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IN THIS
Issue

From the Editors' Desks:
Virtual Conferences, Now and Then

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Comments from the EiC on virtual conferences "Now":
As we in the IAPR Community are well aware, the global coronavirus pandemic has forced conference organizers to move to an online format. The last issue of the *IAPR Newsletter* had several reports of highly successful virtual conferences. You will read more in this issue and in several of the forthcoming issues as well.

We are fortunate to live in a time when an online meeting can be a real-time, interactive experience in many of the same ways that an in-person conference, workshop or summer/winter school is.

Some people might point to the disadvantages; others, like the organizers of the 2020 Summer School on Biometrics, will find some advantages (see SSB 2020 report in this issue). For example, a format that allows participants to not only directly ask questions but also submit written questions and statements, enables shy participants to have more interaction than they might have had otherwise.

At this point in time, IAPR-sponsored and endorsed conferences and workshops scheduled through February 2021 will be held online. This includes ICPR 2020 and its workshops along with S+SSPR 2020.

With today's meeting platforms, online conferences are vital, well-attended, productive events for students and researchers from academia and industry with live, online presentations and real-time interaction among participants.

Comments from the Layout Editor on virtual conferences "Then":
Like the technology to manage them, attitudes about online meetings have changed since they were first conceived. While laying out this issue of the *IAPR Newsletter*, I came upon something interesting in the *Newsletter* archives.

CALLS for PAPERS

2 0 2 1

ICPRAM 2021
10th International Conference on
Pattern Recognition Applications and Methods
Vienna, Austria
Deadline: Oct. 29, 2020
Dates: Feb. 4-6, 2021

VISAPP 2021
16th International Conference on
Computer Vision Theory and Applications
Vienna, Austria
Deadline: Oct. 29, 2020
Dates: Feb. 8-10, 2021

S+SSPR 2020
IAPR Joint International Workshops on
Statistical Techniques in Pattern Recognition (SPR) and
Structural and Syntactic Pattern Recognition (SSPR)
Padua, Italy
Deadline: Nov. 1, 2020; Dates: Jan. 19-22, 2021

ICPRS 2021
11th International Conference on
Pattern Recognition Systems
Curicó, Chile
Deadline: Nov. 2, 2020
Dates: Mar. 17-19, 2021

DGMM 2021
1st International Conference on
Discrete Geometry and Mathematical Morphology
Uppsala, Sweden
Deadline: Nov. 6, 2020
Dates: May 24-27, 2021

CIARP PORTO 2021
25th Iberoamerican Congress on Pattern Recognition
Porto, Portugal
Deadline: Jan. 31, 2021
Dates: May 10-13, 2021

MVA 2021
17th International Conference on
Machine Vision Applications
Nagoya, Japan
Deadline: Mar. 31, 2021
Dates: Jul. 25-27, 2021

In the "From the Editor's Desk" column of the January 1997 issue of the *IAPR Newsletter*, Prof. Maria Petrou, EiC, was decidely against the idea of "Virtual Conferences" (the editorial and her associated cartoon are reprinted in this issue).

But, what was the "Virtual Conference" of 1996?

As explained in that issue of the *Newesletter*,

"**Virtual Conferences and other scary tales...**
It was reported in the newsletter of IFIP (International Federation of Information Processing) that Working Group 6.5 of IFIP under the chairmanship of Mr. Einar Stefferud has proposed the procedure under which virtual conferences should be organised:

Related papers will be mounted on WWW in sets, so as to simulate sets of papers presented in sessions at real conferences. For each set, a mailing list is created to facilitate email discussion of the papers by the people who obtain copies of the set. Mailing list subscriptions are automatically created when people acquire copies of the related set of virtual session papers. A virtual session chair is appointed to act as a moderator and facilitator for each virtual session. The virtual session occurs on the internet in the form of mailing list exchanges, with an archive to automatically accumulate the messages, for access by new recipients of the virtual session set. The email archive becomes a permanent part of the virtual conference proceedings. When it becomes a matter of mailing list consensus that the discussion has covered the appropriate ground, the virtual session may be closed. A small fee may be charged to those participating."

We all miss Prof. Petrou (in whose honor the Maria Petrou Prize is given at ICPR) and wish that she could see what virtual conferences have become and that we would see her along with our other colleagues at ICPR 2020 Online from Milan, Italy, January 10-15, 2021. Registration is now open!

We hope to see you there!

Dear Everybody,

I think it was Aristotle who said "We are what we repeatedly do. Thus excellence is not a quality but a habit". When I first read this, I was struck by the first part of it: We are what we do. We all, directly or indirectly are involved in creating the super-humanoid robots of the future: They will not only do the housework for us, not only do the mining, the fighting and the repairing of nuclear reactors; they will also catch us when we exceed the speed limit by a couple of miles, evade tax by a f'ew pounds, pick a flower from a bush that is not ours, behave improperly in the streets, in the roads, in the buildings. Do you get a feeling of the Big Brother watching? I do. However, in order for this to come true, *somebody* will have to decide, authorise, have built and install all these robots everywhere. *Somebody* who will be the product of *our* society. One of us ! *Somebody* who will have become near robot himself in his thinking...I read with dismay the proposals for the "Virtual Conferences" (see p8). They are the answer to those appallingly organised conferences I felt again compelled, as an editor, to include a report on (see p7) as a way of increasing the voice of the helpless academic victim. The Virtual Conferences, however, will be perfectly organised. The Virtual Conferences will be cheap and effective ways of communication. In a Virtual Conference nobody will be delayed for hours in a cold airport and nobody will lose his suitcase. In a Virtual Conference nobody will be over-charged and nobody will be mugged by a local thug. In a Virtual Conference nobody will suffer indigestion from the local food and nobody will break his leg dancing the local dance during the banquet. But in a Virtual Conference nobody will dance a 1ocal dance, savour a local dish and stroll in unknown streets; because everybody will be sitting inside their four walls, in front of their screens being terribly efficient, terribly professional, terribly productive and terribly robot-like! I sincerely hope that my professional career will be over by the time ICPR will be called IVCPR! What about then all the frustrations we all suffer sometimes at conferences? Wasn't it Nevatia who said that what characterises the human vision system is that it can come up with answers like "This is a red cow with five legs", implying that the human brain, the human nature, can identify the useful, the pleasant and the desirable in a clutter of junk, unpleasantness and repulsion? And isn't that what makes a human different from a robot? And isn't that what makes possible for even a badly organised bad conference to be pref'erable to a perfectly organised Virtual one?

Oh... the good old days of my youth...
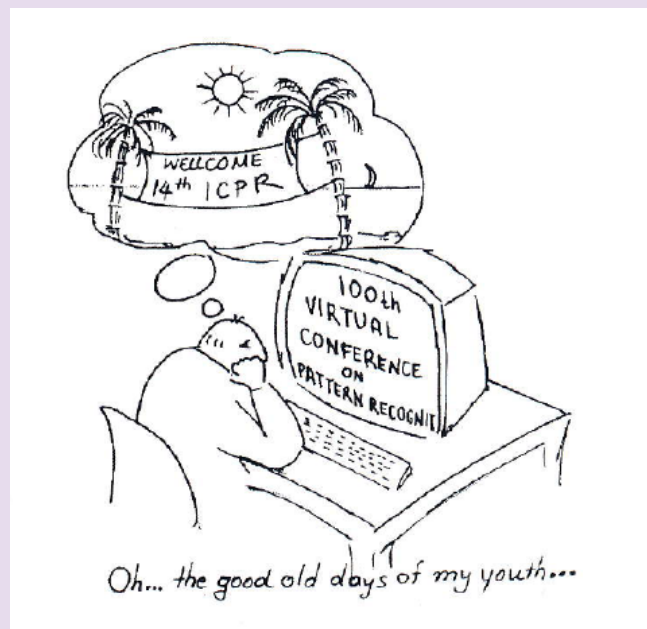
Calls from IAPR Committees

From the IAPR Education Committee:

Call for Applications for IAPR Research Scholarships
https://iapr.org/docs/IAPR-EC-RS-Call-2018.pdf

Description: IAPR Research Scholarships 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. The scholarship covers round trip travel & basic living expenses for a visit of less than 12 months.

Requirements: The candidate must be a full-time researcher with between one and eight years experience. The candidate must also be a member of an IAPR member society.

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

From the IAPR Industrial Liaison Committee:

Call for Internship Listings for the IAPR Internship Brokerage Page
for Companies with internships available and for Students seeking internship opportunities
http://homepages.inf.ed.ac.uk/rbf/IAPR/INDUSTRIAL/

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

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

Please email your listings as follows:

> To: Bob Fisher - *rbf@inf.ed.ac.uk*
> Subject: IAPR internship listing
> Details:
> * Host:
> * Location:
> * Post Type:
> * Specialty:
> * Funded:
> * Length:
> * Degree & Visa Requirements:
> * Internship start date:
> * Application closing date:
> * Details:
> * Contact:

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

NOTE: At the time of publication, there were 35 opportunities listed and more than 8700 accesses since November 2017.

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

From the IAPR Executive Committee (ExCo):

Call for Proposals for Summer/Winter Schools
https://iapr.org/conferences/summerschools.php

Deadline schedule:

Deadline:	School dates:
February 1st	April-July
June 1st	August-November
October 1st	December-March

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

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

How to Submit: Proposals for IAPR funded summer schools should be submitted to IAPR Secretariat Linda O'Gorman by email (*secretariat@iapr.org*). A PDF attachment containing all the required information is appreciated.

For detailed guidelines on the proposal, see the ExCo Initiative on Summer Schools.

An IAPR Her Story: Tin Kam Ho

IBM Watson Health, USA

I was born in Hong Kong in the 1960's. My parents were born to comfortable living in the fertile Pearl River Delta up river from the city, but became refugees of war in adolescence. With the rural economy destroyed and their fathers having perished in the chaos, they moved to the city to find a livelihood after the wars. Like many such families of my generation, survival was a constant goal and everyone who was able was obliged to contribute. Many children left school for full-time work in early teenage, others took out-sourced work from nearby factories to help earn their living. It was through great sacrifices by my parents and elder sister that I stayed to complete high school, and even won the fierce competition for a college education. Expecting to return to duty after graduation, I went into the business school of the Chinese University of Hong Kong to prepare for the typical careers in the city.

Despite the confines of his daily burdens, my father is an eager self-learner with an insatiable longing for things unknown and exciting. Among his books was a college level introductory textbook in astronomy. He named me after the Greek constellation Lyra, and talked to us about the planets, stars, and galaxies from his reading. In my mind, the names of the planets, the stories of faraway stars and galaxies, plus the mythology, were woven into a dream that was sacred, mysterious, and distant. However, like the stories about great scientists and inventors that I heard from school, they were legends that belonged to the books and to another world, a world that had nothing to do with the one I was in touch with and was preparing to settle into.

