THE INTERNATIONAL ASSOCIATION FOR PATTERN RECOGNITION

IAPR Newsletter

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IN THIS Issue




# From the Editor's Desk: Communication 2.0

by Arjan Kuijper
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When I wrote my previous "From the Editor's Desk" – "Industry or academia?" [39:4], I couldn't imagine that *The Guardian* would address this topic in November – and bring it in relation to another of my editorials: "A deep learned black box?" [38:3]. In "'We can't compete': why universities are losing their best AI scientists", the rise of deep learning/artificial intelligence is linked to the strong need of industry for academics. The good news comes from Zoubin Ghahramani. "Universities will have to train enough people to meet the demand, and that's a challenge if lecturers and postdocs are being lured into industry. It's like killing the geese that lay the golden eggs. Companies are starting to realise that and some of the major tech companies are starting to give back to universities by sponsoring lectureships and donating funds."

In the latter editorial mentioned above, I wrote *"One intriguing question that I now have is how many papers will deal with deep learning"*, referring to ICPR 2016. Now, two years later, with the deadline of ICPR 2018 behind us, I would like to rephrase this to, *"One intriguing question that I now have is how many papers will* ***not*** *deal with deep learning"*…..! The scientific world has dramatically changed, and it will be interesting to see how in Beijing this August. I wish the organizers and the reviewers much success!

And, other things have dramatically changed as well. Although Twitter may not be the best way to communicate difficult messages, social media are an established way to spread news. Since the IAPR is much more than ICPRs and the *Newsletter*, the IAPR Publications & Publicity Committee

# CALLS for PAPERS

For the most up-to-date information on IAPR-supported conferences, workshops and summer schools, please visit the IAPR web site: *www.iapr.org/conferences/*

**ICPRS-18**
9th International Conference on
Pattern Recognition Systems
Valparaiso, Chile
Deadline: Feb. 8, 2018
Dates: May 22-24, 2018

**ICFHR 2018**
16th International Conference on
Frontiers in Handwriting Recognition
Niagara Falls, New York, USA
Deadline: Mar. 2, 2018
Dates: Aug. 5-8, 2018

**S+SSPR 2018**
IAPR Joint International Workshops on Statistical Techniques in Pattern Recognition (SPR 2018) and Structural and Syntactic Pattern Recognition (SSPR 2018)
Beijing, China
Deadline: Apr. 15, 2018
Dates: Aug. 17-19, 2018

**ANNPR 2018**
8th IAPR TC3 Workshop on
Artificial Neural Networks in Pattern Recognition
Siena, Italy
Deadline: Apr. 29, 2018
Dates: Sep. 19-21, 2018

**ISAIR 2018**
3rd International Symposium on
Artificial Intelligence and Robotics
Nanjing, China
Deadline: Aug. 1, 2018
Dates: Nov. 17-19, 2018

## Calls for Nominations for Awards to be presented at ICPR 2018

**King-Sun Fu Prize**
Deadline: Feb. 2, 2018

**J. K. Aggarwal Prize**
Deadline: April 30, 2018

**Maria Petrou Prize**
Deadline: April 5, 2018

is thinking of new and improved ways to communicate to and among its members. Here are some thoughts and I look forward to your feedback, (read "How can I help you?" [39:3]) for more inspiration!

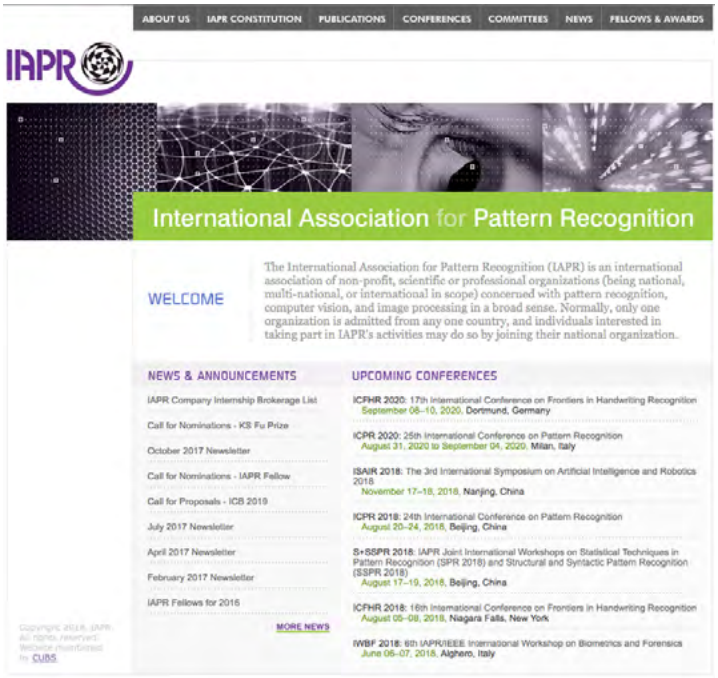
1) **Web site**: Please take a look at the IAPR web site *http://www.iapr.org*

Clearly we can think of 'leaving things as they are' until 'recreating it from scratch'. I'd like to distinguish between format and content and would like to have your opinion on the following questions:

a) Is all content there? Do you miss things? Is it easy to browse the web site and find what you want? What do you expect to be there?

b) Do you see a need for changing the format / layout / design, and, if so, how? Would that improve things mention in the questions above?

c) Is there an easy way to change the web site in order to do so?



2) **Social Media**: We recently revived the IAPR LinkedIn account. And, ICPR 2018 may start a Twitter channel. But:

a) Is there a need for the IAPR to be present on social media? If so, which? LinkedIn, WhatsApp, Twitter, Instagram, Telegram, X-gram, (fill in your favorites), ... Which ones would make sense?

b) What would you expect in terms of activity on social media?

c) Do you think we can reach more people/IAPR members/Students when present on (which?) social media?

3) **Other Media/Presence**: The IAPR is built by its member countries & technical committees.

a) Can you think of ways to 'visualize' the IAPR at member country events, like the "Annual Happy-country Conference on Pattern Recognition (HCPR)"?

b) Would it make sense to promote the IAPR at the "HCPR" & TC conferences? (What should be promoted? Conferences /ICPR/Newsletter/ Scholarships/....)

4) **Other (option D, the open question)**: Did I forget something?

If you have any opinion, thoughts, recommendations, suggestions, or improvements please tell me. Don't feel obliged to answer all questions ☺.

*Best regards,*
*Arjan*

## IAPR Then and Now...10 Years Ago

**FROM THE**
**IAPR EXECUTIVE COMMITTEE**
***IAPR Newsletter***
**Vol. 30 No. 1, January 2008**

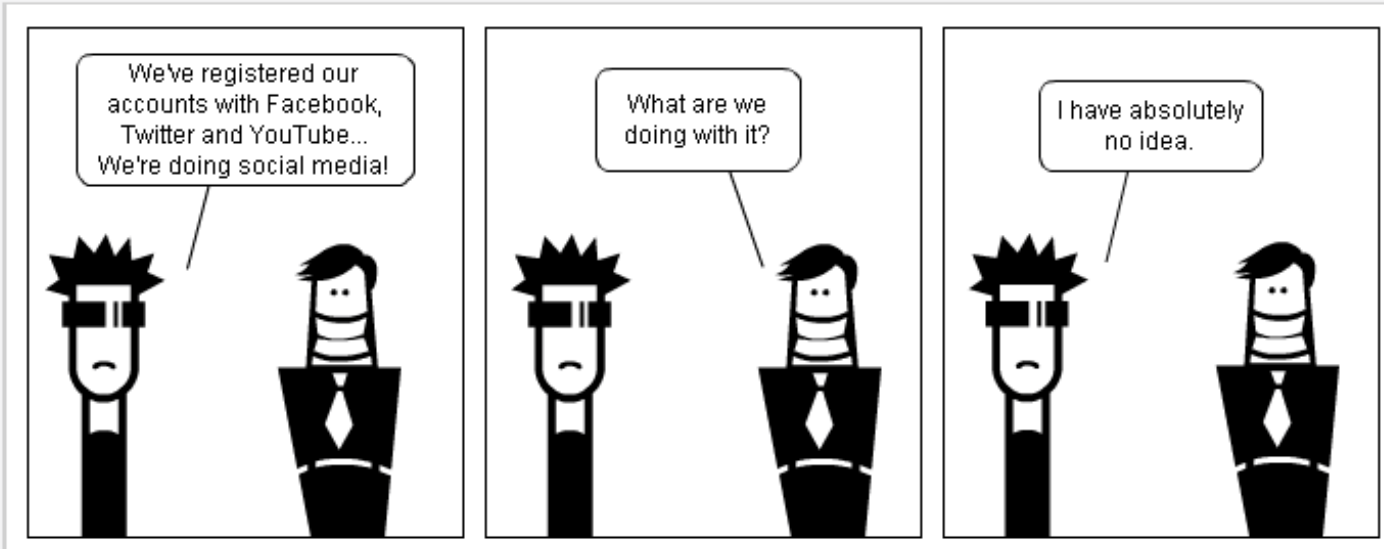
*This announcement from 2008 discusses the last time the IAPR website was reorganized. Now, as then, input from the IAPR Community is key to the success of the project.*

*~ Arjan Kuijper,*
*Chair , IAPR Publications and Publicity Committee and EiC,* IAPR Newsletter

The IAPR website is still being updated after progressive migration to a new server and release of the new site in September, 2007. A lot of work has been done to set up the new site, but more work still needs to be performed to complete the migration and make the site stable. In cooperation with IAPR Standing Committees, the ExCo has planned to reorganize a lot of material that was spread out everywhere on the old site and to make this information more easy to find and more coherent with current IAPR activities, committees, and services. This reorganization requires a significant amount of work but, once completed, should lead to a better integrated bulk of material.

## "Doing" Social Media

View more social media cartoons at
www.socmedsean.com



# Calls from IAPR Committees

From the IAPR Nominating Committee:

## Call for Nominations for the 2018-20 IAPR ExCo

At its next meeting at ICPR 2018 in Beijing, the IAPR Governing Board will elect new IAPR Officers. The IAPR Nominating Committee seeks your help in finding candidates suitable for the jobs of President, First Vice President, Second Vice President, Secretary, and Treasurer. Please, contact the IAPR President Simone Marinai *simone.marinai@unifi.it* for information on the procedure.

From the IAPR Education Committee:

## Call for Applications for IAPR Research Scholarships

*http://www.iapr.org/docs/IAPR-EC-RS-Call-2016.pdf*

**Description:** IAPR Research Scholarships, awarded by the IAPR through its Education Committee (IAPR-EC), seek to make possible mobility across institutions and international boundaries for Early Career Researchers working in fields within the scope of the IAPR's interests. Through this program, the IAPR sees an opportunity to make a significant contribution to the development of Early Career Researchers as well as the wider Pattern Recognition community.

**Covered expenses and duration:** The scholarship covers round trip travel & basic living expenses for a visit of less than 12 months.

**Requirements:** The candidate must be a full-time researcher with between one and eight years experience. The candidate must also be a member of an IAPR member society. See Call for Applications for a full list of requirements.

**Contact information:**

IAPR-EC Chair
c/o Josep Lladós, *josep.llados@cvc.uab.es*

IAPR Secretariat
c/o Linda O'Gorman, *secretariat@iapr.org*

From the IAPR Industrial Liaison Committee:

## Call for Internship Listings for the IAPR Internship Brokerage Page

### for Companies with internships available for Students seeking internship opportunities

*http://homepages.inf.ed.ac.uk/rbf/IAPR/INDUSTRIAL/*

**Description:** The IAPR-ILC wishes to promote opportunities for students to undertake internships at companies working in Pattern Recognition, AI, Computer Vision, Data Mining, Machine Learning, etc. We propose to do this by having a web-based internship listing service. Companies can list their internship opportunities; students can browse the listings and contact the company.

**For companies with internships to list:**
(see examples at the URL above)

Please email your listings as follows:

To: Bob Fisher - *rbf@inf.ed.ac.uk*
Subject: IAPR internship listing
Details:

- Host:
- Location:
- Post Type:
- Specialty:
- Funded:
- Length:
- Degree & Visa Requirements:
- Internship start date:
- Application closing date:
- Details:
- Contact:

**For students:**
If you are a student, please visit the web site given above.

**NOTE:** At the time of publication, there were 16 opportunities listed and more than 4000 views.

**Contact Information:**
Bob Fisher, *rbf@inf.ed.ac.uk*
Chair, IAPR-ILC

From the IAPR Executive Committee (ExCo):

## Call for Proposals for "Summer" Schools

### Deadline: June 1, 2018 (for schools planned for August - November 2018)

"Summer" schools are training activities that expose participants to the latest trends and techniques in the particular pattern recognition field. ("Summer" is used generically; the school can take place in any season.)

To be eligible for a grant, the organizers must work through at least one of the IAPR's technical committees as they develop and present the proposal.

