THE INTERNATIONAL ASSOCIATION FOR PATTERN RECOGNITION

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Special Issue

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IN THIS Issue

Going against the main stream: turning penny stocks into blue chips

by Masaki Nakagawa

Editor's note:
Prof. Dr. Masaki Nakagawa received the 2021 ICDAR Outstanding Achievements Award "for his outstanding contributions in online handwriting beyond the Latin Alphabet, early integration of handwriting recognition in practically useful systems, and his excellent contributions for the ICDAR community, connecting us with Industry in Asia."

Beginning with the opening paragraph, Prof. Dr. Nakagawa notes the importance of pursuit of one's own path as well as collaboration in achieving great things.

~ Jing Dong, EiC

It is my great honor to have received the IAPR/ICDAR Outstanding Achievements Award. I would like to thank all the people who worked together with me, discussed common issues and exchanged ideas.

I started my career as an assistant professor at TUAT (Tokyo University of Agriculture & Technology) after just finishing my M.Sc., as few people had Ph.D.s in computer science then. I started working on designing computer systems for people to be able to input, process and output Japanese text about 45 years ago. There was no keyboard

CALLS for PAPERS

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

+ denotes pending IAPR Conferences & Meetings Approval +

2022

IGS 2021
20th Conference of the
International Graphonomics Society
Las Palmas de Gran Canaria, Spain
Deadline: ~~Dec. 15, 2021~~ Jan. 28, 2022
Dates: Jun. 7-9, 2022 (moved from Sep.13-15, 2021)

ISPR 2022
22nd International Conference on
Intelligent Systems and Pattern Recognition
Hammamet, Tunisia (hybrid)
Deadline: ~~Dec. 31, 2021~~ Jan. 28, 2022
Dates: Mar 24-26, 2022

MCPR 2022
14th Mexican Conference on Pattern Recognition
Ciudad Juárez, Chihuahua, México
Deadline: January 31, 2022
Dates: Jun. 22-25, 2022

IJCB 2022
2022 International Joint Conference on Biometrics
Abu Dhabi, United Arab Emirates
Deadline: April 15, 2022
Dates: October 24-27, 2022

+ ANNPR 2022 +
10th IAPR Workshop on
Artificial Neural Networks in Pattern Recognition
Dubai, UAE
Deadline: TBD
Dates: Nov. 24-26, 2022

or typewriter for thousands of Japanese characters then. Input by online handwriting recognition seemed natural but was actually very tough. It took me ten years to get a Ph.D. and obtain a PI position.

Within ten years after starting this work, most of the systems engineering issues have been solved, but online handwriting recognition remained an elusive goal, and I decided to pursue it. During this period, the Japanese Government spent a huge amount of money to develop machines for reading handwritten postal codes and succeeded in this task by applying many theories and techniques as well as by following a brute force approach. Many people said “Character recognition has ended. Pattern recognition is finished”, but no method could recognize casually handwritten text. I asked myself “Is it a penny stock?” But, I could not buy blue chips due to a small budget. I answered myself “it is a penny stock, but it might become a blue chip someday”. Then I decided to pursue a path that went against the main stream, which is the policy I have been following since then.

I started a project composed of not only handwriting recognition but also incorporating user interfaces (UIs) and applications. Not many people were working on pen-based UIs, and researchers tended to think of applications as cheap topics. I created many collaborative projects with companies. This provided not just a budget but also an opportunity to address real problems, market needs, and new ideas. We wrote joint papers and patents. Large companies understand academia, whereas start-ups ask us for more support but they are close to the market and inform us of the needs of real users.

We created the first large database for online handwritten character patterns. We combined Fujitsu’s offline recognizer and our online recognizer to yield a much better recognition rate. Online recognition models are robust to stoke connection and deformation, whereas offline recognition models are not sensitive to wrong stroke orders or duplicated strokes. We designed a complex recognition model incorporating line and character segmentations, character recognition, geometric context, and linguistic context.

We also studied pen- and touch-based user interfaces. Display-

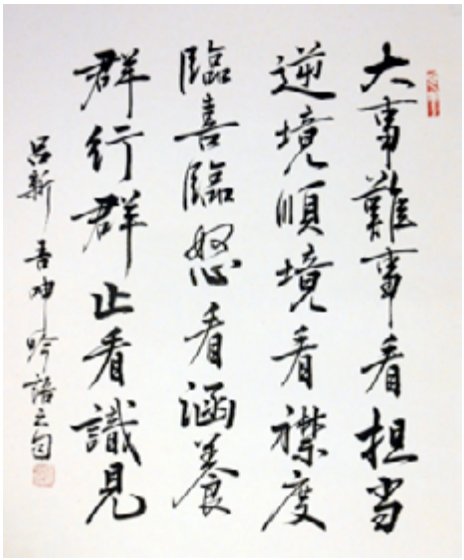
integrated tablets allow direct pointing and manipulation for devices of any size, and provide common UI for them. Gestures can be used as long as they are not ambiguous. For small surfaces such as PDA, however, we needed to scroll many times. So, we designed the scroll speed to be in proportion to the speed of pen (or touch) movement. This is a standard feature on mobile devices now, and is called the touch scroll.

For large surfaces, we needed to move from side to side and stretch hands to touch distant objects, which caused our bodies to occlude the board. So, we made an extendable pointer for clicking a target, which maintains the feeling of direct pointing and manipulation from any standing position. For all these technologies, we applied for a number of US Patents.

Last but not the least, we developed many applications for small devices, tablets and large whiteboards. Digital ink is passed and shared among them and used for casual personal, creative personal, and collaborative purposes. We also designed several educational applications. Overall, we achieved very good results, but there was no big change until 2010.

Although there were booms on two fronts (one for handwriting word-processors, PDAs such as Sony Palmtop, Sharp Zaurus and Apple Newton; and the other for Pen-OS such as PenPoint and Windows for Pen), the market did not expand. Companies shrank their R&D budgets, and some even shut down. The effect of the crash of the Japanese bubble economy remained, and the IT-bubble crash of 2000 also impacted the Japanese economy, and it is now called the “lost 20 years”.

Basically, a university laboratory is a tenant in a university. It could be a gorgeous shop along the Champs-Élysées or 5th Avenue, but it might be a temporary shop along an approach to a shrine or temple open only when there are some fairs or events. I asked myself again “Is it a penny stock?” Many companies already retreated from online handwritten recognition. From the beginning, however, I started my laboratory by going against the mainstream trends. Even falling into a temporary shop, I thought I could continue as long as I was teaching some subjects although I was not a good teacher.



I came across this Chinese poem written 500 years ago. I asked a calligraphy master to write it as shown here. The first vertical line on the right says: When you face a big task or difficult task, you can see your mental capacity or toughness. The second line says: When you are in a favorable circumstance or in an unfavorable circumstance, you can see your prudence, mental tolerance and stability. You may guess the meaning of the third and the fourth lines, or ask a Chinese or a Japanese friend. The third character from the bottom in every line means neither just to see nor to judge but to take care of yourself and others.

