THE INTERNATIONAL ASSOCIATION FOR PATTERN RECOGNITION

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ICPR 2016

Special Issue

with highlights of the

23rd International Conference on Pattern Recognition

IN THIS Issue

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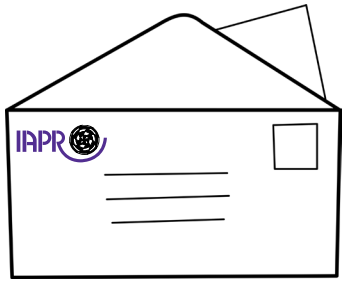


Letter from the President

Simone Marinai

It is an honor for me to have been elected President of the IAPR. In the next two years, I will have the privilege of working with an exceptional Executive Committee: Massimo Tistarelli (1st Vice President), Edwin Hancock (2nd Vice President), Alexandra Branzan Albu (Secretary), Apostolos Antonacopoulos (Treasurer), and the Past President Ingela Nyström. This is a great team, and I am sure that we will do our best to serve our association.

The IAPR has been my scientific family since I first participated in an IAPR conference in 1995. The broad range of research topics covered by the IAPR makes participation in any IAPR event, in particular the ICPR (International Conference on Pattern Recognition), a unique opportunity.

It is non-trivial to recall that the "I" in IAPR stands for International. Within the IAPR, scholars from a wide range of countries freely take on different responsibilities: holding offices, serving on committees, organizing events that take place in nearly every area of the world.

With the admission of two new members (Pakistan and Vietnam) there are now 49 member societies represented on the Governing Board. And, in 2018, the IAPR will celebrate the 40th anniversary of its incorporation and the first meeting of its Governing Board,

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/*

SSB 2017
14th IAPR/IEEE International Summer School on Biometrics
Alghero, Italy
Deadline: Feb. 15, 2017
Dates: Jun. 12-16, 2017

DGCI 2017
20th International Conference on Discrete Geometry for Computer Imagery
Vienna, Austria
Deadline: Mar. 1, 2017
Dates: Sep. 19-21 2017

CVIP 2017
2nd International Conference on Computer Vision and Image Processing & Workshop on Multimedia
Noida, India
Deadline: Mar. 1, 2017
Dates: Sep. 9-12, 2017

ICDAR 2017
14th International Conference on Document Analysis and Recognition
Kyoto, Japan
Deadline: Mar. 15, 2017
Dates: Nov. 10-15, 2017

PReMI 2017
7th International Conference on Pattern Recognition and Machine Intelligence
Kolkata, India
Deadline: Apr. 3, 2017
Dates: Dec. 5-8, 2017

ICPRS 2017
8th International Conference on Pattern Recognition Systems
Madrid, Spain
Deadline: Apr. 9, 2017
Dates: Jul. 12-13, 2017

IJCB 2017
3rd International Joint Conference on Biometrics
Denver, Colorado, USA
Deadline: Apr. 15, 2017
Dates: Oct. 1-4, 2017

CIARP 2017
22nd Iberoamerican Congress on Pattern Recognition
Valparaíso, Chile
Deadline: May 21, 2017
Dates: Nov. 7-10, 2017

PSIVT 2017
8th Pacific Rim Symposium on Image Analysis and Video Technology
Wuhan, China
Deadline: TBA
Dates: Nov. 20-24, 2017

IAPR Then and Now...

Excerpt from K-S Fu's CHAIRMAN'S CORNER LETTER

IAPR Newsletter Vol. 1 No. 1 Aug. 1978

During the Second (1974) IJCPR in Copenhagen, the Standing Committee approved the proposal of establishing a permanent international professional organization for pattern recognition. After two year's preparation, the IAPR was formally established at the Third (1976) IJCPR at Coronado, California, and the Standing Committee approved the Constitution of IAPR and elected the Officers of the Executive Committee. Three committees, Publication, Conference, and Membership were appointed for each. [...] A special committee drafted the IAPR Bylaws which were then approved by the Standing Committee early in 1977. [...] IAPR was formally Incorporated under the laws of the State of New York in January 1978.

Herb Freeman, King-Sun Fu, Toshiyuki Sakai and Theo Pavlidis at the 4th IJCPR in Kyoto (1978)

which was held on November 7, 1978, during the Fourth IJCPR (International Joint Conference on Pattern Recognition) in Kyoto, Japan. From the list of 13 "founding" members, the Federal Republic of Germany stands out, a reminder of a period when walls divided Europe. In a time where new physical and virtual walls are being built around the world, I find it to be extremely important that one scientific, learned society still considers an international sharing of responsibilities as a distinguishing feature engraved in its DNA. And it is worth noting that it is a requirement for IAPR sponsored and endorsed events to welcome participants from all IAPR Member Societies without any restriction due to political, racial, or religious differences.

Since the early years, the IAPR has been closely intertwined with the ICPR (initially IJCPR). This is the flagship event of the association and the place where the Governing Board meets biennially and where many researchers have the opportunity to discuss their work with colleagues (who often are also friends). Within an increasingly competitive research world there is a need for researchers to publish the results of their work in widely recognized venues. Considering that the broad range of topics covered in PR is at the same time a strength and a weakness, we need to do our best to ensure that ICPR is among those venues and to maximize the quality of IAPR publications in general.

In this light, I see of paramount importance the need to re-think the ICPR format. It is too ambitious to expect to come to any real change in fewer than two years; however, I would like to seed one concrete discussion on the future of ICPR, involving first and foremost the ICPR Liaison Committee along with all other concerned Standing Committees as well as the leaders of the Technical Committees. We aim to have some concrete proposals on the table for a broader discussion during the next ICPR in Beijing.

Another area where I would like to make some progress is the support of the work of young researchers. It is not just rhetoric to say that young researchers are the future of any learned society, and the IAPR is no exception. We should continue to focus our resources and efforts to support students to be involved in IAPR events, make connections, and establish long-term professional relationships.

- Since ICPR 2002, the IAPR has provided travel stipends to young investigators to attend ICPR.
- In the last two years, we have channeled IAPR support for Summer Schools towards the significant reduction of attendance costs for students.
- We also began, thanks to the work of the Education Committee, a new IAPR Research Scholarship program that helps young researchers to visit research institutes in other countries.

All of these activities must continue—and be strengthened—in the coming years in a sustainable way, taking into account the IAPR's financial constraints.

The 15 active Technical Committees are the scientific backbone of the IAPR. Once again, it is worth recalling what the "I" in IAPR stands for. A TC should be international in spirit and spread over several IAPR member societies both for its research topics and for its leadership. Leadership rotation is also important, with a continuous aim at getting new (young) people involved.

In the first meeting of the 2016-2018 ExCo in Cancún, we planned several tasks for the Standing Committees. There is no need to list all these tasks here, and I will just mention some relevant topics.

- The **Conferences & Meetings Committee** (C&M), in addition to the exceptional work done to assess requests for sponsorship of conferences, is expected to follow-up on some open issues addressed in the last term related to standardization of URLs and website archiving. Moreover, the C&M will need to take care of some ICPR-related matters like satellite workshops and reorganization of the ICPR guidelines.
- The **Education Committee** will continue to handle the research scholarship applications that we expect will grow in number in the coming years.
- The most important task for the **ICPR Liaison Committee** will be to oversee an analysis of potential changes in the organization of ICPR. The aim is to improve the quality (actual and perceived) of the conference, continuing to consider inclusion and participation as highly important features for ICPR.
- The **Publications and Publicity Committee** has been asked to propose possible updates in the IAPR Website and to continue the interactions with publishers of IAPR journals.

Before I close this letter, I want to thank two people who work behind the scenes to make the IAPR engine work. For many colleagues Linda O'Gorman is just the kind person offering advice about our society at the IAPR booth during

IAPR Then and Now
A look at IAPR membership at the beginning and today

Column 1 *shows the list of countries that have, over the years, formed national pattern recognition societies and joined the IAPR.*

Column 2 *shows which societies formed the association in 1976 when the association was formally established at the 2nd International Joint Conference on Pattern Recognition in Copenhagen. The IAPR was officially incorporated in 1978 with 13 member societies.*

Column 3 *shows the IAPR's membership in 2016. With 49 member societies, the IAPR has over 12,000 members from around the world.*

Argentina	joined in 2010	38
Australia	joined in 1991	104
Austria	joined in 1985	182
Belarus	joined in 1993	67
Belgium	joined in 1978	left in 2004
Brazil	joined in 2003	34
Bulgaria	joined in 1990	47
Canada	joined in 1978	95
Chile	joined in 2007	25
China	joined in 1985	199
Cuba	joined in 2000	69
Czech Republic	joined in 1993	62
Denmark		48
Finland		375
France		351
Germany (GDR pre-1990)	joined in 1985	390
Federal Republic of Germany		one society from Germany after 1990
Greece	joined in 2002	37
Hong Kong	joined in 1993	97
Hungary	joined in 1985	74
India	joined in 1987	158
Iran	joined in 2010	168
Ireland	joined in 1999	61
Israel	joined in 1985	27
Italy		366
Japan		559
Korea (South)	joined in 1992	202
Macau	joined in 2012	37
Malaysia	joined in 2014	25
Mexico	left in 1990; reformed/joined in 2004	91
Morocco	joined in 2003	left in 2009
Netherlands		250
New Zealand	joined in 1999	120
Norway	joined in 1984	99
Pakistan	joined in 2016	51
Poland	joined in 1993	92
Portugal	joined in 1987	67
Russian Federation	joined in 1989	1087
Singapore	joined in 2004	55
Slovenia	joined in 1993	46
South Africa	joined in 1994	91
Spain	joined in 1985	173
Sweden		205
Switzerland	joined in 1986	46
Taiwan	joined in 1994	367
Tunisia	joined in 2014	75
Turkey	joined in 1999	25
Ukraine	joined in 1993	74
United Kingdom		542
USA		4608
Uruguay	joined in 2012	34
Vietnam	joined in 2016	34

ICPRs. Rather, in her role as IAPR Secretariat, Linda helps in an infinite number of matters from handling tax forms and related bureaucratic issues to reminding me to write these notes. The second person I want to thank is Ed Sobczak, who, in his role as IAPR Webmaster, efficiently and effectively manages the IAPR website and performs other related services that are probably unknown to many IAPR members.

Lastly, I would like to thank the Governing Board once again for my election. I will serve, together with my ExCo colleagues, the IAPR community with my best effort, and I look forward to seeing you around the world in the next two years or at least in Beijing for ICPR 2018!

Simone Marinai
IAPR President 2016-2018
simone.marinai@unifi.it

IAPR
www.iapr.org

Calls from IAPR Committees

From the IAPR Executive Committee (ExCo):

Call for Proposals for Summer Schools

Deadline: February 28, 2017 (for schools planned for April - July 2017)

Summer schools are training activities where participants are exposed to the latest trends and techniques in the particular pattern recognition field. They provide a unique opportunity to engage students and junior researchers with senior scientists in a fruitful way .

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.

Of course, the term "Summer School" is somewhat generic and traditional. There is no requirement that a school be offered during the summer.

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.

From the IAPR Education Committee:

Call for Applications 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, funding and duration:

- The scholarship will cover round trip travel and basic living expenses
- The visits will be no longer than 12 months in duration.

Requirements:

- The candidate must be a full-time researcher (PhD research student who has completed at least one year's study at this level or someone already employed as a full-time researcher who has been active in the field for fewer than eight years and is working at a level equivalent to a post-doctoral researcher.
- The candidate must be member of an IAPR member society.
- The covered travel and housing expenses cannot be funded by another scholarship. If there is a shortfall between the actual costs and the amount covered by the Scholarship, the candidate may seek complementary funding, usually from either the home or the host institution.
- The host institution must be different from the candidate's home institution and should be in a different country.
- The home and host institutions must give explicit approval by a signed letter.
- A successful applicant will be permitted to adopt the title "IAPR International Scholar" for the period of the award.

Click here for the full Call for Applications.

Contact information:

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

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

Getting to know...Petia Radeva, IAPR Fellow

Can Egocentric Vision and Lifelogging help Healthcare?

by Petia Radeva, Head, Consolidated Research Group on Computer Vision (University of Barcelona) and Medical Imaging Laboratory of the Computer Vision Center

Pattern Recognition and Computer Vision (PR&CV) are challenging fields by definition. Claiming to be able to see and understand an image, or being able to extract knowledge and learn from a sample of data as human beings do is a brave if not overoptimistic goal. It has been overoptimistic from one of its first known Computer Vision works, when one of the co-founders of the Artificial Intelligence Lab at MIT in 1966 Marvin Minsky asked one of his undergraduate students at MIT to implement a computational system to be able to see and understand an image. During the last 50 years, millions of scientific hours have been spent trying to solve this task. A lot of people had to step on the shoulders of giants in order to construct the PR&CV community, where thirst for knowledge; collaboration; cooperation; sharing of knowledge, articles, data, algorithms, and work; and, not least, the very human wish to build something helpful to others were a must to construct the PR&CV tower similar to Catalonia's human ones.

Photo: https://en.wikipedia.org/wiki/Castell

Petia Radeva, IAPR Fellow

ICPR 2016, Cancún

for contributions to computer vision, machine learning, egocentric vision, life-logging, and medical imaging

Petia Radeva completed her undergraduate study at the University of Sofia, Bulgaria, in 1989; her Masters in 1993 and PhD in 1996 at the Autonomous University of Barcelona. Currently, she is an Associate Professor at the University of Barcelona (UB) and a Senior Researcher in the Computer Vision Center, Spain. She is Head of the Consolidated Research Group on Computer Vision at UB and Head of the Medical Imaging Laboratory of the Computer Vision Center (*www.cvc.uab.es*).

Her research interests are on development of learning-based approaches for computer vision and health applications: End-to-end technologies for large scale image analysis; Using autobiographic episodes captured by a lifelogging camera to enhance memory of patients with mild cognitive impairment; Monitorizing by a wearable camera to help people eat better and thus assure healthier lifestyle; Measuring active aging of older people.

SCIENTIFIC MERITS: h-index of 36 (Google Academic), 379 international publications, more than 90 impact factor journals (Microsoft Academic Research), achieving 5505 citations.

AWARDS: Petia Radeva was awarded IAPR Fellow (2016), CIARP award Aurora Pons Porrata (2016) and Academia ICREA (2014), award of the Catalonian government to the best researchers in any scientific field.

In fact, belonging to this community for 25 years, now I cannot determine which was the stronger motivation for me (maybe both): thirst for knowledge or wish to construct something to be helpful to society. Probably because of this, I spent my Masters and PhD thesis on Computer Vision and Medical Imaging.

Going further with exploring how PR&CV algorithms can help healthcare, I thought about wearable cameras. Wearable cameras are very recent and at the same time an exponentially growing market tendency. According to Tractica, the wearable camera market is still in the early stage of development and has experienced exponential growth in the last few years, expanding from 5.6 million in 2014 to a predicted 30.6 million units annually in only three years from now (2020). Today, most of the wearable cameras (e.g. GoPro) are used for leisure and sport. My hypothesis is that such devices can have huge impact for healthcare, too. In particular, if last year 21 million users bought Fitbit Fitness Trackers to help them stay in healthy physical condition, wearable cameras can give very important information about the nutritional habits of a person, for example. This is really important, since recent nutritional studies show that what people eat could be as important as how they eat. As an example, in a TedxMileHigh talk, Lauren Constantini explains the case of a person significantly reducing his weight by up to 45 kg just by changing the social and physical conditions and context of his meals (lighting and social context).