**How to Submit:** Proposals for IAPR funded summer schools should be submitted to IAPR Treasurer Apostolos Antonacopoulos by email (*a.antonacopoulos@primaresearch.org*). A PDF attachment containing all the required information is appreciated.

For detailed guidelines on the proposal, see the **ExCo Initiative on Summer Schools**, *http://www.iapr.org/committees/SummerSchool-2016.pdf*

# Call for Bids to Host ICPR 2022

**From the IAPR Conferences & Meetings Committee:**

## Call for Bids to Host ICPR 2022

*http://www.iapr.org/conferences/proposals.php*

The International Conference on Pattern Recognition (ICPR) is the major scientific event organized under the auspices of the International Association for Pattern Recognition (IAPR).

The aim of this conference is to bring together international experts to share their experiences and to promote research and development in Pattern Recognition.

The conference is hosted by an institution under the auspices of an endorsing IAPR member organisation (national association).

Any such organisation interested in making a proposal to host an ICPR must proceed according to the rules outlined in the guidelines document (download below).

It is expected that Proposers familiarise themselves with the guidelines for organising ICPR first, to fully plan their bid. The submission of a bid implies full agreement with the guidelines and procedures for organising the conference as well as with the IAPR constitution.

Bids to host ICPR 2022 must be submitted to the IAPR Conferences and Meetings Committee by **April 20, 2018**.

The selection of the conference venue will be made by the IAPR Governing Board (GB) during its meeting at ICPR 2018 in Beijing, China.

Organizations interested in organizing ICPR 2022 should submit the bid to
Dan Lopresti (*lopresti@cse.lehigh.edu*) C&M chair by **April 20, 2018**.

Dan Lopresti
IAPR C&M chair

PLEASE NOTE: A revised "Guidelines for Organizing and Bidding to Host an ICPR" document will be available by the end of February. The current document (last updated May 15, 2016) is made available here as a general guide to the process.
Guidelines for Organising and Bidding to Host an ICPR (pdf)

# CALLS FOR NOMINATIONS

# FOR AWARDS TO BE PRESENTED @ ICPR 2018

## King-Sun Fu Prize, the highest honor given by the IAPR

**Deadlines for Submission of Nomination and Endorsement Forms:**
**Nomination Forms: February 2, 2018**
**Endorsement Forms: February 4, 2018**

***http://www.iapr.org/fellowsandawards/awards_kingsunfu.php*.**

The IAPR established this prize in honor of the memory of Professor King-Sun Fu, who was instrumental in the founding of the IAPR, served as its first President, and is widely recognized for his extensive contributions to the field of pattern recognition.

This biennial prize is given to a living person in recognition of an outstanding technical contribution to the field of pattern recognition.

The nomination must be made by a member of a national member society of IAPR and by endorsement of at least five members, representing at least two member societies different from that of the nominator. The prize recipient shall be selected by the Prize Committee, subject to approval by the IAPR Governing Board.

Members of the IAPR Executive Committee, as well as of the Prize Committee, shall be ineligible for the prize and may not serve as nominators or endorsers.

## J. K. Aggarwal Prize

**Deadline for Submission of Nomination and Endorsement Forms:**
**April 30, 2018**

***http://www.iapr.org/fellowsandawards/awards_aggarwal.php***

Professor Aggarwal is widely recognized for his extensive contributions to the field of pattern recognition and for his participation in the IAPR's activities.

The recipient is a young scientist, under the age of 40 at the date of the deadline for nominations, who has brought a substantial contribution to a field that is relevant to the IAPR community and whose research work has had a major impact on the field.

The prize recipient shall be selected by the J. K. Aggarwal Prize Committee, subject to approval by the IAPR Governing Board, upon nomination by a member of a national member society of IAPR and by endorsement of four members, representing at least two member societies different from that of the nominators and nominee.

Members of the IAPR Executive Committee, as well as of the J.K. Aggarwal Prize Committee, shall be ineligible for the prize and may not serve as nominators or endorsers.

## Maria Petrou Prize

**Deadline for Submission of Nomination and Endorsement Forms:**
**April 5, 2018**

***http://www.iapr.org/fellowsandawards/awards_petrou.php***

The Maria Petrou Prize is awarded biennially to a living female scientist/engineer who has made substantial contributions to the field of Pattern Recognition, and whose past contributions, current research activity and future potential may be regarded as a model to both aspiring and established researchers.

This Prize honors the memory of Professor Maria Petrou as a scientist and engineer of the first rank, and particularly in her role as a pioneer for women researchers and highly successful role model. She is widely recognized for her extensive contributions to the field of image processing and pattern recognition. She also made significant contributions to the growth of IAPR, covering significant leadership roles.

The prize recipient shall be selected by the Maria Petrou Prize Committee, subject to approval by the IAPR Governing Board, upon nomination by a member of an IAPR national member society and by the endorsement of two more members, at least one of whom must be a woman.

Members of the IAPR Executive Committee, as well as of the Maria Petrou Prize Committee, shall be ineligible for the prize and may not serve as nominators or endorsers.

# Getting to know...Rangachar Kasturi, IAPR Fellow

*Rangachar Kasturi, IAPR Fellow*
*ICPR 1996, Vienna*

*For contributions to document analysis and for service to IAPR*

*Kasturi Rangachar (his full given name) was born to a family of teachers in Bangalore, India, in 1949. He often accompanied his mother, a first grade teacher, to school even before he was old enough to join. With this head start, at the age of 19 he graduated with a degree in Electrical (power) Engineering from Bangalore University. During the next ten years, he designed VHF communication equipment at Bharat Electronics, Bangalore, and digital circuits to operate the scientific models in Visvesvaraya Industrial and Technological Museum, Bangalore. But driven by his passion for teaching, in 1978, he moved from Bangalore to Lubbock, Texas—almost 180° apart in longitude—to attend graduate school at Texas Tech University. Once the youngest, there he was the oldest student in his classes! Also in this transition, Kasturi became his formal* Last-name *and Rangachar became his* First-name, *perhaps because this was the order in which one of his application forms was read!*

*Under the direction of Professor John Walkup, he completed his MS degree in 1980 in* Optical

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*Editor's note:*
*Prof. Rangachar Kasturi received the 2017 IAPR ICDAR Outstanding Achievements Award "for seminal research in document image analysis and graphics recognition, and for outstanding leadership to the international pattern recognition community".*

*In this Feature Article, the IAPR Newsletter asked Prof. Kasturi to respond to some specific questions about his varied and successful career.*

*Please also see:*

- *IAPR Member News...Rangachar Kasturi Named Recipient of 2015 IEEE Computer Society Merwin Award*, IAPR Newsletter *Vol. 37, No. 4, October 2015*
- *Presentation slides from Prof. Kasturi's award lecture at ICDAR 2017, Graphics Recognition: A Historical Perspective and Recent Advances*
- *Meeting Reports: ICDAR 2017 in this issue*

*~ Arjan Kuijper, Editor-in-Chief*

by Rangachar Kasturi, Douglas W. Hood Professor of Computer Science and Engineering, University of South Florida, USA

***1) Congratulations - you have published at each ICPR since 1984! Can you tell us how this conference has changed in the last 34 years?***

Clearly ICPR has grown in size by every measure; papers presented, attendance, number of countries of delegates, citations to papers published in ICPR proceedings, etc. The biennial ICPR and the annual IEEE CVPR (which had its first meeting in 1983) were adequate to present all important research results in our field. But today, in addition to these two ever-growing conferences, IAPR and IEEE have numerous other conferences and workshops on focused topics such as Face and Gesture Recognition, Biometrics etc. But what is even more important is the impact of our field on our day-to-day life. During the 1980s, there were only a few universities and research laboratories around the world where an active research program existed in pattern recognition and computer vision and even fewer companies that were hiring graduates in this area. Today practically everyone is impacted by this technology whether it is face/fingerprint recognition to prove identity or barcode scanning to checkout groceries; and our graduates are among the most sought after candidates by all technology companies and educational institutions.

***2) Your co-authored book* Machine Vision *is very popular. What makes the book a success? Is it luck, the reputation of the authors, or something else?***

The books that were available in the market at that time were addressing the needs of students pursuing advanced degrees and researchers. We had also published a two volume IEEE

tutorial text on computer vision that included reprints of key papers for researchers and graduate students. But there was no introductory book to someone who was new to this area. So, we wrote this book at a level appropriate for students in their final year undergraduate program or for a practitioner as a self-study guide. Based on our experience in teaching such a course at our universities, we included only well-known and proven methods/algorithms and provided sufficient details to enable easy implementation on a personal computer. Our publisher, McGraw-Hill, had much experience in the college textbook market. Perhaps the other factors you mentioned also played a role!

***3) You also organized an ICPR. Can you tell us something about organizing such a big event?***

Successful organization of any such large event starts with assembling a team of highly dedicated and experienced volunteers. In 2004, when we proposed to host ICPR 2008 in Tampa, I had just finished my term as the president of IAPR. I also had the experience of organizing ICDAR in 1999. In these roles, I had the pleasure of working with many outstanding individuals. I sought the help of a small group of people I had known for a long time to serve as General Chairs, Program Chairs, and Local Arrangements Chairs. These volunteers had much experience in organizing such large events and, in turn, identified others. Our university leadership enthusiastically supported our efforts and assumed all financial risks; fortunately there were no unforeseen events (being in Florida, we were concerned about hurricanes) and the conference resulted in a slight surplus.

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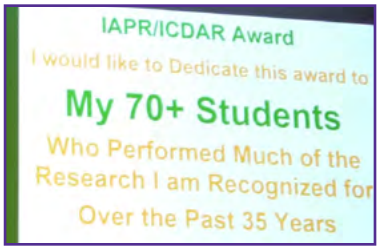
Information Processing *and his PhD in* Digital Image Processing *in 1982. He was elected to Texas Tech Electrical Engineering Academy in 1997.*

*Kasturi began his academic career at the Pennsylvania State University and became a Full Professor in 1995. He received the Penn State Engineering Outstanding Research Award in 1996 and its Premier Research Award in 2002. He joined the University of South Florida in 2003 as the Douglas W. Hood Professor of Computer Science and Engineering. During his 35 years as a faculty member, Kasturi has directed projects on document analysis for graphics recognition, aircraft collision avoidance, performance evaluation of video content analysis algorithms, and facial expression analysis to detect pain in infants. He has advised over 70 graduate students resulting in over 200 publications. These have received over 10,000 citations resulting in an h-index of 48.*

*As a visiting scholar at the University of Michigan during 1990-91, Kasturi and his host, Ramesh Jain, compiled a two-volume tutorial text, Computer Vision: Principles, Advances and Applications, IEEE CS Press, to serve as a guide for students and researchers who were interested in this emerging area. This led to the publication of the popular textbook, Machine Vision, Kasturi, Jain, and Schunck, McGraw-Hill, 1995. Along the same lines he and Lawrence O'Gorman of Bell Labs, compiled the tutorial text, Document Image Analysis, also published by IEEE CS Press in 1995.*

*Kasturi's first experience with IAPR was as an author at the 7th ICPR in Montreal, Canada in 1984. He much enjoys these opportunities and has attended every ICPR since Montreal. He was the Program Chair of ICPR 2002 in Quebec City and hosted ICPR 2008 in Tampa. Kasturi recalls approaching Professor Herb Freeman at an ICPR about his interest in helping IAPR activities in map data processing and was pleasantly surprised when President Levine appointed him as the chair of the IAPR Technical Committee on Map Processing (TC10; now TC10 on Graphics Recognition). TC10 joined TC11 on Reading Systems to start the ICDAR series of conferences in 1991. He and Professor Srihari led the organization of ICDAR in their hometown of Bangalore in 1999. Kasturi proposed and hosted the inaugural IAPR Workshop on Graphics Recognition (GRec); 12th edition of this series was recently held in France. At the recent ICDAR in Kyoto, Japan Kasturi was honored with the IAPR/ICDAR Outstanding Achievements Award.*




*Kasturi served in various leadership roles within the IAPR: Editor-in-Chief of* MV&A *(1993-94), an associate editor of* IJDAR, *chair of numerous committees, a vice-president, a member of the IAPR Governing Board, and President (2002-04). He was elected a Fellow of IAPR in 1996.*

*Kasturi has also been an active contributor to the IEEE. He served as the Editor-in-Chief of* IEEE Trans. on Pattern Analysis and Machine Intelligence, *General Co-chair of IEEE CVPR Conference (2001), member of IEEE Computer Society Executive Committee and the Board of Governors, and as its President (2008). He is an IEEE Fellow. In 2015, he received the Richard E. Merwin Award for Distinguished Service from the IEEE Computer Society.*

*He was a Core Fulbright scholar during 1999. As a current Fulbright Specialist, he is looking forward to working with educators and researchers around the world to share his expertise, strengthen institutional linkages, and help build capacity at the host institutions.*