But these two worlds came to a strange intersection soon after I started college. One day on a notice board outside the main cafeteria, I saw a faded blue card mentioning a star observation party that was to gather every Wednesday evening under the Science Lecture Hall. Something from those faraway stories started clicking, and I decided to go and take a look. To my disappointment, nobody showed up.

Looking back 40 years later, I sometimes think if I had stopped there, my life would have been very different. But the calling of that distant dream was irresistible. I decided to go again the next week, and on that fateful night, the Astronomy Club came. They brought binoculars, telescopes, star charts, and took everyone to the top of the Science building for an unobstructed view of the dark sky. There I met the glorious Orion and Sirius and started to engage with this other-worldly group of friends who were enthusiastic about those mysterious stories. Not only that, they took action to bring those stories into their lives, and bring me into their lives. I took up responsibilities in the club and started peeking into how science was pursued in the real world. They generously shared what they learned and advised me on how I could also get myself prepared through rigorous mathematics training. They took me onto projects like estimating the heights of mountains on the moon during a lunar eclipse, or calculating an astronomical almanac. In time, those once mysterious things became everyday subjects to tackle, and on the horizon we saw far more to explore. After a few years of this, how could I give it up and return to settle for a job at a

bank or a trading firm? I decided to follow in their footsteps to come to the U.S. for graduate school.

My father was intrigued by the idea of me going out for adventures that he himself was denied. Despite the surprise, he supported my plan whole-heartedly. For this, he returned from retirement and went for another job, to give me time to complete my studies before taking over support of the family. I decided that I would tell him as much as possible of what I could see in the new world, so he would have a part in the adventure too.

I arrived in the U.S. in 1985. Computer Science (CS) was fresh and open in those years. A program in "Systems Science" offered by Louisiana State University at Baton Rouge was particularly flexible, accepting newcomers from many backgrounds. There, I obtained foundational training in CS and continued in mathematics. To fulfill the requirements for the Master's degree, I completed a project on space object surveillance, using methods in celestial mechanics that I had learned in the club. Another part of the project required shape recognition, which I found fascinating. So, by the time I decided to go for a PhD, image analysis and pattern recognition surfaced as the top choices.

Professor Srihari's lab at the State University of New York at Buffalo (later known as CEDAR) was one of the very few that were active in this area. The lab had committed to a series of OCR related projects from the United States Postal Service [See "Pattern Recognition at the US Postal Service: A Decade of Achievement", *IAPR Newsletter* 28:2]. The tasks involved real-world challenges with severe limits in image quality, plus demands in accuracy, robustness, and processing speed,

forcing us to innovate beyond the existing technology. There could be no better training than being immersed in active projects like these, and I am grateful that I had the opportunity to start my research career there. It was through presentations of this work that I was introduced to the IAPR community, starting with the 1990 SSPR workshop organized by Henry Baird.

Soon after I completed my PhD, Henry invited me to join him at Bell Labs. While the work at CEDAR placed utmost emphasis on empirical results that could meet the client's needs, our work at Bell Labs followed a very different path. Henry showed me an entirely different way of thinking. Instead of solving one OCR problem for one client, he wanted to solve the problem completely for all clients under all conditions – all types of imaging noise, all font shapes,

and all languages. This required deeper understanding of where the fundamental challenges were and how to address them thoroughly.

Almost in parallel to the work with Henry, I started exchanges with Professor Eugene Kleinberg in Department of Mathematics at SUNY, whom I had consulted shortly before leaving the campus. He was building a new mathematical theory in ensemble learning. He gave me a thick manuscript he was working on. Everything in it sounded both familiar and strange. It took numerous discussions between us, over the next ten years, for me to finally capture his deep insight in an extremely simple example that I could explain to anyone interested. A side product of this discussion, the random decision forest, has become a widely accepted method for classification.

Tin Kam Ho is a senior AI scientist at IBM Watson Health, where she leads projects in natural language semantics, with applications in clinical text analysis, knowledge discovery, question answering, and conversational systems. From 1992 to 2014, she was in Bell Labs at Murray Hill, first as a research scientist and later as the Head of Statistics and Learning Research Department. She pioneered research in multiple classifier systems and ensemble learning, random decision forests, and data complexity analysis. She also explored interactive data visualization and the interplay between scientific computing and data analysis. Her work in telecommunication includes wireless geolocation, smart grid demand forecasting, video surveillance, user profiling, recommender systems, and customer experience analysis, as well as simulation, control, and monitoring of continental-scale fiber optic networks. Earlier, she worked in image recognition, multilingual reading machines, and data analysis in astronomy.

She served as Editor-In-Chief for Pattern Recognition Letters in 2004-2010, and as Editor or Associate Editor for other journals including IEEE Transactions on Pattern Analysis and Machine Intelligence, Pattern Recognition, and International Journal on Document Analysis and Recognition. Her work has been honored with the Pierre Devijver Award in statistical pattern recognition, several IBM and Bell Labs awards, and a Young Scientist Award from the International Conference on Document Analysis and Recognition. She received a PhD in Computer Science from SUNY at Buffalo in 1992. She is a Fellow of the IAPR and the IEEE. In 2020 she was named a Master Inventor at IBM.

Professor George Nagy started to visit us at Bell Labs towards the end of the 1990s, and I was given an opportunity to learn from the grandmaster. George's approach to work was different but equally inspiring: he insisted on getting a thorough solution to a very small but representative problem. The problem should be so small that you could afford to understand every aspect of it—even calculate all you need by hand. We started to drill into the role of context, and arrived at a counter-intuitive conclusion: in OCR the shapes of the symbols actually do not matter, as long as they are consistent. That completed my full circle from exploiting large scale, real-world samples of mail images to relying on only a single idealized shape, plus a model of its distortion, to concluding that no shape training is really needed, after all.

The decision forest was soon proven to be a powerful method suitable for many domains. It was on par with several other generic methods, but it was not always perfect. So what caused such apparent limits in accuracy for some data? With a sabbatical visitor Mitra Basu, I started to investigate this. We sought a representation of the entire space of classification problems, and with that to understand the domains of competence of each method —mirroring Henry's approach to OCR. Our first presentation of this work at ICPR 2000 attracted Professor Anil Jain's attention. He rose from the audience to endorse our work immediately and openly, and from there started our many years of follow-up discussions. His broad vision and experience opened up my perspectives into another dimension: unsupervised learning. In classification studies, the classes are often dictated by the task we address in the application domain. But what is the real notion of classes? Do they exist naturally in the data, and what if the natural classes do not match those desired for the task? The issue of clustering tendency and class identifiability links back to our study of data complexity. There is still much to understand and explore.

Over three decades have passed since I committed to be a scientist. In this time, my research career has also been stimulated and enriched by encouragements from Professors Jean-Claude Simon, Robert Duin, Josef Kittler, and Rangachar Kasturi, collaboration with Larry O'Gorman at Bell Labs, the shared passion with Fionn Murtagh for pattern recognition in astronomy, and several years of joint work with Gabriella Sanniti di Baja on the editorship of Pattern Recognition Letters. I am grateful to have been nurtured by these great pioneers in IAPR.

My father has continued to share my journey and his vision. Now well into his 90's, my father is still eager to hear about my work and the exciting frontiers of science that I manage to explain. Most recently, he asked me about the promise of quantum computing.

An Interview with Jingdong Wang, IAPR Fellow

*Jingdong Wang, IAPR Fellow
ICPR 2018, Beijing*

For contributions to multimedia search, similarity search, attention analysis, and video surveillance

Jingdong Wang is a Senior Principal Research Manager with the Visual Computing Group at Microsoft Research Asia (Beijing, China). He received the B.Eng. and M.Eng. degrees from the Department of Automation at Tsinghua University in 2001 and 2004, respectively, and the PhD degree from the Department of Computer Science and Engineering, the Hong Kong University of Science and Technology, Hong Kong, in 2007. His areas of interest include neural network design, human pose estimation, large-scale indexing, and person re-identification. He is an Associate Editor of the IEEE TPAMI, the IEEE TMM and the IEEE TCSVT, and is an area chair (or SPC) of several leading Computer Vision and AI conferences, such as CVPR, ICCV, ECCV, ACM MM, IJCAI, and AAAI. He is an IAPR Fellow and an ACM Distinguished Member.

His representative works include deep high-resolution network (HRNet), interleaved group convolutions, discriminative regional feature integration (DRFI) for supervised saliency detection, neighborhood graph search (NGS) for large scale similarity search, composite quantization for compact coding, and so on. He has shipped a number of technologies to Microsoft products, including Bing search, Bing Ads, Cognitive services, and XiaoIce Chatbot. The NGS algorithm developed in his group serves as a basic building block in many Microsoft products. In the Bing image search engine, the key color filter function is based on the salient object algorithm developed in his group. He has pioneered the development of a commercial color-sketch image search system. More information about Dr. Jingdong Wang can be found at https://jingdongwang2017.github.io/.

Editor's note:

For this essay, the IAPR Newsletter invited Dr. Wang to touch on these questions.

1. *Can you identify the most important factors for computer vision/ pattern recognition/ object recognition, in the past 20 years?*

2. *What factors will you address when you supervise the students?*

3. *Can you say something about your research work on approximate nearest neighbor search? What was its purpose and impact?*

~ Jing Dong, IAPR Newsletter *EiC*

Can you identify the most important factors for computer vision/ pattern recognition/ object recognition, in the past 20 years?

We have witnessed explosive progress in computer vision during this time, and it can mainly be attributed to three factors: the availability of big data, the development of modern deep learning architectures and methods, and the introduction of large-scale efficient computation.

In 2009, an enormous image database, called ImageNet, was released by Professor Fei-Fei Li and her collaborators for visual object recognition. It served as the basis for the ImageNet Large Scale Visual Recognition Challenge (ILSVRC), which saw a major breakthrough in 2012: AlexNet, a deep convolutional neural network by Geoffrey Hinton and his collaborators, won first place by a tremendous margin. What made AlexNet so effective was its successful training at a considerably larger scale than that of competing machine learning models at the time, which was made feasible by the use of efficient computing hardware, namely Graphics Processing Units (GPUs). The work on AlexNet launched the deep learning era in computer vision, which has significantly advanced nearly every sub-area within the field.

Since then, several milestone

developments in deep learning, such as GoogleNet, VGGNet, ResNet and DenseNet, have arisen from progress on image classification, and various networks based on those architectures were designed for certain other visual recognition tasks, such as semantic segmentation and object detection.

In 2019, my team presented a universal network, called HRNet, that extends beyond image classification to broad application on general computer vision tasks, such as image classification, semantic segmentation, object detection, human pose estimation, and so on. It demonstrates superior performance over ResNet and has become widely used in many prominent visual recognition and image enhancement challenges. Now, HRNet is a standard in human pose estimation and has growing popularity in semantic segmentation.