The problem is that wearable cameras used for lifelogging every day can take up to 2,500 images that means around 75,000 images per month and 900,000 images per year. Today, there is no problem to acquire and store such an amount of information, but the real problem is who will look at 900,000 images?! How can the semantics of this large amount of information be extracted to make it useful?

People using wearable cameras need a PR&CV community effort to process and analyze this amount of data, extract patterns of behavior and lifestyle, extract information about social interactions, activities, events, and habits in order to get real profit from it. And the PR&CV community is getting aware of this. Just look at the rapidly growing number of articles on first-person camera (egocentric) vision over the last 5 years as well as the workshops organized at highly prestigious conferences like CVPR, ECCV, ICCV, BMVC, ACM MM, the number of special issues in journals, and public datasets and code.

What are the problems and technologies to be applied when processing large-scale images coming from wearable cameras? Looking back 15 to 20 years, we can see that our algorithms were not very ambitious: they had to recognize a small number of categories: AR Database(126), Yale Face(15), Caltech(6), 101(101), VOC2005(10), TU Graz(4), VOC2006(10), Caltech256(256), MIT-CSAIL(125), VOC2007(21), Cifar(10), Cifar-100(100). On the other hand, taking into account the amount of data (several thousands of images), the goal was really challenging (and perhaps, overoptimistic). Recently, there were two milestones that made a tipping point in the image analysis: the advances in deep learning and, in particular, convolutional neural networks

IAPR Fellow Q & A

With their years of experience, IAPR Fellows have a lot to offer to younger researchers just getting started in their careers. With that in mind, I asked Dr. Radeva some additional questions.

~ Arjan Kuijper, EiC

EiC: In some of your recent paper titles you raise questions - do you think that choosing these titles attracts more attention (& citations)?

PR: I strongly believe that each article should answer a question. In fact, this is one of my first recommendations to PhD students, when writing a paper: what is the question each article addresses, even what is the question each paragraph answers. Today, with the exponentially growing number of papers, messages in the articles should be clear and concise. So being able to define the main question is very helpful.

EiC: Is deep learning a hype?

PR: Taking into account the number of works on deep learning, articles published, successful systems (NVidia web page is reporting really interesting success stories of deep learning), companies are investing big hope and efforts in this technology. Still, we should not forget the pre-deep learning time. And trying to understand the deep learning techniques and their relation to the techniques we have been developing decades of years before is really interesting and helpful to understand this technology. On the other hand, we need for the technology to go through the hype stage in order to arrive at the plateau of productivity, when the technology really will find its place in the science and society.

(CNN) and the appearance of the ImageNet database with 1,000 categories and 15 million images. CNN could go so far due to the fast improvement of hardware allowing processing millions of images with models of millions of parameters. Being helped by the GPUs processing, today we are able to experiment with different architectures of CNN having up to 150 layers. Today, we have the hardware and software tools to experiment with complex architectures in a "Lego®" fashion. And although we can “design neural networks that are up to 10 times cheaper and with up to 15 times less parameters that at the same time outperform their predecessors from one year ago, the next challenge in the near future is to have them working on our mobile devices without extra hardware support or prohibitive memory overhead” (Christian Szegedy, Senior Research Scientist at Google). But the real challenge in Deep learning is how to take advantage of the millions of unlabeled and unstructured data in order to improve deep learning algorithms and create systems working in real situations. In the same way, as 10 years ago face detection and recognition were among the most challenging and difficult problems, today face detection is applied in every camera or image-based social media, we expect that in the next five years PR&CV algorithms will be able to understand social interactions, understand and summarize video clips, recognize video and human activities, do text processing or extract medical experts knowledge from medical images being basic for screening, diagnosis, intervention and follow-up.

And in this direction, we hope that deep learning will also help with lifelogging data to extract and analyze the thousands of images about people wearing the camera and their environment; that will be able to give them advice about how and what they eat in order to keep them healthy; that will be able to diagnose early when people are getting too much stress or even are entering into the first stages of a depression, just by observing the evolution of their social interaction.

And when we get older, the algorithms should be able to follow our active aging, keeping track of how we communicate, how we do our basic activities like nutrition or resting, or our instrumental activities like being able to shop, to transport, to communicate by phone, and even create a very personalized serious games with our proper images by creating enjoyable cognitive exercises to keep our brain fit and detect the most early age-related mental problems.

We are almost there to complete the undergraduate project of Minsky’s student: being able to understand an image. But will we be able to monitor and understand ourselves? Today, more than ever, our PR&CV community has all the necessary tools and a wide spectrum of open problems to work hard on in order to advance scientifically and achieve a real technological breakthrough for science, society and humanity. First and very promising results are here. Let’s maintain the strong collaboration between research and industry, and keep working hard in this direction!

Ingela Nyström presenting the IAPR Fellow Award to Petia Radeva

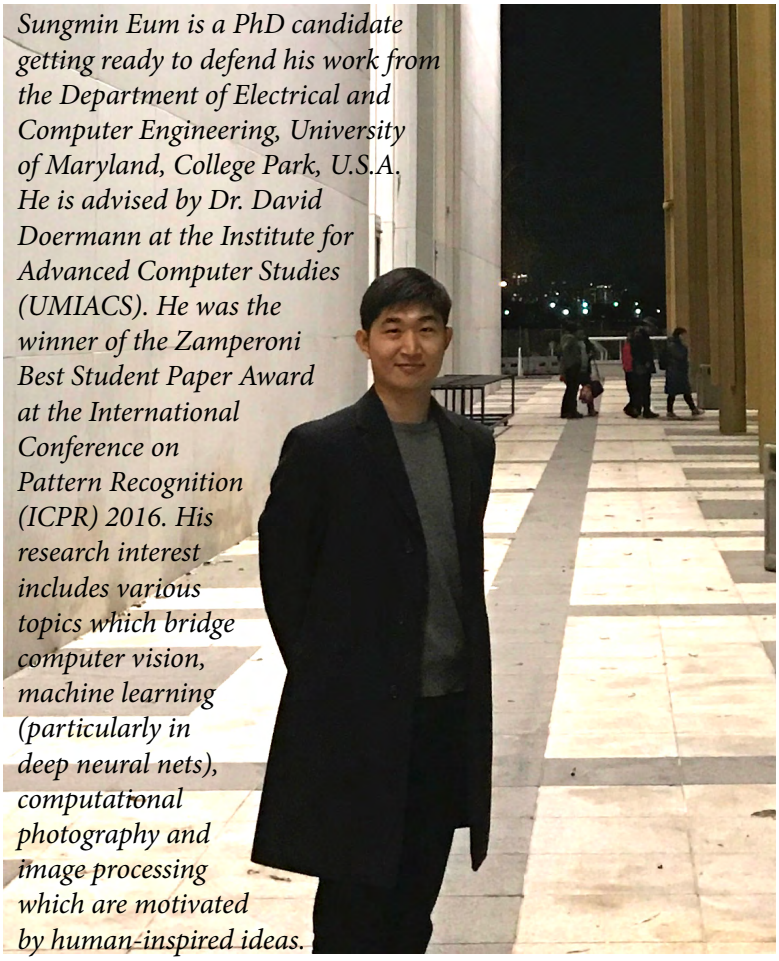
IAPR...The Next Generation

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

~Arjan Kuijper, Editor -in-Chief

Sungmin Eum



Sungmin Eum is a PhD candidate getting ready to defend his work from the Department of Electrical and Computer Engineering, University of Maryland, College Park, U.S.A. He is advised by Dr. David Doermann at the Institute for Advanced Computer Studies (UMIACS). He was the winner of the Zamperoni Best Student Paper Award at the International Conference on Pattern Recognition (ICPR) 2016. His research interest includes various topics which bridge computer vision, machine learning (particularly in deep neural nets), computational photography and image processing which are motivated by human-inspired ideas.

Editor's note:
Sungmin Eum was the winner of the Piero Zamperoni Best Student Paper Award at ICPR 2016. The conference is the subject of this ICPR 2016 Special Issue *of the* IAPR Newsletter.
~ Arjan Kuijper, Editor-in-Chief

by Sungmin Eum, Department of Electrical and Computing Engineering, University of Maryland, College Park, USA

Briefly: How did you get involved in pattern recognition?

It all started when I got a chance to work on the "The detection of Diphthongs for knowledge-based speech recognition" for my undergraduate independent study. This came to me as a significant point of intersection where my area of study could meet the beauty of nature. Since I was a person who greatly relished the wonders of human bodies and nature, the process of finding hidden patterns in natural signals certainly provided me with pure delights and stronger motivations that I could not find in any other areas. This was when I decided to get involved in a research that closely dealt with patterns from human beings and nature. To satisfy my thirst and to equip myself with substantial skills, I decided to join the masters program without a second thought.

I started off as a research assistant in the Computer Vision Laboratory in Yonsei University, Korea. I participated in the project, "Abnormal User Detection Using Face Occlusion Verification for Automatic Teller Machines (ATM)". As this work was partially funded by a corporate vendor who wanted to commercialize the product at the end of the day, I had to deal with double challenges concurrently. I had to come up with an algorithm with state-of-the-art performance, but with low computational complexity at the

same time. While working on this project, I remember getting my first English-written paper accepted to present at the CVPR Workshops. It certainly was an overwhelming opportunity for me, not only to feel the joy of sharing my work with others, but also getting to know that there were lots of researchers who are willing to share how they "recognize the patterns" in their unique domains.

In more detail: What technical work have you done and what is/are your current research interest(s)?

Currently, my PhD research could be described largely into two streams. The first line of research mainly focuses on 'camera-based image and video analytics' that mixes a bit of computer vision techniques and some flavor of image processing. My first problem was to tackle the challenge of capturing high-quality images of large sources in a single frame with limited field-of-view, particularly for document images. For this problem, I proposed a novel graphcut-based image mosaicking method which seeks to overcome the known limitations of the previous approaches. Basically, the method guides a cut in the overlapping portion of the two images so that the cut line would make as little artifact as possible. Our method does not require any prior knowledge of the content of the given document images, making it more widely applicable and robust. One of the interesting parts is that we incorporated a sharpness measure which induces cut generation in a way that results in the mosaic including the sharpest pixels.

The second problem I addressed was the issue of removing the highlight regions caused by the light sources reflecting off glossy surfaces, for instance, picture frames. We specifically target the cases where the highlights are saturated and the original contents are completely obscured. The method is based on an interesting observation that when two images are captured at different viewpoints, the displacement of the target content is different from that of the highlight regions (Motion parallax). This work was meaningful for its first use of 'highlight correspondences' for better localization of the highlights in multiple images.

My very recently published work was about selecting frames of a planar object in a video or a set of images by analyzing their "frontalness". In my paper, I defined "frontalness" as a measure of how close the surface normal of an object aligns with the optical axis of a camera. The unique and novel aspect of our method is that unlike previous planar object pose estimation methods, our method does not require a frontal reference image. Our approach was motivated by an observation that a true frontal image can be used to reproduce other non-frontal images by perspective projection, while the non-frontal images have limited ability to do so.

As the second line of research, I have recently been working on image/video classification and object detection problems using deep learning approaches, specifically using the deep convolutional neural networks (CNN). One of my recent works was to find out how semantic keywords (e.g., police, fire, smoke, helmet, and car) and visual features could come together to better classify events that may look similar but contain semantically different situations. I am also delving into the same event recognition problem with a rather different approach, which tries to integrate the learned information from architecturally different tasks within a single unified framework to boost up the primary task performance. Moreover, the investigation of human actions is also one of the topics I find intriguing. Specifically, I am currently seeking to break down the human actions into fine-grained action atoms which can be generally used and shared across different actions.

How can the IAPR help young researchers?

Whenever I get an opportunity to attend a conference, I always get more than what I expect to get. Not only does it bring a chance to learn new techniques and ideas from the presentations, but also it provides time and space to freely interact with others where I can get valuable opinions and feedback about my work and thoughts. What's important is to be able to leave a relatively small research society where people often revolve around similar ideas and to meet with people who have been struggling to overcome entirely different challenges. Listening to their ideas and learning from their thought processes, which are often different in nature, helps me to step back and observe my problems with a fresh perspective. A conversation with a person who majors in bioinformatics even led to one of my recent publications.

It doesn't necessarily have be a conference. What matters is a forum for young researchers to share their ideas with the others who have different perspectives. I believe this is where the IAPR could come into play. The IAPR could help in setting up such occasions from time to time in different regions. A steady and well-established program would certainly be of great asset to all the young "isolated" researchers.

Comments from the ICPR 2016 General Chair


Photo : Rangachar Kasturi

Since the creation of the IAPR in the 1970s, this was the first time that an ICPR was held in Latin America, and we were very proud to welcome the ICPR 2016 participants to Cancún, a remarkable, original, and beautiful city on the Yucatán Peninsula, known not only for its beaches and the ancient Maya culture but also for its traditional downtown area. We are sure that the attendees enjoyed the conference and the cultural richness of the city.

The novelty of this edition of the conference was that we brought technological advances to Latin America for the benefit of research centers, universities, and society as a whole, hoping that it will be a fundamental stimulus for progress in science and education for the near future. Also, we took measures to encourage women to participate in all activities promoted by the IAPR as–for the first time–we offered a coffee break and lunch for female scientists (47 female researchers participated).

A total of 1,234 manuscripts were submitted to the conference. Following the review process, 199 papers were accepted for oral presentations and 478 were accepted as posters. In addition, 33 contests and four invited papers were included in the proceedings. The technical program included 40 oral sessions distributed in five parallel tracks, four poster sessions, and seven plenary sessions including the K-S Fu, the J. K. Aggarwal and, for the first time, the Maria Petrou lectures. 933 delegates from 50 countries attended ICPR 2016.

The organization of such a large conference was the result of the contribution of many people. Our gratitude goes to members of the Program Committee and Track Chairs who dedicated their time to the review process and to the preparation of the program. We also thank the reviewers who have evaluated the papers and provided the authors with valuable input on their research work.

Finally we acknowledge the work of conference committee members who strongly contributed to make this event successful and, I hope, unforgettable.

Eduardo Bayro-Corrochano
General Chair, ICPR 2016
CINVESTAV,Campus Guadalajara, Mexico

Traditional Dances of Mexico at ICPR 2016

Editor's note:
At the banquet, ICPR 2016 delegates and guests were treated to a spectacular demonstration of traditional dances of Mexico.
~ Arjan Kuijper, Editor-in-Chief

"Folk dances are dances that are developed by people that reflect the life of the people of a certain country or region."

~Wikipedia article on Folk dance

Mexican dance has been influenced by the country's cultural, political and religious history. Some of the themes that come through are related to the Mexican Revolution, the Spanish Colonial Period, Catholicism, and Nature.