The situation changed drastically around 2010. My colleague, Dr. Bilan Zhu and I started a university start-up, iLabo. Our online Japanese handwriting recognizer was sold to smartphones and tablets through a software company and even installed on GALAXY. Now many smart phones and tablets with handwriting input use our recognizer. My previous patents for user interfaces also brought us a gift: in 2010, TUAT sold them and used the money to rebuild a restaurant for students.

The demand for handwriting recognition is increasing steadily. iLabo is now selling recognizers also to the education market. The current business is for self-learning. Learners read questions and write their answers. The system recognizes handwritten answers. The Learners can help the system by verifying the recognition results and correcting errors or rewriting answers. Then, the system scores them immediately. The learners can get immediate feedback.

The next step is to score handwritten answers in exams. Although multiple-choice questions are widely used in current e-learning and e-testing systems, descriptive answers are a better indicator of learner’s understanding and problem-solving ability. Moreover, they encourage learners to think rather than select. However, scoring descriptive answers is a time-consuming task.

In 2014, it was proposed that descriptive questions be added to the current multiple-choice questions for the Japanese language and Mathematics tests in the new university entrance common examination in Japan. More than 500,000 applicants take this exam every year. Trial runs (60,000 examinees) for this new format were made in 2017 and

2018 by the National Center for University Entrance Examinations (NCUEE). This format was eventually abandoned in 2019 due to the limited time available for scoring, and the applicants' anxiety about their scores, which are not open to them. However, the data from the trials is valuable. They have been scored by human graders and can be used to train and evaluate automatic scoring systems. Even if automatic systems are not used for the university entrance exam, they can be used in schools, as scoring handwritten answers is a huge burden for teachers.

There are two ways to score handwritten answers semi-automatically or automatically. In semi-automatic or computer-assisted scoring, computers cluster or pre-score handwritten answers and human examiners score them. In fully automatic scoring with scoring confirmation, computers score handwritten answers, and examinees confirm their answers and scoring. Human examiners correct any wrong scoring.

Dr. Hung Tuan Nguyen, Dr. Cuong Tuan Nguyen, and I at TUAT are collaborating with Prof. Tsunenori Ishioka and Mr. Haruki Oka at NCUEE to automate scoring of short text answers in the Japanese language. We apply multiple DNN recognizers of different types, take the result with the largest vote, and then apply linguistic context processing. We neither correct any misrecognition nor add any annotation, but immediately apply the BERT model to read the text and predict the score. The result of this scoring is amazing: there is little difference between this automatic scoring and the human scoring.

We now combine handwriting recognition and scoring, and train them end-to-end. My dream is to further unify online recognition of handwritten answers from tablets and offline recognition from scanners. The same DNN architecture may learn to recognize Japanese, English, and Math answers.

I am looking forward to presenting the results of this approach and seeing you at the next IAPR conferences.

ICDAR 2023

The International Conference on Document Analysis and Recognition (ICDAR) is the premier international event for scientists and practitioners involved in document analysis and recognition, a field of growing importance in the current age of digital transition.

The 17th edition of this conference will be held in San José, California in August of 2023 (tentative).

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

COVID-19: Applications are welcome, assuming pandemic travel regulations allow a visit during the proposed period.

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 40 opportunities listed and more than 12,000 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/winter schools are training activities that expose participants to the latest trends and techniques in the particular pattern recognition field.

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/winter 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.

CALLS FOR NOMINATIONS

FOR AWARDS TO BE PRESENTED @ ICPR 2022

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

Deadlines for Submission of Nomination & Endorsement Forms:
Nomination Forms: April 2, 2022
Endorsement Forms: April 4, 2022
https://iapr.org/fellowsandawards/awards_kingsunfu.php

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

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

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

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

J.K. Aggarwal Prize

Deadline for Submission of Nomination & Endorsement Forms: May 1, 2022
https://iapr.org/fellowsandawards/awards_aggarwal.php

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

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

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

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

Maria Petrou Prize

Deadline for Submission of Nomination & Endorsement Forms: May 1, 2022
https://iapr.org/fellowsandawards/awards_petrou.php

The Maria Petrou Prize is awarded biennially at ICPRs to a living female scientist/engineer who has made substantial contributions to the field of Pattern Recognition, and whose past contributions, current research activity and future potential may be regarded as a model to both aspiring and established researchers. This Prize honors the memory of Professor Maria Petrou as a scientist and engineer of the first rank, and particularly in her role as a pioneer for women researchers and highly successful role model. She is widely recognized for her extensive contributions to the field of image processing and pattern recognition. She also made significant contributions to the growth of IAPR, covering significant leadership roles.

The Prize consists of a suitably inscribed plaque and a cash amount partially covering a visiting period of the winner at some research institution or university.

IAPR Fellow Award

Deadline for Submission of Nomination & Endorsement Forms: January 31, 2022
https://iapr.org/fellowsandawards/index.php

We welcome nominations for the award of Fellow of the IAPR, FIAPR. Anyone is eligible to be nominated, except for current members of the IAPR Executive and Fellow Committees.

To initiate a nomination, a nominator must write and submit an IAPR Fellow Nomination Form. Current members of the Executive and Fellow Committees may not serve as nominators.

Each nomination must be endorsed by at least one recommendation letter (submitted Endorsement Form), either from a member of an IAPR Member Society (different from the nominator) or from an IAPR Fellow.

Each electronic submission will be acknowledged by an email.

Massimo Tistarelli, Chair,
IAPR Fellow Committee
tista@uniss.it
Subject: IAPR Fellowship 2022
cc: *webmaster@iapr.org*

Call for Bids to Host ICPR 2026 from the IAPR Conferences & Meetings Committee

From the IAPR
Conferences & Meetings Committee (C&M)

Call for Bids to Host ICPR 2026
Deadline: May 1, 2022

Click here to go the ICPR Proposals page at the IAPR website.

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

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

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

Any such institutions interested in making a proposal to host an ICPR must proceed according to the rules outlined in the latest version of the guidelines, which can be linked to from here: *https://iapr.org/conferences/proposals.php*.

The submission of a bid implies full agreement with the guidelines and procedures for hosting the conference as well as with the IAPR constitution.

Deadlines and Decisions:

Bids to host ICPR 2026 must be submitted to the Chair of the IAPR Conferences and Meetings Committee (C&M) by **May 1, 2022**.

The selection of the conference venue will be made by the IAPR Governing Board (GB) during its meeting at ICPR 2022 in Montréal, Québec, Canada.

Institutions interested in organising ICPR 2026 should submit the bid to C&M Chair Elisa Barney Smith (*EBarneySmith@boisestate.edu*) by **May 1, 2022.**

Elisa Barney Smith
IAPR C&M Chair

IAPR...The Next Generation

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

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

~Jing Dong, Editor -in-Chief

Alexander Mattick

Alexander Mattick is a master's student at Friedrich-Alexander Universität Erlangen-Nürnberg in Germany, where he also recently received his bachelor's degree.

