Document Recognition and Retrieval XIX

Christian Viard-Gaudin
Richard Zanibbi
Editors

25–26 January 2012
Burlingame, California, United States

Sponsored and Published by
IS&T—The Society for Imaging Science and Technology
SPIE

Volume 8297

Proceedings of SPIE, 0277-786X, v. 8297
## Contents

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>vii</td>
<td>Conference Committee</td>
</tr>
<tr>
<td>ix</td>
<td>Introduction</td>
</tr>
</tbody>
</table>

### REGION LABELING

**8297 03** Graphical image classification combining an evolutionary algorithm and binary particle swarm optimization [8297-02]  
B. Cheng, R. Wang, Missouri Univ. of Science and Technology (United States); S. Antani, National Library of Medicine (United States); R. J. Stanley, Missouri Univ. of Science and Technology (United States); G. R. Thoma, National Library of Medicine (United States)

**8297 04** Combining SVM classifiers to identify investigator name zones in biomedical articles [8297-03]  
J. Kim, D. X. Le, G. R. Thoma, National Library of Medicine (United States)

**8297 05** Comprehensive color segmentation system for noisy digitized documents to enhance text extraction [8297-04]  
A. Ouji, Y. Leydier, F. LeBourgeois, Institut National des Sciences Appliquées, CNRS, Univ. de Lyon (France)

**8297 06** Ensemble methods with simple features for document zone classification [8297-05]  
T. Obafemi-Ajayi, Univ. of Missouri (United States); G. Agam, B. Xie, Illinois Institute of Technology (United States)

### HANDWRITING RECOGNITION

**8297 07** A robust omnifont open-vocabulary Arabic OCR system using pseudo-2D-HMM [8297-06]  
A. M. Rashwan, M. A. Rashwan, A. Abdel-Hameed, S. Abdou, Cairo Univ. (Egypt) and RDI (Egypt); A. H. Khalil, Cairo Univ. (Egypt)

**8297 08** Variable length and context-dependent HMM letter form models for Arabic handwritten word recognition [8297-07]  
A.-L. Bianne-Bernard, A2iA SA (France) and Lab. Traitement et Communication de l'Information, CNRS, Telecom ParisTech (France); F. Menasri, A2iA SA (France); L. Likforman-Sulem, Lab. Traitement et Communication de l'Information, CNRS, Telecom ParisTech (France); C. Mokbel, Univ. of Balamand (Lebanon); C. Kermorvant, A2iA SA (France)

**8297 09** Post processing for offline Chinese handwritten character string recognition [8297-08]  
Y. Wang, X. Ding, C. Liu, Tsinghua Univ. (China)

**8297 0A** Complexity reduction with recognition rate maintained for online handwritten Japanese text recognition [8297-09]  
J. Gao, B. Zhu, M. Nakagawa, Tokyo Univ. of Agriculture and Technology (Japan)
Improving isolated and in-context classification of handwritten characters [8297-10]
V. Mazalov, S. M. Watt, The Univ. of Western Ontario (Canada)

Using specific evaluation for comparing and combining competing algorithms: applying it to table column detection [8297-11]
A. C. e Silva, LIAAD-INESC Porto (Portugal)

Identification of embedded mathematical formulas in PDF documents using SVM [8297-12]
X. Lin, L. Gao, Peking Univ. (China); Z. Tang, Peking Univ. (China) and State Key Lab. of Digital Publishing Technology (China); X. Hu, BeiHang Univ. (China); X. Lin, Vobile, Inc. (United States)

Chemical structure recognition: a rule-based approach [8297-13]
N. M. Sadawi, A. P. Sexton, V. Sorge, The Univ. of Birmingham (United Kingdom)

Quantify spatial relations to discover handwritten graphical symbols [8297-14]
J. Li, H. Mouchère, C. Viard-Gaudin, Institut de Recherche en Communications et Cybernétique, CNRS, Univ. de Nantes (France)

Automatic indexing of scanned documents: a layout-based approach [8297-16]
D. Esser, D. Schuster, K. Muthmann, Technische Univ. Dresden (Germany); M. Berger, DocuWare AG (Germany); A. Schill, Technische Univ. Dresden (Germany)