The photos on this page show several types of music and dancing, including:

- Mariachi, the cultural and spiritual tradition marked by musicians in studded charro outfits and wide-brimmed hats
- Jarabe Tapatío (Mexican Hat Dance), which was a courting dance
- Son Jarocho, from Veracruz, Mexico, with a blend of African, Spanish and native rhythms
- La Danza del Venado (Deer Dance), a ritualistic dance from the Yaqui region of Mexico with dancers in the roles of deer and hunter
- Tlacolorerosis (agricultural dance), from the Guerrero region, with roots in the Aztec religion

Photos: Diego Sánchez/Victor Alvarez

Coffee Break for Women and Lunch for Women @ ICPR

Tuesday, December 6, 2016

Recognizing the steadily growing number of female researchers in fields of interest to the IAPR and hoping to foster new connections among these researchers, the IAPR Executive Committee and the ICPR2016 organizers sponsored two events for the first time: a Coffee Break for Women at ICPR and a Lunch for Women at ICPR.

Both of these events followed the first Maria Petrou Lecture—given by Michal Irani—that honored a "female scientist/engineer who has made substantial contributions to the field of Pattern Recognition (or a closely related field), and whose past contributions, current research activity and future potential may be regarded as a model to both aspiring and established researchers".

Photo: Susan Vincil, www.vistaimagery.com

Lunch for Women at Mocambo Restaurant

~

Approximately 30 women attended the luncheon

Photos: Diego Sánchez/Victor Alvarez

Winner of the 2016 K. S. Fu Prize

Robert Haralick

City University of New York, USA

For contributions in image analysis including remote sensing, texture analysis, mathematical morphology, consistent labeling, and system performance evaluation.

Dependency has multiple forms, each of which in its own way restricts possibilities. If xNx1 is a discretely valued random N-tuple governed by a probability P, the uncertainty about a random value of x is the entropy associated with P. If the uncertainty is less than the maximal possible uncertainty for x, that decrease in uncertainty induces a stochastic dependency among the components of x and/or makes certain values of certain components more or less probable.

The most visual case of stochastic dependency occurs in the image domain. Any patch of an image that shows a texture is a region having a stochastic dependency among the pixel values of the patch. The gray level co-occurrence matrix captures a second order dependency among the values of neighboring pixels. Functionals of the co-occurrence matrix can be used as features in distinguishing one texture from another. We show how the commonly used can be improved by putting the co-occurrence matrix into the setting of graphical models and how it is possible to produce a texture transform image. Each pixel in a textural transform image gives the joint occurrence probability of the neighborhood values centered around that pixel. The size of the neighborhood can be arbitrary.

Another class of dependencies is driven by relationships, for example spatial relationships. A consistent labeling approach permits recognizing objects that are always in a legal spatial relationship. We review how a consistent labeling problem can be posed and then define a relation join-decomposition generalization. Solving the relation join-decomposition is equivalent to learning relationships in data. It is interesting that learning relationships necessarily involves learning relationships of no-influence. No-influence obeys the same semi-graphoid properties that conditional independence obeys.

Structure specifies the organization of data. One level of organization is the partitioning of data into clusters, each of whose points are similar to one another. The classic K-means algorithm uses a structure of zero-dimensional manifolds. Similarity is specified by the distance of a point to the cluster center. Clustering can be done where the ideal of each cluster is a k-dimensional manifold where k can vary from cluster to cluster. Here similarity can be specified by the distance of the point to the manifold. We give an algorithm for doing such clustering and show how it can be used prior to doing regression to get more meaningful regression relationships.

IAPR Then and Now...20 Years Ago, *IAPR Newsletter* Vol. 18 No. 4, Oct. 1996

Excerpts from Dr. Maria Petrou's From the Editor's Desk column
following the 13th ICPR in Vienna, Austria, at which Prof. Robert Haralick was elected IAPR President

Dear Everybody,
And when you thought it was safe to forget all about Vienna and 13th ICPR, you got this issue and it brought it all back! This newsletter is dominated by the activities in Vienna and it comes to you hot from the press! In fact it is so hot, that some cookies did not manage to get into the oven before the door shut! So, the report on the technical content of ICPR as well as the New President's address will be included in the January issue of the newsletter. I can of course report that from August 22 this year our Big Boss is **Professor Haralick**, elected as president by the Governing Board in Vienna. Apart from this change, our Executive Committee has a new 1st Vice President, Professor Gelsema, a new 2nd Vice President, Professor Kidode, while the Treasurer remains the same, Dr. Bigun, and the secretary Dr. Sanniti di Baja is also the same, and of course Professor Kittler remains on the Committee as the Past President.

Winner of the 2016 J. K. Aggarwal Prize

Fei-Fei Li

Stanford University, USA

For seminal contributions to object and event classification using learning methodologies based on statistical and neuroscience principles.

It takes nature and evolution more than five hundred million years to develop a powerful visual system in humans. The journey for AI and computer vision is about fifty years. In this talk, I will briefly discuss the key ideas and the cutting edge advances in the quest for visual intelligences in computers. I will particularly focus on the latest work developed in my lab for both image and video understanding, powered by big data and the deep learning (a.k.a. neural network) architecture.

Editor's note:
ICPR 2016 saw the inauguration of the IAPR's Maria Petrou Prize, which is given "to a living female scientist/engineer who has made substantial contributions to the field of Pattern Recognition (or a closely related field), and whose past contributions, current research activity and future potential may be regarded as a model to both aspiring and established researchers". http://www.iapr.org/fellowsandawards/awards_petrou.php.

Please also see photos from the Coffee Break for Women and Lunch for Women @ ICPR, both events were held for the first time at ICPR 2016.

~ Arjan Kuijper, Editor-in-Chief

Winner of the 2016 Maria Petrou Prize

Michal Irani

Weizmann Institute for Science, Israel

For pioneering contributions to space-time video analysis, motion estimation, and image analysis by composition and as a role model for early career researchers striving for excellence and rigour in the fields of computer vision and pattern recognition.

Title: “Blind” Visual Inference

In this talk I will show how “blind” visual inference can be performed by exploiting the internal redundancy inside a single visual datum (whether an image or a video). The strong recurrence of patches inside a single image/video provides a powerful data-specific prior for solving complex tasks in a “blind” manner. The term “blind” here is used with a double meaning: (i) Blind in the sense that we can make sophisticated inferences about things we have never seen before, in a totally unsupervised way, with no prior examples or training data; and (ii) Blind in the sense that we can solve complex Inverse-Problems, even when the forward degradation model is unknown.

I will show the power of this approach through a variety of example problems (as time permits), including:

1. “Blind Optics” — recover optical properties of the unknown sensor, or optical properties of the unknown environment. This in turn gives rise to Blind-Deblurring, Blind Super-Resolution, and Blind-Dehazing.
2. Segmentation of unconstrained videos and images.
3. Detection of complex objects and actions (with no prior examples or training).

Invited talk in Biomedical Image Analysis and Applications

Josien Pluim, Groningen University, The Netherlands

Validation of image registration: the truth is hard to make

Medical image registration has been a topic of research for many decades by now. In those years, enormous progress has been achieved in terms of the quality of the solutions, the complexity of problems that can be tackled and the speed of computation. There is one aspect falling far behind with respect to progress: validation. Although attempts to validate image registration methods have been made, their number and success do not match that of method development. Finding ways to evaluate method performance is a very tough problem.

The presentation will focus on ways in which registration is standardly validated, on recent developments in validation and on dilemmas encountered. Although some aspects treated are specific to image registration or medical applications, many of the material covered is generic and holds for other areas of image analysis.

Invited talk in Image, Speech, Signal and Video Processing

Wolfgang Förstner, Institute of Geodesy and Geoinformation, Bonn, Germany

A Future for Learning Semantic Models of Man-Made Environments

Deriving semantic 3D models of man-made environments hitherto has not reached the desired maturity which makes human interaction obsolete.

Man-made environments play a central role in navigation, city planning, building management systems, disaster management or augmented reality.

They are characterised by rich geometric and semantic structures. These cause conceptual problems when learning generic models or when developing automatic acquisition systems.

These conceptual problems are caused by the interplay between (1) the elementary data structures of the 3D objects and the observed images or 3D point clouds, (2) the topology of the rich spatial structures, (3) the partonomy and taxonomy of complex objects, and (4) the uncertainty and qualitativeness of the used notions in the envisaged application domains.

I will sketch some research issues in conceptual modelling playing a key role for a further evolution of acquiring man-made environments from visual data.

Invited talk in Pattern Recognition and Machine Learning

Ricardo Baeza-Yates, Universitat Pompeu Fabra, Barcelona, Spain

Visual Congruent Ads for Image Search

The quality of user experience online is affected by the relevance and placement of advertisements. We propose a new system for selecting and displaying visual advertisements in image search result sets. Our method compares the visual similarity of candidate ads to the image search results and selects the most visually similar ad to be displayed. The method further selects an appropriate location in the displayed image grid to minimize the perceptual visual differences between the ad and its neighbors. We conduct an experiment with about 900 users and find that our proposed method provides significant improvement in the users' overall satisfaction with the image search experience, without diminishing the users' ability to see the ad or recall the advertised brand. This is joint work with Yannis Kalantidis, Ayman Faharat, Lyndon Kennedy and David A. Shamma.

Invited talk in Computer Vision

Marc Pollefeys, ETH Zurich and Microsoft, Zurich, Switzerland

Semantic 3D reconstruction

Obtaining 3D geometric information from images is one of the big challenges of computer vision. It is critical for applications such as robotics, autonomous vehicle navigation and augmented reality. I will first briefly talk about some our recent work on vision-based autonomous micro-aerial vehicles, driverless cars and 3D on mobile devices. While purely geometric models of the world can be sufficient for some applications, there are also many applications that need additional semantic information. Next, I will focus on 3D reconstruction approaches which combine geometric and appearance cues to obtain semantic 3D reconstructions. Specifically, the approach I will present is formulated as a multi-label volumetric segmentation, i.e. each voxel gets assigned a label corresponding to one of the semantic classes considered, including free-space. We propose a formulation representing raw geometric and appearance data as unary or high-order (pixel-ray) energy terms on voxels, with class-pair-specific learned anisotropic smoothness terms to regularize the results. We will see how by solving both reconstruction and segmentation/ recognition jointly the quality of the results for both subtasks can be improved and we can make significant progress towards 3D scene understanding.

ICPR 2016 Workshops

IWPRHA3

3rd International Workshop on Pattern Recognition for Healthcare Analytics

https://sites.google.com/site/iwprha3/

An ICPR 2016 Workshop, endorsed by the IAPR
December 4, 2016, Cancún, Mexico

Workshop Organizers:
Faisal Farooq, IBM, USA
Jianying Hu, IBM, USA
Stein Olav Skrøvseth, University Hospital of North Norway
Rogerio Abreu De Paula, IBM, Brazil

By Faisal Farooq

Introduction

IWPRHA3 brought together pattern recognition and healthcare researchers interested in healthcare analytics and applications of pattern recognition in this field. The workshop program consisted of presentations by invited speakers from pattern recognition and from healthcare and by authors of papers submitted to the workshop. In addition, there was an interactive panel discussion to identify important problems, applications and synergies between the pattern recognition and healthcare analytics disciplines. The intended audience of the workshop included pattern recognition researchers interested in solving healthcare analytics problems as well as the healthcare community in general including payers, providers and researchers.

Workshop Content

Keynote Talks

The workshop featured two keynote talks delivered by internationally renowned researchers in the field.

The first keynote talk was delivered by Prof. Robert Jenssen of the University of Tromsø–The Arctic University of Norway. Prof. Jenssen directs the Machine Learning group at the university and in recent years has heavily focused on developing machine learning and pattern recognition algorithms for healthcare applications. Prof.

Jenssen discussed Data-Driven Prediction of Colorectal Surgical Complications using Machine Learning and Pattern Recognition. In his keynote talk he described efforts to leverage recent machine learning and pattern recognition methodology for predicting postoperative complications in colorectal surgery. Such complications include anastomosis leakage, a potentially lethal condition, wherein early detection is very important.

The second keynote talk was delivered by Prof. B. Prabhakaran of the University of Texas at Dallas. Prof. Prabhakaran's talk title was "All Living Things Move" – Kinematics in Human Healthcare and Performance. Prof. Prabhakaran discussed the recent developments in body sensor technology in capturing human body and body part motions, and the techniques for analyzing the captured data. He also described his experiences with applications in fields such as Physical Medicine & Rehabilitation, Medical Physics & Radiation Oncology, and Speech Language Pathology.

Contributed Talks

The workshop also included six paper presentations that were selected for presentation after a peer review process. We received a total of 10 submissions for the workshop and each submission was reviewed by at least three experts in the field. The final decision to select six papers for presentation was based on the cumulative scores each submission received. Each presentation included 20 minutes of presentation and five minutes of Q&A. The presentations included a very good mix of machine learning, pattern recognition and image processing technologies on

1. Learning similarities between irregularly sampled short multivariate time series from EHRs
2. Evaluation of face-to-face communication skills for people with dementia using a head-mounted system
3. Extracting Important Factors of Prescribing Medicine by Data Analysis of Health Checkup and Tele-Medical Intervention Program in Developing Countries
4. Texture Features for Classification of Vascular Ultrasound
5. Unsupervised Fully Automated Cartilage Segmentation from Knee MRI
6. Nucleus-based Cell Classification in Cervical PAP Smear Images using a Decision-Tree

Panel

The workshop concluded with an interactive panel. The panelists included the two keynote speakers Profs. Jenssen and Prabhakaran as well as one of the workshop organizers Dr. Jianying Hu. The panel was moderated by Dr. Faisal Farooq. The panelists answered a wide variety of questions including but not limited to:

1. Why is the time right for Data Science to be mainstream in healthcare?
2. What are some unique challenges healthcare poses?
3. Where are the gaps in the problems that are being addressed by the community and what can be done to bridge those gaps?
4. Where are the big areas of opportunity in healthcare that Data Science can address?

The panelists as well as the audience shared their experiences including challenges and success stories which served as cues for various questions and a productive discussion. Many young researchers including students, scientists, faculty in this field found these extremely useful as they are marching on a journey in this discipline.

Robert Jenssen, University of Tromsø, Norway

Title: *Data-Driven Prediction of Colorectal Surgical Complications using Machine Learning and Pattern Recognition*

Abstract excerpt*: "[...] The talk will describe efforts to leverage recent machine learning and pattern recognition methodology for predicting postoperative complications in colorectal surgery. Such complications include anastomosis leakage, a potentially lethal condition, wherein early detection is very important."*

B. Prabhakaran, University of Texas (Dallas)

Title: *All Living Things Move - Kinematics in Human Health-care and Performance*

Abstract excerpt: *"[...] In this talk, we discuss the recent developments in body sensor technology in capturing human body and body part motions, and the techniques for analyzing the captured data. We also describe our experiences with applications in fields such as Physical Medicine & Rehabilitation, Medical Physics & Radiation Oncology, and Speech Language Pathology. Then, we consider the advances in mixed/augmented/virtual reality and explore possible applications incorporating them along with the sensors used for capturing human kinematics.*

Organization:
Friedhelm Schwenker, Ulm University, Germany
Stefan Scherer, University of Southern California, USA

by Friedhelm Schwenker

The fourth edition of the MPRSS workshop was organized by Dr. Friedhelm Schwenker (Institute of neural Information Processing, Ulm University, Germany) and Prof. Stefan Scherer (Institute of Creative Technologies, University of Southern California, USA). The MPRSS 2016 workshop was sponsored by Ulm University, the University of Southern California, the Transregional Collaborative Research Center SFB/TRR 62 Companion-Technology for Cognitive Technical Systems at Ulm University and the Technical Committee on Pattern Recognition in Human-Machine Interaction (TC9) of the International Association for Pattern Recognition (IAPR).