His current research interests are document analysis as well as the combination of classical with machine learning techniques.

He recently received the ICDAR 2021 Best Student Paper Award for his "Smartpatch"-architecture.

Editor's note: As noted, Alexander Mattick received the ICDAR 2021 Best Student Paper Award. Please read more about the conference in the ICDAR 2021 section of this Special Issue of the IAPR Newsletter.
~ Jing Dong, EiC

by Alexander Mattick, Master's Student, Universität Erlangen-Nürnberg, Germany

Briefly: How did you get involved in pattern recognition?
The first exposure I had to pattern recognition was a blog post by Andrej Karpathy about "The Unreasonable Effectiveness of Recurrent Neural Networks", which showed some exemplary use cases for RNNs. After fighting to reimplement (or at least understand) the "Shakespear" example and failing miserably at it, I went into researching the theory behind some of the simpler algorithms like regression, KNN, and SVMs before once again diving into neural networks.

Ever since then I have been continuing to learn more about pattern recognition and artificial intelligence, specifically focusing on the theoretical backbones of modern techniques. Much later I had the opportunity to work on my first actual research project, an extension of which turned into "Smartpatch".

In more detail: What technical work have you done and what is/are your current research interest(s)?
During my bachelor's I got the opportunity to work with my project-supervisor Martin Mayr on historical document analysis. I was specifically interested in using generative models to extend small historical document datasets. We therefore looked at improving the method "GANwriting", the state-of-the-art system for unsupervised offline handwritten text generation.

Our goal was to remove stroke- and character-level artifacts from GANwriting by augmenting the training signal with a special discriminator attending to individual characters. While naive sliding-window based discrimination already provided improvements, we found that specifically targeting characters by using the attention-map of a handwritten text recognition model improved the results significantly above the state-of-the-art.

Further, our titular "Smartpatch" model, that also injects the character information into the discriminator, allowed for even more increases in generative performance. We also proposed a new benchmark for generative text modelling that produces more consistent and interpretable results than the existing frechet inception

distance. This was necessary as we, as well as prior work, noticed the tenuous correlation between FID and perceived visual quality caused by the massive domain shift between inception's imagenet-training and handwritten text.

Even though we only specifically studied extending GANwriting, our methods are readily applicable to any (offline and online) text generation model, as it only needs a crude recognition model that can approximately locate the characters in the sequence (no additional labeling or architecture changes).

Generative modelling of texts promises to be a great boon for the analysis of (historical) documents, as the datasets are usually very limited and labeling is expensive. There's another complication that makes historical document analysis especially hard: not only is one required to make do with comparatively little data, but the data you do get is mostly in a very degraded state. Automated generation of additional training data allows us to train generative models on existing datasets (sometimes current writers) and produce samples that imitate the style of new datasets. Due to the conditional generation of new samples, we already know which labels the newly produced text-pieces are supposed to have and are then able to fit a writer-identification network or handwritten text recognition model directly on the new samples. Effectively, this allows for the transfer of information from a known to an unknown dataset as a trained generative prior.

Historical document analysis is, ironically, always under a certain amount of time-pressure since even with our greatest preservation efforts, many ancient documents degrade to the point of undecipherability or simply get lost. This is especially true for the more mundane documents, such as letters or newspapers, which where never meant to last. However, this type of document often gives the greatest insights, as daily life isn't dominated by book-worthy events but rather the mundane that nobody bothered writing down explicitly. Historians therefore rely on extracting little pieces of information from diverse sources of data to puzzle together the day-to-day lives of ordinary people. Large-scale digitisation and automated processing of such sources allows for the unprecedented level of analysis necessary to piece together, for example, the microeconomic reality of life as a baker in the 3rd century B.C.

Aside from my current work in document analysis I'm also very interested in the usage of statistical methods in conjunction with classical (AI)-Techniques, such as planners, theorem provers, graph search algorithms, integer programming and knowledge graphs. I believe that this is still an underresearched area which promises huge improvements on both sides: on the statistical side, the exact reasoning and explainability of classical techniques could be a method to produce more robust algorithms with human auditable causal reasoning; on the classical side, learned heuristics or information extractors can inject implicit information about the solution distributions that were previously hidden. However, there's still lots of work to do in the space of discretisation, efficiency, causality and memory-augmented learning to make use of this or even make it possible.

One has to consider a future in which deep learning based systems are widely deployed in safety critical scenarios. Due to the inherit brittleness of statistical methods against e.g. distribution shifts, it's going to become necessary to either robustify the networks or at least make sure that the non-statistical parts of the software work as intended. I believe that classical and statistical hybrid system can be used to achieve both goals.

There's a certain duality between data-first statistical methods and theory-first classical methods, which I believe to be underutilised.

How can the IAPR help young researchers?

Starting off in the scientific field is hard. There are lots of things to learn, manage and account for and that's before even considering the amount of factual knowledge necessary to produce meaningful research.

Aside from the obvious talking point about funding young researchers so that they are able to perform the experiments they need to, I think an equally important point is getting first-timers a foot in the door. This could be as simple as providing a cache of interesting research questions that aren't groundbreaking or complex, but enough to learn the process behind researching, writing and submitting a paper.

If people are very ambitious or the project works out better than expected, one can always increase the scope later on, but having the option for a low-stakes stepping-stone into research seems like a good idea.

It's important to introduce people to research at their own pace, rather than throwing them into the deep-end and risking discouragement before they even start.

From the EXCO

The IAPR ExCo on...

Encouraging diversity in Summer/Winter Schools and IAPR Prizes and Awards

by Terence Sim (Singapore)
IAPR 2nd Vice-President

News from the IAPR Executive Committee

- **THE TIME IS NOW:** submit your national, ethnic, and gender diverse nominations for the IAPR Awards to be presented at ICPR 2022.
- Governing Board Ballots for the Prize and Nominating Committees have been initiated.
- ICPR 2022 is only 7 months away! Check out the Call for Workshops, Tutorials, and Challenges in this issue.
- Items from the January meeting of the IAPR ExCo:
  - The IAPR has available funds for Summer/Winter Schools. These events are especially important now, when the research community has not been able to meet in person for a couple of years. Read Terence's column to the right.
- It is with great sadness that we share the news that Michael Duff has passed away. Michael participated actively in IAPR activities for many years. Please see the special In Memoriam section in this issue of the IAPR Newsletter.

Virtual meetings. Like them or not, these have become standard features in our Conferences and our Summer/Winter Schools. Virtual meetings are good in that they tend to be much cheaper than physical ones, and they allow anyone from anywhere in the world to participate. All you need is a decent internet connection, which thankfully is more widely available now than ever before. This presents a great opportunity for the IAPR to reach out to participants from under-represented national, ethnic and gender groups from across diverse geographical regions.