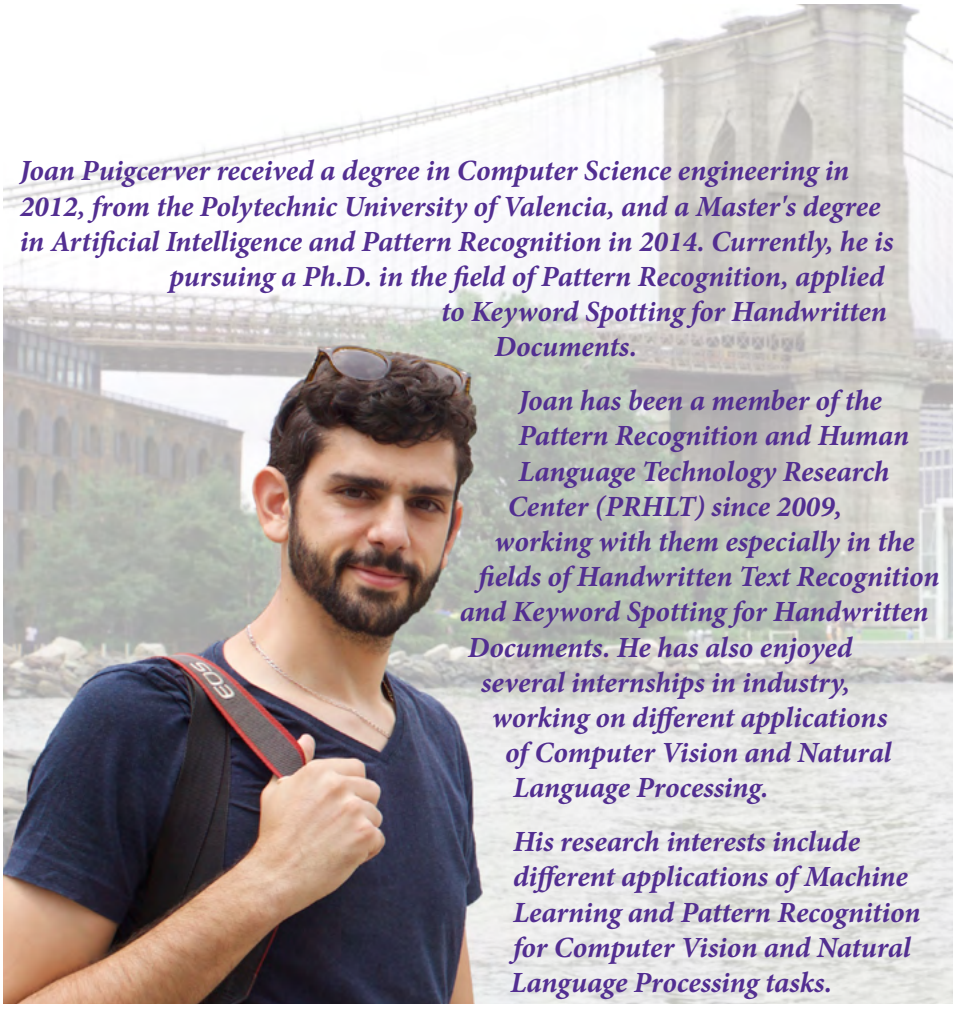
# IAPR...The Next Generation

***In this series of Feature Articles, the IAPR Newsletter asks young researchers to respond to three questions:***

- ***Briefly: How did you get involved in pattern recognition?***
- ***In more detail: What technical work have you done, and what is/are your current research interest(s)?***
- ***And lastly: How can the IAPR help young researchers?***

***~Arjan Kuijper, Editor -in-Chief***

## Joan Puigcerver Pérez



*Joan Puigcerver received a degree in Computer Science engineering in 2012, from the Polytechnic University of Valencia, and a Master's degree in Artificial Intelligence and Pattern Recognition in 2014. Currently, he is pursuing a Ph.D. in the field of Pattern Recognition, applied to Keyword Spotting for Handwritten Documents.*

*Joan has been a member of the Pattern Recognition and Human Language Technology Research Center (PRHLT) since 2009, working with them especially in the fields of Handwritten Text Recognition and Keyword Spotting for Handwritten Documents. He has also enjoyed several internships in industry, working on different applications of Computer Vision and Natural Language Processing.*

*His research interests include different applications of Machine Learning and Pattern Recognition for Computer Vision and Natural Language Processing tasks.*

*Editor's note:*
*Joan Puigcerver Pérez won the IAPR ICDAR 2017 ITESOFT Best Student Paper Award at ICDAR 2017 for the paper entitled, "Are Multidimensional Recurrent Layers Really Necessary for Handwritten Text Recognition".*
*~ Arjan Kuijper,* IAPR Newsletter *EiC*

by Joan Puigcerver Pérez, Polytechnic University of Valencia (Universitat Politècnica de València), Spain

***How did you get involved in pattern recognition?***
It happened pretty much by accident, quite early as an undergraduate student. During an Algorithms and Data Structures lecture, as a Computer Science sophomore, I implemented a tool to do noise removal from images, with some ideas that I got from the lectures. Because the tool was very simple and not very effective, I asked my professor for a few ideas. Although I did not know it, my professor was a member of the Pattern Recognition and Human Language Technology research group. He patiently suggested a few ideas to improve my tool, and we started talking about different topics. The common topic behind all our discussions turned out, indeed, to be pattern recognition.

The next year, my former professor was looking for students to join the research group, I applied and got the opportunity to start working on handwritten text recognition. In the beginning, my tasks were mainly preparing scripts for

running experiments, but a copy of the Hidden Markov Model Toolkit book landed on my desk, and I started reading it while I waited for my experiments to run. Thanks to that book, and the many talks and discussions with my lab-mates, I got very interested in pattern recognition.

I was astonished by the fact that quite simple ideas brought from statistics could be used to tackle such a variety problems, like speech recognition, text recognition, machine translation or face recognition. From there, I could not resist learning more about the field that unified all those applications.

During my last year as an undergrad, I had the opportunity to spend one year abroad in Sweden, and decided to focus on machine learning courses. Thanks to that, I was able to get an internship offer at Google, where my work also involved pattern recognition, and my interest in the field increased even more. I have been "obsessed" with it ever since.

***What technical work have you done, and what is/are your current research interest(s)?***
As I mentioned earlier, I started my path working on handwritten text recognition. At first, I used to work on feature engineering, although, to be frank, my work did not involve much research, but simply running experiments to compare existing methods and tuning the different parameters of the recognition pipeline (which has been coined lately as “Grad Student Descent"). This was a period that I used mostly to read about the basics and to try to learn as much as I could about pattern recognition in general, and handwritten text recognition in particular.

Actually, it wasn't until a few years later that I finally worked on my first real research project. During my first internship at Google Research, I also worked on feature engineering. However, we did something different from the classical feature engineering approach. Thanks to the courses in machine learning that I had recently taken, and the increasing interest in artificial neural networks and deep learning, we replaced the handcrafted features with a neural network. The project was a big success, and we managed to dramatically reduce the error rates of an in-house OCR engine, across more than 40 languages (including Bengali, Chinese, English, Telugu, Vietnamese, and many others). I felt that I had produced something significant and novel, and I was—for the first time—a researcher.

After my experience in the US, I decided that I wanted to try to pursue a “serious" career as a researcher in the field of pattern recognition, and returned to Spain to enroll in a Master's program in artificial intelligence and pattern recognition. My Master's advisers (who became my PhD supervisors afterwards) suggested that I work on keyword spotting for handwritten documents. This would later become the main topic of my PhD.

What is “keyword spotting?", you might ask. Well, that is a question with different answers depending on whom you ask. Strictly speaking, in the context of handwritten documents, the goal of keyword spotting is to find all (and only) instances of a given query keyword in a large collection of handwritten documents. For instance, a person could want to find the name of some ship or territory in a huge archive of handwritten logbooks. They could also want to find their family name in a large set of birth or marriage certificates. Because these archives contain so many handwritten documents, manual or fully-automatic transcription is unfeasible. These are just two examples were keyword spotting has been applied with success.

Given my background in text recognition, during my Master's degree and the first year of my PhD, I tried to study where and why the recognition-based approaches failed when applied to keyword spotting. However, because I am a big fan of statistical approaches to pattern recognition, I later decided to focus on designing a probabilistic formulation for keyword spotting.

Using this probabilistic framework, a big part of my PhD has also focused on trying to understand the relationship among the existing (and sometimes heterogeneous) methods used for keyword spotting, and how to design new algorithms that perform better, in a principled manner, and not just by simple trial-and-error.

Nonetheless, keyword spotting has not been the sole focus of research during my PhD. In general, I like to read about and explore ideas on different applications of pattern recognition and machine learning. For instance, during the last year, I mainly worked on handwritten text recognition using deep learning approaches. In particular, I have been exploring new network architectures that are able to achieve state-of-the-art accuracy, but are much faster to train.

In addition, I also devoted a large fraction of time trying to make my research reproducible and providing statistical analysis of the results obtained. I believe that both are good recipes for making progress in science really significant, and we (the community) should spend more time and discussion on these issues.

Moreover, I also had the opportunity to spend some time in industry, working on other other computer vision projects, mainly involving deep neural networks (from the recognition of businesses using StreetView imagery to content-based video recommendation, or detecting logos in images from social media).

Currently, when I am not in the mood to work on my dissertation, I like to spend some time exploring ideas to achieve effective, and principled, unsupervised learning. I believe unsupervised learning is an area of research with tremendous potential impact across many applications and with a lot of room for improvement, and I will definitely devote more time to it once I complete my PhD.

***How can the IAPR help young researchers?***

When I think of the IAPR, I mainly see the organization as the backbone of a large number of conferences and workshops devoted to the pattern recognition field and many of its subfields. These events are a great environment to get to know other researchers interested in the same or similar topics, share ideas, and foster collaboration among peers. To some, these might sound like void words read from a brochure. But, I could never emphasize too much how important these experiences have been to me. The opportunity to discuss ideas in person, or ask for comments or clarifications, with colleagues from all around the world, is simply priceless. You get so much more out of your time with first-hand contact and discussions, rather than e-mails!

Thankfully, especially for young researchers, the IAPR is here not only to help with the organization of conferences and workshops, but also to promote summer schools on different topics, to provide travel grants to attend all the previously-mentioned activities, to contribute to publication awards and, more broadly, to encourage newcomers to the field of pattern recognition.

Click here for the special section in this issue on ICDAR 2017 and its IAPR-sponsored and endorsed workshops.


IAPR ICDAR 2017 ITESOFT Best Student Paper Award presented to Joan Puigcerver Pérez (second from the left) by General Chair Koichi Kise (left) and Program Co-chairs (left to right) C. V. Jawahar, Daniel Lopresti, and Dimosthenis Karatzas

# BENCHMARK DATASETS

*Editor's note:*

*Do you have benchmarking news to share?*

*Send the link.*
*Describe the contents.*
*Include a contact person.*
*We'll feature your dataset in this series.*

*~ Arjan Kuijper,* IAPR Newsletter *EiC*
*arjan.kuijper@igd.fraunhofer.de*

The "Benchmarking Datasets" feature in this issue is taken from a tutorial entitled "Open Source Software and Datasets for Wildlife Video Surveillance" *http://www.viametoolkit.org/iccv-2017-tutorial/* that was held on October 22, 2017, at the International Conference on Computer Vision (ICCV) 2017 in Venice, Italy.

The tutorial exposed the audience to three major wildlife datasets, existing analytics developed for them, and associated open-source toolkits. Descriptions of the datasets mentioned in each section of the tutorial appear below:

**Underwater Imagery and Video for Fisheries Stock Assessment**

The National Marine Fisheries Service (NMFS) of the US National Oceanic and Atmospheric Association (NOAA) has created underwater imaging systems to collect data on fish and coral in various ocean climates near the USA.

NMFS has initiated a Strategic Initiative on Automated Image Analysis and has sponsored research in algorithms to automatically detect and classify fish and other marine life. NMFS has also sponsored the development of an open-source toolkit, Video and Image Analytics for Marine Environments (VIAME), to integrate the efforts across the program.

Descriptions of and links to publicly available datasets for detection, classification, and tracking of fish, scallops, coral and other marine life in video from various depths and lighting conditions, with tens of thousands of annotations suitable for learning can be found here: *http://marineresearchpartners.com/nmfs_aiasi/DataSets.html*.

**Underwater Visual Data for Coral Reef Fish Biodiversity Monitoring**

Fish4Knowledge (F4K) is a video repository, which contains about 700k 10-minute video clips recorded to monitor coral reefs in Taiwan. The F4K dataset contains videos recorded from sunrise to sunset showing several challenging conditions, such as murky water, algae on the camera lens, very low frame rates, and low spatial resolution, which make the fish detection and identification tasks extremely complex.