For the MPRSS 2016 workshop 18 papers were submitted from which 10 were selected for oral presentation at the workshop. Papers presented original research in machine learning and pattern recognition in human computer interaction focusing on both theoretical and applied aspects.

Selected and revised papers will be published in Summer 2017 in the Springer LNCS/LNAI series as postconference proceedings.

In addition to the regular program an invited tutorial on Multimodal Recognition of Mental States: Emotions, Dispositions, Pain was given by Harald C. Traue, Steffen Walter, Holger Hofmann, Sascha Meudt, Friedhelm Schwenker all at Ulm University.

ICPR 2016 participants at the 4th International Workshop on
Multimodal Pattern recognition of social signals in human computer interaction (HCI)

Photos: Diego Sánchez/Victor Alvarez

PRRS-9-2016

9th Workshop on Pattern Recognition in Remote Sensing

http://iapr-tc7.de/prrs/PRRS2016.htm

An ICPR 2016 Workshop, endorsed by the IAPR, December 4, 2016, Cancún, Mexico

Workshop Chairs:
Eckart Michaelsen, Germany
Jie Shan, USA

by the Workshop Chairs

The IAPR's Technical Committee 7 on Remote Sensing and Mapping organizes workshops on pattern recognition applied to remotely sensed data. This has quite some tradition by now, and it is regularly done in close temporal and geographical neighborhood of the ICPRs.

In 2016 the PRRS was again held in the form of a one-day workshop within the frame of the ICPR, this time in Cancún, Mexico, on the Sunday before the start of the main conference.

Remotely sensed data, such as satellite and aerial imagery, set one of the classical application topics of pattern recognition. But the workshop is also intended to draw experts and researchers from the photogrammetry and remote sensing communities to the ICPR and to make them aware of the IAPR–fostering inter-disciplinary cooperation. This PRRS–like most of its predecessors–was co-sponsored by IAPR-TC7, ISPRS ICWG II/III, and IEEE-GRSS, and most of the participants actually are more active in the remote sensing communities than in the IAPR.

The classical topic of pattern recognition in remote sensing is pixel-wise land-use classification from satellite or aerial images. Often these data are taken in different spectral bands than the usual RGB, and in particular more recent data usually have more than just three colors. In fact so-called hyper-spectral data have become very popular in remote sensing, featuring about two hundred bands. E.g. the key-note of this PRRS (held by D. Tuia, Univ. of Zurich) was mostly motivated by such hyperspectral applications. Basically the spectral bands suitable to remote sensing are given by the atmospheric transmission. So, next to the visual and the infra-red domain, also the RADAR domain is an important source, in particular satellite-based synthetic aperture RADAR (known as SAR). As additional source there is LIDAR (air-based or mounted on vehicles). This is where considerable overlap with the robotics community exists. Next to pixel-wise classification object recognition is also a topic, concentrating on things like buildings, vehicles, roads, or rivers.

The 14 technical talks held during the workshop can be assigned to the topics outlined above. These works were selected from 17 submitted manuscripts on the base of single blind reviews by the proven and diligent TC-7 program committee. The corresponding proceedings will appear in IEEE-Xplore. The speakers were from diverse countries such as the USA, China, Germany, Brazil, Russia, France etc. Since the workshop was held in conjunction with the ICPR, the audience was very international as well, and there were more than just the speakers, key-note speaker, and chairs listening. In fact there were about forty people present, and technical discussions were very vivid.

Uwe Stilla (chair ISPRS ICWG II/III), Eckart Michaelsen (chair IAPR-TC7, and chair PRRS-9-2016), Jie Shan (co-chair IAPR-TC7, and co-chair PRRS-9-2016), and Devis Tuia (IEEE-GRSS and keynote speaker of PRRS-9-2016)

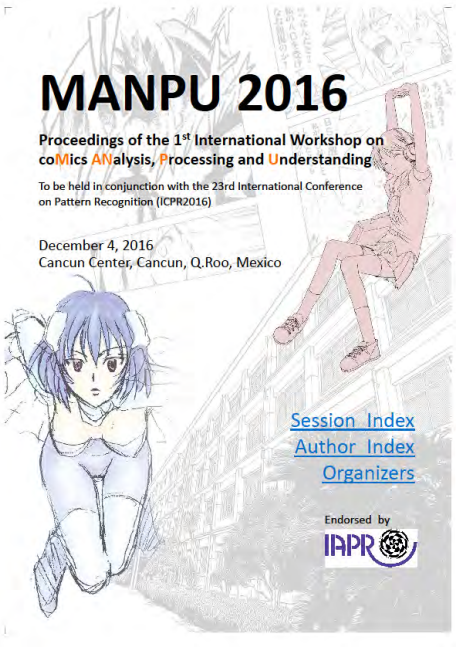
Whoever is interested in these topics and in the next PRRS (to be held in China in 2018) should contact Eckart Michaelsen (TC7 Chair, eckart.michaelsen@iosb.fraunhofer.de) or Jie Shan (TC7 Co-chair, jshan@purdue.edu), and join IAPR-TC7.

MANPU2016

The First International Workshop on coMics ANalysis, Processing and Understanding

December 4, 2016
Cancun Center, Cancun, Q.Roo, Mexico

An ICPR 2016 Workshop, endorsed by the IAPR
http://manpu2016.imlab.jp/



Proceedings are availble in the ACM Digital Library.

General Co-chairs:
Jean-Marc Ogier, University of La Rochelle, France
Kiyoharu Aizawa, The University of Tokyo, Japan
Koichi Kise, Osaka Prefecture University, Japan

Program Co-chairs:
Jean-Christophe Burie, University of La Rochelle, France
Toshihiko Yamasaki, The University of Tokyo, Japan
Motoi Iwata, Osaka Prefecture University, Japan

by the General Co-chairs and the Program Co-chairs

MANPU 2016 received contributions from seven countries. The number of submitted papers and accepted papers were 17 and 12, respectively. The review process was carried out by the Program Committee that consisted of 18 outstanding researchers, all of whom are specialists of comics analysis, processing and understanding.

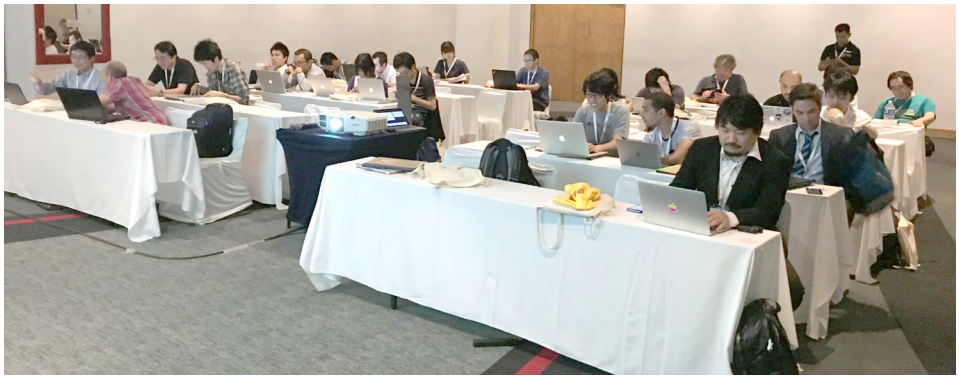
MANPU 2016 consists of one invited talk, two oral sessions (total 6 presentations), one poster session (total 6 presentations) and one panel discussion in a single track. The presentations widely covered the topics related to comics researches, for example, the dataset of comics, comics analysis, comics image processing, comics understanding, comics visualization, and so on. The number of attendee was around 40.

The 12 accepted papers and one invited paper were published by ACM in ACM Digital Library. The URL is as follows: http://dl.acm.org/citation.cfm?id=3011549

Prof. Akihiko Shirai from Kanagawa Institute of Technology (Japan) was invited to give keynote talk titled “Manga generator, a future of interactive manga media: invited talk paper.” The paper of his keynote talk is in public in ACM Digital Library at the following URL: http://dl.acm.org/citation.cfm?id=3015156&CFID=719897196&CFTOKEN=79955713

The steering committee for the MANPU decided to submit the workshop proposal of the 2nd International Workshop on coMics ANalysis, Processing and Understanding to ICDAR 2017 (International Conference on Document Analysis and Recognition).

The next edition of the workshop will be held in Kyoto, Japan in November 2017.



Workshop Chairs:

Mohamed Daoudi, Télécom Lille, France
Francisco Flórez-Revuelta, University of Alicante, Spain
Pietro Pala, University of Firenze, Italy
Hazem Wannous, University of Lille 1, France

by the Organizing Committee

The objective of UHA3DS 2016 was to bring together researchers from computer vision and machine learning communities, working together in a natural synergy and having an interest in using recent computing technologies to understand humans, but also support them. About 25-30 people attended the workshop, resulting in valuable scientific exchanges.

The review process was carried out by the Program Committee, composed of experts in the workshop topics who provided three independent reviews for each submitted paper. Only 9 papers were accepted as oral presentations.

The Workshop program consisted of two sessions covering topics such as 3D pose estimation, human activity analysis, hand gesture analysis, body expression and body language.

The invited speaker, Prof. Rita Cucchiara from Università di Modena e Reggio Emilia Italy, gave a keynote speech entitled "Human behavior understanding & 3D data".

Proceedings of UHA3DS 2016 will be published in the Springer LNCS Series.

Rita Cucchiara (Ms.Electr. Eng. '89, Phd in Comp. Eng. '92) is full professor at UNIMORE, Italy. She is Director of the Interdip. Research Center in ICT "Softech-ICT", Director of Master in "Visual Computing and Multimedia Technology" and coordinates the Research Lab Imagelab. She is Fellow and Member of the Governing Board dell'Intern. Ass. of Pattern Recognition IAPR since 2012 and Member of the Advisory Board of the Computer Vision Foundation since 2016. The Research activities cover Computer Vision, Pattern Recognition and Machine Learning, Multimedia, for video analysis by surveillance cameras, human behaviour understanding, people detection and tracking and social interaction recognition. She coordinated several research projects: among them: Italy-France Galileo project with INRIA Paris (2008-09); BESAFE , funded by NATO "Science for Peace", with Hebrew Univ. Israel (2008-12); THIS, European CHIPO/JLS project MIUR Italian Technology Clusters in smart cities and communities (2014-17) She is involved in activities of scientific organization; among them: Area Chair at CVPR 2014, 2016, Program Chair at ICCV 2017, Tutorial chair at ECCV2016,ACMMM2016,ICPR2016. Rita Cucchiara is author of more than 270 papers in international journals and proceeding of international conferences with referees; She has currently H-INDEX=37, citation 8100, i-10index 134.

MPRSS 2016 Invited Speaker, Prof. Rita Cucchiara, Università di Modena e Reggio Emilia Italy

FFER 2016

2nd International Workshop on Face and Facial Expression Recognition from Real World Videos

http://www.vap.aau.dk/ffer16/

An ICPR 2016 Workshop, December 4, 2016, Cancún, Mexico

Organizers:

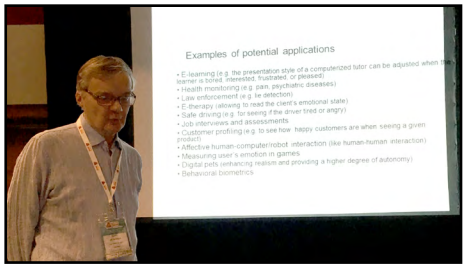
Kamal Nasrollahi, Aalborg University, Denmark
Gang Hua, Stevens Institute of Technology, USA
Thomas B. Moeslund, Aalborg University, Denmark
Qiang Ji, Rensselaer Polytechnic Institute, USA

by Kamal Nasrollahi

The workshop received eight submission, out of which seven were accepted for the oral presentation. Besides these seven presentations, the technical program included a keynote speech which was given by Professor Matti Pietikäinen from the University of Oulu in Finland. The speech highlighted the research works on face and facial expression recognition that are being carried out at Professor Pietikäinen's center for Machine Vision Research. There were about 50 people attending the workshop.

The presented papers included topics like, Classification of Subtle Facial Expressions, Face Recognition, Facial Expression Recognition, Age Estimation, Face Verification, Head Pose Estimation, and Super-resolution.

The proceedings of the workshop will be published by Springer.



Dr.Sc.Tech. Professor Matti Pietikäinen gave a keynote on Towards Reading Emotions from Face Videos.

DLPR 2016

1st International Workshop on Deep Learning for Pattern Recognition

http://dlpr2016.csp.escience.cn/dct/page/1

An ICPR 2016 Workshop, December 4, 2016, Cancún, Mexico

Workshop Chairs:

Xiang Bai (Huazhong University Science and Technology),
Zhaoxiang Zhang (Institute of Automation, Chinese Academy of Sciences),
Shiguang Shan (Institute of Computing Technology, Chinese Academy of Sciences),
Chunhua Shen University of Adelaide), Yi Fang (New York University),
Jingdong Wang (Microsoft Research Asia), Yangqing Jia (Facebook),
Shuicheng Yan (National University of Singapore)

35 submissions to DLPR were received, and 20 of them were accepted after peer reviews performed with easychair, including six oral papers and 14 poster papers. Around 150 researchers or graduate students attended the workshop and took part in the related discussions.

The pdf files of all the accepted papers have been published on the workshop website: http://dlpr2016.csp.escience.cn/dct/page/1.

In addition, parts of accepted papers were invited to a "Pattern Recognition Letters" Special Issue on: Deep Learning for Pattern Recognition (DLPR).

INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION

http://cvaui2016.oceannetworks.ca/

2nd Workshop on Computer Vision for Analysis of Underwater Imagery Cancun, Mexico

An ICPR 2016 Workshop, December 4, 2016, Cancún, Mexico

Workshop Chairs:
Alexandra Branzan Albu
(University of Victoria, BC, Canada)
Maia Hoeberechts
(Ocean Networks Canada, BC, Canada)


Photo: Diego Sánchez/Victor Alvarez

by the Workshop Chairs

Monitoring marine and freshwater ecosystems is of critical importance in developing a better understanding of their complexity, including the effects of climate change and other anthropogenic influences. The collection of underwater video and imagery, whether from stationary or moving platforms, provides a non-invasive means of observing submarine ecosystems in situ, including the behavior of organisms.