The IAPR ExCo encourages diversity and inclusivity in all our activities. If you are planning a Conference, Summer or Winter School, or even a one-off talk, please consider providing a virtual component, and publicize your event to under-represented people and regions. Doing so will make your event accessible to many who would otherwise not have a chance to experience high-quality international events. Who knows if your event might inspire the next transformational scientist or inspirational leader?

If you need funds to attract such under-represented people for your Summer or Winter Schools, please approach the IAPR ExCo for grants of up to US$2,500 for established Schools and US$5,000 for new ones. For maximum benefit, these grants are best used to bring in remote and virtual participants, as opposed to onsite attendees. Indeed, we at the ExCo see Conferences and Summer/Winter Schools as the best mechanism to create the most impact: training and nurturing the next generation of technical experts. Please contact the IAPR Secretariat (secretariat@iapr.org) at least four months in advance to apply for such grants (see IAPR ExCo Initiative on TC Activities Summer/Winter Schools and the Call for Proposals for Summer/Winter Schools).

Thus far, the most common Schools are about document processing and biometrics, but the IAPR has a much wider breadth of interests, as reflected in its fifteen Technical Committees (TCs). All IAPR TCs are highly encouraged to organize a School in different regions of the world. Ideally, your program should span a few days, and provide not just training, but also faculty mentoring, and social networking for all participants.

Prizes and Awards. Yet another way to promote diversity and inclusivity is through the various Prizes that IAPR awards. There are three prestigious Prizes, shown in the box below, and they are awarded at every International Conference on Pattern Recognition (ICPR), the IAPR's premier conference. The IAPR ExCo would like to see award winners from a broader geographical region, and from under-represented ethnicities and genders. To this end, we strive to make the Prize Committees more representative globally. We would also welcome discussions with each Prize Committee on how to attract nominees and award winners in a more inclusive manner.

Nominations for these Prizes can be made to the committee chairs, subject to the rules and dates on the IAPR web site.

- King-Sun Fu Prize Call for Nominations: *https://iapr.org/fellowsandawards/awards_kingsunfu.php*
- J. K. Aggarwal Prize Call for Nominations: *https://iapr.org/fellowsandawards/awards_aggarwal.php*
- Maria Petrou Prize Call for Nominations: *https://iapr.org/fellowsandawards/awards_petrou.php*

First and most recent winners of the King-Sun Fu, J. K. Aggarwal and Maria Petrou Prizes		
King-Sun Fu Prize	J.K. Aggarwal Prize	Maria Petrou Prize
In honor of Professor King-Sun Fu, founding member and first President of IAPR, and widely recognized for his extensive contributions to the field of pattern recognition.	In honor of Professor Aggarwal, widely recognized for his extensive contributions to the field of pattern recognition and for his participation in IAPR activities.	In honor of Professor Maria Petrou, a scientist and engineer of the first rank, and a pioneer for women researchers and a highly successful role model.
Azriel Rosenfeld (1988) Ching Yee Suen (2020)	Bernhard Schölkopf (2006) Abhinav Gupta (2020)	Michal Irani (2016) Maja Pantić (2020)

Conclusion. Finally, and more practically, the IAPR ExCo recognizes that diversity and inclusivity requires constant effort to sustain, and cannot be a one-off endeavor. We thus appeal to IAPR members worldwide to offer concrete ideas to foster diversity. Better yet, please step up to serve as leaders.

IAPR Then and Now...Encouraging gender diversity in nominations for IAPR Awards

***IAPR Newsletter* Vol. 38 No. 1, January 2016**

In today's society, many organisations have the matter of gender diversity on their agenda. Studies show that job satisfaction is better in mixed environments – for women as well as for men. Satisfaction at work results in higher quality of the work, and scientific quality is a corner-stone for the IAPR. The IAPR ExCo has written this memo on diversity from an IAPR perspective, and we urge you all to consider it. ~Ingela Nystrőm, IAPR President

IAPR Fellowships as well as the King-Sun Fu (KSF), the J. K. Aggarwal (JKA), and the Maria Petrou (MP) Prizes are very prestigious career achievements, since they acknowledge the excellent quality of scholarship and service contributions of the researcher who has received them. Such achievements enable researchers to become visible as role models and to undertake leadership positions.

Women are underrepresented in STEM (Science, Technology, Engineering, and Mathematics) domains, at all levels of education, in academia and in industry. So, it is not surprising that women are likewise underrepresented in the IAPR Fellow population. No female scientist has yet been honoured with the KSF Prize or received the JKA Prize, which may come from the fact these prizes were established when even fewer women were participating in Pattern Recognition and its related fields.

The degree of the imbalance in IAPR Fellowships, however, is surprising: 12 women versus 198 men. The ExCo has also noticed the low attendance of women (about 10%) at ICPR conferences.

Recognition through peer-nominated awards strengthens leadership roles in academic and industrial positions. This, in turn, provides more opportunities to inspire the next generation of researchers. The IAPR should take a leadership role in helping the next generation of female researchers by giving them more role models to follow.

Working towards more gender diversity in leadership would likely result in more young women choosing to go into STEM fields in the future. They would then attend related conferences and create a diversity-friendly environment in which all researchers can thrive.

The recently established MP Prize is to be awarded at ICPRs to a female researcher in the field of Pattern Recognition, which will happen the first time at ICPR 2016. Please submit your nominations.

Hereby, we in the ExCo reach out to the IAPR community and strongly encourage the nomination of women for IAPR Fellowships and for the KSF and JKA Prizes.

In Memoriam: Michael J. B. Duff

January 17, 1933 - December 29, 2021

We are deeply saddened to report the passing of Michael Duff, a distinguished researcher who was a long-time leader in the international pattern recognition community. Michael was instrumental in the founding of the British Machine Vision Association and was also very involved in the IAPR from its early days. From the early 1980s to the early 2000s, he had roles on the Governing Board and ExCo (as Secretary and as President from 1990-92). He later led the Constitution & Bylaws and Advisory Committees and served as Editor of the IAPR Newsletter. *Michael was elected an IAPR Fellow in 1994 for "contributions to architectures for parallel processing, and outstanding leadership."*

On behalf of the entire IAPR community, the ExCo offers its deepest condolences to Michael's wife Susan, the other members of his family, and his many colleagues and friends.

~ Daniel Lopresti, IAPR President

Michael J. B. Duff

by Virgionio Cantoni

At the end of this troubled 2021, the news came that Michael J. B. Duff has left us. Michael played a very important role in the development of multiprocessor architectures for image processing. He inspired us, transmitting his passion for research, and he boosted our engagement and skills.

Michael started his career as a physicist in the 1950s searching for particles on bubble chamber images. He quickly realized it was necessary to speed up processing at the array level, as inputs were large but structured. Therefore, during the 1950s, cellular automata (quoted even in the early work by John von Neumann) were emulated using the general-purpose computers that were available at the time. Michael began building his own computer that matched the 2D image data structure, and he started his brilliant career in computer architectures.