***Organizers and Speakers:***

- *Dr. Anthony Hoogs, Senior Director of Computer Vision, Kitware Inc.*
- *Dr. Concetto Spampinato, Leader of the Pattern Recognition and Computer Vision Lab, University of Catania*
- *Jason Holmberg, Founder, Wild Me*
- *Dr. Charles Stewart, Head of the Department of Computer Science, Rensselaer Polytechnic Institute*
- *Dr. Benjamin Richards, Lead Survey Scientist, NOAA Pacific Islands Fisheries Science Center*

**Identifying and Re-identifying Individual Animals for the Purpose of Population Assessment**

The Wildbook open source software platform includes front-end data interfaces for upload of images and associated observational metadata; underlying computer vision algorithms for detection of animals, labeling of species, and identification of individual animals; an API for the addition / substitution of new or alternative computer vision algorithms; and a back-end scalable and collaborative web platform for standards-based wildlife data storage and management, including advanced, consolidated searching. Wildbook includes a RESTful API and an R package to support the easy export of data to cross-disciplinary analysis applications and other software (e.g., Google Earth) and provides a platform that supports the further exposure of data in biodiversity databases (e.g., GBIF.org and iOBIS.org). Wildbook is currently in use to study a wide range of terrestrial and marine species, including frogs and toads, zebras, giraffes, cheetahs, sea turtles, manta rays, dolphins, whale sharks and humpback whales.

From the


# News from the Executive Committee of the IAPR

by Alexandra Branzan Albu (Canada)
IAPR Secretary

## *Wishing you a happy, healthy, and prosperous 2018 and looking forward to seeing you at ICPR 2018 in Beijing!*

On the subject of ICPR 2018, we'd like to draw your particular attention to some items in this issue of the *IAPR Newsletter*:

Call for Nominations for the 2018-20 IAPR Executive Committee

Call for Bids to Host ICPR 2022

Calls for Nominations for the King-Sun Fu, J. K. Aggarwal, and Maria Petrou Prizes


Photo of the ExCo taken by Joakim Nyström during the 2017 ExCo Interim Meeting

## *The IAPR Executive Committee*

*Massimo Tistarelli (First Vice President), Edwin Hancock (Second Vice President), Simone Marinai (President), Alexandra Branzan Albu (Secretary), Ingela Nyström (Past President), and Apostolos Antonacopoulos (Treasurer)*

# In Memoriam

## Professor Jun-Ichiro Toriwaki
## 1939-2017

With great sadness, we have to announce that Jun-ichiro Toriwaki, Professor Emiritus of Nagoya University, IAPR Vice President (1994) and IAPR Fellow (1996) passed away on October 5, 2017.

Prof. Toriwaki made his pioneering work in image processing, especially in medical image processing. He was an active researcher in both theory and application in medical images, including conventional X-ray image and volumetric CT images. He developed computer-assisted diagnosis system for chest X-ray images in the 1980s. This can be denoted as pioneering research in computer-assisted medical image diagnosis, which is currently actively investigated by using deep neural networks.

He published many papers not only in medical image processing but also on theoretical topics, including topological properties and distrance transformation in digital images. Some examples are delectability of pixels or voxels in binarized images, thinning, and Euclidean distance transformation. Also, he has worked in computer graphics and virtual reality in the 1990s. This research was applied for volumetric medical images. Some examples are surgical simulation for the skull surgery and virtualized endoscopy system.

Prof. Toriwaki served for many domestic and international societies as a leading researcher in this area. His service as the IAPR Vice President is one example. He hosted many international and domestic conferences including MICCIA 2002 (General Co-chair) and the annual meetings of Japan Society for Computer Aided Surgery. He was the president of the Institute of Image Electronics Engineers of Japan.

He published nine textbooks especially for educating young researchers. These books include the topics of image processing, volumetric image processing, computer graphics and visualization, medical imaging, probability and pattern recognition. These textbooks are still widely used in Japanese universities.

Receiving a "Commendation for Science and Technology of the Minister of Education, Culture, Sports, Science and Technology"

We would like to express sincere condolences on Prof. Toriwaki's death.

Prof. Kensaku Mori
Graduate School of Informatics, Nagoya University

# IAPR Technical Committee News

*This section the* IAPR Newsletter *publishes short, timely items by and about the IAPR's Technical Committees.*

*There are three main aims:*

1. *to give the IAPR's TCs regular access to the broader IAPR community*
2. *to introduce the various TCs to those who are new to the IAPR and*
3. *to keep the rest of the IAPR community interested and informed about TC happenings.*

*~Arjan Kuijper,* IAPR Newsletter *EiC*

In this issue:



## IAPR TC6 Computational Forensics

***https://sites.google.com/site/compforgroup/***

**Jean-Marc Ogier, Chair**

**Chang-Tsun Li, Vice Chair**

IAPR TC6 aims to provide leadership in the multi-disciplinary domain of Computational Forensics (CF). Emphasis is given to research, development and educational activities within CF that focus on the analysis and recognition of pattern evidence. CF is a research domain that concerns the investigation of forensic problems using computational methods. The primary goal is the discovery and the advancement of forensic knowledge. CF involves modeling, computer simulation, computer-based analysis and recognition in studying and solving forensic problems.

The group aims to further promote research, development and education in CF, and to provide a platform for cooperation and exchange for researchers, practitioner and teachers from the various disciplines of computational and forensic sciences.

Since its creation, the group has promoted exchange and research in the field of Computational Forensics, mainly through:

- International forum, the IWCF workshops, to peer-review and exchange research results
- Performance evaluation, benchmarking and standardization of algorithms and computational procedures
- Resources in the form of datasets, software tools, and specifications, e.g. data formats and system interfaces
- Education and training to prepare current and future researchers and practitioners
- Sources of information on events, related activities and financing opportunities

More detailed information on the motivation and mission statement can be found in the Application for the IAPR Technical Committee.

The website is reachable at the following address: *https://sites.google.com/site/compforgroup/*

Past activities: During ICDAR 2017, which was held in Kyoto in November 2017 (see report on ICDAR 2017 in this issue), TC6 organized a workshop dedicated to computational document forensics. It gathered around 40 participants, with a very nice panel discussion crossing seniors view on document forensics questions.

We are now planning the organization of the 7th International Workshop on Computational Forsensics to be held at ICPR 2018 (*http://www.icpr2018.org*).

If you are interested in the activities of IAPR TC6 or if you want to join the TC's mailing list, please contact

Jean-Marc Ogier *Jean-marc.ogier@univ-lr.fr*
or Chang-Tsun Li at *C-T.Li@warwick.ac.uk*

# More IAPR Technical Committee News

## IAPR TC11 - Reading Systems

**http://www.iapr-tc11.org/**

**Dimosthenis Karatzas, Chair**
**Masakazu Iwamura, Vice Chair**

by Richard Zanibbi, TC11 Communications Officer

The TC-11 flagship conference, the **International Conference on Document Analysis and Recognition** (ICDAR) 2017, was a great success (see special section on ICDAR 2017 and some of its related workshops in this issue)! Congratulations to Dr. Koichi Kise and his team for hosting an inspiring meeting in Kyoto. A number of excellent talks were given, and the workshop and poster sessions were well-attended and lively. A photo album is available online: *http://u-pat.org/ICDAR2017/album/index.html*.

**ICDAR Awards:** Congratulations to the IAPR/ICDAR award recipients:

- Prof. Rangachar Kasturi—Outstanding Achievements Award (see Getting to Know feature in this issue)
- Dr. Alicia Fornés—Young Investigator Award
- Jerod Weinman—Best Paper Award
- Joan Puigcerver—Best Student Paper (see IAPR...the Next Generation feature in this issue)
- Emilien Royer, Joseph Chazalon, Marçal Rusiñol, and Frédéric Bouchara—Best Poster

**Upcoming Conferences:**

The 13th IAPR International Workshop on Document Analysis Systems (DAS) 2018 will be held in Vienna, Austria, during 24-27 April.
*https://das2018.cvl.tuwien.ac.at*

The 16th International Conference on Frontiers in Handwriting Recognition will be held from August 5-8th in Niagara Falls, USA. ICFHR paper submissions are due March 2nd.
*http://icfhr2018.org*

**TC10/TC11 Summer School Proposals**: Proposals for the TC10/TC11 Summer School are due Jan. 31st. Proposal guidelines may be found online (*http://www.iapr-tc11.org/mediawiki/index.php/Guidelines_for_Organising_and_Bidding_to_Host_the_TC10_/_TC11_Summer_School*).

**Follow us!**
You can join the TC-11 mailing list using this link: *https://www.jiscmail.ac.uk/cgi-bin/webadmin?SUBED1=iapr-tc11&A=1*, or follow us on our Twitter feed (#iapr_tc11).


# ICPR 2018

## See you in Beijing!!!!

## Registration begins April 15, 2018

**24th INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION**

***In Beijing, China — August 20-24, 2018***

**www.icpr2018.org**

*ICPR will be an international forum for discussions on recent advances in the fields of Pattern Recognition, Machine Learning, and Computer Vision and on applications of these technologies in various fields.*

### GENERAL CHAIRS:

Tieniu Tan (China), Josef Kittler (UK), Anil Jain (USA)

### PROGRAM CHAIRS:

Cheng-Lin Liu (China), Rama Chellappa (USA), Matti Pietikäinen (Finland)

### TRACKS and TRACK CHAIRS:

**Track 1: Pattern Recognition and Machine Learning**

Dacheng Tao (Univ. of Technology Sydney, Australia)
Daniel Lee (University of Pennsylvania, USA)
Marcello Pelillo (University of Venice, Italy)
Sergios Theodoridis (Univ. of Athens, Greece)

**Track 2: Computer Vision**

Hongbin Zha (Peking University, China)
Takayuki Okatani (Tohoku University, Japan)
Krystian Mikolajczyk (Imperial College, UK)
Ming-Hsuan Yang (UC Merced, USA)

**Track 3: Speech, Image, Video and Multimedia**

Changsheng Xu (Inst. of Automation of CAS, China)
Theo Gevers (Univ. of Amsterdam, The Netherlands)
Bhiksha Raj (Carnegie Mellon University, USA)
Yi Yang (University of Technology Sydney, Australia)

**Track 4: Biometrics and Human Computer Interaction**

Zhenan Sun (Institute of Automation of CAS, China)
Arun Ross (Michigan State University, USA)
Massimo Tistarelli (University of Sassari, Italy)
Brian Lovell (University of Queensland, Australia)

**Track 5: Document Analysis and Recognition**

Koichi Kise (Osaka Prefecture University, Japan)
Venu Govindaraju (SUNY Baffalo, USA)
Simone Marinai (University of Firenze, Italy)
Apostolos Antonacopoulos (University of Salford, UK)

**Track 6: Biomedical Imaging and Bioinformatics**

Tianzi Jiang (Institute of Automation of CAS, China)
Dimitris Metaxas (Rutgers University, USA)
Elena Marchiori (Radboud Univ., The Netherlands)
Seong-Whan Lee (Korea University, Korea)

### WORKSHOPS, TUTORIALS & CONTESTS

To take place August 19, 2018,
immediately before the main conference

**Workshop Co-chairs:**

Zhaoxiang Zhang (China)
David Suter (Australia)
Yingli Tian (USA)

**Tutorial Co-chairs:**

Greg Mori (Canada)
Zhouchen Lin (China)

**Contest Co-chairs:**

Dimosthenis Karatzas (Spain)
Xiang Bai (China)

**Important Links:**

Main conference: *www.icpr2018.org*

Registration: *http://www.icpr2018.org/index.php?m=content&c=index&a=lists&catid=22*

Program Overview: *http://www.icpr2018.org/index.php?m=content&c=index&a=lists&catid=18*

# Meeting Reports

## ICDAR 2017 Section

In this section:




General Chair:

Koichi Kise, Osaka Prefecture University, Japan

by the General Chair

The International Conference on Document Analysis and Recognition (ICDAR) is a biannual meeting run by TC10 (Graphics Recognition) and TC11 (Reading Systems). ICDAR2017 was held in Kyoto, an ancient capital of Japan which attracts 50 million tourists each year.

**Conference scope and statistics**

ICDAR has been the flagship meeting in the field of document analysis and recognition. It covers wide areas of document analysis and recognition from traditional topics such as character recognition to emerging ones such as human-document interaction.

ICDAR2017 received 409 full-paper submissions from 43 countries (23 papers from Africa, 48 papers from America, 192 papers from Asia, 5 papers from Oceania, and 141 papers from Europe). The submitted papers were reviewed by 226 PC members and 123 sub-reviewers. Based on 1243 reviews, 23 area chairs made recommendations. Finally, 52 papers were selected for oral presentation and 160 papers for poster presentation. The overall acceptance rate was 51.8% (oral acceptance: 12.7% and poster acceptance: 39.1%) which were the lowest in the last ICDARs. The accepted papers will be published by the IEEE CS press. The total number of participants was 512.

**What's new**

In ICDAR2017, we introduced the following new features.