Oceanographic data acquisition has been greatly facilitated by the establishment of cabled ocean observatories, whose co-located sensors support interdisciplinary studies and real-time observations. Scheduled recordings of underwater video data and static images are gathered with Internet-connected fixed and PTZ cameras, which observe a variety of biological processes. These cabled ocean observatories, such those operated by Ocean Networks Canada (*www.oceannetworks.ca*), offer a 24/7 presence, resulting in unprecedented volumes of visual data and a "big data" problem for automated analysis. Due to the properties of the environment itself, the analysis of underwater imagery imposes unique challenges which need to be tackled by the computer vision community in collaboration with biologists and ocean scientists.

This workshop was well attended (30 participants) and provided a forum for researchers to share and discuss new methods and applications for underwater image analysis. We received 14 submissions, out of which 10 were accepted based on a thorough peer review process. Many of the submitted papers were of excellent quality, so the high acceptance rate reflects a self-selection process performed by the authors of the submissions. We thank the members of Program Committee for lending their time and expertise to ensure the high quality of the accepted workshop contributions.

This year's technical program covered a variety of topics, including applications to fisheries research, species classification, and scene reconstruction, among others. Three keynote talks were given by prominent researchers from ocean science, industry and computer science perspectives. Dr. Henry Ruhl, National Oceanography Centre, Southampton, UK, spoke on "Advances in Computer Vision and Pattern Recognition for Research in Biological Oceanography." Dr. Anthony Hoogs, Kitware, Clifton Park, NY, USA, talked about the "Video and Imagery Analytics for the Marine Environment (VIAME): an Open Source Framework for Underwater Image Processing." Finally, Dr. Yogesh (Yogi) Girdhar, Woods Hole Oceanographic Institution (WHOI), Woods Hole, MA, USA, entertained workshop participants with his talk entitled, "Real-time Unsupervised Scene Understanding for Building Curious Underwater Exploration Robots."

We hope that all workshop attendees will be inspired in their research by participating in CVAUI 2016, and that this workshop will foster many fruitful conversations and open new areas for collaborative interdisciplinary research in underwater image analysis.

Workshop Chairs:
Miguel Colom (CMLA, ENS Cachan, France)
Bertrand Kerautret (LORIA, Université de Lorraine, France)
Pascal Monasse (LIGM, École des Ponts ParisTech, France)
Jean-Michel Morel (CMLA, ENS Cachan, France)

by the Workshop Chairs

A new event was proposed with the first edition of the Workshop on Reproducible Research in Pattern Recognition. The aim of this workshop was to give an overview of Reproducible Research (RR) for authors, with a special focus on Pattern Recognition algorithms.

The call for papers was organized into two main tracks: RR Frameworks and RR Results. The first track was dedicated to the general topic of Reproducible Research in Computer Science with papers describing experiences, frameworks and platforms. The second track focused on the description of previous works in terms of Reproducible Research. The latter track contained ICPR companion papers describing their quality of Reproducible Research.

This workshop received 16 submissions with eight papers submitted to Track 1 of RR Framework, six papers to Track 2 of RR Results, and two papers associated to the invited talks. After a reviewing process including mostly three reviewers per paper, six papers were accepted as oral presentations and four as poster. We thank the scientific committee, allowing high quality works including papers, algorithms and source code reviews. A total of 12 accepted papers (including the two invited papers) are going to be published as post-proceedings by Springer in the LNCS series.

The different topics of workshop were equitably represented with six presentations for the RR Framework track and five presentations for the RR Result track. Two invited presentations were given during the workshop. The first one was a presentation of the Image Processing On Line journal (IPOL) presented by Pascal Monasse in a common work with Miguel Colom. The second invited talk was given by Daniel Lopresti and Bart Lamiroy with a presentation of the DAE platform in the context of Reproducible Research. The number of attendees were around 30.

For its first edition, the RRPR committee introduced the "Reproducible Label in Pattern Recognition" in order to highlight the reproducible aspects of the RRPR and ICPR works. The work of the authors who obtained the Reproducible label is archived and publicly available in the GitHub account of the organizing committee, *https://github.com/RLPR*.

Actually, seven papers were submitted and two are already accepted and the others are under peer-review. More submissions might be accepted. More details are available at the RRPR website

Finally a selection of papers will be invited to an RRPR IPOL special issue (*www.ipol.im*).

ICPR 2016 Tutorials

Adversarial Pattern Recognition

An ICPR 2016 Tutorial, December 4, 2016, Cancún, Mexico

Lecturer:
Fabio Roli, IAPR Fellow, IEEE Fellow (University of Cagliari, Italy)

"If you know the enemy and know yourself,
you need not fear the result of a hundred battles"
~ Sun Tzu, The art of war, 500 BC

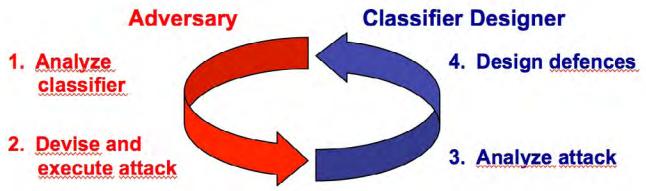
Learning-based pattern classifiers are currently used in several applications, like biometric recognition, spam filtering, malware detection, and intrusion detection in computer networks, which are different from traditional pattern recognition tasks. The difference lies in the fact that in these applications an intelligent, adaptive adversary can actively manipulate patterns with the aim of making a classifier ineffective.

Traditional machine learning techniques do not take into account the adversarial nature of classification problems like the ones mentioned above. One of the consequences is that the performance of standard pattern classifiers can significantly degrade when they are used in adversarial tasks. Pattern classifiers **can be significantly vulnerable to well-crafted, sophisticated attacks** exploiting knowledge of the learning and classification algorithms.

Being increasingly adopted for security and privacy tasks, pattern recognition techniques will be soon targeted by specific attacks, crafted by skilled attackers. In particular, two main threats against learning algorithms have been identified, among a larger number of potential attack scenarios, respectively referred to as evasion and poisoning attacks. This kind of problem has been named adversarial pattern recognition, and is the subject of an emerging research field in the machine learning community.

The purposes of this tutorial were: (a) to introduce the fundamentals of adversarial machine learning to the ICPR community; (b) to illustrate the design cycle of a learning-based pattern recognition system for adversarial tasks; (c) to present the new techniques that have been recently proposed to assess performance of pattern classifiers under attack, evaluate classifiers' vulnerabilities, and implement defense strategies that make learning algorithms and pattern classifiers more robust against attacks; (d) to show some applications of adversarial machine learning to pattern recognition tasks like biometric recognition and spam filtering.

About 40, coming from different countries, attended, and there was a lively discussion, which witnesses the interest for this topic in our community.



Handling Blur

An ICPR 2016 Tutorial, December 4, 2016, Cancún, Mexico

Lecturers:
Jan Flusser, Filip Šroubek, and Barbara Zitová
all three lecturers are from the
Institute of Information Theory and Automation, Czech Academy of Sciences, Czech Republic

Blur is an unwanted phenomenon, which is common in digital images. It results in smoothing high-frequency details, which makes the image analysis difficult. Heavy blur may degrade the image to such an extent, that neither automatic analysis nor visual interpretation of the content are possible. If we did not have proper tools for processing and analyzing blurred images, many unique images would be lost. Two major approaches to handling blurred images exist. They are more complementary rather than concurrent; each of them is appropriate for different tasks and employs different mathematical methods and algorithms.

Image restoration (blue in Figure) is one of the oldest areas of image processing. It appeared as early as the 1960's and 1970's in the work of the pioneers A. Rosenfeld, H. Andrews, B. Hunt, and others. In the last ten years, this area has received new impulses and has undergone a quick development. We have witnessed the appearance of multichannel techniques, blind techniques, and superresolution enhancement resolved by means of variational calculus in very high-dimensional spaces. A common point of all these methods is that they remove the blur from the input image and produce an image of a high visual quality. However, image restoration methods are often ill-posed, ill-conditioned, and time consuming.

On the contrary, the **blur-invariant** approach (yellow in Figure), proposed originally in 1995, works directly with the blurred data without any preprocessing. Blurred image is described by features, which are invariant with respect to convolution with some group of kernels. Image analysis is then performed in the feature space. This approach is suitable for object recognition, template matching, and other tasks where we want to recognize/localize objects rather than to restore the complete image. The mathematics behind it is based on projection operators and moment invariants.

In the tutorial, we focused on both approaches. We started with blur modeling and analyzed potential sources of blur in real images. In the first part of the tutorial we reviewed traditional as well as modern deconvolution techniques, including blind deconvolution, space variant deconvolution, and multichannel deconvolution. In the second part we discussed invariants to image blurring. The tutorial was completed with numerous demonstrations and practical examples.

The attendance of around 10 people was relatively low. However, the lively discussion during the coffee break and at the end of the tutorial, indicated the deep interest of the attendees.

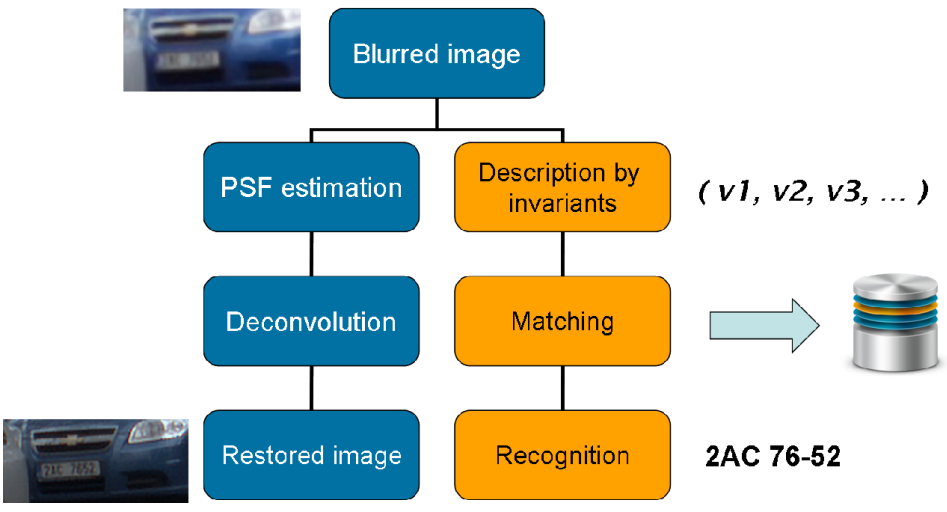


Figure. Two major approaches to handling blurred images exist: image restoration (blue) and blur-invariant (yellow)

Multimodal human behavior analysis in the wild: recent advances and open problems

An ICPR 2016 Tutorial, December 4, 2016, Cancún, Mexico

Lecturers:
Xavier Alameda-Pineda, INRIA Grenoble Rhône-Alpes
Nicu Sebe, University of Trento

During the IAPR International Conference on Pattern Recognition (ICPR) of 2016, in Cancún, we had the honor to give a tutorial course on multimodal human behavior analysis in the wild. We made a special effort to describe recent advances and open problems in the field, by showing practical examples and discussing the methodological choices for different applicative scenarios.

The course lasted four hours with a short break in the middle. The first two hours were devoted to show a vast amount of examples for which off-the-shelf methods would not work and different modifications needed to be done. The applications that motivated these advances are truly diverse, for instance: eye tracking, extreme head-pose estimation, crowd analysis, separation of moving sound sources, detection of social attention attractors or heart-rate estimation from unconstrained face videos.

During the second part of the course, a more in-depth analysis of a few of the methodologies was given. In particular, we described how low-rank matrix completion approaches can be used to address different tasks with the robustness required to operate in scenarios with noisy and missing data, specific to applications in the wild. Moreover, we discussed variational Bayesian approaches that are able to reduce the complexity of EM algorithms in probabilistic modelling with latent variables while keeping a good overall performance of the system.

We designed the tutorial for researchers from the pattern recognition community interested in computer vision and audio processing for human behavior analysis applications. All along the course we focused on the automated analysis of human behavior in unstructured scenarios and its many potential applications in health care, conflict and people management, sociology, marketing and surveillance. Special emphasis was given to recent approaches combining signal processing and machine learning to robustly extract crucial low and middle level information.

The tutorial was instructed by Prof. Nicu Sebe (University of Trento) and by Dr. Xavier Alameda-Pineda (INRIA Grenoble Rhône-Alpes).

We greatly acknowledge the efforts of Dr. Elisa Ricci (Fondazione Bruno Kessler and University of Perugia) in jointly preparing the slides that she could not present due to family constraints. We missed you!

All the material is available online at the URL: *http://mhug.disi.unitn.it/tutorial-icpr-2016/*.

We believe the course tutorial was a success and we are willing to prepare another tutorial in related topics in the upcoming ICPR in Beijing!

Data-driven Pattern Recognition: Philosophical, Historical, and Technical Issues

An ICPR 2016 Tutorial, December 4, 2016, Cancún, Mexico

Lecturers:
Marcello Pelillo, IAPR Fellow, IEEE Fellow (Italy)
Fabio Roli, IAPR Fellow, IEEE Fellow (Italy)

"How does it happen that a properly endowed natural scientist comes to concern himself with epistemology? Is there no more valuable work in his specialty? I hear many of my colleagues saying, and I sense it from many more, that they feel this way. I cannot share this sentiment."

~ Albert Einstein (1916)

Paraphrasing a well-known remark by Carl von Clausewitz, it can safely be said that "pattern recognition is the continuation of epistemology by other means." In fact, fundamental questions pertaining to categorization, abstraction, generalization, induction, etc., have been on the agenda of mainstream philosophy, under different names and guises, since its inception. With the advent of modern digital computers and the availability of enormous amounts of raw data, these questions have now taken a computational flavor.

As it often happens with scientific research, in the early days of pattern recognition there used to be a genuine interest around philosophical and conceptual issues, but over time the interest shifted almost entirely to technical and algorithmic aspects, and became driven mainly by practical applications. In recent years, however, there has been an increasing interest around the epistemological problems of machine learning, from both the computer scientist's and the philosopher's camps, as witnessed by a variety of initiatives and studies such as a recent special issue of Pattern Recognition Letters (October 2015).

The growing availability of inexpensive data for some real-world tasks, combined with the increasing power of computers, brought naturally to the current data-driven paradigm, which can be seen as a modern incarnation of empiricist philosophy. The practical success of this approach has raised the issue of "the unreasonable effectiveness of data" and led Google researchers to maintain that "memorization is a good policy if you have a lot of training data."[1] If memorization is a good policy, this seems to imply that all the work done in the earlier good days about generalization from small data sets and exploitation of a priori knowledge is outdated. Pattern recognition can then be fully driven by (big) data, assuming that you can get gigabytes of data very quickly, with no real cost. Unfortunately, there are real-world tasks for which this is simply not possible. In a recent Edge conversation[2], Gary Marcus, a professor of psychology and a machine-learning expert, said: "If you have a robot at home, you

The Human Condition (1933)
René Magritte

can't have it run into your furniture too many times. You don't want it to put your cat in the dishwasher even once […]. If you're talking about a robot in a real-world environment, you need for it to learn things quickly from small amounts of data." If the above remark is correct, and certainly is, then the business model based on "data bulimia" is not so profitable as many claim, and it should be questioned.