Cellular Logic Operations (CLOs) are performed digitally to transform a data array P(I,J) into a new data array P'(I,J). The value of each element in the new array is determined by its value in the original array and the original values of its nearest neighbors constituting the "cell"; whence the term "cellular logic". During thirty years there was a vast community of researchers, both academic and industrial, that committed themselves to the design and implementation of innovative parallel architectures that could be efficiently used for image processing. Many of them remained on paper, but just to quote two outstanding examples following the CLOs approach, we can mention the so-called SIMD architectures such as CLIP4 (Duff, 1978) and the pipelined (MISD) such as Cytocomputer (Sternberg, 1981). From the 60s, for over 40 years, computer scientists have suggested, designed, built and sometimes even marketed, new computer architectures for image processing. This was the genesis of modern image systems, following these lines it was hoped that real-time processing could be achieved.

Michael, heading the UCL Image Processing Group with Terry Fountain and other co-workers (I had the opportunity to strongly interact also with Tony Reeves and Kim Matthews) developed a series of eight increasingly complex systems (CLIP0 to CLIP7), ranging from arrays of 25 to 9216 processors. In some details, the basic characteristics of the Processor Elements (PEs) were: the broadcasting of single bit data to the 4/8 neighbors and the gating of the data in input following the 4/8 connectivity; the propagation that means recursion CLOs operations (synchronous/asynchronous) and detection of a stable condition on the array (by the so called 'OR-Sum-Tree', having through this the connected component as 'atomic' data; the PE was a single bit processor operating in SIMD.

All these subjects were exciting, at the cutting edge of image processing research of the time. Beside the activity on CLOs on flat array, it is worth mentioning Michael's strong activity on the analysis of how our topic field was evolving, the evaluation of the potentialities of new research lines, and the different aspects of matching algorithms to architectures.

In this connection, a meaningful example is the one on the collection of multiresolution, or "pyramid" techniques, for rapidly extracting global structures (features, regions, patterns) from an image. One of

Remembering Michael J. B. Duff

the most successful paradigms of pyramidal architectures was the planning strategy: processing images at low resolution, with a subset of data, and subsequently refining the resolution at the required level of detail. In 1986, we organized a NATO Advanced Research Workshop on Pyramidal Systems for Image Processing with the participation of seven groups engaged in the design of pyramidal architectures (fine grained [bin quad, four quad] and coarse grained, SIMD/MIMD/MISD, using existing or ad hoc chip or custom made]; seven groups were engaged in pyramidal algorithms for image analysis; six groups on the implementation of pyramidal algorithms on different architectures (array, hypercube and prism) and analysis of expected performance.

Michael entitled his chapter: “Pyramid. Expected Performances”. I consider this contribution very exciting. Besides an evaluation, he suggested how to change the flat array architecture and how to perform efficiently pyramidal processing on arrays. This has been a very successful suggestion because it has been what we later pursued to propose the ‘logical pyramid’! In fact, in our final hardware, we did not change the CLOs paradigm, but we found the way to avoid extra connections in the array, by including the bypass of the PEs and log2 N (N is the square side length) controllers (one for each plane of the quad pyramid), the instruction being distributed in row parallelism. At the maximum resolution it was a flat array; when this resolution was not required, all the low resolutions of the quad pyramid could work in parallel in Multi-SIMD mode.

Broadly speaking, hardware evolution is, in fact, a constant adaptation of technology to demand-driven processes along time and it may be considered as a steadily changing evolution.

Nowadays, a substantial thread in hardware development passes through Graphical Processing Units (GPU) architectures, also driven by the Deep Learning application paradigm. Typical GPU design schemas are based on arrays (exploiting also multiresolution) of cores using shared memory for communication, whereas software applications make a mixed use of CPU (general computing, coarse grain) and GPU (data parallel computation, fine grain) On this purpose Michael once stated: "Many hands make light work is a well-known saying, but then so is too many cooks spoil the broth". Of course, technology has evolved enormously, but the primitives of that time are curiously not that far away.

Michael’s contributions are relevant also in service to the British and International Pattern Recognition communities. In 1967 he founded a discussion group on Pattern Recognition, which developed in 1976 into the British Pattern Recognition Association and in the mid-1980s, now the British Machine Vision Association. Throughout all these years, Michael has been an outstanding member of IAPR. Fellow of IAPR since its institution, he has served as president from 1990 to 1992, secretary for four years, chairman of various IAPR committees and Editor of the *IAPR Newsletter*.

His research led to publications of high scientific value, written in a brilliant style, which, at the same time, were concrete and precise.

I had the opportunity to meet him at several international conferences and workshops. His open-minded view was combined with a profound intellectual honesty. To say his own, calmness and 'humor' were his strength and even when the ideas were different and the objection oversized, he ended with his 'really?' with a legendary distinction.

Unfortunately, he left us 'really', without a question mark, and we will miss him forever 'really!', with an exclamation point.

Remembering Michael J. B. Duff

I must have first seen Mike when I came to ICPR in Rome in 1988 as a new GB member, recently appointed as a surprisingly young President of the Swedish IAPR member society. However, I cannot say I remember that. The real serious meeting was when I became Secretary of the IAPR in 1990. Mike became President at the same time. We co-operated closely in the ExCo for four years, when we become not only colleagues but friends.

I loved speaking to Mike, his voice was wonderful, and what I will remember the most. Especially when he understood he need not talk simplified English to me (he was always considerate enough to do this with people whose English was weak). He was the kindest man – but he could insult the unwary in the most stinging way when he felt like it was warranted. I am, however, not sure the target always understood the insult, it was so kindly spoken.

Unfortunately, Mike and I never really shared research interests, but it is clear that Mike had a large impact on the early development of special image processing computers. I am sad that – in his humble way – he said with a smile, "All I did is now useless and forgotten." I am sure his students, colleges and the British Machine Vision Association feel very differently! As do many others, not the least the readers of the IAPR Newsletter, of which he was Editor 1999-2002.

We worked together on the ExCo, not only on running matters - which were more cumbersome at that time as the web was far from developed. Today's ExCo would be surprised at how many letters and documents went by snail mail (which was not as snail then as it is today!).In addition, one lasting thing our ExCo accomplished was establishing the IAPR Fellowship. The whole ExCo, but as I remember mostly Mike, spent a lot of time of developing the criteria to be used. In the beginning only service to the IAPR and publication in IAPR journals and conferences counted. We thought that would automatically implicate scientific excellence. Later ExCos have changed the criteria many times, from more or less discounting IAPR activities to bringing some of that back. Anyway, I doubt the introduction of the Fellowship would have been as smooth and as successful without Mike. And of course he would have gotten it in the first batch if he had not been part of the ExCo!