1. *Passport system:* Traditional ICDARs have had a registration system that required registration for each event (the main conference, workshops, and tutorials). For ICDAR2017, we offered two registrations: the ICDAR passport for all events and the pre-event pass for all but the main conference.
2. *Review with area chairs and rebuttal:* Since ICDAR2013, we have started using the rebuttal system that allows the authors to give rebuttals to their reviews to correct factual errors in the review. From ICDAR2015, we also introduced the area chair system by which area chairs have the responsibility to make a recommendation for the acceptance of papers based on the review results. And in ICDAR2017, we first introduced the double-blind submission that hides authors' information from reviewers.
3. *Conference format:* We reduced the number of oral tracks from three to two. We also introduced a new way of poster display: posters were allowed to be displayed through the main conference (three days).
4. *Student travel awards:* In order to help student participants, we offered a student travel award that gave 150K to 200K JPY, depending on the place of residence. We received 57 applications and the award committee selected 21 winners.
5. *Future workshop:* In addition to ordinary workshops, we organized a special workshop called the "workshop on the future of document analysis and recognition". The purpose of this workshop was to discuss

attractive open problems and possible future directions of research. We had more than 90 participants. After short position talks by invited speakers, we split the participants into 6 groups with specific topics and had hot discussions. The titles of discussion groups were as follows:

- When is good enough and challenges beyond 100%
- Contextual DAR
- Evolution of documents
- Roles of big data and AI
- Interdisciplinarity for DAR
- Reproducibility and datasets

6. *Local organization:* We also introduced some new tips to attract participants. One


(a) No character, no life (b) all of my love to documents

was T-shirts. We printed two messages: (a) no character, no life or (b) all of my love to documents and asked participants to select on which side—either characters or documents—they stand. Another small surprise was the offer of additional decoration to name badges. We prepared messages including: “I’m Student”, “First-time attendee”, “Looking for Job”, “I’m Talented”, “Expecting to win awards” and “Love to get drunk”. Participants loved to put those additional tags to express themselves. An important point that we considered was food. In addition to typical local foods and sweets, we prepared vegetarian and halal and received very positive feedback from the participants.

**Keynote talks**

The main conference included the following three keynote talks.

1st day: "Graphics recognition: A historical perspective and recent advances", by Prof. Rangachar Kasturi, University of South Florida, USA. This was the IAPR/ICDAR Outstanding Achievements Award, and it gave an overview of the history of graphics recognition.

2nd day: "Who are we now? An attempt to understand the ICDAR community!", by Prof. Andreas Dengel, German Research Center for Artificial Intelligence (DFKI), Germany. Prof. Dengel presented the results of an analysis of paper authorship presented at past ICDARs to uncover hidden structures of our community.

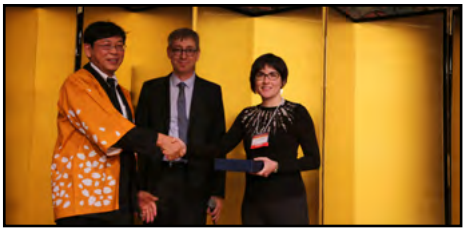
3rd day: "Deep neural networks for scene text reading revisited", by Prof. Xiang Bai, Huazhong University of Science and Technology, China. Prof. Bai dealt with an unavoidable hot topic on deep learning for scene text analysis.

**Award winners**

The ICDAR conference series gives two kinds of awards, for achievements and for papers. There are two awards for achievements: the outstanding achievements award and the young investigator award. The awards for papers are: best paper award, best student paper award, and best poster award. The winners are as follows:

- *IAPR/ICDAR Outstanding Achievements Award:* Prof. Rangachar Kasturi "for seminal research in document image analysis and graphics recognition, and for outstanding leadership to the international pattern recognition community". (See Getting to Know... in this issue.)

- *IAPR/ICDAR Young Investigator Award:* Dr. Alicia Fornés "for outstanding contributions in the recognition of handwriting, text and graphics, with high impact to the field of Digital Humanities, and her service to the IAPR Technical Committee on Graphics Recognition".



- *Best paper award:* Jerod Weinman, “Geographic and Style Models for Historical

# Meeting Reports

## ICDAR 2017 Section

In this section:



Map Alignment and Toponym Recognition"

- *Best student paper award:* Joan Puigcerver, "Are Multidimensional Recurrent Layers Really Necessary for Handwritten Text Recognition?" (See IAPR... The Next Generation in this issue.)
- *Best poster award:* Emilien Royer, Josep Chazalon, Marçal Rusiñol, and Frédéric Bouchara, "Benchmarking Keypoint Filtering Approaches for Document Image Matching"

Click here for ICDAR 2017 photo album

**Satellite events**

We had the following satellite events that attracted a lot of participants:

(1) Workshops

- GREC: 12th International Workshop on Graphics Recognition (two days).
- MANPU: 2nd International Workshop on coMics Analysis, Processing and Understanding (one day)
- HIP: 4th International Workshop on Historical Document Imaging and Processing (two days)
- ICDAR-OST: 1st International Workshop on Open Services and Tools for Document Analysis (two days)
- ICDAR-WML: Workshop on Machine Learning (one day)
- CBDAR: 7th International Workshop on Camera-Based Document Analysis and Recognition (one day)
- MOCR: 6th International Workshop on Multilingual OCR (one day)
- HDI: 1st International Workshop on Human-Document Interaction
- IWCDF: 1st International Workshop on Computational Document Forensics
- Special Workshop: The Workshop on the Future of Document Analysis and Recognition

Traditionally, GREC has been held at a location apart from the main conference. This year, we located it at ICDAR itself. We also had some new faces: ICDAR-OST, ICDAR-WML, HDI, IWCDF, all of which captured new features and factors of research in the field of document analysis and recognition. HIP and ICDAR-WML attracted a large number of participants. For more details of each workshop, visit this page.

(2) Competitions: Similar to previous ICDARs, we also had a wide variety of competitions in various categories:

- Handwritten Historical Document Layout Recognition
- Historical Handwritten Script Analysis
- Character/Word Spotting
- Handwriting Recognition
- Document Image Binarization
- Document Recognition (Layout Analysis and Text Recognition)
- Document Reconstruction
- Post OCR Correction
- Robust Reading Competitions
- Text in Video
- Forensics
- Arabic Text

If readers are interested in the competitions please visit this page.

(3) Tutorials

- GMPRDIA: Graph-based Methods in Pattern Recognition and Document Image Analysis (half day)
- RTRS: Building a Robust Text Reading System for Unconstrained Scene Images (half day)
- Word Spotting - From Bag-of-Features to Deep Learning (half day)

The details of the above tutorials can be found at this page.

(4) Doctoral consortium

Following the tradition of past ICDARs, we also had doctoral consortium with 23 young and talented Ph.D. students. The event was a half-day and guided by two chairs: Véronique Eglin and Rafael Dueire Lins. The details can be found on this page.

**Next ICDAR**

The next ICDAR, ICDAR2019 will be held in Sydney, Australia. The main conference is scheduled from September 22-25, 2019. I hope to see you in Sydney!

Proceedings of ICDAR 2017 will be available through IEEE*Xplore*

# 12th IAPR International Workshop on Graphics Recognition

November 9-10, 2017
Kyoto, Japan
http://grec2017.loria.fr

General Chairs:
Alicia Fornès, Universitat Autònoma de Barcelona, Spain
Bart Lamiroy, Université de Lorraine, Loria (UMR 7503), France

by the General Chairs

The biennial GREC workshop series is closely associated with ICDAR. It aims at providing a unique atmosphere and fostering a very high level of interaction, discussion, and exchange of ideas (distinctly different from classical conference-like presentations), while providing high quality and good impact post-proceedings. It therefore forms an excellent opportunity for researchers and practitioners at all levels of experience to share new ideas and knowledge about graphics recognition methods. Graphics Recognition is a subfield of document image analysis that deals with graphical entities in written documents, engineering drawings, maps, architectural plans, musical scores, mathematical notation, tables, diagrams, comics etc.

Previous GREC workshops were held at Penn State University (USA, 1995), Nancy (France, 1997), Jaipur (India, 1999), Kingston (Canada, 2001), Barcelona (Spain, 2003), Hong Kong (China, 2005), Curitiba (Brazil, 2007), La Rochelle (France, 2009), Seoul (South Korea, 2011), Lehigh University (USA, 2013), and Nancy (France, 2015).

For the 2017 edition, the TC10 leadership team decided to make some changes in order to increase participation and interactivity. GREC was therefore organized as an integated ICDAR workshop at the same venue as the main conference, in Kyoto, Japan.

The program was organized in a single-track, two-day workshop, but featured an invited speaker, Prof. I. Fujinaga, from McGill University. Besides his keynote talk providing an in depth review of the research on music score interpretation, the program comprised several sessions dedicated to specific topics related to graphics in document analysis and graphic recognition. Each session began with an introductory talk by the session chairs, describing the state-of-the-art, putting the presented talks in a more global perspective, and stating the current open challenges of session topics. This was followed by a number of short talks presenting solutions to some of these questions or presenting results of the speaker's work. A panel discussion concluded the sessions. The workshop also featured a discussion group session on future evolutions of the Graphics Recognition domain.

The program consisted of 27 scientific presentations and one contest/challenge announcement. It contained both classical and emerging topics of Graphics Recognition. Session topics included interpretation of engineering drawings, maps and charts; symbol recognition and spotting; optical music recognition; performance evaluation and interpretation; and raster to vector conversion.

The workshop had over 100 highly interactive participants on the first day. The second day, owing the start of other ICDAR workshops, attendance was 35.

Full access to the program and list of presented papers is available from the GREC 2017 website (http://grec2017.loria.fr). Long abstracts of the papers are published by IEEE in the ICDAR proceedings. Springer will publish a selection of fully reviewed extended papers in 2018 as an LNCS volume.

# Meeting Reports

## ICDAR 2017 Section

In this section:



# HIP 2017

**The 4th International Workshop on Historical Document Imaging and Processing**
**November 10-11, 2017 | Kyoto, Japan** ***http://events.unifr.ch/hip2017/***


Workshop Chairs:
Andreas Fischer, University of Fribourg, Switzerland
Angelika Garz, University of Fribourg, Switzerland
Kengo Terasawa, Future University Hakodate, Japan
Bill Barrett, Brigham Young University, USA


by Andreas Fischer

HIP 2017 was held in conjunction with the ICDAR 2017. Previous editions of HIP were held in Beijing (2011), Washington (2013), and Nancy (2015).

The HIP workshop series has developed into a major event that provides a confluence for leading research in historical document imaging and processing. In Kyoto, we were happy to welcome over 100 participants to the workshop, which provided the researchers with a forum that is complementary and synergetic to the main sessions at ICDAR on document analysis and recognition.
The topics addressed in HIP encompass the entire processing chain for historical documents from image acquisition to information extraction. This year, there was an emphasis on the growing importance of machine learning in this processing chain, such as convolutional and recurrent neural networks.

33 papers were submitted, representing fifteen different countries from six continents. These statistics show clearly the growing interest in historical documents all over our globe. We were happy to welcome—for the first time to a HIP workshop— a submission from Cambodia as well as a strong presence of the hosting country, Japan. Thanks to the 41 members of the program committee and seven additional reviewers, each submitted paper was carefully peer-reviewed by two to three knowledgeable researchers in the field whose countries of origin were as diverse as those of the authors. We were pleased to be able to accept 19 papers (for an acceptance rate of 58%). They were presented on the first day of the workshop in four oral sessions on Character Datasets and Text Retrieval, Character Recognition, Layout Analysis and Complete Workflows, and Binarization and Page Segmentation.

At the closing ceremony, the IAPR Best Paper Award of HIP 2017 was presented to Hung Tuan Nguyen, Nam Tuan Ly, Kha Cong Nguyen, Cuong Tuan Nguyen and Masaki Nakagawa for their paper entitled "Attempts to recognize anomalously deformed Kana in


Japanese historical documents". This outstanding work is breaking ground for the challenging problem of Kana recognition in historical Japanese documents, thoroughly investigates state-of-the-art methods at different recognition levels, and promotes the use of open data for historical document imaging and processing.

As in previous years (HIP 2011, HIP 2013, HIP 2015), the HIP 2017 proceedings have been published in the ACM Digital Library.

The workshop was complemented by two social events. On the first day, a workshop dinner and, on the second day, a visit to the Ritsumeikan University Art Research Center and the Kyoto Institute, Library and Archives (Rekisaikan).

We would like to thank each and everyone for contributing to a successful HIP 2017. Special thanks go to our sponsor FamilySearch for their continuous and generous support that greatly simplified the overall organization, to the ICDAR 2017 organizers for the excellent coordination with the main conference, and to Apostolos Antonacopoulos for agreeing to serve as chair for the next HIP workshop, which is envisaged for Sydney, Australia, in 2019.