The goal of this tutorial was to critically address all these issues and provide pattern recognition researchers, in particular the youngers who did not live the early days of research, a picture of the philosophical and historical issues that are behind the current paradigm of Big Data + Deep Learning + GPUs, also discussing some technical issues that are relevant for a comprehension that goes beyond the mainstream and trends. We felt that this could be an opportunity for reflection, reassessment and eventually some synthesis, with the aim of providing the field a self-portrait of where it currently stands and where it is going as a whole, and hopefully suggesting new directions.

The tutorial was attended by around 40 international participants. The lively discussion showed strong interest in this topic.

[1] A. Halevy, P. Norvig, and F. Pereira, The unreasonable effectiveness of data. IEEE Intelligent Systems, vol. 24, no. 2, pp. 8-12, 2009.

[2] https://www.edge.org/conversation/gary_marcus-is-big-data-taking-us-closer-to-the-deeper-questions-in-artificial

Image-based measurement

An ICPR 2016 Tutorial, December 4, 2016, Cancún, Mexico

Lecturer:
Cris Luengo, Flagship Biosciences, Colorado, USA

In this tutorial, we discussed several different topics related to the task of obtaining accurate (unbiased) estimates of morphological properties of real-world objects, as imaged by a camera, microscope, MRI scanner, etc. This is a topic poorly addressed in image processing textbooks, even if the scientific literature has quite a bit to say about it.

We first reviewed some basic concepts from the field of stereology. In that field there is several hundred years' experience in deriving accurate estimates of morphological properties of objects, and many of the tools and techniques used in that field translate very well to images. Some of these techniques are so important, for example how to deal with image edge effects, that they should be taught in every image processing class.

Next we discussed algorithms to quantify area (volume in 3D), perimeter (surface area in 3D), Feret diameters and other features of binarized objects. Methods shown in most textbooks are biased, the methods we discussed are not. We analyzed (roughly) their precision.

The third part of the tutorial dealt with sampling and aliasing, and showed one method, called soft clipping, of converting an intensity image into a quasi-binarized image in which there is much less aliasing than a binary image. We then discussed a method to quantify area (volume), perimeter (surface area), bending energy and Euler number from such quasi-binarized images, yielding estimates several orders of magnitude more precise than their binarized counterparts.

The last part of the tutorial showed how to obtain size distributions without performing any segmentation at all. We used the granulometry, an established method from Mathematical Morphology, to do so. We saw applications of the granulometry using isotropic structuring elements (disks) as well as linear structuring elements, and discussed the use of the path opening to improve performance for the case of linear structuring elements.

Although the tutorial did not attract as many people as I had hoped, we did have a very engaged audience, with lots of interesting questions and discussions. I'm usually happy to have even one such student in my classroom!

I have written about unbiased measurements of binarized objects on my blog: *http://www.crisluengo.net/index.php/archives/tag/measure*.

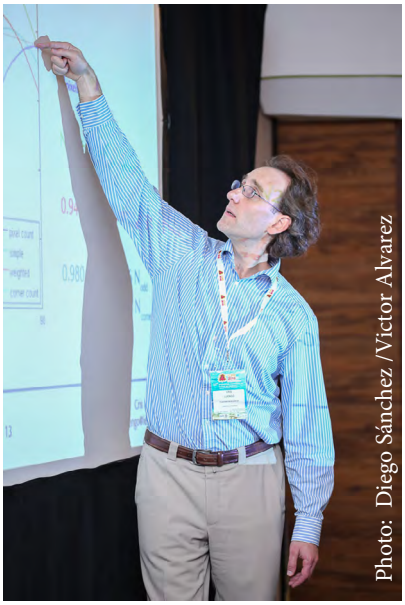


Photo: Diego Sánchez /Victor Alvarez

Cris' Image Analysis Blog
theory, methods, algorithms, applications

Similarity searching: Indexing, Nearest neighbor finding, Dimensionality reduction, and Embedding methods for applications in multimedia database

An ICPR 2016 Tutorial, December 4, 2016, Cancún, Mexico

Lecturer:
Hanan Samet, University of Maryland, USA

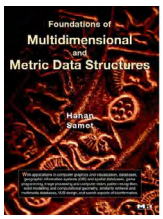
This half-day tutorial was presented by Prof. Hanan Samet of the University of Maryland at College Park. Attendance started slowly and ramped up to approximately 50 attendees by the conclusion of the tutorial.

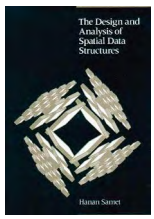
Prof. Samet started the tutorial by pointing out that similarity searching is usually achieved by means of nearest neighbor finding. Existing methods for handling similarity search in this setting fall into one of two classes. The first is based on mapping to a low-dimensional vector space which is then indexed using representations such as k-d trees, R-trees, quadtrees, etc. The second directly indexes the objects based on distances using representations such as the vp-tree, M-tree, etc. Mapping from a high-dimensional space into a low-dimensional space is known as dimensionality reduction and is achieved using SVD, DFT, etc. At times, when we just have distance information, the data objects are embedded in a vector space so that the distances of the embedded objects as measured by the distance metric in the embedding space approximate the actual distance. The search in the embedding space uses conventional indexing methods which are often coupled with dimensionality reduction. The key to the embedding methods is that the distance in the embedding space should be less than the true distance which makes the embedding contracitve. This means that if the distance of an object from the query object in the embedding space is greater than the query distance, then the object is too far. Some commonly known embedding methods are multidimensional scaling, Lipschitz embeddings, and FastMap.

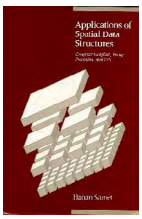
The tutorial was organized into five parts that covered the five basic concepts outlined above: indexing low and high dimensional spaces, distance-based indexing, dimensionality reduction, embedding methods, and nearest neighbor searching.

Prof. Samet concluded the tutorial with demos of existing systems that deploy some of the techniques discussed in the tutorial. The first was the VASCO system which enables the implementation of many spatial data structures and seeing how they are built as well as used in algorithms for operations such as windowing and incremental nearest neighbor finding (see *http://donar.umiacs.umd.edu/quadtree/index.html*). The second was the SAND Internet Browser which enables browsing a spatial relational database. The third was NewsStand which enables reading news with a map query interface which makes use of spatial synonyms (see *newsstand.umiacs.umd.edu*).

Professor Hanan Samet is a Distinguished University Professor at the University of Maryland. He has a Ph.D from Stanford University. He is the







author of the text "Foundations of Multidimensional and Metric Data Structures" published by Morgan-Kaufmann, an imprint of Elsevier, San Francisco, 2006, "Design and Analysis of Spatial Data Structures" and "Applications of Spatial Data Structures: Computer Graphics, Image Processing and GIS" published by Addison-Wesley, Reading, MA, 1990.

He received the 2011 ACM Paris Kanellakis Theory and Practice Award, which is one of the highest awards in Theoretical Computer Science.

ICPR 2016 Contests

Contest Organizers:

Pierre-Marc Jodoin (Université de Sherbrooke, Canada)
Lucia Maddalena (National Research Council, Italy)

The aim of the SBMC 2016 contest was to advance the development of algorithms and methods for scene background modeling through objective evaluation on the SBMnet dataset, that includes videos spanning different categories (basic, intermittent motion, clutter, jitter, illumination changes, background motion, very long, and very short).

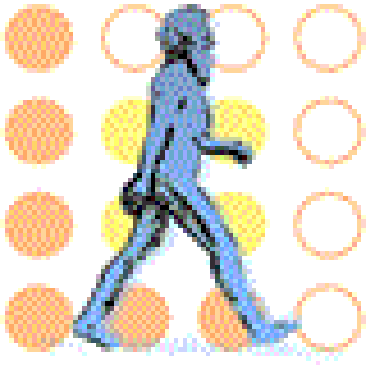
Eight contest result and paper submissions were accepted, authored by researchers of different countries, namely Belgium, China, France, Germany, Italy, Japan, Korea, Mexico, Qatar, and Spain. The proposed methods cover most of the methodologies commonly adopted for background modeling and initialization, based on temporal statistics, subsequences of stable Intensity, iterative model completion, missing data reconstruction, and neural networks.

The Contest winners, Benjamin Laugraud, Sébastien Piérard and Marc Van Droogenbroeck, received a plaque for results achieved by their method "LaBGen-P: A Pixel-Level Stationary Background Generation Method Based on LaBGen".

The success of SBMC 2016 is to be credited to the contribution of many people, including the Program Committee Members: Thierry Bouwmans, Universitè La Rochelle (France), Maurizio Giordano, National Research Council (Italy), Zhiming Luo, University of Sherbrooke (Canada), Alfredo Petrosino, University of Naples Parthenope (Italy), Sébastien Piérard, University of Liège (Belgium), Yi Wang, University of Sherbrooke (Canada). Moreover, the SBMnet dataset, the website and the utilities associated with this benchmarking facility would not have materialized without the tireless efforts of Yi Wang and Martin Cousineau (Université de Sherbrooke, Canada) and of the Staff of the CVPRLab (University of Naples Parthenope, Italy).

Contents for this section and links to other sections in the ICPR2016 Highlights:

From left to right, Lucia Maddalena, Benjamin Laugraud (SBMC 2016 winner), Pierre-Marc Jodoin



Joint Contest on Multimedia Challenges Beyond Visual Analysis

http://chalearnlap.cvc.uab.es/

An ICPR 2016 Contest, December 4, 2016, Cancún, Mexico

Organizers:
Hugo Jair Escalante (Mexico), Jun Wan (China), Sergio Escalera (Spain), Isabelle Guyon (USA), Michael Riegler (Norway), Xavier Baró (Spain), Henning Müller (Switzerland), Martha Larson (the Netherlands)

We organized an academic competition and workshop at ICPR2016 that focused on four problems that require effective processing of multimodal information in order to be solved. Two tracks were devoted to gesture spotting and recognition from RGB-D video, two fundamental problems for human computer interaction. Another track was devoted to a second round of the first impressions challenge of which the goal was to develop methods to recognize personality traits from short video clips. For this second round we adopted a novel collaborative-competitive (i.e.,coopetition) setting. The fourth track was dedicated to the problem of video recommendation for improving user experience under a certain watching situation.

The challenge was open for about 45 days, and received outstanding participation: almost 200 participants registered for the contest, and 20 teams sent predictions in the final stage. Results and winners of the contest were presented at ICPR. Overall the workshop had the participation of 11 speakers with published papers in the proceedings and three outstanding keynote speakers: Alberto del Bimbo, Fabio A. González and L. Enrique Sucar.

The contest was supported by three organizations with vast experience and prestige in the organization of academic contests, namely: Chalearn (http://www.chalearn.org/), MediaEval (http://www.multimediaeval.org/), and ImageCLEF (http://www.imageclef.org/). The contest was also supported by the IAPR TC-12 on Multimedia and Visual Information Systems (http://iapr-tc12.info/).

The main goals of the challenge were fulfilled: the state of the art was advanced considerably in the four tracks, with novel solutions to the proposed problems (mostly relying on deep learning). However, further research is still required. The data of the four tracks will be available to allow researchers to keep making progress in the four tracks.

Keep in touch with the ChaLearn LAP website for further events on looking at people. Please check the overview paper for further details: H. J. Escalante et al. **ChaLearn Joint Contest on Multimedia Challenges Beyond Visual Analysis: An overview**. Proceedings of ICPR Workshops, 2016.

Prize award ceremony, team leaders for winners of each track: 1) Ali Salah (BU-NKU); 2) Yunan Li (FLiXT); 3) Xiujuan Chai (ICT-NHCI); 4) Mathias Lux (ITEC-AAU)

SSGCI 2016

Competition on Subgraph Spotting in Graph representation of Comic Book Images

http://icpr2016-ssgci.univ-lr.fr

An ICPR 2016 Contest, December 4, 2016, Cancún, Mexico

Organizers:
Jean-Christophe Burie (University of La Rochelle, France)
Pasquale Foggia (University of Salerno, Italy)
Clément Guérin (University of La Rochelle, France)
Thanh Nam Le (University of La Rochelle, France)
Muhammad Muzzamil Luqman (University of La Rochelle, France)
Jean-Marc Ogier (University of La Rochelle, France)
Christophe Rigaud (University of La Rochelle, France)

by Muhammad Muzzamil Luqman

Graphs are widely used for representing the structure, topology and attributes of underlying information in various application domains of pattern recognition. Information retrieval based on the structural (and topological) similarity between query and retrieval candidates can be best modeled by an attributed graph retrieval problem, which thus is a very important research problem especially for the application domains of structural pattern recognition, computer vision, image analysis, data mining and machine learning.

This research problem becomes more challenging if the graphs contain attributes on their nodes and arcs. The research problem of searching a query graph in a database of graphs is termed as “subgraph spotting”. The proposed competition focused on the research problem of subgraph spotting in a database of attributed graphs. The goal of the SSGCI competition was to spot a query attributed graph in a database of attributed graphs. This means that for a given query attributed graph the goal is to retrieve every graph in the database that contains this query graph and to provide node correspondences between the query and each of the result graphs (as shown in the figure). This main challenge of the SSGCI competition represented an open research problem in

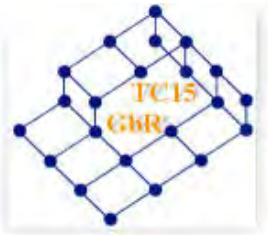
Figure: Summarizing the ICPR 2016 Competition on Subgraph Spotting in Graph Representations of Comic Book Images (SSGCI

graph-based structural pattern recognition. The problems of matching, indexing and retrieval of graph-based representations of underlying data are actively researched by various research teams around the globe.

The SSGCI competition was organized as a joint collaboration of the various members of three IAPR Technical Committees (TCs): IAPR TC-10 on GRAPHICS RECOGNITION, IAPR TC-11 on READING SYSTEMS and IAPR TC-15 on GRAPH BASED REPRESENTATIONS. Researchers from L3i Laboratory of University of La Rochelle (France) and University of Salerno (Italy) participated in the organization of the SSGCI competition.

The dataset for the SSGCI competition was obtained from a real problem domain of structural pattern recognition: "Document Image Analysis, Recognition and Understanding". We selected the "comic book images" as the data source for extracting graph representations, as they have lots of relational information in their content and the various building blocks of the comics exhibits challenging diversity in their shape and attributes while maintaining enough discriminatory information that permits their identification and recognition. The use of comic book images as the source for extracting the graph representations for the competition not only ensured that there is enough variability in the graph dataset, but it also ensured that there isn't too much variability so that the graph matching becomes too difficult. The dataset is freely available for the academic research via the website of the SSGCI competition (*http://icpr2016-ssgci.univ-lr.fr*).

IAPR Technical Committees TC10, TC11 and TC15 collaborated to organize the SSGCI 2016 competition.



