pal</i>	
Exemplary Sequence Cardinality: An Effective Application for Word Spotting	1146
<i>Tanmoy Mondal, Nicolas Ragot, Jean Yves Ramel and Umapada Pal</i>	

Competition Papers

ICDAR2015 Competition on Recognition of Documents with Complex Layouts - RDCL2015	1151
<i>Apostolos Antonacopoulos, Christian Clausner, Christos Papadopoulos and Stefan Pletschacher</i>	
ICDAR 2015 Competition on Robust Reading	1156
<i>Dimosthenis Karatzas, Lluis Gomez-Bigorda, Anguelos Nicolaou, Suman Ghosh, Andrew Bagdanov, Masakazu Iwamura, Jiri Matas, Lukas Neumann, Vijay Ramaseshan Chandrasekhar, Shijian Lu, Faisal Shafait, Seiichi Uchida and Ernest Valveny</i>	
ICDAR2015 Competition on Smartphone Document Capture and OCR (SmartDoc)	1161
<i>Jean-Christophe Burie, Joseph Chazalon, Mickaël Coustaty, Sébastien Eskenazi, Muhammad Muzzamil Luqman, Maroua Mehri, Nibal Nayef, Jean-Marc OGIER, Sophea Prum and Marçal Rusinol</i>	
ICDAR 2015 Competition HTRtS: Handwritten Text Recognition on the tranScriptorium Dataset ..	1166
<i>Joan Andreu Sánchez, Alejandro H. Toselli, Verónica Romero and Enrique Vidal</i>	
ICDAR 2015 Text Line Detection in Historical Documents (ANDAR-TL-2015)	1171
<i>Michael Murdock</i>	
ICDAR2015 Competition on Keyword Spotting for Handwritten Documents	1176
<i>Joan Puigcerver, Alejandro Héctor Toselli and Enrique Vidal</i>	
ICDAR 2015 Contest on MultiSpectral Text Extraction (MS-TEx 2015)	1181
<i>Rachid Hedjam, Hossein Ziae Nafchi, Reza Farrahi Moghaddam, Margaret Kalacska and Mohamed Cheriet</i>	
ICDAR 2015 Competition on Signature Verification and Writer Identification for On- and Off-line Skilled Forgeries (SigWIcomp2015).....	1186
<i>Muhammad Imran Malik</i>	
ICDAR2015 Competition on Multi-script Writer Identification and Gender Classification using QUWI Database	1191
<i>Chawki Djeddi, Somaya Al-Maadeed, Abdeljalil Gattal, Imran Siddiqi, Labiba Souici-Meslati and Haikal El Abed</i>	
ICDAR 2015 Competition on Video Script Identification (CVSI 2015).....	1196
<i>Nabin Sharma, Ranju Mandal, Rabi Sharma, Umapada Pal and Michael Blumenstein</i>	
ICDAR2015 Competition on Text Image Super-Resolution	1201
<i>Clément Peyrard, Moez Baccouche, Franck Mamalet and Christophe Garcia</i>	

Workshops Papers

AMIGO – Automatic Indexing of Lecture Footage	1206
<i>Markus Eberts, Adrian Ulges and Ulrich Schwanecke</i>	
Camera-based Document Image Retrieval System using Local Features - comparing SRIF with LLAH, SIFT, SURF and ORB	1211
<i>Q.B. Dang, V.P. Le, M.M. Luqman, M. Coustaty, C.D. Tran and J-M. Ogier</i>	
Improving Document Matching Performance by Local Descriptor Filtering	1216
<i>Joseph Chazalon, Marc al Rusinol and Jean-Marc Ogier</i>	
ALIF: A Dataset for Arabic Embedded Text Recognition in TV Broadcast	1221
<i>Sonia Yousfi, Sid-Ahmed Berrani and Christophe Garcia</i>	

Rectification of Camera Captured Document Images for Camera-Based OCR Technology	1226
<i>Mohamed Fawzi, Mohsen. A. Rashwan, Hany Ahmed, shaimaa Samir, Sherif M. Abdou, Hassanin M. Al-Barhamtoshy and Kamal M. Jambi</i>	
SmartDoc-QA: A Dataset for Quality Assessment of Smartphone Captured Document Images - Single and Multiple Distortions	1231
<i>Nibal Nayef, Muhammad Muzzamil Luqman, Sophea Prum, Sebastien Eskenazi, Joseph Chazalon and Jean-Marc Ogier</i>	
Efficient indexing for Query By String text retrieval	1236
<i>Suman K. Ghosh Lluís Gómez, Dimosthenis Karatzas and Ernest Valveny</i>	
Multi-script Iterative Steerable Directional Filtering For Handwritten Text Line Extraction	1241
<i>Wassim Swaileh, Kamel Ait Mohand and Thierry Paquet</i>	
Recognizable Units in Pashto Language for OCR.....	1246
<i>Riaz Ahmad, Muhammad Zeshan Afzal, Sheikh Faisal Rashid, Marcus Liwicki, Andreas Dengel and Thomas Breuel</i>	
Script Independent Online Handwriting Recognition	1251
<i>Oendrila Samanta, Anandarup Roy, Ujjwal Bhattacharya and Swapna K. Parui</i>	
OCR for Bilingual documents using Language Modeling	1256
<i>Anupama Ray, Sai Rajeswar and Santanu Chaudhury</i>	
Document Indexing Framework for Retrieval of Degraded Document Images	1261
<i>Ritu Garg, Ehtesham Hassan and Santanu Chaudhury</i>	
Quantitative Evaluation of Features for Forensic Handwriting Examination	1266
<i>Angelo Marcelli, Antonio Parziale and Claudio De Stefano</i>	
Handedness Detection of Online Handwriting based on Horizontal Strokes.....	1272
<i>Erika Griechisch and Erika Bencsik</i>	
Behaviour of Dynamic and Static Feature Dependences in Constrained Signatures	1278
<i>Giuseppe Pirlo, Moises Diaz, Miguel A. Ferrer, Donato Impedovo and Fabrizio Rizzi</i>	