What factors do you address when you supervise students?
I have worked closely with about 100 interns since I joined Microsoft Research Asia. Through my collaborations with them, I observed that besides a solid mathematics background, strong programming skills, and a positive attitude, it is at least as important for research students to have good communication skills.

I adopted two effective ways for communicating with students: discussing ideas with them and asking them to describe the problems they are facing and need help with. I found that there was often a gap between what we planned to do and what they actually ended up doing. When they presented their ideas or the difficulties in their research, in many cases most of the discussion time was spent on clarifying what they wanted to say instead of on

discussing solutions. After trying various ways to address this issue, I found writing to be an effective solution.

Now, I often ask students to write in detail what they want to discuss with me, so that I can read it before the discussion and our discussion can then be focused on finding solutions. From careful writing about their difficulties, it turns out that students can frequently figure out a solution by themselves without needing to have discussions with me. In addition, I have asked them to write in detail what we have discussed in meetings, including ideas and solutions, to make sure that we are on the same page.

Through writing, we can organize our thoughts better, discover possible issues more easily, and even come up with new and more interesting ideas.

Can you say something about your research work on approximate nearest neighbor search? What was its purpose and impact?
Approximate nearest neighbor (ANN) search is a problem that, given a query item, identifies the approximate nearest item in a database with high efficiency and/or small memory cost. My focus is on searching for nearest vectors under the Euclidean distance. It is a fundamental topic in many research areas, including computational geometry, pattern recognition, and computer vision. I started the research in 2009 because it has concrete value for Microsoft Bing image search.

My first ANN work, trinary-projection tree (TP-tree) published in CVPR 2010 and TPAMI, aims to improve the randomized version of kd-trees that was initially designed for exact nearest neighbor search. Motivated by my key observation that search quality, in terms of

time and accuracy, highly depends on space partitioning and tree traversal costs, we optimize a trinary projection vector, whose entries are 1, 0, or -1, for which the inner product between it and real-valued vectors can be rapidly computed. With the trinary projection vector, a better tradeoff becomes possible between space partitioning and tree traversal, whose main costs come from the inner product operation.

After completing the TP-tree project, I reached a conclusion: the essence of practical ANN search is to efficiently find good nearest neighbor candidates. In TP-trees and kd-trees, tree traversal aims to identity the leaf nodes most likely to contain nearest neighbors. I conjectured and verified that the candidates identified later are most likely to be neighbors of previous candidates.

Then I asked myself a question: can we use the neighbor vectors of a previously identified candidate as the next candidates? This approach for identifying the next candidates would provide much greater efficiency than tree traversal. Motivated by this, I came up with the important but simple idea of using a neighborhood graph to index vectors, and then experimentally verified that it outperforms previous ANN search algorithms. Later, I analyzed why this simple approach works well and showed that the underlying reason comes from the triangle inequality: if a vector is near the query, then its neighbor vector is also near the query. I shipped this algorithm to Microsoft Bing image search and Bing Ads in 2013. To our knowledge, we are the first to use the neighborhood graph algorithm in actual products. Recently, we improved the algorithm by using a relative neighborhood graph for indexing deeply-learned web

document vectors, perhaps the first to combine the traditional inverted index with bag-of-words sparse representations and vector search with deeply-learned dense representations.

In addition, I have done research on compact coding for reducing memory costs. For this, I generalized product quantization to produce a more efficient and effective approach called composite quantization, which

was published in ICML 2014 and later TPAMI. I also wrote a survey paper, "A Survey on Learning to Hash", to theoretically and empirically show that quantization is superior to binary hashing.

Pattern Recognition & Neural Networks

Dick de Ridder, Robert P. W. Duin, Ela Pekalska, Marina Skurichina and David M J Tax - with thanks to Josef Kittler

Track 2 of the 15th ICPR was the track concerned with traditional pattern recognition. Although the title of the conference would lead one to expect this to be the largest track, in fact the number of contributions was just slightly more than 25% of the conference total. Perhaps this is indicative of the strong emphasis on application of pattern recognition techniques, rather than theoretical development. Even so, the number of contributions was impressive.

In total, about 250 papers were presented, of which roughly 120 focussed on an application, 100 dealt with statistical pattern recognition, and some 30 contained work in the area of structural and syntactic pattern recognition. The majority of these papers, more than 80%, were presented as posters. Although this offered the possibility of having good discussions with the authors, it also meant that visits had to be planned well, as poster and oral sessions overlapped and each poster session contained around 25 posters in track 2 alone. As for the oral sessions, a new feature was the invited talk. Most of these were very good, but only some (Bunke, Torras) showed a broad overview of work in a certain area and not all had a clear connection to the topic of the session.

In the area of applications, a subject traditionally receiving much attention is document analysis and OCR. Especially recognising non-western characters (Chinese, Kanji, Farsi, Ghuzuri, Devanagari) is still an active research area. There was also a fair share of medical applications and many papers were presented on various forms of biometrics. Notably, a few applications on signals (audio, speech).

In applications, there seemed to be a

general interest in hierarchical methods, e.g. combining various levels of density estimation and/or classification (e.g. Chou and Shapiro; Vinokourov and Girolami; Zhang, Ding and Liu). For density estimation, the EM-trained mixture-of-Gaussians model seems to become the *de facto* standard, although not all authors seem to recognise equally well the limitations the model assumptions impose on their applicability (the most often heard question, therefore, being 'How do you choose K?'). Some novel, i.e. non-Gaussian work included the use of mixtures of Bernoulli distributions (Grim, Pudil and Somol) and Poisson distributions (Kaban and Girolami).

As for the more basic research, our impression is that many researchers still find there is some ground to cover in traditional areas such as feature extraction/selection, cluster analysis and k-nearest neighbour speedup. Combination of experts, not only of classifiers but also of clustering (Qian and Suen) is also a topic still generating interest. In general however, many of the techniques presented in these areas were improvements on existing work rather than new methods. Significantly less authors focussed on more fundamental problems. An interesting presentation in this area was given by Ho and Basu, which went back to the basics of pattern recognition to discuss possible measures of classification problem complexity.

In some cases, it was interesting to see how rather old methods can still spark new ideas. For example, variations on the nearest neighbour theme were proposed for classification (Mitani and Hamamoto) and outlier detection (Tax and Duin) and an interesting modification of the Parzen algorithm was discussed by Muto, Nagase and Hamamoto. In contrast, there was

little theoretical development on newer research topics such as neural networks, support vector machines or Bayesian methods. Some interesting work in neural networks was presented on pruning (Messer and Kittler), the use of prior weights (Raudys) and neural networks for performing canonical correlation analysis or CCA (Fyfe and Lai). Support vector machines were used, or reformulated, successfully by some authors to perform tasks they were not originally designed for: clustering (Ben-Hur et al.), feature selection (Hermes and Buhmann) or ranking (Kim, Hwang and Lee).

For neural networks and SVMs, the lack of theoretical development is understandable: both can now be applied quite well off-the-shelf. For newer developments such as Bayesian methods (and graphical models, discussed in an excellent tutorial and plenary by Bishop), the lack of interest is more of a mystery. Is the ICPR community simply slow to catch on, or is there a genuine lack of interest in these areas? If the latter is true, do we run the risk - as Andrew Blake put it in a lecture a few days after ICPR, at BMVC 2000 - of being 'overtaken' by communities such as the NIPS one? Perhaps not.

The strength of the ICPR seems to lie in bringing together researchers interested in using methods (possibly developed elsewhere) in real-world applications. Consequently, we might see the emphasis at the ICPR shift from classifier development to issues such as representation, feature extraction/selection and selection/combination of methods, always in relation to the application at hand. But we should be careful not to lose touch with theoretical developments.

IAPR...The Next Generation

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

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

~Jing Dong, Editor -in-Chief

Guo-Wang Xie

Guo-Wang Xie received his bachelor's degree in agricultural electrification from the Henan University of Science and Technology, Luoyang, China, in 2018.

He is currently reading for his master at the University of Chinese Academy of Sciences.

His current research interests are in the general area of pattern recognition and computer vision. He works in rectifying distorted document images. He received the IAPR Best Student Paper Award at the Workshop on Document Analysis Systems (DAS) 2020.

Editor's note:

Students and young researchers represent the future of the IAPR, and the IAPR Newsletter *is happy to give them a forum through this Feature series.*

As a master's student, Guo-Wang Xie is one of the youngest contributors to this column. He received the DAS 2020 IAPR Best Student Paper Award. The report *on* DAS 2020 *appears later in this issue.*

~ Jing Dong, IAPR Newsletter *EiC*

How did you get involved in pattern recognition?

When I was an undergrad, I came into contact with several artificial intelligence applications related to Optical Character Recognition and face recognition. After the bachelor's degree at Henan University of Science and Technology, I entered the University of Chinese Academy of Sciences and gained basic knowledge about pattern recognition and its applications.

The first task in my master's research was brain segmentation of structural magnetic resonance imaging (MRI) at the Institute of Automation, Chinese Academy of Sciences (CASIA). This was also my first pattern recognition task.

Thanks to the CASIA's inclusive and rigorous scientific research attitude and excellent teachers, I now have a more comprehensive understanding of pattern recognition, which will be of great help to my future study.

What technical work have you done, and what is/are your current research interest(s)?

In my first project (mentioned above), I predicted the category of each voxel in whole brain segmentation of structural MRI. Realizing all the steps from scratch gave me the basic idea of how to solve the problem.

My second task was rectifying a distorted document image. With the popularity of mobile devices in recent years, camera-captured document images are becoming more and more common. Unlike document images captured by flat scanners, camera-based document images are more likely to deform due to multiple factors such as uneven illumination, perspective change, paper distortion, folding and wrinkling. This makes the processing and

recognition of document image more difficult. To reduce the effect of distortion in processing of document images, dewarping approaches have been proposed to estimate the distortion and rectify the document images.

I view the document image as a field of displacement flow, such that by estimating pixel-wise displacements, the image can be transformed to another image accordingly. For rectifying distorted documents, the displacement flow is estimated using a fully convolutional network (FCN), which is trained by regressing the ground-truth displacements of synthesized document images.

Currently, my research interest is in rectifying distorted a document image smoothly and rapidly. Although the previous method can dewarp document images effectively under various geometric distortions, the edge of the partially rectified image was still not neat enough and the speed of calculation still needed to be further improved. In the future, we plan to reduce computation and improve rectifying speed.

How can the IAPR help young researchers?

As a master's student, I sometimes face some problems in scientific research and really need a platform where I can display and learn excellent work. I was able to attend the DAS 2020 conference, which was endorsed by the IAPR, it was a very important platform for communication and exchange ideas.

Through this experience, I have deepened my love for pattern recognition. In the IAPR, young researchers can stimulate their curiosity through cutting-edge research. As we all know, curiosity can improve a person's creative enthusiasm, and it is also a powerful motivation for a person to overcome difficulties.

I think the IAPR is a pure land, without oppression and contempt, only respect and openness.