Keywords cloud of the SSGCI competition

Contest Chairs:
Brian C. Lovell (U. Queensland, Australia)
Gennaro Percannella (U. Salerno, Italy)
Alessia Saggese (U. Salerno, Italy)
Mario Vento (U. Salerno, Italy)
Arnold Wiliem (U. Queensland, Australia)

Brian C. Lovell (left) and Gennaro Percannella (right) on behalf of the organizing committee of the HEp-2 contest with Shiqi Yu representing the team from the Computer Vision Institute, Shenzhen University, China, that won the competition.

This was the fourth of a series of benchmarking initiatives organized over the last few years and hosted by the ICPR conference (in 2012 and 2014) and by ICIP 2013, all of which attracted a very wide audience. The contest, that is a joint initiative by the University of Salerno (Italy) and the University of Queensland (Australia) with the support of Sullivan Nicolaides Pathology (SNP), Australia, primarily aimed to provide a platform for scientists and practitioners for performing research to develop Computer Aided Diagnosis (CAD) systems for pathology tests utilizing indirect immunofluorescence protocol.

The contest considered the Antinuclear Antibodies (ANA) test using Human Epithelial type 2 (HEp-2) cells. In particular, the 2016 edition of the competition was divided into four tasks addressing specific problems: (1) HEp-2 cell classification; (2) Patient specimen classification; (3) HEp-2 mitotic cell identification and (4) Cell segmentation. The first two tasks were already proposed in previous editions of the contest and used the same datasets in order to witness the advances made by the scientific community on such tasks. Conversely, the remaining two tasks were proposed to the community for the first time.

Following the experience of previous editions of the competition, the participants received a public set of data for training their pattern recognition systems; then they had to submit the software implementation of the proposed method in the form of an executable together with all the parameterizations required to execute it; then, the organizers independently ran the methods on the private test set. Each research team was allowed to apply to any number of tasks with one executable with one set of parameters per task. The participants could also submit a regular paper in the ICPR 2016 format describing their method and the results achieved on the public part of the dataset. The submitted papers underwent blind peer review in order to guarantee originality and technical soundness.

Ten research teams coming from all the continents participated in the competition. The organizers received fifteen executables, five for task 1, three for task 2, two for task 3 and five for task 4, and the Moreover, the Program Committee carefully reviewed the paper submissions, and six high-quality papers were selected for oral presentation and publication in the ICPR2016 proceedings.

Results achieved on the private test set were disclosed only during the contest session held at ICPR 2016. Roughly two dozen people attended the session, having the opportunity to exchange ideas on the themes of the competition in a very informal but productive way.

For more information see: *http://mivia.unisa*.it and *http://www.itee.uq.edu.au/sas/*.

Graph Distance Contest

https://gdc2016.greyc.fr/

An ICPR 2016 Contest, December 4, 2016, Cancún, Mexico

Scientific committee:

Luc Brun (Normandie University, ENSICAEN, France)
Xiaoyi Jiang (University of Münster, Germany)
Jean-Yves Ramel (University of Tours, LI Tours, France)

Organizing committee:

Zeina Abu-Aisheh (University of Tours, LI Tours, France)
Sébastien Bougleux (Normandie University, UNICAEN, France)
Benoit Gaüzère (Normandie Univ., INSA Rouen, LITIS, France)

This contest focused on the definition and the computation of general dissimilarity measures between graphs through two challenges:

Challenge 1: computation of the exact or an approximate graph edit distance

Challenge 2: computation of a dissimilarity measure for graph classification

Different datasets were considered with symbolic or numerical attributes on both nodes and edges.

The goal of Challenge 1 was to compute the exact or an approximate GED, for several pairs of graphs of several datasets, under the following constraints: running time limited to 30 seconds and edit costs imposed for each dataset. The submitted methods were compared according to running time closeness to reference distances. The reference distance is the optimal edit distance (when available) or the minimal distance found by the methods under evaluation.

The participants were:

- An Exact Graph Edit Distance Computation using a Binary Linear Program, Julien Lerouge, Zeina Abu-Aisheh, Romain Raveaux, Pierre Heroux, and Sebastien Adam, http://arxiv.org/pdf/1505.05740.pdf with 3 variants (24Threads)
- A Branch-and-Bound algorithms: Zeina Abu-Aisheh, Romain Raveaux, Jean-Yves Ramel and Patrick Martineau with 3 variants, http://www.rfai.li.univ-tours.fr/PagesPerso/zabuaisheh/anytimeGM.html
- Assignment Problem based methods: Benoit Gaüzère, Sébastien Bougleux, Luc Brun, Vincenzo Carletti, Mario Vento https://hal.archives-ouvertes.fr/hal-01246709/file/technical_report_ged.pdf with 2 variants

The detailed results of this challenge show that F24threads, the method based on Binary Linear Program, is the most precise between exact methods but fails to have a good deviation when matching graphs whose sizes are bigger than 60 vertices. QAPE beat F24threads on big graphs (graphs whose size is bigger than 60 vertices). Indeed, QAPE was the most precise approximate algorithm but since we don't have all the optimal solutions it's hard to tell how far its solutions are from the optimal ones and it is still not adapted to work with numeric attributes. DF and PDFS are highly dependent on the bipartite matching algorithm (used as a lower bound). One can notice that there is still no method that can match more than 40 nodes with really good deviation (compared to the optimal)

In future, more challenging datasets with all the optimal solutions, with bigger sizes of graphs, with denser graphs and with different types of attributes have to be used. The influence of costs on the methods has also to be studied more deeply.

The goal of the Challenge 2 was, given a dataset decomposed into a train set, a validation set and a test set, to determine the class of the graphs in the test set with a usual k-NN classifier (with k=3, decision at majority, reject if 3 different classes). The evaluation was done on four differents datasets

The two submitted methods were analyzed and compared, for each dataset, according to recognition rate and confusion matrix. The first method was High Order Stochastic Graphlets for Graph-Based Pattern Classification, Anjan Dutta and Josep Lladós and the second one was the Upper Bound Depth-First Graph Edit Distance Algorithm proposed by Zeina Abu-Aisheh, Romain Raveaux, Jean-Yves Ramel and Patrick Martineau.

The results demonstrate that the both methods are interesting, as the first method wins on two datasets (GREC, MAO) and the other one wins on Monoterp and Mutagenicity datasets.

MICHE-II

Mobile Iris CHallenge Evaluation II

http://biplab.unisa.it/MICHE_Contest_ICPR2016/

An ICPR 2016 Contest, December 4, 2016, Cancún, Mexico

Organizers:
Maria de Marsico (Sapienza University of Rome, Italy)
Michele Nappi (University of Salerno, Italy)
Hugo Proença (University of Beira Interior, Portugal)
Modesto Castrillón Santana (University of Las Palmas de Gran Canaria, Spain)

Mobile biometric recognition by personal and/or wearable devices provides a further application for user mobile equipment, which are ubiquitous nowadays. On the other hand, it extends the field of application of traditional biometric identification systems, by allowing capture of biometric traits in any place. The information captured by mobile devices can be compared with that stored either on the device itself, or even within RFID tags, smartcards or machine readable identification documents (IDs) for single user verification purposes. In addition, identification operations may be carried out on a remote server, for recognition in a set of relevant subjects.

Iris is a natural candidate for mobile biometric recognition for two reasons: iris acquisition is little intrusive, and iris codes are among the less expensive templates. Most current iris recognition systems still require that subjects stand close to the capture device (about 1m or less) and look towards it for about 3s. The first iris biometric competitions have relied on images acquired in these conditions. The aim of the contest Mobile Iris CHallenge Evaluation II (MICHE-II), launched in conjunction with ICPR 2016, was to collect relevant contributions to the field of mobile iris recognition in both academy and industry.

In this new context, it is assumed that the subject to be recognized autonomously operates the capturing device. MICHE-I provided a dataset suitable to assess the performance of biometric applications related in this specific set up.

The composition of the dataset used for MICHE-II challenge is basically the same as MICHE-I, with the addition of new unpublished images to be used mostly in each competitor's ranking process. Three kinds of smartphones and tablets were used:

- a Galaxy Samsung IV (GS4), with Google Android Operating System, CMOS posterior camera with 13 Megapixel (72dpi) and 2322 × 4128 resolution, CMOS anterior camera with 2 Megapixel (72 dpi) and 1080 ×1920$ resolution;
- iPhone5 (IP5), with Apple iOS Operating System, iSight posterior camera with 8 Megapixels (72 dpi) and 1536 ×2048 resolution, anterior FaceTime HD Camera with 1.2 Megapixels (72 dpi) and 960 × 1280$ resolution;
- Galaxy Tablet II (GT2), with Google Android Operating System, no posterior camera, 0.3 Megapixels anterior camera with 640 × 480$ resolution.

As a consequence, the three groups of images have different levels of resolution, which is one of the factors that can negatively affect cross-device recognition.

Image distortions in the MICHE-II dataset include: (a) reflections caused by light sources, people or objects in the scene; (b) out of focus; (c) blur, due either to an involuntary movement of the hand holding the device, or to an involuntary movement of the head/eye; (d) occlusions, due to eyelids, eyeglasses, eyelashes, hair, or shadows; (e) device-specific artifacts, due to the low resolution and/or to the specific noise pattern of the device; (f) off-axis gaze; (g)variable illumination; and (h) different color dominants. The lack of precise localization and of fixed distance in the capture causes both images containing well centred eyes and images containing half faces to be

present in dataset. This results in variable sizes of the region useful for recognition. This is typical of mobile captures performed by the user, which are usually neither too close nor at arm-length. This introduces further difficulties, since eye localization must be performed in a pre-processing step. In some cases, the resulting size of the iris region is smaller. In other cases, it is possible to exploit the further possibilities offered by an extended periocular region. The dataset has been collected during several different data acquisition sessions separated in time. The time elapsed between the first and second acquisition of a subject varies from a minimum of two months to a maximum of nine. At present, MICHE-I contains images from 75 different subjects, with 1297 by GS4, 1262 images from IP5, and 632 images from GT2.

According to a policy established by NICE competitions, the problem of iris recognition was tackled by two separate challenges: MICHE-I dealt with the problem of segmentation of iris images acquired by mobile devices, and the following MICHE-II started from the best segmentation algorithm as a fair preliminary processing step to feed the following phases of feature extraction and classification. This algorithm was provided to all competing groups registered for the challenge, in order to get an unbiased comparison.

Out of the 12 submitted algorithms, six were selected to be presented at ICPR2016, namely the ones achieving the best performance. Moreover, the authors were invited to submit an extended version of their work to a special issue of Pattern Recognition Letters.

All selected approaches were presented during the conference. A number of external conference attendees, not participating to the competition, were also present. Therefore a stimulating and interesting discussion of methods and results was carried out, which was appreciated by both organizers and participants.

Details on the competition can be found at: *http://biplab.unisa.it/MICHE_Contest_ICPR2016/* and results at *http://biplab.unisa.it/MICHE_Contest_ICPR2016/finalrank.php*. Presentations at the conference can be found at: *http://biplab.unisa.it/MICHE_Contest_ICPR2016/presentations.php*.

Some of the session participants

AcTiVComp16

Contest on Arabic Text Detection and Recognition in Video Frames

An ICPR 2016 Contest, December 4, 2016, Cancún, Mexico

Organizers:
Oussama Zayene (Tunisia), Nadia Hajjej (Tunisia), Soumaya Ben Mansour (Tunisia)
Sameh Masmoudi Touj (Tunisia), Jean Hennebert (Switzerland),
Rolf Ingold (Switzerland), and Najoua Essoukri Ben Amara (Tunisia)

Introduction:

In the last two decades, important progress has been achieved in the conventional field of Arabic OCR (e.g., scanned documents) in terms of systems, datasets and competitions. However, few attempts have been made on the development of detection and recognition systems for embedded Arabic text in videos. To this end, we have organized the first Arabic video text detection and recognition competition—AcTiVComp[2] in the context of ICPR 2016.

The main objectives of this contest were

1. to evaluate the performance of participating systems to automatically locate and recognize overlay texts using our freely available AcTiV[1] dataset and
2. to unify the groundtruth formats, the evaluation protocols and metrics used in the Arabic Video OCR domain.

Fig1. Typical video frames from AcTiV dataset. From left to right examples of RussiaToday, France24, TunisiaNat1 and AljazeeraHD channels

AcTiVComp16:

In this first edition of AcTiVComp four groups participated with five systems:

Three systems for the detection task:

- *ATD-CH system* was submitted by Houda Gaddour from the MIRACL "Multimedia, InfoRmation systems and Advanced Computing Laboratory", University of Sfax, Tunisia. This system is based on color clustering, area stability filtering and heuristic merging.
- *FM-AVTD system* was submitted by Yang Xue-hang from the NLPR "National Laboratory of Pattern Recognition", Institute of Automation, Chinese Academy of Sciences, China. This system consists of MSER algorithm, AdaBoost classifier and rule-based post-processing module.
- *D-ATVF system* was submitted by Seiya Iwata and Wataru Ohyama, from the Graduate School of Engineering, Mie University, Japan. This system is based on projection profile analysis, Difference of Gaussians (DOG) filter and eccentricity reduction.

Two systems for the recognition task:

- *ATR-SID system* was submitted by Soumaya Essefi from the National Engineering School of Sousse, University of Sousse Tunisia. This system is based

on Multi Dimensional Recurrent Neural Networks (MDRNNs) coupled with Connectionist Temporal Classification (CTC).

- *R-ATVF system* was submitted by the authors of the *D-ATVF system*. This system is based on modified quadratic discriminant function (MQDF) and dynamic programming (DP).

The performance of detection systems was measured using the standard evaluation metrics i.e. recall, precision and f-score using our open-source evaluation tool. The recognition systems were evaluated based on the recognition rates at the character, word and line levels i.e. CRR, WRR and LRR. The participating systems were tested in a blind manner on the closed-set of the AcTiV dataset which was unknown to all participants. Twelve evaluation protocols (six for each task) were used to evaluate the participating systems under the same experimental conditions. These protocols can be divided into two groups: channel-dependent protocols e.g., protocol 4.3 for TunisiaNat1 TV channel (detection task) and cross-channels (or channel-free) protocols e.g. protocol 6.4 for All-SD channels (recognition task). More details about the protocols are explained in the contest paper[2].

In the detection task, the best results were yielded by the FM-AVTD system for "AljazeeraHD", "France24" and "TunisiaNat1" channel-dependent protocols and "All-SD" cross-channels protocol and by the D-ATVF system for "RussiaToday" channel-dependent protocol.

In the recognition task, the best results were yielded by the ATR-SID system for "France24", "RussiaToday" and "TunisiaNat1" channel-dependent protocols and by the R-AVTF system for protocol 6.4. The contest results show that there is still room for improvement in both detection and recognition of Arabic video text. We look forward to having more participants in future editions of AcTiVComp and more researchers joining the challenging research topic of Arabic video text detection and recognition.