I was probably one of the first women with a reasonable international impact in image analysis. This was not always easy. For example, the first thing a certain elderly professor I met in Rome asked was about my marital status, not about my position or field of research. He also "very kindly" told me exactly how to vote at my first GB meeting. Mike was, on the other hand, very supportive of female scientists, in a friendly, professional way. With many other experiences, this was one of the things I appreciated very much. He even, as Chair of the Nominating Committee, tried to make me IAPR President in 1996, even though we both knew this would be too early. With a group of what we then called MCPs, the idea was resolutely stopped. So, I was very happy to see Gabriella Sanniti di Baja become President in 2000, when the idea of a female President was no longer outrageous and several of the most active MCPs had retired from the GB. I was even happier when my own PhD student Ingela Nyström became President in 2014. I doubt these appointments would have been possible without Mike's early efforts!

After our four years in the ExCo together Mike and his wife Susan and I have met in many places at conferences and otherwise. We have kept in contact through the years and I have visited their wonderful home a number of times. I am only sorry that the contact has been purely digital in later years. I have had so much fun and so much satisfaction from knowing Mike both professionally and personally. He will be missed and very fondly remembered.

Gunilla Borgefors

Remembering Michael J. B. Duff

I have known Michael, and his wife Sue, for many years.

In the seventies, Michael collaborated with Stefano Levialdi and Luigi Cordella, both working at the Institute of Cybernetics of the Italian National Research Council, where I was taking my first steps in pattern recognition.

Additionally, Michael and Sue used to spend part of their summer holidays at a resort that was very close to the Institute of Cybernetics. So even though I have never worked on computer architectures, there have been plenty of opportunities to spend some time together.

Subsequently, these opportunities increased due to our deep involvement with the IAPR. Michael was IAPR President for the 1990-92 term, and I assumed the same role ten years later for the 2000-02 term.

When Michael retired, Sue threw a surprise party for him. And it was really a big surprise. On the other hand, behind every great man there is always a great woman, and Sue sure is! Michael didn't expect to find many old colleagues and friends, including myself, coming from various places clapping their hands for him.

After he retired, we continued to keep in touch by email and, when possible, in person. The last time I met Michael and Sue was in London on April 22, 2013 when we took this picture where we are all smiling. This is the way I want to remember Michael.

I will miss you, Michael! My hugs to you, Sue!

Gabriella Sanniti di Baja

IAPR Then and Now...Excerpt from "An IAPR Her Story: Gabriella Sanniti di Baja" *IAPR Newsletter,* Vol. 40 No. 2, January 2018

I have been lucky enough to meet several times people like Azriel Rosenfeld, Herbert Freeman, Michael Duff, and many other who inspired me to be as active as possible within the IAPR. Life has been generous to me and has given me so much. I have had problems, like everyone else, but I always tried to address them by considering them as a test bench.

Should I be born again I would not change anything in my life.

Remembering Michael J. B. Duff

I am honoured to be asked to write a few words about Mike as a former student of his.

Mike was first my final year undergraduate project supervisor, and subsequently my PhD supervisor. But Mike's 'supervision' for myself and many of his students went far beyond the period of study or academic matters, he was a role model and a mentor to many of us.

I am certain I am not alone in saying that the original reason that I joined Mike's Image Processing Group at UCL was because of Mike himself rather than my interest in Image Processing, as back in those early days of that field and as a fresh graduate, I had barely heard of the term 'Image Processing' or knew what it meant. (In hindsight, with a surname of 'I''P', I guessed that is what I should be doing.)

But, honestly, many of us were attracted to Mike's research group because of his vision, his personality, his sense of humour and his ever-smiling face.

It was also due to his encouragement while he was the President of the International Association of Pattern Recognition (IAPR) that the Hong Kong Society for Multimedia & Image Computing was established and became a member of the IAPR family. Mike also offered his support by coming to Hong Kong in 1992 to give the inaugural speech of the Society which to this day is still fondly remembered by the community.

Looking back, when Mike asked me to join his research group forty years ago, I asked him why should I spend three or more years doing PhD study instead of finding a job and starting a career, the answer he gave was simple: there are not many occasions in life where one is given the opportunity to spend three years focusing on doing one thing that one really enjoys. And this is still the answer I give to my students when they ask me the same question.

But personally, because of Mike's guidance and mentorship, his warm smile and encouragement, and his introduction of the field of Image Processing and academia to myself, I have been doing something that I really enjoy for over thirty years.

This is typical of Mike, as a teacher and mentor, he smilingly gave simple answers with profound impact that can be life changing.
Thank you, Mike, for the life-changing moment. We will miss you greatly.

Horace Ip

IAPR Then and Now...Excerpt from

"Presidents Come and President's Go" by Michael Duff (Outgoing IAPR President)

IAPR Newsletter
Vol. 15 No. 2, February 1993

It is always dangerous to single out particular individuals to thank them but I must just record my gratitude to Dr. Gunilla Borgefors. Gunilla worked unceasingly, despite suffering considerable pain from a recent bicycle accident, and combined her efficient work as Secretary with a particularly productive period as Chairman of the Membership Committee, as a consequence of which we now have five new members (South Korea, Poland, Slovenia, Hong Kong and Czechoslovakia). My job as President was made much lighter and more enjoyable as a result of Gunilla's advice and support and I am very grateful to her.

My thanks to you all for your co-operation in the past eight years. I have enjoyed working for IAPR and I look forward to a continuing association with you and your various activities in the years to come.

IAPR Then and Now...Excerpt from

"Incoming President's Message" by J. K. Aggarwal

IAPR Newsletter
Vol. 15 No. 2, February 1993

I begin my tenure as Presidenot f IAPR in the foosteps of Michael Duff and Martin Levine, under whom I served as Treasureor f the Association. [...] I would like to take this opportunity to thank Michael and Martin for the excellent leadership that they provided over the past years. The programs they initiated are beginning to bear fruit, and the entire membership has benefited from their efforts.

Remembering Michael J. B. Duff

It was great working with Michael and Susan over the years. Prior to our involvement in the IAPR Executive Committee, I had the pleasure of attending a workshop on CLIP4 programming in London as well as a workshop in the town of Abingdon, near Oxford, both organized by Michael. With the CLIP4 project, at least, Michael was a pioneer in the field of parallel processing of images; it was an exciting time, and there was a wonderful community thanks in large part to Michael, who inspired many within his own group and among his colleagues at other institutions. I'll always remember him fondly.

Steve Tanimoto

I am very sad to hear the news.

Of course I remember Michael. He was a very friendly senior colleague when I served as Treasurer on the Executive Committee of IAPR. He was always helpful and available to help. He knew a lot about activities and roles of IAPR from which we all have benefited, even when he was not serving formally.

My condeleances go to his family.

Josef Bigun

It is really sad news to me, too.