At the same time, the IAPR can also provide young researchers with more opportunities to promote their work to the society and help them find the value of what are they doing. Like a grass, even if it is ordinary, it has its gorgeous side, and there are always people who can appreciate its value. The voices of criticism and appreciation should exist at the same time. In the IAPR, a valuable work will not be buried because of the likes and dislikes of several people. The openness and tolerance of the IAPR will also inspire young researchers to create greater value.

I hope that those who encounter difficulties and challenges (whether research problems or social relations) in the learning process can find confidence and courage in the IAPR.

Dewarping Document Image by Displacement Flow Estimation with Fully Convolutional Network
Gow-Wang Xie, Fei Yin, Xu-Yao Zhang, Cheng-Lin Liu

Abstract: As camera-based documents are increasingly used, the rectification of distorted document images becomes a need to improve the recognition performance. In this paper, we propose a novel framework for both rectifying distorted document image and removing background finely, by estimating pixel-wise displacements using a fully convolutional network (FCN). The document image is rectified by transformation according to the displacements of pixels. The FCN is trained by regressing displacements of synthesized distorted documents, and to control the smoothness of displacements, we propose a Local Smooth Constraint (LSC) in regularization. Our approach is easy to implement and consumes moderate computing resource. Experiments proved that our approach can dewarp document images effectively under various geometric distortions, and has achieved the state-of-the-art performance in terms of local details and overall effect.
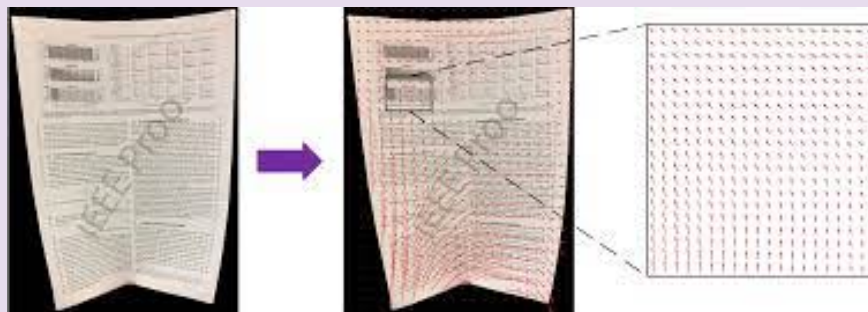
Fig. 1. Our approach regards the document image as a field of displacement flow, which represents the displacements of pixels for transforming one image into another for rectification.

Xie GW., Yin F., Zhang XY., Liu CL. (2020) Dewarping Document Image by Displacement Flow Estimation with Fully Convolutional Network. In: Bai X., Karatzas D., Lopresti D. (eds) Document Analysis Systems. DAS 2020. Lecture Notes in Computer Science, vol 12116. Springer, Cham. https://doi.org/10.1007/978-3-030-57058-3_10

From the ExCo
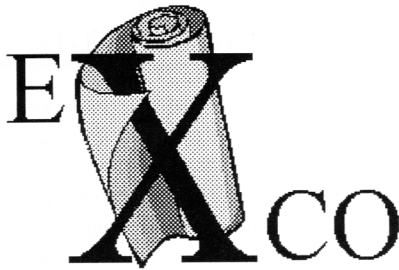
The IAPR ExCo on…
Women in the IAPR Community
by Alexandra Branzan Albu (Canada)
IAPR 1st Vice-President
and Co-Organizer of the Women at ICPR Workshop

News from the IAPR Executive Committee

- ICPR 2020 will be an Online event. The ExCo is working with the ICPR 2020 Organisers to help ensure a smooth transition from in-person to online.

- ICPR 2020 Registration is now open!

- Recipients of the King-Sun Fu, J. K. Aggarwal, and Maria Petrou Prizes will be known soon. Stay tuned!

- The 2020 IAPR Fellows will be presented at ICPR 2020.

- Bids to Host ICPR 2024 are in! The Conferences & Meetings Committee will prepare a report for a vote at the upcoming Governing Board Meeting.

- Wear a mask. Keep your distance. Wash your hands. Stay healthy.

We live in extraordinary times. Most of us have been working remotely from our homes since the onset of the COVID 19 pandemic in March 2020, so there has been little opportunity for informal interactions with colleagues outside Zoom meetings. In fact, many of us have been experiencing Zoom-fatigue as virtual meetings place a different set of demands on our cognition and attention mechanisms than physical ones.

As is true for women in all fields at this time (the disproportionate domestic burden on women and its impact on the gender equality gains that have been made over recent decades has been widely reported), women researchers and academics have likely been especially affected by the imposed remote work, since juggling work and caregiving responsibilities has reached a whole new level of difficulty when working from home. The words of Alessandra Minello from her recent article "The pandemic and the female academic" in Nature resonate particularly well with me:

> *"Since COVID-19 closed my university on 12 March, I've seen more sunrises than in the rest of my previous life. Now, I must be at work before daybreak.*
>
> *Silence and concentration are pivotal for my thinking and teaching. When I record lessons for my students to watch online, minimizing background noise is a must. But my son is two years old. In the first lesson I tried to record, you can clearly hear his toy trumpet playing during the last two slides of the presentation. Night and dawn — when he's asleep — are my only options for recording.*
>
> *Another demand on my time are colleagues located around the globe who have the atavistic desire to meet face-to-face online. At any hour of the day. And that's how my colleagues have come to know my son, whose little head pops up on the webcam now and again."*

In 2016, the ExCo began several initiatives aimed at encouraging gender diversity in the IAPR Community, beginning with nominations for awards [38:1]. The *Newsletter* continued with "From the Editor's Desk" columns on gender balance [38:2 and 40:2]. And ICPR 2016 in Cancun saw the first Women @ ICPR events [39:1]: coffee breaks for women and a luncheon for women attending the conference. The tradition continued at ICPR 2018 in Beijing. These events provided an informal setting for women to connect.

Our efforts continue and expand. The *Newsletter* now has a Feature series of essays from women in th eIAPR Community sharing their life experiences. Gabriella Sanniti di Baja wrote the inaugural article in the "IAPR Her Story" series [40:2]. Vera Yashina shared her insights in 2019 [41:4], and Tin Kam Ho in this issue. And ICPR 2020 will host a new workshop for all genders celebrating women's contributions to the IAPR.

The first **Women at ICPR** (W4PR) workshop will take place at ICPR 2020 and will be held online, as will ICPR 2020 and the other ICPR workshops. This event will be more than just another online meeting in your calendar. The co-organisers and I aim to foster an international community of all IAPR researchers who embrace

diversity and inclusiveness values. In particular, we aim to empower young women researchers by giving them tools to thrive in an academic and scientific world where they are under-represented, by building their confidence that they can be excellent researchers and make significant, impactful contributions to the field of Pattern Recognition.

The format of the workshop will be highly interactive, as it will consist of several short invited presentations given by some role models within the IAPR along with panel and Q&A periods and moderated discussions held in break-out rooms.

We extend a warm invitation to all IAPR members who believe in equal opportunities to participate to W4PR on Sunday January 10! More information can be found on its web site *http://homepages.inf. ed.ac.uk/rbf/wicpr20.html*.

Let us together make the invisible women visible!

IAPR Then and Now...Coffee Break for Women and Lunch for Women @ ICPR, Tuesday, December 6, 2016
IAPR Newsletter ICPR 2016 Special Issue, Volume 39 Number 1, February 2017

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

IAPR ⬡ Technical Committee News

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

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

~Jing Dong, IAPR Newsletter *EiC*

IAPR TC4 Biometrics
http://iapr-tc4.org/
Zhenan Sun, Chair
Julian Fiérrez, Vice Chair

The report on the 2020 Summer School on Biometrics is in this issue of the *IAPR Newsletter*.

The 2020 International Joint Conference on Biometrics (IJCB 2020) was held online successfully from September 28 to October 1, 2020. A full report will be published in the IAPR Newsletter soon. Some highlights:
- The IJCB series combines two major biometrics research conferences, the International Conference on Biometrics (ICB) and the Biometrics Theory, Applications and Systems (BTAS) conference.
- For the first time, IJCB had two rounds of submissions. From 211 submissions, 85 were accepted.
- The conference also witnessed six keynote speakers, one award talk, two panel sessions, and two tutorials along with a doctoral consortium session and UG mentoring program.
- The conference was attended by 294 participants using an online conference platform.

The Winter School on Biometrics 2021 (WSB2021) will be held in Shenzhen, China, from January 24 to 28, 2021. It will be organized in a mixed mode. Participants are encouraged to attend in-person; those who cannot, will attend online. To reduce risk during the pandemic, the school directors will select a maximum of 40 students to attend in-person.

HID 2020
TC4 Workshop on
Human Identification at a Distance

@ ACCV 2020

TC4 Workshop on Mobile and Wearable Biometrics Workshop
WMWB 2020

@ ICPR 2020

Organizers:

IAPR/IEEE WINTER SCHOOL ON BIOMETRICS 2021
24 - 28 January 2021 Shenzhen, China

More IAPR Technical Committee News

IAPR TC7 - Remote Sensing and Mapping
http://iapr-tc7.ipb.uni-bonn.de/

Jie Shan, Chair
Ribana Roscher, Vice Chair

IAPR TC-7 is happy to announce that the 11th IAPR Workshop on Pattern Recognition in Remote Sensing (PRRS 2020/2021) will take place again. It will be held virtually in conjunction with the International Conference on Pattern Recognition (ICPR 2020) (https://iapr.org/icpr2020) on January 10, 2021. The workshop is organized by Ribana Roscher, Gabriele Cavallaro, Jie Shan, Eckart Michaelsen, Uwe Stilla, and co-sponsored by the International Society for Photogrammetry and Remote Sensing (ISPRS).

News will be posted on the TC7 website: *http://iapr-tc7.ipb.uni-bonn.de/*.

The special issue "Advances in Pattern Recognition in Remote Sensing" has been published in the IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing. It has been a tradition that a special issue is published as a result of IAPR-TC7's biennial workshop Pattern Recognition in Remote Sensing, which takes place in conjunction with the International Confeence on Pattern Recognition (ICPR). It is meant to collect extended works from the presentations in the Workshop and to include new independent submissions.

For this specific special issue, we received 23 submissions, among which two (2) were accepted in 2019 as regular papers, and five (5) are included as Open Access papers in this special issue. The editors of the special issue are Jie Shan (USA), Eckart Michaelsen (Germany), Uwe Stilla (Germany) and Fenzhen Su (China). The papers are available at *https://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=4609443&refinements=SpecialSection:Advances%20in%20Pattern%20Recognition%20in%20Remote%20Sensing*.

The special issue covers various topics in pattern recognition in remote sensing. It addresses both fundamental theory and applications of advanced remote sensing. In terms of theory, we have works in scale space, neural networks, segmentation, transfer learning, and optimization. The data used ranges from lidar point cloud to very high resolution (sub meter) satellite images. The applications are mostly focused on agricultural and environmental phenology studies. We expect that the diverse subjects will benefit a wide range of readers, either in their research or professional practice.