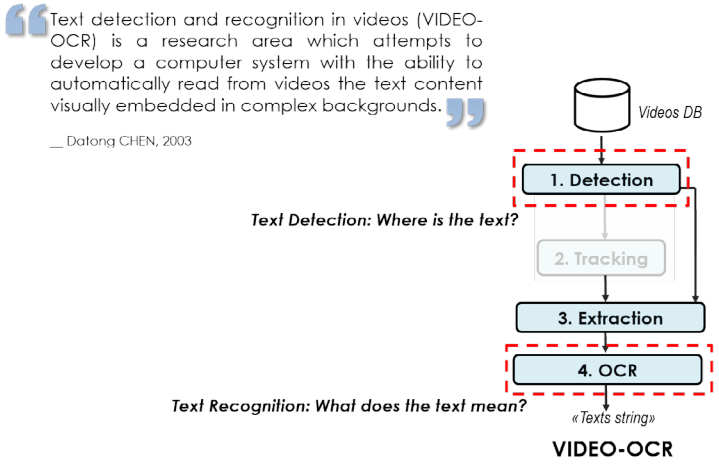
[1] O. Zayene, J. Hennebert, S. M. Touj, R. Ingold, and N. Essoukri Ben Amara, "A dataset for Arabic text detection, tracking and recognition in news videos- AcTiV", in Proc. of ICDAR'15, Nancy- France, August 2015.

[2] Zayene O., Hajjej N., Touj S. M., Ben Mansour S., Hennebert J., Ingold R. et Ben Amara N. E., "ICPR2016 Contest on Arabic Text Detection and Recognition in Video Frames—AcTiVComp", ICPR'16, Cancún Mexico 2016.

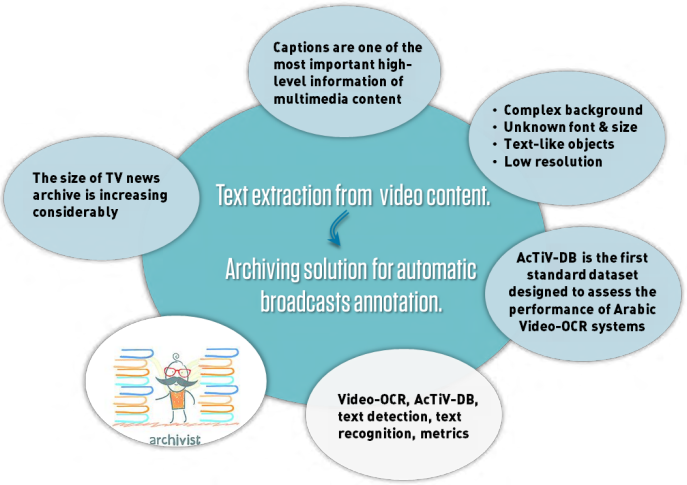
AcTiVComp17

http://diuf.unifr.ch/diva/AcTiVComp/

will take place in conjunction with ICDAR2017 (November 10-15, 2017, Kyoto, Japan)



Video-OCR system pipeline



Video-OCR context, challenges and objectives

Photo by Rangachar Kasturi

Mohammad Showkat-Ul Alam (USA)
For contributions to the advancement and development of architectures, algorithms, and performance metrics for optical pattern recognition and high resolution image reconstruction

Richard Bowden (UK)
For contributions to computer vision in the fields of sign language, gesture, and activity recognition and for service to IAPR

Alberto Broggi (Italy)
For contributions in the field of computer vision-based advanced driver assistance systems and autonomous driving

Xilin Chen (China)
For contributions to image modeling and object recognition

Mohamed Cheriet (Canada)
For contributions to ancient manuscript processing, form construction, handwriting recognition, multidisciplinary application, and for service to IAPR

Aly A Farag (USA)
For contributions to object modeling and biomedical applications

Yun Fu (USA)
For contributions to pattern recognition, data mining, and visual intelligence

Anders Lars-Gunnar Heyden (Sweden)
For contributions to multiple view geometry and auto-calibration and for service to IAPR

Gang Hua (USA)
For contributions to visual computing and learning from unconstrained images and videos

C. V. Jawahar (India)
For contributions to computer vision, pattern recognition, and document image understanding

Kenichi Kanatani (Japan)
For contributions to 3D computer vision analysis and computation

Ajay Kumar (Hong Kong)
For contributions to human identification using biometrics

Zhouchen Lin (China)
For contributions to image processing, computer vision and machine learning

Derong Liu (China)
For contributions to neural networks and associative memories

Tao Mei (China)
For contributions to large-scale video analysis, understanding, and applications

Sushmita Mitra (India)
For contributions to neuro-fuzzy and hybrid approaches to pattern recognition and machine intelligence, with applications to bioinformatics and medical imaging

Maja Pantic (UK)
For contributions to affective and behavioural computing

Petia Radeva (Spain)
For contributions to computer vision, machine learning, egocentric vision, life-logging, and medical imaging

Amit K Roy-Chowdhury (USA)
For contributions to collaborative sensing and distributed processing in camera networks with applications in tracking, re-identification, and activity recognition

Punam Kumar Saha (USA)
For contributions to digital topology and geometry and their application

Stan Sclaroff (USA)
For contributions in tracking, human gesture analysis, shape recognition, and video databases

Zhenan Sun (China)
For contributions to automatic iris recognition and applications

Emanuele Trucco (UK)
For contributions to computer vision and applications

René Vidal (USA)
For contributions to computer vision and pattern recognition

Dong Xu (Australia)
For contributions to machine learning for visual recognition and domain adaption

Jian Yang (China)
For contributions to 2D image representation and discriminant analysis

Naokazu Yokoya (Japan)
For contributions to image processing, computer vision, and mixed and augmented reality

Jie Zhou (China)
For contributions to biometrics, computer vision, and image processing

ICPR 2016 Best Paper Awards

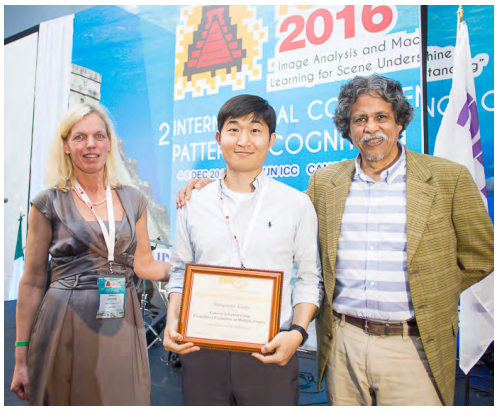
Best Industry Related Paper Award

presented to

Niki Martinel, Gian Luca Foresti, and Christian Micheloni

for the 23rd ICPR Paper

"Distributed and Unsupervised Cost-Driven Person Re-Identification"



Piero Zamperoni Best Student Paper Award

presented to

Sungmin Eum

for the 23rd ICPR Paper

"Content Selection Using Frontalness Evaluation of Multiple Frames"

authors: Sungmin Eum and David Doermann

NOTE:
Sungmin Eum is the author of the IAPR...The Next Generation column in this issue of the IAPR newsletter.
~A. Kuijper, EiC, IAPR Newsletter

Photos: Diego Sánchez/Victor Alvarez

Intel Best Scientific Paper Awards

Track 1: Pattern Recognition and Machine Learning
Qing Tian and Songcan Chen
"Cross-Heterogeneous-Database Age Estimation with Co-Representation among Them"

Track 2: Computer Vision and Robot Vision
Susanna Glad, Martin Danelljan, Fahad Shahbaz Khan, and Michael Felsberg
"Deep Motion Features for Visual Tracking"

Track 3: Image, Speech, Signal and Video Processing
Dan Xu, Jingkuan Song, Xavier Alameda-Pineda, Elisa Ricci, and Nicu Sebe
"Multi-Paced Dictionary Learning for Cross-Domain Retrieval and Recognition"

Track 4: Document Analysis, Biometrics and Pattern Recognition Applications
Yusuf Osmanlioglu, Santiago Ontañón, Uri Hershberg, and Ali Shokoufandeh
"Efficient Approximation of Labeling Problems with Applications to Immune Repertoire Analysis"

Track 5: Biomedical Image Analysis and Applications
Serge Bobbia, Yannick Benezeth, and Julien Dubois
"Remote Photoplethysmography Based on Implicit Living Skin Tissue Segmentation"

Photo: Diego Sánchez/Victor Alvarez

IBM Best Student Paper Awards

Track 1: Pattern Recognition and Machine Learning
Yangwei Liu
"One-Pass Online SVM with Extremely Small Space Complexity"
authors: Yangwei Liu and Jinhui Xu

Track 2: Computer Vision and Robot Vision
Satoshi Morinaka
"3D Reconstruction under Light Ray Distortion from Parametric Focal Cameras"
authors: Satoshi Morinaka, Fumihiko Sakaue, Jun Sato, Kazuhisa Ishimaru, and Naoki Kawasaki

Track 3: Image, Speech, Signal and Video Processing
Bo Wang
"Adaptive Boosting for Image Denoising: Beyond Low-Rank Representation and Sparse Coding"
authors: Bo Wang, Tao Lu, and Zixiang Xiong

Track 4: Document Analysis, Biometrics and Pattern Recognition Applications
Andras Rozsa
"Are Facial Attributes Adversarially Robust?"
authors: Andras Rozsa, Manuel Günther, Ethan Rudd, and Terry Boult

Track 5: Biomedical Image Analysis and Applications
Jennifer Alvén
"Shape-Aware Multi-Atlas Segmentation"
authors: Jennifer Alvén, Fredrik Kahl, Matilda Landgren, Viktor Larsson, and Johannes Ulén

Photo: Diego Sánchez/Victor Alvarez

IAPR Service Awards

IAPR/ICPR 2016

Distinguished Performance Award

presented to

Prof. Brian Carrington Lovell

in recognition of outstanding performance as Program Chair of the 23rd International Conference on Pattern Recognition

IAPR Certificate of Appreciation

presented to

Linda O'Gorman

for highly professional support to the IAPR ExCo
and for service to the IAPR

Photos: Joakim Nyström
and Diego Sánchez/Victor Alvarez

Elsevier Awards presented at ICPR 2016

Elsevier *Pattern Recognition*

Journal Award of Excellence

presented to

Professor Ching Y. Suen

in recognition of his
distinguished editorial services (1984-2016)

Elsevier Journal of the Pattern Recognition Society

Pattern Recognition Best Paper Award for 2013

presented to

Zhiquan Qi, Yingjie Tian, Yong Shi

received by Mohamed Cheriet (ETS, Canada) in place of authors

for the paper entitled

"Robust twin support vector machine for pattern classification"
Pattern Recognition. Volume 46, Issue 1, Jan. 2013, Pages 305-316.

Elsevier Journal of the Pattern Recognition Society

Pattern Recognition Best Paper Award for 2014

presented to

Asja Fischer and Christian Igel

receivedby Asja Fischer

for the paper entitled

"Training restricted Boltzmann machines: An introduction"
Pattern Recognition. Volume 47, Issue 1, Jan. 2014, Pages 25-39.

Photos: Diego Sánchez/Victor Alvarez

The 2016 Meeting of the IAPR Governing Board

The IAPR Governing Board meets every two years during the ICPR conference. Representatives from all of the IAPR's member societies get together to discuss and vote on matters of high importance to the governance of the IAPR.

Some of the key outcomes of the 2016 Governing Board meeting are listed below. (See the IAPR News at the IAPR website and future issues of the *IAPR Newsletter* for more information as it becomes available.)

- New member societies from Vietnam and Pakistan were approved by a unanimous GB vote.
- The venue of ICPR 2020 will be Milan, Italy. This venue was selected by vote from among five competing bids of excellent quality.
- An increase in annual membership dues was approved. Annual dues had remained the same for the past 20 years. The previous good financial status of IAPR had enabled new initiatives, such as TC Summer Schools, Research Scholarships, and IAPR Travel stipends. In order to sustain these initiatives, the IAPR needs to begin implementing a new financial plan. The modest dues increase is part of that plan.

IAPR Executive Committee for the 2016-2018 Term

Photo: Diego Sánchez/Victor Alvarez

The New IAPR ExCo: Secretary Alexandra Branzan-Albu, Treasurer Apostolos Antonacopoulos, President Simone Marinai, First Vice-President Massimo Tistarelli, Second Vice-President Edwin Hancock, Past President Ingela Nyström

This bulletin board contains items of interest to the IAPR Community

ICVSS 2017

Sicily ~ 09-15 July

International Computer Vision Summer School

APPLICATION DEADLINE: 31 MARCH 2017

The 11th edition of the International Computer Vision Summer School aims to provide both an objective and clear overview and an in-depth analysis of the state-of-the-art research in Computer Vision.

click anywhere on this notice to go to:
http://iplab.dmi.unict.it/icvss2017/

Springer + IAPR =

The IAPR and Springer have a new agreement that allows IAPR members to get discounted subscriptions to the International Journal on Document Analysis and Recognition (IJDAR) and Machine Vision and Applications (MVA).

Contact Linda O'Gorman, *secretariat@IAPR.org* for more information

Clink on links below so you don't miss these important items in this issue:

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
2017	FEB	ICPRAM 2017: 6th International Conference on Pattern Recognition Applications and Methods		**Portugal**
	MAR	CCIW 2017: 6th Computational Color Imaging Workshop	CCIW 2015	**Italy**
	APR	ASAR 2017: First Intl. Workshop on Arabic Script Analysis and Recognition		**France**
		IWBF 2017: 5th International Workshop on Biometrics and Forensics	IWBF 2016	**UK**
	MAY	MVA 2017: 15th IAPR Intl. Conf. on Machine Vision Applications	MVA 2015	**Japan**
		GbR 2017: 11th IAPR-TC15 Workshop on Graph-based Representations	GbR 2015	**Italy**
	JUN	SCIA 2017: 20th Scandinavian Conference on Image Analysis	SCIA 2015	**Norway**
		SSB 2017: 14th IAPR/IEEE International Summer School on Biometrics	Biometrics 2016	**Italy**
		IGS 2017: 18th International Graphonomics Society Conference		**Italy**
		MCPR 2017: 9th Mexican Congress on Pattern Recognition	MCPR 2016	**Mexico**
	JUL	* ICVSS 2017: International Computer Vision Summer School: From Representation to Action and Interaction *	ICVSS 2016	**Italy**
		ICPRS 2017: 8th International Conference on Pattern Recognition Systems		**Spain**
	AUG	* CAIP 2017: 17th International Conference on Computer Analysis of Images and Patterns *		**Sweden**
	SEP	* ICIAP 2017: 19th Intl. Conference on Image Analysis and Processing *	ICIAP 2015	**Italy**
		* GCPR 2017: 39th German Conference on Pattern Recognition *		**Germany**
		DGCI 2017: 20th International Conference on Discrete Geometry for Computer Imagery	DGCI 2016	**Austria**
	NOV	CIARP 2017: 22nd Iberoamerican Congress on Pattern Recognition		**Chile**
		ICDAR 2017: 14th International Conference on Document Analysis and Recognition		**Japan**
		PSIVT 2017: 8th Pacific Rim Symposium on Image and Video Technology	PSIVT 2015	**China**
	DEC	PreMI 2017: 7th International Conference on Pattern Recognition and Machine Intelligence	PreMI 2015	**India**

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To contact us:
Arjan Kuijper, Editor-in-Chief, *arjan.kuijper@igd.fraunhofer.de*
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Linda J. O'Gorman, Layout Editor, *secretariat@iapr.org*