CDBAR 2017

## 7th International Workshop on Camera Based Document Analysis and Recognition

November 11, 2017
Kyoto, Japan
*http://www.cvc.uab.es/cbdar2017*

Workshop Chairs:

Lluis Gomez-Bigorda, Computer Vision Centre, Spain

Muhammad Muzzamil Luqman, L3i Laboratory, University of La Rochelle, France

Dimosthenis Karatzas, Computer Vision Centre, Spain

The CBDAR 2017 was held in conjunction with the ICDAR 2017 conference, with the main aim of providing a natural link between document image analysis and the wider computer vision community by attracting cutting edge research on the topic. The workshop was sponsored by A9/Amazon and endorsed by the IAPR.

The workshop received a total of 14 paper submissions, that were reviewed in a single-blind review process by a Programme Committee composed by 20 internationally renowned experts. The final program comprised eight accepted papers that were presented as oral presentations in three different sessions. The workshop's proceedings will be published by IEEE CPS, along with the proceedings of the main conference, ICDAR 2017. A best paper award was awarded to Mengyi En, Rong Li and Jianqiang Li for their paper: “Feature Pyramid Based Scene Text Detector”.

The Technical Programme included two Keynote Talks during the morning: “Making Scene Text Useful for Mobile Recognition”, given by R. Manmatha (A9/Amazon, USA); and “Considerations in Chinese Scene Text Detection and Recognition”, given by Prof. Cheng-Lin Liu (Chinese Academy of Sciences). In the afternoon, a special session was held around the ICDAR Robust Reading Competitions with short oral presentations of the competitions and participating methods. Finally, the closing Panel Discussion provided a space for debate about Robust Reading methods, datasets, and future challenges. The workshop was very well attended, with an average of 60 participants during the whole day.

# Other Meeting Reports

## Conferences, Workshops & Summer Schools





IWBF 2017

### 5th International Workshop on Biometrics and Forensics

April 4-5, 2017
Coventry, UK
*www.warwick.ac.uk/iwbf2017*

General Chair:
Chang-Tsun Li, University of Warwick, UK

Program Chairs:
Victor Sanchez, University of Warwick, UK
Alex Kot, Nanyang Technology University, Singapore
Mark Nixon, University of Southampton, UK

by Victor Sanchez

The International Workshop on Biometrics and Forensics (IWBF) is an international forum devoted specifically to facilitate synergies in research and development in the areas of multimedia forensics, forensic biometrics, and forensic science. IWBF has been held annually since 2013 in various parts of Europe. It provides the meeting place for those concerned with the usage of multimedia analysis in forensic applications and biometric recognition systems, attracting participants from industry, research, academia, and end-users.

IWBF 2017 was organized by the Digital Forensics Lab and the Signal and Information Processing (SIP) Lab of the University of Warwick. IWBF 2017 was sponsored by the International Association for Pattern Recognition (IAPR), the Horizon2020 Program of the European Union through the IDENTITY project, and the Engineering and Physical Science Research Council (EPSRC) of the United Kingdom. This edition also gained the endorsement of the IEEE Signal Processing Society.

IWBF 2017 received over 50 submissions from 18 different countries, namely Australia, Austria, China, France, Germany, India, Italy, Japan, Malaysia, Mexico, Netherlands, Norway, Portugal, Qatar, Taiwan, Turkey, UK, and the USA, a substantial increase from previous editions. The Technical Program Committee and a team of nearly 30 additional reviewers were involved in a rigorous peer-review selection process, based on three distinct reviewers per paper. The technical program comprised 18 oral presentations and a poster session, with an oral acceptance rate of 36%. The proceedings were published by IEEE and are available online.

The program included two invited talks by experts in digital image forensics:

- "Copying with the enemy: Multimedia forensics in adversarial conditions" by Prof. Mauro Barni, IAPR Invited Keynote Speaker, University of Siena, Italy
- "What Else Does Your Biometric Data Reveal?" by Prof. Arun Ross, Michigan State University, US;

and the discussion session "Biometrics in Europe -

Opportunities for Collaboration", organized by the European Association for Biometrics Academia Special Interest Group.

Based on the comments of reviewers, the top four papers were presented in a special session chaired by Prof. Chang-Tsun Li:

1. "Is Your Biometric System Robust to Morphing Attacks?" Authors: Marta Gomez-Barrero, Christian Rathgeb, Ulrich Scherhag, Christoph Busch
2. "Non-reference image quality assessment for biometric presentation attack detection" Authors: Amrit Pal Singh Bhogal, Dominik Söllinger, Pauling Trung, Andreas Uhl
3. "From Image to Sensor: Comparative Evaluation of Multiple PRNU Estimation Schemes for Identifying Sensors from NIR Iris Images" Authors: Sudipta Banerjee, Arun Ross
4. "Full-fingerprint Volumetric Subsurface Imaging using Fourier-Domain Optical Coherence Tomography" Authors: Ctirad Sousedik, Ralph Breithaupt

The audience in this session voted for the best paper of the workshop. The Best Paper Award, which was sponsored by the IAPR, was given to paper number 4. The authors of the top ten papers, based on the reviewers' comments, were invited to extend their articles and submit them to a special section of the Special Issue of the IET Biometrics Journal.

The technical program was complemented by a social program that consisted of a tour of Warwick Castle followed by a banquet. The Best Paper Award was announced at the end of the banquet.

IWBF 2017 was a great success. This success is to be credited to the contributions of the general chair, the advisory chairs, the program chairs, the reviewers, the local logistics organizer, the volunteer students, and all the authors and attendees. We look forward to the next edition of IWBF, which we are certain will also be a great workshop, both scientifically and socially.

Proceedings of IWBF 2017 have been published in IEEE*Xplore*

IGS 2017

## 18th International Graphonomics Society Conference (IGS2017)

### Graphonomics for e-citizens: e-health, e-society, e-education

June 18-21, 2017
Gaeta, Italy
*http://www.graphonomics.org/igs2017*

General Chair:
Claudio De Stefano
University of Cassino and Southern Lazio, Italy

Co-Chair:
Angelo Marcelli
University of Salerno, Italy

by the General Chair

IGS2017 was the 18th edition of the biennial conference of the International Graphonomics Society. It was a single-track, IAPR-sponsored conference focusing on recent advances in the fields of science and technology of handwriting and other graphic skills, and their impact on daily life within the e-society.

The conference was organized by the University of Cassino and Southern Lazio, Italy, and hosted in the Aragonese-Angion Castle of Gaeta, which is located on the top of the hill with a spectacular view on both the mediaeval part of the town and the sea.

As in previous editions, the conference included invited speaker presentations, oral, poster

and demo sessions as well as working group discussions. The aim of the IGS conference series is to bring together the works of many experts in a multidisciplinary subject that involves different competences and knowledge, spanning from the study of the handwriting generation models to the development of machine learning techniques for handwriting recognition.

In particular, the theme of this edition was “Graphonomics for the e-citizens: e-health, e-society and e-education” and was meant to outline the contribution that the fundamental and applied studies of handwriting and drawing skills may provide to the development of individuals in a society where the convergence of information and communication technology are introducing artifacts that are redefining the relation between individuals and the world, as well as the social interactions between individuals. All the interactions required a language to be expressed and the oldest and universal language we have developed so far is based on signs:  handwriting, signatures, and drawings. The pervasive use of new devices is not only affecting the way these signs are produced, stored and communicated, but it is also extending the alphabet of signs that can be manipulated by them. In such a scenario, graphonomics, because of its multidisciplinary and interdisciplinary nature, may provide a valuable framework for the social, scientific and technological challenges the e-citizenship endeavors.

IGS2017 received 65 contributions by 147 researchers from 21 countries of all six inhabited continents. After the review process, involving 58 Program Committee members, 52

contributions were accepted for presentation and publication in the conference proceedings. 27 papers were presented in 7 technical oral sessions, 10 in two special oral sessions and 15 during three poster sessions. There were also three invited talks.

There were 71 registered participants, 10 of whom were not presenting a paper. Among them, there were 13 students. Participants experienced a rich program of presentations, demonstrations and working group sessions, punctuated by coffee and lunch breaks that encouraged discussion and exchange of ideas among the participants.

There was a rich social program, including the welcome party, the conference banquet and the farewell party. During the parties, there were two concerts: the first with an orchestra of 16 guitars, and the second one with a duet of guitar and violin. The banquet was held in a beautiful restaurant overlooking the sea of the Gaeta gulf. On the second evening of the conference, participants enjoyed a tour of the town, allowing them to visit the main monuments and churches. Finally, there was a post-conference tour in the surroundings of Gaeta, including a visit to the Sanctuary of the Split Mountain, famous for its miraculous crack, and a walk along the history and nature trail of Monte Orlando.

The first keynote speech, "Control of the hand and arm: Distributed, but serial rather than parallel processing”, was delivered by Prof. Marc H. Schieber, head of the Neural Control of Hand and Finger Movements Laboratory, University of Rochester Medical Center, School of Medicine and Dentistry,

Dr. Heidi H. Harralson, Managing Partner of Spectrum Forensic International, gave the second keynote speech titled “Handwriting in the Digital Age”.

Finally, the third keynote speech by Prof. Oliver Tucha, head of the Department of Clinical and Developmental Neuropsychology, Faculty of Behavioural and Social Sciences, University of Groningen, was on the topic “Handwriting in Children with Attention Deficit Hyperactivity Disorder”.

In addition to the main program, two very well attended Special Sessions were organized on the first and third days of the conference. The first one on the topic “Sensory and Motor Brain-Machine-Interfaces for Grasping and Manipulation: From Basic

to Clinical Applications" was organized by prof. J. L. Contreras-Vidal, University of Houston, USA, and included five talks and a panel discussion. The second one, entitled "Digital palaeography and Codicology", was organized by prof. M. Maniaci, University of Cassino and Southern Lazio, Italy, and comprised five talks.

We considered three prizes in different research fields, for the best paper authored and presented by a student.

The IGS best student paper award on Graphonomics, sponsored by the International Graphonomics Society, was assigned to Danilo Romano for the paper titled: "A Computational Model-Based Analysis of Cerebellar Plasticity in Motor Learning".

The AFDE Bryan Found Research Award, sponsored by the Association of Forensic Document Examiners for the best student paper in forensics, was given to Carina Fernandes, who authored and presented the paper "Alzheimer's Disease and Handwriting - What do we know so far?".

Finally, the GIRPR best student paper award on Pattern Recognition, sponsored by the Gruppo Italiano Ricercatori Pattern Recognition, was assigned to Daniel Berio for the paper "Computer Aided Design of Handwriting Trajectories with the Kinematic Theory of Rapid Human Movements".

As concluding remarks, we feel from participants' feedback that IGS2017 was a successful event from both the scientific point of view (in terms of quality of papers and discussions) and the social point of view, allowing the participants to interact in a relaxed atmosphere and to enjoy the beauties of Gaeta.

CVIP-WM 2017

## 2nd International Conference on Computer Vision and Image Processing & Workshop on Multimedia

September 9-12, 2017
Greater Noida Extension Center, IIT Roorkee, India
*https://www.iitr.ac.in/cvip2017/*

General Chairs:
Bidyut Baran Chaudhuri, (ISI Kolkata, India)
Mohan Kankanhalli (NUS, Singapore)

Organizing Chairs:
Balasubramanian Raman (IIT Roorkee),
Sanjeev Kumar (IIT Roorkee),
Partha P. Roy (IIT Roorkee)
Vinod Pankajakshan (IIT Roorkee)

by Balasubramanian Raman, Sanjeev Kumar, Partha P. Roy and Vinod Pankajakshan

The second International Conference on Computer Vision and Image Processing & Workshop on Multimedia (CVIP-WM-2017) were organized at Indian Institute of Technology – Roorkee (IITR) in its Greater Noida Extension Center. The conference was endorsed by International Association of Pattern Recognition (IAPR) and was mainly sponsored by MathWorks.

The conference brought together delegates from around the globe in the focused area of computer vision and image processing. CVIP-2017 received a total of 175 paper submissions from which 65 high quality articles were selected for presentation based on reviews provided by the members of the technical program committee from 10 different countries. The presentations were made in a carefully categorized technical program consisting of seven oral sessions and two poster sessions. The overall acceptance rate was around 37% and the oral acceptance rate was about 22%. Interactions on several latest advances in vision technology such as cybernetic health, perception of visual sentiment, reshaping of human figures in images and videos using 3D morphable models, vision & language, and challenges in biometric system development were facilitated.

The works presented were of very high quality, and three prizes were awarded to encourage the recipients.