And ^ More IAPR Technical Committee News

IAPR TC15 Graph Based Representations
https://iapr-tc15.greyc.fr
Pasquale Foggia, Chair
Luc Brun and Bin Luo, Vice Chairs

TC15 maintains a web page of applications/librairies and benchmarks related to graph based problems in pattern recognition (*https://iapr-tc15.greyc.fr/links.html*). We have recently added a C++ library together with its python binding related to graph edit distance (GEDLIB). In addition to the encoding of many graph edit distance heuristics, this library also proposes some side functionalities like the computation of a median graph and the resolution of the LSAPE (Linear Sum Assignment Problem with or without Edition) problem.

People new in this field may also be interested by our web page dedicated to lectures related to pattern recognition on graphs (*https://iapr-tc15.greyc.fr/lectures.php*).

IAPR TC18 Discrete Geometry and Mathematical Morphology
http://www.tc18.org

Bertrand Kerautret, Chair
Michael Wilkinson, Vice Chair
email: *tc18@tc18.org*

News update of TC18 from COVID Evolution

Following the evolution of the world health crisis, the main new event gathering Digital Geometry and Mathematical Geometry (called DGMM), underwent a new organization. Indeed, the two steering committees, in consideration that an online event was not necessarily a good choice to share and present research results, reorganized with the following dates:

Title and abstract submission: November 6, 2020	Full paper submission: November 16, 2020
Preliminary author notification: January 15, 2021	Rebuttal deadline: January 25, 2021
Camera ready deadline: February 26, 2021	Registration deadline: May 10, 2021

See more details on the conference website: *https://www.dgmm2021.se*. And the call for papers here: *https://tc18.org/files/divers/callForPapersDGMM2021_CfP.pdf*.

The other event oranized by this TC, RRPR 2020, will follow the ICPR 2020 organization with an online event. The deadlines are past for main papers but always open for short companion papers highlighting reproducible results in Pattern Recognition. The poster is available on the website: *https://rrpr2020.sciencesconf.org/resource/page/id/3*. RRPR 2020 short paper deadlines:

Short paper companion paper deadline: October 24th
Second round companion paper deadline: November 24th

And still More IAPR ⬡ Technical Committee News

IAPR TC19 Computer Vision for Cultural Heritage Applications
www.cvl.iis.u-tokyo.ac.jp/IAPR-TC19

Guillaume Caron, Chair
Olga Regina Pereira Bellon, Vice Chair
Advisors: Katsushi Ikeuchi, Roberto Scopigno, El Mustapha Mouaddib, and Takeshi Oishi

1) Endorsed journal special issue

International Journal of Computer Vision Special Issue on Computer Vision and Cultural Heritage.

This special issue is guest edited by Rei Kawakami (Tokyo Institute of Technology), Takeshi Oishi (the University of Tokyo) and Katsushi Ikeuchi (Microsoft), members of TC19. Articles are called for submission until January, 15th 2021. Expected topics deal with sensors and software for e-Heritage modeling, displaying, restoration, analysis. An emphasis on e-Heritage representative projects is also awaited.

For more information and submission guidelines, please visit: *https://www.springer.com/journal/11263/updates/18262414*

2) Endorsed workshops (reminder)

FAPER in conjunction with ICPR 2020, January, 11th 2021

The paper submission deadline was extended to October, 17th 2020.

As ICPR goes fully virtual, potential attendees can stay informed about organization details on the FAPER website: *https://sites.google.com/view/faper-workshop*.

PatReCH in conjunction with ICPR 2020, January, 11th 2021

The review process has begun, and the workshop program is expected to be finalized in early December 2020. Possible attendees are advised to visit the PatReCH website to stay tuned about organization details: *http://lia.unicas.it/patrech2020*.

FAPER 2020
International Workshop on
Fine Art Pattern Extraction and Recognition
January 11, 2021 | Milan, Italy
https://sites.google.com/view/faper-workshop

PatReCH 2020
Pattern Recognition for **Cultural Heritage**
2nd International Workshop
in conjunction with ICPR
January 11, 2021, Milan, Italy

3) New communication tools

TC19 is now on twitter (@cv4cha) so feel free to follow! TC19 website embeds a regularly updated collection of tweets regarding call for papers, events, open positions and more about cultural heritage involving computer vision.

Twitter users are encouraged to use hashtags like #cv4cha, #cv4cha_news, #cv4cha_cfp, #cv4cha_job, and others following the same pattern, in tweets to allow their fast broadcast among the community.

https://iapr.org/icpr2020

ICPR
25th INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION
Milan, Italy 10 | 15 January 2021
"putting Artificial Intelligence to work on patterns"

COVID-19
PENSA POSITIVO
Think positive
IAPR

Technically Co-Sponsored by
IEEE COMPUTER SOCIETY

Registration is now open!

https://www.micc.unifi.it/icpr2020/index.php/registration/

NOTE: your IAPR Member Number
is the number assigned by your IAPR Member Society

ICPR 2020 will take place online

(Workshops, Tutorials, and Competitions will also be online)
January 10-15, 2021

Technically Co-Sponsored by
IEEE computer society

Organizing Team

General Chairs:
Rita Cucchiara (UNIMORE, Italy), **Alberto Del Bimbo** (Univ. of Firenze, Italy), and **Stan Sclaroff** (Boston Univ., USA)

Program Chairs:
Kim Boyer (U. of Albany, USA), **Brian Lovell** (U. of Queensland, Australia), **Marcello Pelillo** (U. of Ca' Foscari Venezia, Italy), **Nicu Sebe** (U. of Trento, Italy), **René Vidal** (Johns Hopkins U., USA), **Jingyi Yu** (Shanghai Tech. U, China)

ICPR 2020 Workshops

January 10, 2021	January 11, 2021
CVAUI Computer Vision for Analysis of Underwater Imagery	FAPER Intl Wksh on Fine Art Pattern Extraction & Recognition
MAES Machine Learning Advances Environmental Science	MANPU coMics ANalysis, Processing & Understanding
PRAConBE PR and Automation in Construction & the Built Environment	PATRECH Pattern Recognition for Cultural Heritage
PRRS 11th IAPR Wksh on PR in Remote Sensing	VIQA Video and Image Question Answering: building a bridge between visual content analysis and reasoning on textual data
WAAMI Wksh on Analysis of Aerial Motion Imagery	CADL Wksh on Computational Aspects of Deep Learning
AIDP Artificial Intelligence for Digital Pathology	DLPR Deep Learning for Pattern Recognition
AIHA Intl Wksh on AI for Healthcare Applications	EDL/AI Explainable Deep Learning/AI
CAIHA Computational and Affective Intelligence in Healthcare Applications for Vulnerable Populations	HDL High-dimensional Deep Learning
CARE PR for positive teChnology And eldeRly wEllbeing	IADS Integrated Artificial Intelligence in Data Science
GOOD Designing AI in support of Good Mental Health	IML Intl Wksh on Industrial Machine Learning
MadiMA 6th Intl Wksh on Multimedia Assisted Dietary Management	ManifLearn Manifold Learning in Machine Learning
3DHU 3D Human Understanding	MMDCLCA Multi-Modal DL: Challenges & Applications
FBE Wksh on Facial and Body Expressions	MOI2QDN Metrification and Optimization of Input Image Quality in DL
HCAU 1st Intl Wksh on Deep Learning for Human-centric Activity Understanding	FGVRID Fine-Grained Visual Recognition and re-Identification
MPRSS Wksh on Multimodal pattern recognition for social signal processing in human computer interaction	IWBDAF Intl Wksh on Biometric Data Analysis and Forensics
W3AS Automatic Affect Analysis and Synthesis Wksh	IWCF Intl Wksh on Computational Forensics
CBIR Content-Based Image Retrieval	MMForWild MultiMedia FORensics in the WILD
TAILOR Texture Analysis, cLassificatiOn and Retrieval	RISS Research & Innovation for Secure Societies
EgoApp Wksh on Applications of Egocentric Vision	WMWB TC4 Wksh on Mobile and Wearable Biometrics
ETTAC Wksh on Eye Tracking Techniques, Applications and Challenges	DEEPRETAIL Wksh on Deep Understanding Shopper Behaviours and Interactions in Intelligent Retail Environments
IWCR Wksh on Cognitive Robotics	IMTA Wksh on Image Mining Theory and Applications
PaMMO - Perception and Modelling for Manipulation of Objects	IUC Human & Vehicle Analysis for Intelligent Urban Computing
W4PR Woman at ICPR 2020	PATCAST Intl Wksh on Pattern Forecasting
	RRPR Wksh on Reproducible Research in PR
	VAIB Visual observation and analysis of Vertebrate and Insect Behavior

Meeting Reports

Conferences, Workshops & Summer/Winter Schools

17th International Summer School for Advanced Studies on Biometrics for Secure Authentication:

BIOMETRICS, FORENSICS AND IDENTITY SCIENCE FOR HUMAN-CENTERED APPLICATIONS

Directors:
Massimo Tistarelli (University of Sassari, Italy)
Josef Bigun (Halmstad University, Sweden)
Enrico Grosso (University of Sassari, Italy)
Anil K. Jain (Michigan State University, USA)

by Massimo Tistarelli

The 2020 IAPR Summer School on Biometrics was held June 7-12, 2020, in Alghero, Italy. This was the 17th edition of a strongly established training course started in 2003 to promote knowledge dissemination and research in Biometrics and related fields. The school was technically co-sponsored by Eurasip, the European Association for Biometrics, IAPR and IEEE.

The school main theme was related to the application of biometrics and forensic science to human-centered scenarios and applications. The school particularly addressed how the most advanced technologies for personal recognition may impact society and how it can applied for social good.

Despite the COVID-19 outbreak, this was, by far, among the best school editions both for the large participation, the highest in almost 20 years, and the outstanding lecturers, some of whom had been unable to present a lecture in the past editions.

Several subjects were taught at the summer school forming a total of 39 hours of theoretical lectures from 25 different lecturers and several hours of guided practical sessions using MatLab[1] tools.

The subjects ranged from fundamentals, such as machine learning and pattern recognition techniques applied to biometrics, to more advanced topics such as neuroscience and applied subjects such as biometric template protection, large-scale evaluation and the deployment of biometrics technologies in forensic cases.

This 17th edition of the summer school, featured a line-up of exceptional lecturers, selected from the editorial boards of top-level scientific journals and conferences. Prof. Tomaso Poggio, among the fathers of computational neuroscience and machine learning, presented a keynote on the most recent findings in developing a theory and a mathematical framework for deep learning. Prof. Kevin

[1] The school committee is grateful to Mathw-Works for providing a special trial version of MatLab software, specifically for the school students to develop the practical sessions.