I recall his wonderful leadership at the difficult time for IAPR when the Soviet Union collapsed. Also, I recall his great leadership and decision shown at the ExCo Meeting held urgently in Lausanne in 1991, to discuss on the possibility of moving the predetermined 12th ICPR in Jerusalem due to the Middle-east political uncertainty.

My sincere condolences to his family.

Masakazu Ejiri
2nd Vice President
when Michael Duff was president

I am indeed very sad to hear about Michael.

I worked with Michael in a variety of roles while he was President of IAPR and while I was President of IAPR. He was always very helpful and thought of the well being of the IAPR. We shall miss him.

My condolences to his family.

Jake (J. K. Aggarwal)

The many sessions of the BPRA (British Pattern Recognition Association) which Michael chaired, and those he spoke at, are a nostalgically pleasant memory for me.

I always found Michael a pleasant and likeable Chairman and host, and was deeply impressed by his taking on the challenge of designing not only pattern recognition algorithms but also the hardware to implement them.

Denis Rutovitz

Remembering Michael J. B. Duff

For many years, Mike was the driving force behind establishing a thriving UK computer vision and pattern recognition research community. His original initiative to establish a pattern recognition discussion group led to the creation in 1976 of the British Pattern Recognition Association (BPRA), which in 1990 merged with the Alvey Vison Club (AVC) to become the BMVA.

I joined the Organising Committee of the BPRA shortly after its formation, and found Mike a supportive colleague, who worked tirelessly for the benefit of our community. In those far off days, when general purpose computers were nowhere near powerful enough to tackle realistic image processing and analysis tasks, we shared an interest in specialised architectures for computer vision.

We worked on diametrically opposed approaches, but he was a generous and inclusive 'adversary', and I much enjoyed our many debates, both one-to-one, and at the series of international pattern recognition architecture symposia he organised. I was BPRA Chair in 1990, when the plan to merge Mike's 'baby' with the AVC emerged, and I particularly valued his constructive approach and support.

It's very sad to hear that he is no longer with us, and I for one would like to register my gratitude for everything he did for our community.

Chris Taylor

The CLIP4 image processor array was a remarkable invention. At a time when even relatively simple processing of an image on a general purpose computer could take several minutes, the CLIP4 was something entirely different.

After a year learning how to code for the CLIP4, travelling down from Edinburgh to UCL, floppy disc in hand, I was able to see the outline of my keys moving, in real-time, across the monitor screen. It was incredibly inspiring, and down to the genius and inventiveness of Mike Duff and his team.

Andrew Blake

Yes, the UK was quite advanced in that area at the time, with others. I remember examining a PhD with Mike and he was bemoaning the lack of continued funding. Then we ended up with the transputer, which was neat but with a serial link.

Mark Nixon

British Machine Vision Association Distinguished Fellow, 2000

The BMVA is very pleased to announce that its first Distinguished Fellow is Professor Michael Duff, FIEE, FIAPR, FRSA, from the Physics Department of University College London.

Professor Duff started his career as a physicist in the 1950s and, like most physicists of the time, he was spending his time looking at images of the bubble chamber, chasing exotic particles. Unlike most physicists, however, when it became obvious that the computers of the time were not powerful enough for anybody to do any serious image processing with them, he set off to build his own computer! Thus a brilliant career in computer architectures started. The first outcome of his work was UCPR1 in 1967, which was based on ideas evolving from studies of mammalian vision and in particular on models of the retinal architecture.

Over the following two decades, heading the UCL Image Processing Group, he developed these ideas with the series of eight increasingly complex multiprocessor systems, generally categorised as Cellular Logic Image Processors (CLIP0 to CLIP7), ranging from arrays of 25 to 9216 processors. One of these, CLIP4, was put into commercial production. The CLIP programme was given the British Computer Society Technical Award for 1985. In recent years, this project has developed into various studies of computer architectures based on nanoelectronics, funded by DARPA and the European Community.

During all this period, his work on computer architectures was accompanied by studies in parallel algorithm design and applications to real problems in applied image processing.

However, the contributions of Professor Duff do not stop here. In 1967 he founded a discussion group on Pattern Recognition, which in 1976 developed into the British Pattern Recognition Association. It was this Association which in the mid-1980s joined forces with the then Alvey Vision Club to form the BMVA as you know it today. Throughout all these years, Professor Duff has been working in raising the profile of the UK community in the international scene by being an active member of IAPR (to which BMVA is affiliated). He has served as the secretary of IAPR for four years and as its president from 1990 to 1992. He has been chairing or is member of various IAPR committees and for a few years from 1998 he was the IAPR newsletter editor.

BMVA this year proudly honours him with the Distinguished Fellow title.

https://britishmachinevisionassociation.github.io/fellowship/2000-duff.html

Remembering Michael J. B. Duff

I met Michael many times at BPRA and BMVA meetings, as well as at a NASI in Italy. I always found him to be very nice guy, archetypal academic and strongly community minded. I also met his brother once as he was admissions tutor for postgrads in particle physics at UCL.

I remember Josef mentioning that Michael got mugged and had his wallet snatched, maybe at the Barcelona IAPR.

John Illingworth

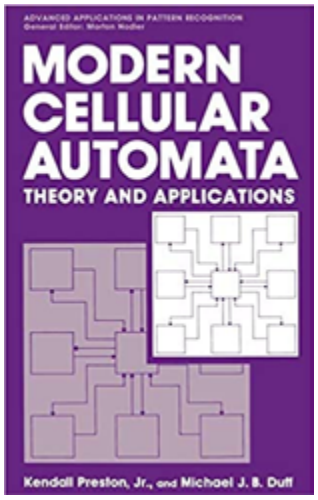
Editorial note:
The mention of a mugging piqued my curiosity, so I asked Josef Kittler to elaborate. His response is shared below.

~ Linda O'Gorman, IAPR Newsletter *Layout Editor*

I believe the incident happened at the Paris ICPR, but I am not 100% sure. My recollection is rather hazy.

Michael described how two men robbed him at the airport. They created an incident at the top of an escalator. One before him, and one immediately behind him. The guy before him dropped a newspaper on the floor and caused a pile up at the top of the escalator when picking it up. Michael fell over him, and the guy behind him landed on top of Michael, and used the commotion to pickpocket Michael's wallet. Michael was particularly dismayed because he apologised to the guy who pickpocketed him profusely for making him fall. Michael was not the only one from the conference affected. There was a team operating at the airport and targeted other travellers in exactly the same way.

Josef Kittler



I note you can still buy his book (one of his books?) on Amazon https://www.amazon.com/Modern-Cellular-Automata-Applications-Recognition/dp/0306417375/ref=sr_1_2?crid=18WKKDFR8UGT8&keywords=modern+cellular+automata+theory+and+applications&qid=1642711844&sprefix=modern+cellular+automata+theory++and+applications%2Caps%2C55&sr=8-2

Mark Nixon

Editorial note: Modern Cellular Automata *is also availale from SpringerLink,* https://link.springer.com/book/10.1007/978-1-4899-0393-8

I knew Mike initially through reputation: my post-doc work was in parallel image processing on the mini-DAP and his research into designing the Clip-4 and processing images on it was pretty much the only prior art.