- IAPR Best Paper Award : "Engineering the Perception of Recognition through Interactive Raw Primal Sketch by HNFGS and CNN-MRF", Apurba Das, and Nitin Ajithkumar
- IAPR Best Student Paper Award: "Denoising of Volumetric MR Image using Low Rank Approximation on Tensor SVD framework", Hawazin S Khaleel, Sameera V Mohd Sagheer, Baburaj M, and Sudhish N George


- Best Poster Award : "Multi-Scale Directional Mask Pattern for Medical Image Classification and Retrieval", Akshay A. Dudhane, and Sanjay N. Talbar

The program also included five keynote talks by eminent researchers in computer vision and image processing. We are very grateful to the keynote speakers:

- Prof. Ramesh Jain, University of California, Irvine in the USA, gave an overview of Cybernetic Health.
- Prof. Mohan S Kankanhalli, National University of Singapore, gave us an overview of Perception of Visual Sentiment: From Experimental Psychology to Computational Modeling.
- Prof. Prem K. Kalra, Indian Institute of Technology Delhi in India, discussed Reshaping of human figures in images and videos using 3D morphable models.
- Prof. C. V. Jawahar, International Institute of Information Technology Hyderabad in India, gave us an overview of Vision and Language.
- Prof. Phalguni Gupta, Indian Institute of Technology Kanpurin in India, discussed Challenges in Biometric System Development.


The proceedings of the conference will be published by Springer in two volumes of their prestigious Advances in Intelligent Systems and Computing (ASIC) series. In the proceedings, the articles have been thematically divided based on their relation to operations at the lower, middle and higher levels of vision systems, and their applications. The editors of this proceedings are Bidyut Baran Chaudhuri, (ISI Kolkata, India), Mohan Kankanhalli (NUS, Singapore) and Balasubramanian Raman (IIT Roorkee, India).

The organization of the conference was due to the synergistic contributions of various individuals and groups including the international advisory committee members from 6 different countries with their invaluable suggestions, the technical program committee members with their timely high quality reviews, the keynote speakers with informative lectures, the student volunteers with their unconditional help, and our sponsors and endorsers with their timely support. We owe a big thanks to the IAPR for endorsing the conference and sponsoring two of the best paper prizes.

From the feedback received, we believe that CVIP-WM 2017 was a successful conference both scientifically and socially. The favorable response to CVIP-WM 2017 has encouraged us to facilitate the organization of the next CVIP in 2018 on a larger scale.


General Chairs:
Tieniu Tan, Chinese Academy of Sciences, China
Zixiang Xiong, Texas A&M University, USA
Hongkai Xiong, Shanghai Jiao Tong University, China

by Yao Zhao, Beijing Jiaotong University, China

ICIG is the biennial conference hosted by the China Society of Image and Graphics (CSIG), focusing on innovative technologies of image, video, and graphics processing and fostering innovation, entrepreneurship, and networking. With the breakthrough of deep learning, artificial intelligence, and computer vision, our conference witnesses the obvious occurrence.

ICIG 2017 was hosted by CSIG, organized by Shanghai Jiao Tong University, and co-organized by Nanjing University of Science & Technology and ZongMu Technology. This year, it received a total of 370 high quality submissions. Among them, 80 were accepted as oral (12 as special session papers) and 92 as poster, for a total of 172 accepted papers. The acceptance rate for regular submissions is around 18.38% as oral and 24.8% as poster, excluding the special sessions where the majority were invited. All the papers accepted for presentation at the conference will be included in the Proceedings of ICIG 2017, have been published in three volumes as Springer LNCS 10666, 10667, and 10668 and will be indexed by Ei. Over 200 participants attended the conference.

ICIG 2017 featured a rich and diversified program, three keynote speeches which were from Scott T. Acton, University of Virginia, Charlottesville, Virginia, USA; Long QUAN, Department of Computer Science and Engineering, HKSUT; Jingyi Yu, School of Information Sciences and Technology, Shanghai Tech University, China. Three special sessions, 12 regular oral sessions, six poster sessions, one ICCV 2017 China Pre-Conference and one Young Scientist Forum.

At the closing ceremony, three paper awards were announced and presented. The awards were selected based on evaluation of review scores and presentation quality by a committee led by program chair and award chair. The paper awards and the recipients are as follows:

ICIG2017 Best Paper Award:

- Wei-Hong Li, Yafang Mao, Ancong Wu and Wei-Shi Zheng, Correlation based Identity Filter: An Efficient Framework For Person Search
- Wenjie Li, Rongrong Ni and Yao Zhao, JPEG Photo Privacy-Preserving Algorithm Based on Sparse Representation and Data Hiding
- Zhentao Tan, Bin Liu and Nenghai Yu, PPEDNet: Pyramid Pooling Encoder-Decoder Network for Real-Time Semantic Segmentation

DGCI 2017

Vienna, September 2017

http://dgci2017.prip.tuwien.ac.at/

Organizing Chairs:
Walter G. Kropatsch, Vienna University of Technology, Austria
Ines Janusch, Vienna University of Technology, Austria
Nicole M. Artner, Vienna University of Technology, Austria

by David Coeurjolly, Chair of the Steering Committee, University of Lyon, France

DGCI 2017 was organized by Walter G. Kropatsch, Nicole M. Artner and Ines Janusch from the Pattern Recognition and Image Processing Group at TU Wien, Austria.

The DGCI conference is the main event of IAPR Technical Committee 18 (IAPR TC18) "Discrete Geometry and Mathematical Morphology". It's aim is to gather researchers in discrete geometry and topology, and discrete models, with applications in image analysis and image synthesis. Discrete geometry plays an expanding role in the fields of shape modeling, image synthesis, and image analysis. It deals with topological and geometrical definitions of digitized objects or digitized images and provides both a theoretical and computational framework for computer imaging.

DGCI 2017 took place in the very nice facility of TU Wien and attracted 48 researchers. The scientific program consisted of three invited talks and 18 oral and 10 poster presentations during the three days. Presentations were organized into sessions following the conference topics:

- Geometric transform
- Discrete tomography
- Discrete modeling and visualization
- Morphological analysis
- Discrete shape representation, recognition and analysis
- Discrete and combinatorial topology
- Discrete and combinatorial tools for image segmentation and analysis
- Models for discrete geometry

During the first day, the event started with a very inspiring invited presentation by Helmut Pottmann (TU Wien, Austria) entitled "Freeform Architecture and Discrete Differential Geometry". His presentation covered very interesting geometry processing problems with direct application to architecture and design. After several paper sessions, the first day ended with an interesting poster session followed by a friendly Ice Breaker Party at TU Wien.

The second day of the conference began with a presentation by IAPR distinguished speaker Michael Wilkinson (University of Groningen, The Netherlands) entitled "A guided tour of connective morphology". Such a highly recognized keynote speaker highlights the fact that digital geometry and mathematical morphology are getting closer, spurring the recent change of the IAPR TC18 title from "Discrete Geometry" to "Digital Geometry and Mathematical Morphology". After several paper sessions, the second half of the second day was dedicated to community discussion (IAPR TC18 "brainstorming session and open problems" and

Steering Committee meetings). This day ended with a very interesting guided tour through the first district of Vienna and the wonderful gala dinner in a typical Wiener place.

During the gala dinner, we announced the location of the next DGCI event (Spring 2019). Proposals had been collected before the conference and the Steering Committee decided to locate the next event in Paris/ Marne-la-Valléen, France, organized by Yukiko Kenmochi, Michel Couprie, Jean Cousty, and Nabil Mustafa (ESIEE).

Also during the dinner, the Award Committee announced the winner of the “Best student paper award” sponsored by Springer. This year, the prize was given to Thomas Caissard, a PhD student in Lyon, France, for his work on Laplace-Beltrami operators on digital surfaces ("Heat kernal Laplace-Beltrami operator on digital surfaces" by Thomas Caissard, David Coeurjolly, Jacques-Olivier Lachaud, and Tristan Roussillon). The committee acknowledged the quality of the work and the importance of the results.

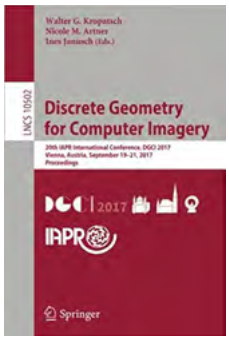
The last day of DGCI 2017 started with a very refreshing invited talk by Eric Andres (Université de Poitiers, France). His presentation was entitled “Collaborating with an Artist in Digital Geometry”. He covered his collaborations with an artist using digital geometry tools to create art pieces. Several technical paper sessions followed with very interesting paper presentations.

The overall event was perfectly organized by a very enthusiastic local team driven by Walter. Everyone agreed on the fact that this event was very successful. Many very stimulating scientific discussions took place and many interesting projects started during the conference. The proceedings were published in Springer’s series on Lecture Notes in Computer Science, Volume 10502.

Now, we are working on a special issue of the event that will be published in the Journal of Mathematical Imaging and Vision (JMIV). Ten papers have been invited to submit an extended version, and we expect a very valuable and insightful special issue on our research topics.

**Conference proceedings**

Click on the image to go the publisher’s web site for this volume.




See you in Paris - Marne-La-Vallée for DGCI 2019 !

# BOOKSBOOKSBOOKS

## A Note of Thanks from the *IAPR Newsletter*'s Associate Editor for Book Reviews

Since its beginnings in 2004, the **BooksBooksBooks** section of the *IAPR Newsletter* has relied on publishers providing review copies of their publications. This column is possible only through their generous support.

Thank you, Springer and Whittles, for the following books:

- *Video Text Detection* by Tong Lu et al. (Springer, 2014)
- *Airborne and Terrestrial Laser Scanning* by George Vosselman and Hans-Gerd Maas (Whittles Publishing, 2010)
- *Support Vector Machines for Pattern Classification, 2nd ed.* by Shgeo Abe (Springer, 2010)
- *Probabilistic Graphical Models* by Luis Enrique Sucar (Springer, 2015)
- *Scalable Pattern Recognition Algorithms* by Pradipta Maji and Sushmita Paul (Springer, 2014)
- *Handbook of Biometric Anti-Spoofing* by Sébastien Marcel, Mark S. Nixon, and Stan Z. Li, Eds. (Springer, 2014)

### Guide to Medical Image Analysis: Methods and Algorithms

by Klaus D. Toennies

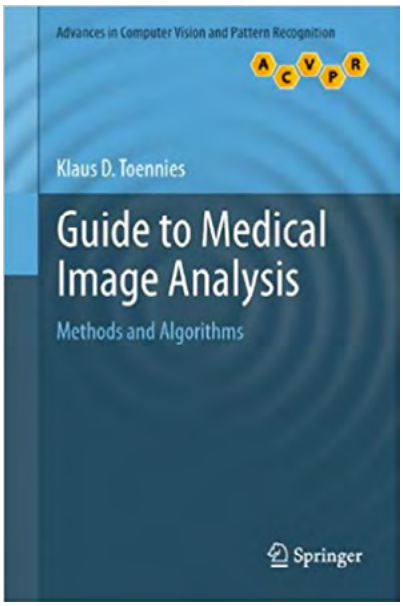
Springer, 2017
*http://www.springer.com/book/9781447173182*

Reviewed by Guang Yang, Imperial College London, UK

For many reasons, medical image analysis is a fast growing research area. The three most important reasons are: there are numerous relevant clinical open questions that rely on medical images, which provide an insight for doctors to look into the patients; as both the imaging and computing hardware develop really fast, the data are accumulated too quickly for clinicians to manually process; perhaps most importantly, automatic medical image analysis methods provide not only fast processing but also more objective quantification and evaluation.

In order to keep up with this fast-paced research area, Dr Klaus D. Toennies provides a new version of his book named Guide to Medical Image Analysis: Methods and Algorithms that originated from and has been organised as a series of lecture notes about processing and analysis of medical images. In general, the topics discussed in this book are wide ranging but with insightful details from digital image acquisition, image storage and transfer to image enhancement, feature detection, segmentation, registration, and machine learning based analysis. Details of the conventional and the more recently developed algorithms are given in each chapter followed by comprehensive references and exercises at the end. This book consists of 13 chapters, each covering a particular aspect of medical image acquisition, processing and analysis.

The first chapter gives an introduction to medical image analysis. Table 1 summarizes that different scenarios for computer-assisted image analysis have different requirements. For example, for cohort and clinical study, the number of studied cases is always very large, the time constraints are low, and no interaction is acceptable. In contrast, for computer aided




Click above to go the publisher's web site for this volume.

diagnosis, treatment planning, and computer assisted surgery, the number of cases is small and interaction is acceptable. Therefore, in order to make the clinical workflow more efficient and effective, it is important that there be collaboration and discussion between data experts (e.g., radiologists, surgeons, and physicians) and methodology experts (computer scientists and engineers). The most critical problems in medical image analysis include: medical imaging reconstruction or data formation, image registration (same modality for different patients or cross-modality for the same patient), segmentation, and automated classification or pattern recognition. For a specific task, we can use specialised software tools instead of building everything from scratch, e.g., using Matlab, MevisLab, OpenCV, ITK and etc. that are introduced in the book. Finally, an example of Multiple Sclerosis Lesion Segmentation in Brain MRI was given to provide the reader an overall feeling about the medical image analysis pipeline.