Layout-based substitution tree indexing and retrieval for mathematical expressions [8297-17]
T. Schellenberg, B. Yuan, R. Zanibbi, Rochester Institute of Technology (United States)

Efficient cost-sensitive human-machine collaboration for offline signature verification [8297-18]
J. Coetzer, J. Swanepoel, Stellenbosch Univ. (South Africa); R. Sabourin, Univ. of Quebec (Canada)

Questioned document workflow for handwriting with automated tools [8297-19]
K. Das, S. N. Srinari, Univ. at Buffalo (United States); H. Srinivasan, Janya Inc. (United States)

Iterative analysis of document collections enables efficient human-initiated interaction [8297-20]
J. Chazalon, B. Coüasnon, Institut National des Sciences Appliquées de Rennes, CNRS, Univ. Européenne de Bretagne (France)
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>VeriClick: an efficient tool for table format verification</td>
<td>G. Nagy, M. Tamhankar, Rensselaer Polytechnic Institute (United States)</td>
<td></td>
</tr>
<tr>
<td>Asymptotic cost in document conversion</td>
<td>D. Blostein, Queen's Univ. (Canada); G. Nagy, Rensselaer Polytechnic Institute (United States)</td>
<td></td>
</tr>
<tr>
<td>Style or writer identification</td>
<td>Style comparisons in calligraphy</td>
<td>X. Zhang, Shanghai Maritime Univ. (China); G. Nagy, Rensselaer Polytechnic Institute (United States)</td>
</tr>
<tr>
<td>An Oracle-based co-training framework for writer identification in offline handwriting</td>
<td>U. Porwal, Univ. at Buffalo (United States); S. Rajan, Fujitsu Labs. of America, Inc. (United States); V. Govindaraju, Univ. at Buffalo (United States)</td>
<td></td>
</tr>
<tr>
<td>Handwritten document age classification based on handwriting styles</td>
<td>C. Ramaiah, G. Kumar, V. Govindaraju, Univ. at Buffalo (United States)</td>
<td></td>
</tr>
<tr>
<td>Handwriting individualization using distance and rarity</td>
<td>Y. Tang, S. Srihari, Univ. at Buffalo (United States); H. Srinivasan, Janya Inc. (United States)</td>
<td></td>
</tr>
<tr>
<td>Construction of language models for an handwritten mail reading system</td>
<td>O. Morillot, L. Likforman-Sulem, Lab. Traitement et Communication de l’Information, CNRS, Telecom ParisTech (France); E. Grosicki, DGA (France)</td>
<td></td>
</tr>
<tr>
<td>Interactive paper session</td>
<td>Bleed-through removal in degraded documents</td>
<td>R. Rowley-Brooke, A. Kokaram, Trinity College Dublin (Ireland)</td>
</tr>
<tr>
<td>Clustering document fragments using background color and texture information</td>
<td>S. Chanda, K. Franke, Gjøvik Univ. College (Norway); U. Pal, Indian Statistical Institute (India)</td>
<td></td>
</tr>
<tr>
<td>Lecture video segmentation and indexing</td>
<td>D. Ma, G. Agam, Illinois Institute of Technology (United States)</td>
<td></td>
</tr>
<tr>
<td>Unsupervised categorization method of graphemes on handwritten manuscripts: application to style recognition</td>
<td>H. Daher, D. Gaceb, V. Eglin, S. Bres, Institut National des Sciences Appliquées, CNRS, Univ. de Lyon (France); N. Vincent, Lab. d’Informatique Paris Descartes, CNRS, Univ. Paris Descartes (France)</td>
<td></td>
</tr>
<tr>
<td>Retrieving handwriting by combining word spotting and manifold ranking</td>
<td>S. Peña Saldariaga, Synchromedia (Canada); E. Morin, Lab. Informatique de Nantes Atlantique, CNRS, Univ. de Nantes (France); C. Viard-Gaudin, Institut de Recherche en Communications et Cybernétique de Nantes, CNRS, Univ. de Nantes (France)</td>
<td></td>
</tr>
</tbody>
</table>
**The A2iA French handwriting recognition system at the Rimes-ICDAR2011 competition**
F. Menasri, J. Louradour, A.-L. Bianne-Bernard, C. Kermorvant, A2iA SA (France)