Bowyer, Editor-in-Chief of the IEEE Transactions on Biometrics and Identity Science, exposed the most recent advances in the understanding of potential bias in current face recognition systems. Prof. James Haxby, an outstanding neuroscientist, presented a lecture on the representation of visual data in the brain and topographic mapping to design such representations from fMRI recordings. Prof. Lior Wolf, from Facebook research labs, presented an overview of how to deploy deep learning and convolutional neural networks in biometrics. Prof. Arun Ross, from Michigan State University, presented a lecture on the commonalities between biometrics and image forensics. On the last day, Prof. Anil Jain, among the fathers of today's Biometrics, presented a quick overview of the state-of-the-art in biometric technologies and the open problems, allowing the students to participate in an animated Question & Answer session. All lecturers, among the most highly reputed experts in their fields, presented the most up-to-date view in biometric technologies

and forensic applications.

Given the current COVID-19 outbreak several technological platforms were used to facilitate the student's engagement and to maximize the benefits of ongoing discussions without a physical presence. A major constraint to be faced was the variety of time zones from which the participants and the lecturers were connected. In the last two months before the school the original schedule was carefully redesigned and the format of the lectures adapted to be best followed despite of the very early or very late time of the day.

Given the impossibility of a physical presence the school could not maintain some of the planned features, such as the special evening sessions. However, the wise application of three main communication platforms enabled a good level of engagement among the participants and with all lecturers. A particular effort was devoted to choose the applications for lecturing and to share data:

• Zoom Webinars was selected as the main teaching platform, as it allows full control of the audio and video of the lecturers and of the participants. The application divides participants between "Attendees", or general audience, who do cannot be seen or heard, and "Panelists", the section for the lecturers, who have full control of audio, video, polling, answering questions and screen share. This arrangement avoided any disturbance or intrusion during the lectures. The technical staff carefully monitored all sessions to facilitate the participation of the audience by enabling the audio-video resources whenever needed at the end of each lecture, or during the lecture.

• Slack was used to provide a fast

Complete list of lecturers and the presented lectures

Sunday June 7
• **Prof. Massimo Tistarelli** (University of Sassari, Italy) *Opening and presentation of the school courses.*
• **Dr. Thirimachos Bourlai** (West Virginia University, USA) *Practical biometric recognition systems and project - PART 1.*
• **Prof. Michele Nappi** (University of Salerno, Italy) *Iris recognition: Fundamentals.*
• **Prof. Michele Nappi** *Iris recognition: Challenges.*

Monday June 8
• **Prof. Alessandro Verri** (University of Genova, Italy) *Machine learning for biometrics.*
• **Prof. Massimo Tistarelli** *Face recognition in the wild: Challenges and perspectives.*
• **Prof. Lior Wolf** (Tel Aviv University and Facebook, Israel) *Deep learning for biometrics: from technologies to meta-technologies.*
• **Prof. Tomaso Poggio** (Massachusetts Institute of Technology, USA) *Deep learning for biometrics: from technologies to meta-technologies.*
• **Prof. Kevin Bowyer** (University of Notre Dame, USA) *What does it even mean for face recognition to be biased, sexist, racist, etc?*

Tuesday June 9
• **Prof. Raffaele Cappelli** (University of Bologna, Italy) *Fingerprint recognition.*
• **Prof. Mark Nixon** (University of Southampton, UK) *Soft biometrics for human identification.*
• **Dr. Fantin Girard** (Idemia, France) *Exploiting biometrics: Diving in the deep.*
• **Prof. Rama Chellappa** (University of Maryland, USA) *Shallow and Deep Representations for Video- based Face Recognition.*

Wednesday June 10
• **Prof. Zhenan Sun** (Chinese Academy of Science) *Iris recognition.*
• **Prof. Alice O'Toole** (University of Texas at Dallas, USA) *Understanding face representations in deep CNNs: Face space theory evolves.*
• **Prof. James Haxby** (Dartmouth College, USA) *Modeling the shared information encoded in fine-scale cortical topographies.*
• **Prof. Ida Gobbini** (University of Bologna, Italy) *Individual Differences in the Neural System for Face Perception and Recognition.*
• **Prof. Vishal Patel** (Rutgers University, USA) *Continuous authentication in the mobile world.*

Thursday June 11
• **Prof. John Mason** (University of Swansea, UK) *Speaker recognition.*
• **Dr. Jonathon Phillips** (NIST, USA) *Competitions in face recognition and visual biometrics.*
• **Prof. Arun Ross** (Michigan State University, USA) *Biometrics and image forensics.*
• **Prof. Christoph Busch** (Hochschule Darmstadt, Germany) *Privacy protection.*
• **Prof. Ioannis Kakadiaris** (University of Houston, USA) *Looking at Humans: How can attributes help?*

Friday June 12
• **Prof. Didier Meuwly** (Netherlands Forensic Institute, Netherlands) *Forensic biometrics: the use of biometric data and databases in forensic applications.*
• **Prof. Anil Jain** (Michigan State University, USA) *Biometrics Q&A.*
• **Dr. Thirimachos Bourlai** *Practical biometric recognition systems and project - PART 2.*
• **Prof. Emilio Mordini** (Responsible Technology, France) *Ethical Implications of Biometric Recognition.*
• **Prof. Massimo Tistarelli** *Concluding remarks and discussion.*

communication channel among all participants and the lecturers. Everybody could exchange documents, send messages and make quick calls without the need to explicitly exchange personal data.

• An ad-hoc php application, developed by one of the school students, was used to allow the participants to share 11 posters showing their current research. The application also enabled videoconferencing with the

poster presenter through a Zoom meetings call.

Also the format of the lectures was changed into one hour of live or recorded presentation, followed by 30 minutes for discussion. Thanks to the Zoom webinars platform, the participants could not only directly ask questions but also submit written questions and statements. In this way, the most shy students could also be actively involved and interact with the lecturers.

In order to allow all participants to follow all lectures, despite of the large time differences due to the different time zones, all lectures were recorded and made available at the end of each day for two weeks.

63 participants from 8 different time zones, ranging from CET-8 to CET+7.5, attended the school lectures. The class was formed by students, researchers, professionals and officers, coming from different universities, research centres, private companies, and public offices in the following 19 countries (in brackets is the number of participants): Albania (2), Australia (1), Belgium (2), Benin (1), Canada (1), Denmark (2), France (8), Germany (3), India (14), Israel (4), Italy (9), Netherlands (3), Pakistan (1), Portugal (2), Romania (1), Russia (2), Turkey (1), UK (2), USA (4).

The lack of a physical venue eliminated travel expencse and enabled a greatly reduced registration fee, alllowing more students from underdeveloped countries to participate.

This year's students demonstrated a strong interest in the impact of biometrics in social frameworks and to forensic cases. Most of them are either working directly on the design of biometric systems, for deployment in society or pursuing high-level

IAPR Newsletter report on the 2020 Summer School on Biometrics
Cristina Sirbu, the Politehnica University of Timişoara, Romania

The Summer School on Biometrics 2020 provided a clear and in-depth picture on the state-of-the art in biometric verification/identification technology, with a specific focus on Deep Learning.

In general, what did you learn from the Summer School and, in particular, did you learn anything new?
Thinking to my last years, my focus was understanding, learning and analyzing classical image processing followed by the new technological trends as Deep Learning. I am pleased that I had the opportunity to participate at the summer school where I learned about limitations and performance of current Deep Learning Approaches topics in the area of biometrics, forensics and identity science for human-centered applications.

The talks by, Prof. Massimo Tistarelli (University of Sassari, Italy), Prof. Alice O'Toole (University of Texas, USA), Prof. Arun Ross (Michigan State University, USA), Prof. Ida Gobbini (Dartmouth College, USA) discussed the topics most closely linked to my Phd thesis.

However, I also appreciated the practical sessions where Prof. Bourlai Thirimachos (West Virginia University, USA) was involved as a mentor to help and discuss our issues regarding face recognition. The experience that I gained was learning how to apply basic face recognition tools, understanding the main modules of a typical face recognition system, the factors that affect face recognition accuracy and also how long it takes to run a basic set of face recognition experiments.

In addition, I paid special attention on the presentations where I am less prepared in my daily work, as speaker recognition by Prof. John Mason (University of Swansea, UK), fingerprint recognition with Prof. Raffaele Cappelli (University of Bologna, Italy) or mobile authentication by Prof. Vishal Patel (Johns Hopkins University, USA). Describing their work, they gave me a better and deeper understanding.

Finally I think all lectures, among the most highly reputed experts in their fields, presented the huge potential provided by the Deep Learning paradigm in Biometric technologies and Forensic applications.

What will you do differently because of what you learned?
The related topics that were discussed during the week, raised new problems but also a different mindset to improve my thesis project. Regarding my Phd work, the presentation "Shallow and Deep Representation for Video- based Face Recognition" of Prof. Rama Chellappa (University of Maryland, USA), gave me a new overview regarding actual Deep Neural Network problems for video image processing. For instance, performing the fusion between spatio-temporal behavior in video processing will provide valuable results. Furthermore, I look forward to developing new experiments by applying the knowledges that I have gained this week.

Why was this a valuable experience for you?
This summer school was a great experience - professionally it offered me perspective in the field. The content of the topics was remarkable as well as the experience and the information provided by the Professors and researchers. On one hand, I had the opportunity to extend my knowledge by learning from some of the best at an international level and on another hand, I was inspired by their work which helped me to set a path in order to achieve my own goals.

Also, even though there was no get-together, it was good that I could get in touch with the other researchers and discuss topics that are of high interest in the beginning of my career in the academic world and as a young researcher. Exchanging experiences was definitely a noteworthy aspect of the summer school.

scientific research in the field. This enhanced the interaction between students and lecturers and stimulated and challenged even the most experienced lecturers with questions and requests for explanations. As a result, both the students and lecturers have been much involved in technical discussions and plans for collaborations.

Most of the students actively took part in the practical sessions. A project was assigned to small groups of students and the best projects were presented in the final session of Friday afternoon.

Remarkably, also representatives of government agencies and forensic laboratories attended the school courses. This not only

denotes the high reputation gained by the school, but also a deep interest of different government offices in the adoption of newer biometric technologies in the service of the citizens.

A unique Question & Answer session was conducted by Prof. Anil Jain, possibly the most outstanding and highly reputed scientist in the field of biometrics. The discussion was actively fostered by Prof. Jain with the collaboration of the Chair, Prof. Alice O'Toole.

The students actively participated to the discussion and very interesting conclusions were drawn on several aspects of biometrics and the application to forensic science, as well as to other

scenarios involving the greater public.

The school participants were offered the possibility to display a poster on their research activity and to submit a research paper to be orally presented at a special session organized during the week. 11 posters were presented.

Out of the 63 participants, 29 students could benefit from a full or partial scholarship to cover the registration fees, thanks to the financial support generously provided by Eurasip, the IAPR, IDEMIA and the IEEE Biometrics Council. All sponsorship support was widely advertised during the school week.