The second chapter provides an overview of medical imaging acquisition for almost every available clinical imaging modality, e.g., X-ray/Computed Tomography, Magnetic Resonance Imaging (MRI), Ultrasound, Single Photon Emission Computed Computed Tomography (SPECT), Positron Emission Tomography (PET), and also brief discussions of Optical Coherence Tomography, Optical/ Electron Microscopy, EEG, and MEG. Image acquisition methods can be categorised into projective and non-projective methods, and they can also be classified into physiological and functional imaging techniques. The key problem of medical imaging is to obtain clear images or signal representations of clinically relevant information, and the main task of medical image analysis is to solve the incomplete differentiation of structures of interest with artefacts and noise in these scanned data. This chapter contains a very nice overview of these different medical imaging modalities; however, the reader may also want to have more understanding of multi-modal imaging analysis, e.g., PET-MRI or structural imaging and functional imaging.

Chapter Three provides a summary of medical image storage and transfer. For example, in clinical environments, standards HL7 and DICOM are widely used. In addition, there is further integration needed for DICOM-based PACS with HL7-based RIS systems. Also, proper image compression, storage, and transfer can make the clinical workflow more efficient.

Compared to natural images captured by digital cameras, medical images suffer from low signal to noise ratio. Frequently, the image quality will also be affected by motion and other artefacts; therefore, in Chapter Four, image enhancement techniques are discussed. In general, medical image enhancement techniques include contrast, resolution, and edge enhancement and noise reduction via different filtering methods. Successful image enhancement processing is always a prerequisite for the success of the subsequent steps, e.g., segmentation.

Apart from image enhancement, feature detection, which is discussed in Chapter Five, is also an important step for further medical image analysis. Widely used feature detection methods include edge tracking, Hough transform, SIFT feature extraction, bag of features etc. More recently, deep learning has become a very hot topic in medical image analysis. The more abstract features of the images can be learnt directly from the multiple layers of the network. In my opinion, this might be an area of further reading for those interested in more effective features.

Chapters Six to Nine describe the details of the segmentation algorithms used in medical image analysis. From the simplest, thresholding-based methods to more advanced graph cuts, level sets, and active contours approaches. According to [1], the most important part of medical image processing is image segmentation. Image segmentation is a procedure for extracting the region of interest (ROI) through an automatic or semi-automatic process. Many image segmentation methods have been used in medical applications to segment tissues and body organs. Some of the applications are: border detection in coronary angiograms, surgical planning, simulation of surgeries, tumour detection and segmentation, brain development study, functional mapping, automated classification of blood cells, mass detection in mammograms, image registration, heart segmentation, and analysis of cardiac images etc. In summary, successful segmentation is

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References

[1] Norouzi, Alireza, et al. "Medical image segmentation methods, algorithms, and applications." IETE Technical Review 31.3 (2014): 199-213.

[2] Oliveira, Francisco PM, and Joao Manuel RS Tavares. "Medical image registration: a review." Computer methods in biomechanics and biomedical engineering 17.2 (2014): 73-93.

crucial for the fully automated quantification and qualitative visualisation of the medical images.

Chapter Ten discusses medical image registration, which is another important component of medical image analysis. Image registration, also known as image fusion, matching, or warping, can be defined as the process of aligning two or more images [2]. The goal of a medical image registration method is to find the optimal transformation that best aligns the structures of interest in the input clinical scans. Image registration is a crucial step for image analysis in which valuable information is conveyed in more than one image; i.e., images acquired at different times, from distinct viewpoints, from different patients, or by different medical image modalities can be complementary [2]. Therefore, accurate integration (or fusion) of the useful information from two or more images is very important for both longitudinal and cohort studies. Chapter Ten provides detailed descriptions of various medical image registration approaches, e.g., iterative closest points and non-rigid registration methods. Also, it is of note that an atlas based method can solve the segmentation problem via image registration.

Object detection is a necessary step of medical image analysis by searching for an object model in the image. The derived model can effectively describe properties such as shape and the appearance of the object. Essentially, the searching procedure is a process of fitting the model to the data. In Chapter Eleven, several techniques that generate and use object models are presented, e.g., representation of shape and appearance, template matching and Hough transform, quadrics and superellipsoids, medial axis representation, active shape and active appearance models, mass spring models, and finite element models. These models of object attributes are very powerful constrained systems to detect and segment objects while delineating among objects is hard based on the raw image data alone. In conclusion, these object models can introduce the necessary a priori knowledge for detecting and segmenting the objects/regions of interest effectively.

Chapter Twelve provides a comprehensive review on classification and clustering algorithms that have been used for medical images. Apart from conventional methods, e.g., LDA, ICA, SVM, and fuzzy c-Means, more advanced CNN based methods are investigated. Methods like CNN compute a huge amount of network parameters and complex decision boundaries that can help to deal with data, which are difficult to classify. However, a fine tuned network may easily overfit the model using the training data. Therefore, a proper validation/testing scheme is needed as discussed in the final chapter.

The final chapter, named 'Validation', provides an overview of ground truth formation and widely used data splitting methods for the model training, validation and testing.

In conclusion, I am glad to have had the opportunity to review this book, which is suitable for beginners to learn the overall, big picture of medical image analysis. In addition, the book provides an important and useful reference for experienced researchers who may seek to particular aspects of medical image analysis. In general, the book is very well written with details of the algorithms being described in a way that pupils can easily understand. The exercises and references are reasonable and helpful for anyone who wants to understand the introduced concepts in more detail.

## IAPR Then and Now...12.5 Years Ago
## "Books, Books, Books" (excerpt) by Larry O'Gorman
## *IAPR Newsletter* Vol. 26 No. 3, July 2004

How important is a textbook to a field? There are some fields whose texts seem to be synonymous with their identities: Gray's *Anatomy*, Samuelson's *Economics*, Abrams et al.'s *Norton Anthology of English Literature* and Tzu's *Art of War*. There are some fields in which no one involved would fail to have a copy of the text at least for reference: Peterson's *Field Guide to Birds*, Strunk and White's *Elements of Style*, Mayer's *Artist's Handbook* and Rombauer's *Joy of Cooking*. And, of course, there are classic engineering texts that include Knuth's *Art of Computer Programming*, Press et al.'s *Numerical Recipes* and Kernighan and Ritchie's *C Programming Language*. Such is the importance of some of these books that it is difficult to say whether they mirror the field or mold it.

I wondered if there were a comparably authoritative book in our own field of pattern recognition. [...]

# FREE BOOKS/eBOOKS

*Springer and CRC Press have partnered with the* IAPR Newsletter *to offer free books/ebooks to reviewers.*

*If you have interest in and some knowledge of the topic, email us. Depending upon the publisher's availability, you will get an ebook or a hardcopy book or both. In some cases, the publisher may send the ebook first and the hardcopy after review. In future issues of the Newsletter, we may publish a list of pending reviews.*

*~Owais Mehmood, Associate Editor for Book Reviews*

## We are offering the following Springer titles for review:

Titles published in Springer's "Advances in Computer Vision and Pattern Recognition" series are:

* ***"Domain Adaptation in Computer Vision Applications"*** by Gabriela Csurka (Ed.): http://www.springer.com/book/9783319583464

* ***"Deep Learning for Biometrics"*** by Bir Bhanu et al. (Eds.): http://www.springer.com/book/9783319616568

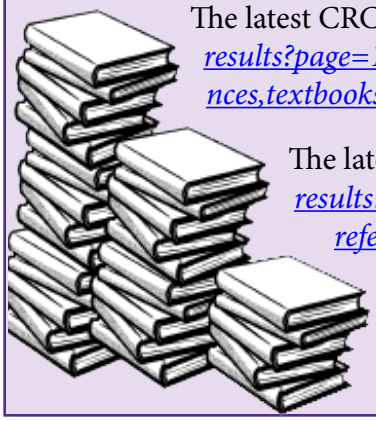
* ***"Decision Forests for Computer Vision and Medical Image Analysis"*** by Antonio Criminisi and J. Shotton (Eds.) http://www.springer.com/gb/book/9781447149286

Other titles of interest are:

* ***"Taxonomy Matching Using Background Knowledge"*** by Heikao Angermann http://www.springer.com/us/book/9783319722085

* ***"Introduction to Intelligent Surveillance"*** (Second Edition) by Wei Qi Yan: http://www.springer.com/book/9783319602271 (forthcoming)

## We are offering any of the following from CRC Press:



The latest CRC offerings in Pattern Recognition are here: https://www.crcpress.com/search/results?page=1&kw=Pattern%20Recognition&order=pubdate&size=12&view=list&type=references,textbooks&status=published

The latest CRC offerings in Data Analytics are here: https://www.crcpress.com/search/results?page=1&kw=data%20analytics%20&order=pubdate&size=12&view=list&type=references,textbooks&status=published

# This bulletin board contains items of interest to the IAPR Community

**Don't miss these important items in this issue:**



## REGISTRATION FOR


**OPENS APRIL 15, 2018**

## Call for Chapters

This first Edition of the ***Handbook of Vascular Biometrics*** is now planned for publication in the **Springer Advances in Computer Vision and Pattern Recognition** series in 2019.

The editorial team is soliciting chapter contributions. Prospective authors should express their interest by **February 15, 2018,** with a concise chapter proposal (title, authors, abstract, organisation, previous publications in the field, description of the nature and extent of original contribution compared to earlier work and action towards reproducible research if applicable) to the editorial team:

Andreas Uhl (Paris Lodron U. of Salzburg), Christoph Busch (Norwegian U. of Science and Technology), Sebastien Marcel (Idiap Research Institute, Raymond Veldhuis (U. of Twente)

Springer + IAPR =


Through an agreement with Springer, IAPR members can get discounted electronic subscriptions to the International Journal on Document Analysis and Recognition (IJDAR) and Machine Vision & Applications (MV&A).

**Deadline to subscribe: March 30, 2018**

Regular Individual Electronic Subscription Rate for each journal - ~~US$99~~

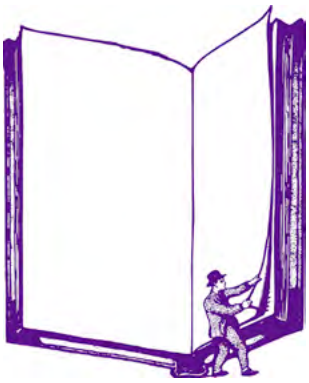
IAPR Member Electronic Subscription Rate for each journal - US$50
If you wish to make use of the IAPR Society Member Electronic Subscription rate for either or both of these publications, please contact Rachel Moriarty (rachel.moriarty@springer.com).

# Meeting and Education Planner

**The IAPR web site has the most up-to-date information on IAPR events. Click here.**
**NOTE: Highlighting indicates that the paper submission deadline is still open.**
*** Asterisks denote non-IAPR events ***

| | | Meeting | Report on previous edition | Venue |
|---|---|---|---|---|
| 2018 | FEB | ICB 2018: 11th International Conference on Biometrics | ICB 2016 | **Australia** |
| | MAR | ASAR 2018: 2nd IEEE International Workshop on Arabic and derived Script Analysis and Recognition | ASAR 2017 | **UK** |
| | | MedPRAI 2018: The Second Mediterranean Conference on Pattern Recognition and Artificial Intelligence | MedPRAI 2016 | **France** |
| | APR | ISCV 2018: 3rd Intl. Conference on Intelligent Systems and Computer Vision | | **Morocco** |
| | | DAS 2018: 13th International Workshop on Document Analysis Systems | DAS 2016 | **Austria** |
| | MAY | ICPRS-18: 9th International Conference on Pattern Recognition Systems | ICPRS-17 | **Chile** |
| | JUN | IWBF 2018: 6th IAPR/IEEE International Workshop on Biometrics and Forensics | IWBF 2017 | **Italy** |
| | AUG | ICFHR 2018: 16th International Conference on Frontiers in Handwriting Recognition | ICFHR 2016 | **USA** |
| | | S+SSPR 2018: IAPR Joint Internatioanl Workshops on Statistical Techniques in Pattern Recognition (SPR 2018) and Structural and Syntactic Pattern Recognition (SSPR 2018) | S+SSPR 2016 | **China** |
| | | ICPR 2018: 24th International Conference on Pattern Recognition | ICPR 2016 | **China** |
| | SEP | ANNPR 2018: 8th IAPR TC3 Workshop on Artificial Neural Networks in Pattern Recognition | ANNPR 2016 | **Italy** |
| | NOV | ISAIR 2018: 3rd Intl. Symposium on Artificial Intelligence and Robotics | | **China** |

***2020 meetings on next page...***



# Meeting and Education Planner

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| | | Meeting | Report on previous edition | Venue |
|---|---|---|---|---|
| 2020 | AUG | ICPR 2020: 25th International Conference on Pattern Recognition | | **Italy** |
| | SEP | ICFHR 2020: 25th International Conference on Pattern Recognition | | **Germany** |

*Thoughts on articles you've read in this issue of the* IAPR Newsletter?

*Ideas for features you'd like to see in the* IAPR Newsletter?

*Send your comments to:*

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https://www.linkedin.com/groups/8159047

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**Deadline for the next issue: March 21, 2018**

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