**Using connected component decomposition to detect straight line segments in documents**
X. Feng, A. Youssef, The George Washington Univ. (United States)

**A synthetic document image dataset for developing and evaluating historical document processing methods**
D. Walker, W. Lund, E. Ringger, Brigham Young Univ. (United States)

Author Index
Conference Committee

Symposium Chairs

Majid Rabbani, Eastman Kodak Company (United States)
Gaurav Sharma, University of Rochester (United States)

Conference Chairs

Christian Viard-Gaudin, Université de Nantes (France)
Richard Zanibbi, Rochester Institute of Technology (United States)

Program Committee

Gady Agam, Illinois Institute of Technology (United States)
Elisa H. Barney Smith, Boise State University (United States)
Bill Barrett, Brigham Young University (United States)
Kathrin Berkner, Ricoh Innovations, Inc. (United States)
Bertrand Coüasnon, Institut National des Sciences Appliquées de Rennes (France)
Hervé Déjean, Xerox Research Centre Europe Grenoble (France)
Xiaoming Ding, Tsinghua University (China)
David Scott Doermann, University of Maryland, College Park (United States)
Oleg D. Golubitsky, Google Waterloo (Canada)
Jianying Hu, IBM Thomas J. Watson Research Center (United States)
Laurence Likforman-Sulem, Telecom ParisTech (France)
Xiaolan Lin, Vobile, Inc. (United States)
Marcus Liwicki, Deutsches Forschungszentrum für Künstliche Intelligenz GmbH (Germany)
Daniel P. Lopresti, Lehigh University (United States)
Hiroshi Sako, Hosei University (Japan)
Sargur N. Srihari, University at Buffalo (United States)
Venkata Subramaniam, IBM India Research Laboratory (India)
Kazem Taghva, University of Nevada, Las Vegas (United States)
George R. Thoma, National Library of Medicine (United States)
Berrin Yanikoglu, Sabanci University (Turkey)
Jie Zou, National Library of Medicine (United States)
Introduction

On behalf of the DRR 2012 program committee, we are honored and delighted to welcome you to San Francisco, CA, USA for the Nineteenth Document Recognition and Retrieval Conference (DRR 2012). The conference is part of the Electronic Imaging Symposium, which brings together researchers from various backgrounds related to electronic imaging for an exciting research event.

As one of the well-established conferences of the Electronic Imaging Symposium organized by The Society for Imaging Science and Technology (IS&T), and the International Association for Optics and Photonics (SPIE), DRR continues to reflect the vitality and impact of the worldwide document analysis research community. This year the conference received 46 submissions, fewer than the record 54 received for DRR 2011. However, the quality of the papers was quite high, leading to roughly 59% being accepted for oral presentation, and an additional 17% for poster presentation. We proudly invite you to take advantage of the excellent technical program for DRR 2012, which includes recent advances in document image processing and layout analysis, handwriting recognition, graphics recognition (e.g. for tables, chemical diagrams, and math), human factors in system training and deployment, and retrieval using document images and graphics as queries.

As the Program Chairs, we take primary responsibility for deciding the program, but its content and quality derive from the vision and hard work of the 23 members of the program committee, who have our sincerest thanks for providing paper reviews within a very short time during the summer. Their reviews and comments were essential to shaping the technical program.

We also extend our warmest thanks to Dr. Samy Bengio (Google) and Dr. Christopher Manning (Stanford University), who will give keynote talks on “Large scale visual semantic extraction” (Dr. Bengio) and “Language modeling for Information Retrieval” (Dr. Manning). Their talks will contribute greatly to the success of the conference.

We will announce the winner of the best student paper during the conference. The awardee will be presented with a certificate and monetary award check at the Plenary Session and Society Award Presentations.

We wish you all an exciting and fruitful stay in San Francisco!

Christian Viard-Gaudin
Richard Zanibbi