IAPR Then and Now...Meeting Reports: Conferences, Workshops & Summer Schools
IAPR Newsletter, **Vol. 37 No. 1, Jan. 2015**

Biometrics 2014

Mexican Conference on Pattern Recognition

Virtual Conference
Morelia, Michoacán, México
June 24-27, 2020
https://ccc.inaoep.mx/~mcpr2020/index.html

General Co-Chairs:

Karina Mariela Figueroa Mora, Universidad Michoacana, Mex
Jaime Cerda, Universidad Michoacana, Mex
Juan Anzurez Marín, Universidad Michoacana, Mex
Jesus Ariel Carrasco Ochoa, INAOE, Mex
José Francisco Martínez Trinidad, INAOE, Mex
José Arturo Olvera-López, BUAP

by the General Co-Chairs

MCPR2020 was the 12th edition in this conference series. Due to the measures taken worldwide to avoid the spread of the corona virus COVID-19 disease, MCPR2020 could not be held physically and was moved online.

The conference was organized by Facultad de Ingeniería Eléctrica and Facultad de Ciencias Físico Matemáticas of Universidad Michoacana de San Nicolás de Hidalgo, jointly with Coordinación de Ciencias Computacionales of Instituto Nacional de Astrófísica Óptica y Electrónica (INAOE). MCPR2020 was sponsored by the Mexican Association for Computer Vision, Neural Computing and Robotics (MACVNR) and the International Association for Pattern Recognition (IAPR).

MCPR2020 received contributions from 17 countries. In total 67 papers were submitted, out of which 31 were accepted for publication in the MCPR2020 proceedings and for presentation at the conference in a single track. The review process was carried out by the Scientific Committee, which consisted of 59 outstanding researchers from around the workd, who prepared an excellent selection.

The 31 accepted papers were published by Springer in the volume Pattern Recognition, LNCS 12088, edited by Karina Mariela Figueroa Mora, Juan Anzurez Marín, Jaime Cerda, Jesus Ariel Carrasco-Ochoa, Jose Francisco Martinez-Trinidad, and Jose Arturo Olvera-Lopez.

Click on the image to the right to go to the publisher's web page for this volume.
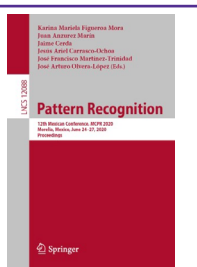
The oral sessions covered the topics: Pattern Recognition Techniques, Image Processing and Analysis, Computer Vision, Industrial and Medical Applications of Pattern Recognition, Natural Language Processing and Recognition, and Artificial Intelligence Techniques and Recognition.

Three outstanding invited speakers gave keynote addresses on topics in pattern recognition (PR):

- "Mathematics of Deep Learning" by Prof. René Vidal, Mathematical Institute for Data Science, The Johns Hopkins University, USA
- "Biases in Social Media Data" by Prof. Ricardo Baeza-Yates, Graduate Data Science Programs, Northeastern University at Silicon Valley, USA
- "Quantum computing: from scientific research to high-tech markets" by Prof. Salvador Elías Venegas-Andraca, School of Engineering and Sciences, Tecnológico de Monterrey, Mexico

Even though MCPR2020 could not be held physically, we are sure that it once again provided a forum for enhancing the collaboration between Mexican PR researchers and the broader, international PR community.

The 3th Mexican Conference on Pattern Recognition will be held in Mexico City, Mexico in the last week of June 2021, organized by the Instituto Tecnológico Autónomo de México ITAM and the Computer Science Department of the National Institute for Astrophysics Optics and Electronics of Mexico.

DeLTA 2020

1st International Conference on Deep Learning Theory and Applications

Online Streaming . 8 - 10 July 2020

http://www.delta.scitevents.org/?y=2020

Conference Chair:
Kurosh Madani, University of Paris-EST Créteil (UPEC), France

Program Chair:
Ana Fred, Instituto de Telecomunicações and University of Lisbon, Portugal

Keynote Speakers:
Petia Radeva, Universitat de Barcelona, Spain (Distinguished IAPR Speaker)
Vincent Lepetit, École des Ponts ParisTech, France

by the Conference and Program Chairs

The 1st International Conference on Deep Learning Theory and Applications (DeLTA2020) was held as an online event. DeLTA 2020 was sponsored by the "Institute for Systems and Technologies of Information, Control and Communication (INSTICC)", and endorsed by the IAPR. For this first edition, DeLTA2020 was organized "in cooperation" with a number of international organizations involved in research related to Deep Learning, Big Data Analytics, Machine Learning, Computer Vision Applications, Natural Language Understanding, and Artificial Intelligence: the ACM Special Interest Group on Artificial Intelligence (ACM SIGAI), the International Neural Network Society (INNS), and the European Society for Fuzzy Logic and Technology (EUSFLAT).

The main goal of DeLTA is to provide a meeting point for researchers and practitioners involved in investigating the manifold facets of deep learning, big data analytics, machine-learning, and artificial intelligence, and active in either theory

development or application design and implementation. During the conference, the attendees had the possibility to exchange ideas about their research and scientific plans among themselves and also with the invited speakers. The intended goal was to spur new and original threads of collaboration to investigate brand new approaches.

DeLTA received 28 submissions from 16 countries. Out of the accepted papers, 4 were selected for oral presentation as full papers, 8 for oral presentation as short papers, and 2 for poster presentation.

In addition, the invited speakers also presented the following plenary lectures:
- **Petia Radeva**, Universitat de Barcelona, Spain (Distinguished IAPR Speaker): Uncertainty Modeling within an End-to-end Framework for Food Image Analysis
- **Vincent Lepetit**, École des Ponts ParisTech, France: 3D Scene Understanding from a Single Image

The conference organization assigned two awards to testify to the value of the best contributions: the Best Paper Award, and the Best Student Paper Award. The

winning papers were chosen by the Program/Conference Chairs based on the best combination of review marks, assessed by the Program Committee, and of paper presentation quality, assessed by Session Chairs and Program Chairs during the sessions. For this edition, the winning papers were:

Best Paper Award
Data Augmentation for Semantic Segmentation in the Context of Carbon Fiber Defect Detection using Adversarial Learning by Silvan Mertes, Andreas Margraf, Christoph Kommer, Steffen Geinitz and Elisabeth André

Best Student Paper Award
Attention-based Text Recognition in the Wild by Zhi-Chen Yan and Stephanie A. Yu

Furthermore, the Authors of DeLTA2020 selected papers will be invited to submit a revised and extended version of their work for a book in the Springer CCIS Series.

We look forward to meet you at the 2nd edition of DeLTA in Lieusaint – Paris, France, July 7-9, 2021.

(http://www.delta.scitevents.org/).

DeLTA2021 will be in Lieusaint-Paris, France: put it in your agenda!

General Chairs:

Cheng-Lin Liu, Institute of Automation of Chinese Academy of Sciences, China

Shijian Lu, Nanyang Technological University, China

Jean-Marc Ogier, University of La Rochelle, France

DAS 2020 was held virtually. The DAS workshop series is a major event in the field of document analysis and recognition, sponsored by the International Association for Pattern Recognition (IAPR) TC-11 (Reading Systems). Since 1994, DAS has been organized every other year in different locations around the world. DAS 2020 made a new record in that it was held virtually for the first time.

DAS 2020 was originally scheduled to be organized physically in Wuhan, China from May 15-17. However, the outbreak of COVID-19 in 2020 disturbed most academic conferences: to prevent coronavirus propagation, people were banned to gather, and international flights were largely reduced. From February to April, the organizing committee of DAS 2020 had many discussions and virtual meetings for re-planning the workshop and finally decided to hold the workshop virtually from July 26-29.

The local organizing committee led by Prof. Xiang Bai of Huazhong University of Science and Technology made great efforts in preparing and operating the meeting platform (Zoom) and running the program. Xiang Bai also served as a Program Chair,

co-working with Dimosthenis Karatzas and Daniel Lopresti.

Thanks to the financial support of four companies (Meituan, Hanvon, HUAWEI, TAL Education Group) and the reduced expense of a virtual conference, DAS 2020 offered free registration to all participants (upon invitation or approval). Over 220 people registered.

The program was run similarly to traditional conferences but adapted to the online environment: oral presentations were given online and then questions and discussions were held live; each poster paper was assigned a Zoom meeting room and presentation and discussions are run freely during the session time. This format let the participants easily accept and adapt.

The main program time was between 17:00-23:30 UTC+8. Despite the inconvenience for people from some zones, the participation and discussions were successful: keynote sessions were attended by over 120 people, oral sessions mostly had over 60 attendees, and poster session discussions were active most of the time.

The program of DAS 2020 was highlighted by three invited keynote

talks. Dr. Tong Sun (Document Intelligence Lab in Adobe) gave talk titled "The Future of Document: A New Frontier in the Post-Pandemic Era". Prof. Lianwen Jin (South China University of Technology) gave a talk "Optical Character Recognition in the Deep Learning Era". Prof. C.V. Jawahar (IIIT Hyderabad, India) gave a talk "Document Understanding Beyond Text Recognition". The keynote talks covered important topics including the emerging deep learning, document AI as well as the historical review of document techniques and applications. On July 26, a tutorial titled "GNN-Based Visually Rich Document Processing" given by Zhibo Yang and Qi Zhang (Alibaba, China) also attracted high attention.

The program included six oral sessions and two poster sessions. 24 oral papers and 16 poster papers were selected from 57 full submissions after strict review. The topics covered character and text recognition, document

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Xiang Bai
Dimosthenis Karatzas
Daniel Lopresti (Eds.)

LNCS 12116

Document Analysis Systems

14th IAPR International Workshop, DAS 2020
Wuhan, China, July 26-29, 2020
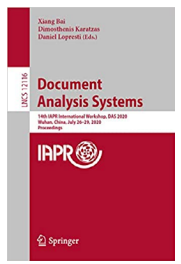Proceedings

IAPR

Springer

image processing, layout analysis, document retrieval, text detection, font design and document applications. The accepted papers are included in the workshop proceedings published as [Volume 12116 in the Springer LNCS series](#).

As a tradition in the workshop series, DAS 2020 organized discussion groups. The participants joined the discussions in six topics: Deep Learning for Document Analysis, Information Extraction and Semantic Recognition, Document Classification and Understanding, Datasets and Evaluation, Layout Analysis and Table Structure Recognition, Word Spotting and Historical Document Analysis. The discussion groups were run in parallel in six Zoom meeting rooms. The discussed points were summarized by the moderator and scribe of each group, and were reported at the last session before the closing ceremony.

At the closing ceremony, two paper awards and an honorable mention were announced and certificates presented. The awards were selected based on evaluation of review scores and presentation quality by a committee led by program chairs. The paper awards and the recipients are as follows:

Nakano Award (Best Paper Award): Fabian Wolf and Gernot Fink, *Annotation-free Learning of Deep Representations for Word Spotting using Synthetic Data and Self Labeling*

IAPR Best Student Paper Award: Guo-Wang Xie, Fei Yin, Xu-Yao Zhang and Cheng-Lin Liu, *Dewarping Document Image by Displacement Flow Estimation with Fully Convolutional Network* (Editor's note: please see related article in this issue, IAPR...The Next Generation spotlighting Guo-Wang Xie.)

Honorable Mention Best Student Paper: Martin Leipert, Georg Vogeler, Mathias Seuret, Andreas Maier and Vincent Christlein, *The Notary in the Haystack – Countering Class Imbalance in Document Processing with CNNs*

The post-workshop questionnaire showed that the oral sessions with live presentation were highly satisfactory, while the interaction of poster sessions and discussion groups was less satisfactory because of the inconvenience of switching between different meeting rooms. An alternative online meeting platform supporting multiple rooms/groups and free switching with one login would be more convenient.
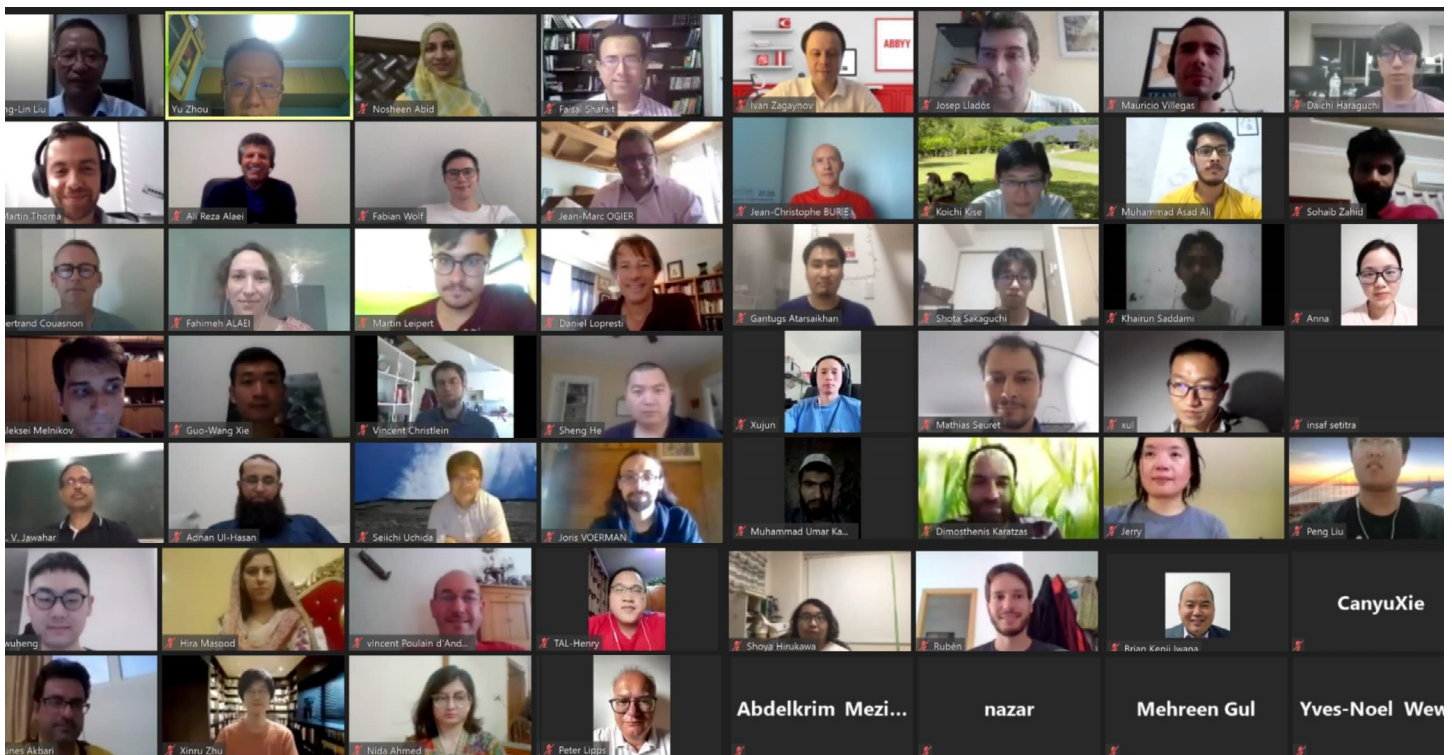

Photo (taken by screen shot at closing ceremony)

BOOKSBOOKSBOOKS

Below is a list of recently or soon-to-be published titles by Springer and CRC Press. Also, please let us know if you have a new book coming out, and we'll list it here. Happy reading!
~Jing Dong, IAPR Newsletter *EiC*

New titles published by Springer:

<u>The following recently-published Springer titles may be of interest to the IAPR members:</u>

＊ ***3D Imaging, Analysis and Applications*** by Liu, Y., Pears, N., Rosin, P.L., Huber, P. (Eds.): <u>https://www.springer.com/gp/book/9783030440695</u>

* ***Active Lighting and Its Application for Computer Vision*** by Ikeuchi, K., Matsushita, Y., Sagawa, R., Kawasaki, H., Mukaigawa, Y., Furukawa, R., Miyazaki, D.: <u>https://www.springer.com/gp/book/9783030565763</u>

＊ ***Advanced Fingerprint Recognition: From 3D Shape to Ridge Detail*** by Feng Liu, Qijun Zhao, David Zhang: <u>https://www.springer.com/gp/book/9789811541278</u>

＊ ***Advances in Photometric 3D-Reconstruction*** by Durou, J.-D., Falcone, M., Quéau, Y., Tozza, S. (Eds.): <u>https://www.springer.com/gp/book/9783030518653</u>

* ***Fundamentals of Pattern Recognition and Machine Learning*** by Braga-Neto, Ulisses: <u>https://www.springer.com/gp/book/9783030276553</u>

New titles published by CRC Press:

<u>Recently published, summer 2020:</u>

＊ ***Smart CMOS Image Sensors and Applications*** by Jun Ohta: <u>https://www.crcpress.com/Smart-CMOS-Image-Sensors-and-Applications/Ohta/p/book/9781498764643</u>

＊ ***Unmanned Aerial Remote Sensing: UAS for Environmental Applications*** by David R. Green: <u>https://www.crcpress.com/Unmanned-Aerial-Remote-Sensing-UAS-for-Environmental-Applications/Green/p/book/9781482246070</u>

＊ ***Deep Learning for Remote Sensing Images with Open Source Software*** by Rémi Cresson: <u>https://www.crcpress.com/Deep-Learning-for-Remote-Sensing-Images-with-Open-Source-Software/Cresson/p/book/9780367858483</u>

＊ ***Fuzzy Machine Learning Algorithms for Remote Sensing Image Classification*** by Anil Kumar, A. Senthil Kumar, Priyadarshi Upadhyay: <u>https://www.crcpress.com/Fuzzy-Machine-Learning-Algorithms-for-Remote-Sensing-Image-Classification/Kumar-Kumar-Upadhyay/p/book/9780367355715</u>

IAPR

This bulletin board contains items of interest to the IAPR Community

How does working in AI, machine learning, and/or computer vision make you feel?
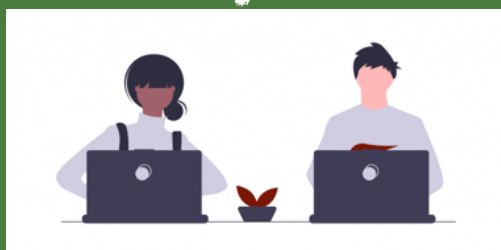
We are researchers interested in learning how developments and excitement in AI, machine learning, and computer vision have affected the community of researchers and practitioners in academia and industry.

We are seeking participants at all levels in both industry and academia.

Your participation would involve writing a short story (typically 1-2 paragraphs) describing a personal, memorable experience with the changing landscape of the AI-related discipline and/or profession.

Your identity will be kept private.

The data from your stories will help scholars understand the challenges of a rapidly moving profession and its implications for individuals. The findings will inform future studies to improve the well-being of all stakeholders in computer vision and machine learning.

If you are interested in participating, please contact:
- ***Professor David Crandall*** *at* *djcran@indiana.edu* *or*
- ***Professor Norman Makoto Su*** *at* *normsu@indiana.edu*

ICPR 2020
25th INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION
Milan, Italy 10 | 15 January 2021
"putting Artificial Intelligence to work on patterns"

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Registration is open!

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.
+ Plus sign denotes pending application for IAPR endorsement/sponsorship +   * Asterisks denote non-IAPR events *

All dates indicated below are as of the time of publication. Conference dates and venues may change due to COVID-19 concerns. Some may be held online. Please check the conference websites for the most up-to-date information.

		Meeting	Report on previous edition	Venue
2020	**DEC**	DICTA 2020: 2020 International Conference on Digital Image Computing: Techniques and Applications	DICTA 2019	**Online** - **Australia**
		CVIP 2020: 5th Intl Conference on Computer Vision and Image Processing	CVIP 2019	**In-person/On-line** - **India**
		MedPRAI 2020: 4th Mediterranean Conference on Pattern Recognition and Artificial Intelligence	MedPRAI 2018	**In-person/On-line** - **Tunisia**
2021	**JAN**	ICPR 2020: 25th International Conference on Pattern Recognition	ICPR 2018	**Online** - **Italy**
		ICPR 2020 Workshops: Workshops that have been provisionally accepted as part of the ICPR 2020 program	ICPR 2018	**Online** - **Italy**
		S+SSPR 2020: IAPR Joint International Workshops on Statistical Techniques in Pattern Recognition (SPR) and Structural and Syntactic Pattern Recognition (SSPR)	S+SSPR 2018	**Online** - **Italy**
	FEB	ICPRAM 2021: 10th Intl. Conf. on Pattern Recognition Applications and Methods	ICPRAM 2020	**Online**
		VISAPP 2021: 16th Intl. Conf. on Computer Vision Theory and Applications		**Online**
	MAR	ICPRS 2021: 11th International Conference on Pattern Recognition Systems	ICPRS 2019	**Mostly online** - **Chile**
	MAY	CIARP PORTO 2021: 25th Iberoamerican Congress on Pattern Recognition	CIARP 2019	**Portugal**
		DGMM 2021: 1st Intl. Conf. on Discrete Geometry and Mathematical Morpholog		**Sweden**
	JUL	MVA 2021: 17th International Conference on Machine Vision Applications	MVA 2019	**Japan**

Thoughts on articles you've read in this issue of the IAPR Newsletter?
Ideas for features you'd like to see in the IAPR Newsletter?
Send your comments to: Jing Dong, Editor-in-Chief, *jdong@nlpr.ia.ac.cn*