I did come to know him a little better by doing a PhD viva with him at UCL, though I have no recollection now as to whose it was. I mostly remember sitting in the ludicrously large leather armchairs in UCL's senior staff common room and Mike's office and labs, which were around the corner from the main UCL campus. Mike was a really nice guy, making me feel confident as a PhD examiner even though I was a fairly new academic at the time.

Adrian Clark

I knew Mike Duff from the days of the BPRA when all the meetings took place at UCL.

He was also the external for my PhD viva.

Tim Ellis

Remembering Michael J. B. Duff

Editorial note:
For more than twenty years, Michael Duff participated one IAPR committee or another. Even before that, his technical accomplishments were noted.

On the following pages, we let the IAPR Newsletter *"Remember Michael J. B. Duff" through a samplling of excerpts from the archives.*

~ Linda O'Gorman, IAPR Newsletter *Layout Editor*

IAPR Then and Now...Excerpts from "NITPIC" by Martin D. Levine, Editor

IAPR Newsletter, Vol. 2 No. 3, November 1979

At the recent Workshop on High-Level Languages for Image Processing, some very excing new computer architectures for image processing were discussed. In particular, Dr. Michael Duff of Unlversity College, London is developing the CLIP 4 systen which will contain an array of nearly l-0,000 individual processors

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IAPR Newsletter, Vol. 4 No. 1, March 1981

A new book will soon be available entitled "Languages and Architectures for Image P:rocessing" edited by M.J.B. Duff of the University College of London and Levialdi of the Instituto di Cibernetica in Naples. The book will be published by the Academic Press

IAPR Then and Now...Excerpt from "FROM THE EDITORS DESK" by Josef Kittler
IAPR Newsletter, Vol. 9 No. 2, December 1986

In a moment of weakness, or unchecked enthusiasm for the good of the cause or perhaps just sheer insanity I submitted to IAPR Secretary's persuasive powers and agreed to take on the task of editing the IAPR Newsletter. It must have happened just when Prof Duff was telling me how he effortlessly ran a local parish magazine appearing once a month over a period of some six years, with a number of volunteers taking the full responsibility for the various sections of the journal, leaving him only the minor task of coordinating their efforts. I remember the feeling of slight embarrassment that came over me at that point for having initially resisted his approaches. For a while I even wondered. why a few months back I also resisted so vehemently to volunteer my services to fill the vacant post of Editor of the British Pattern Recognition Association Newsletter. My optimistic mood however did not last long. Soon after being formally appointed by Prof Sakai, past IAPR President, I contacted the former editor, Tony Reeves, to learn the ropes and to ask him about his sources of information and volunteer editorial and production staff. His reply turned out to be a thin envelope with a list of reports from Japan, a couple of calls for papers and a clear message: This is a one man show from start to finish.

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IAPR Then and Now...Excerpt from the *IAPR Newsletter* 40th Birthday Special Issue "Reflections of Former *IAPR Newsletter* Editors" by Anthony P. Reeves
IAPR Newsletter, Vol. 9 No. 2, July 2018

EiC: Why did you accept the offer / opportunity to become EiC?

APR: I read the first newsletter issue by my successor as editor Josef Kittler, and I found that his introduction to being invited to be editor was strikingly similar to my own of how "effortless" the task was to be. Although I can no longer be sure due the passage of time, I do believe that this encouragement came from the same source, the IAPR Secretary Dr. Michael Duff.

Remembering Michael J. B. Duff

Editorial note:
During his terms on the ExCo and with the "Forum" column when he was EiC of this newsletter, Prof. Duff shared his thoughts with and posed queestions of the IAPR Community. The introduction to his From the President letter sets the tone for his subsequent analysis. "Are We Getting Anywhere?" was also written during his presidency.

~ Linda O'Gorman, IAPR Newsletter *Layout Editor*

IAPR Then and Now...Excerpt from "From the President"
IAPR Newsletter, Vol. 13 No. 3, October 1990

Prof. M. J. B. Duff, IAPR President

When the Governing Board did me the undeserved honor of electing me President and, indeed, earlier, when I was asked if I would accept nomination for the post, it did cause me to think very hard as to whether there would be any positive contribution I could make to the Association's activities. Obviously, having served as Secretary for the last six years, under three former Presidents, I have had an unusually good opportunity to ovserve the Association at work and to note both its strengths and weaknesses. There really would be no excuse for me if I could not at least point to the problems and make a few suggestions as to how things might be improved.

IAPR Then and Now..."Are We Getting Anywhere?"
IAPR Newsletter, Vol. 14 No. 1, May 1991

I had occasion recently to take part in a meeting discussing trends in computer component development, the idea being to try to make informed guesses as to what would be around and useful in thirty years time. With this in mind, it seemed sense to look back thirty years as well. What did we see as the future in the early 1960s? As far as I was concerned, I was that time trying to build semi-automatic and fully automatic devices for making measurements on charged particle tracks in nuclear emulsions and the first paper I wrote on this topic (in 1959) did not even mention the word 'computer'; we had to build our own electronic or electromechanical devices if we wanted to compute.

Nevertheless, at about the same time, Frank Rosenblatt had designed his Perceptron, Stephen Unger had just published two papers on a two-dimensional mesh of processing elements(a precursor to the Connection Machine),W S. McCulloch et al had set people thinking with their well-known paper 'What the frog's eye tells the frog's brain' and Marcel Golay had filed a patent describing a lymphocyte counting device (using an image analysing principle, involving local neighbourhoods which was to be used in many subsequent machines). Thinking back to those days, I have the distinct impression that many of us believed that solving the technical problem of how to achieve fast data processing would almost inevitably lead to effective automatic vision systems, possibly by modelling the systems on what, as it turned out, were very sketchy ideas as to how mammalian vision actually worked.

Pick up any journal today that carries articles on image analysis, vision or whatever and you see much impressive mathematics, beautiful computer-generated images (especially from the fractal camp), sixteen new ways of extracting edges and a shaky old robotic trolley staggering shortsightedly around a factory floor. The question I would like to ask is: are we winning? To be completely cynical, is it a fair assessment to conclude that almost all practical applications of automated vision are at the 'almost good enough' level which means, in effect, 'not good enough'?

Our Association could render a valuable service by acting as a sort of shop window for real achievements in our field. Surely there must be some projects which have resulted in systems which work outside the laboratory in which they were developed, and not just on Tuesdays! Should we not be cataloguing these gems in our collection so that all the world can stand and admire? To be a little more serious, I would like to suggest that someone or some group should make a determined attempt to compile a register of well-engineered solutions to practical problems in applied automated image analysis/vision. Perhaps such a thing exists already; if so, I and I imagine others would like to hear about it. If not, then we need volunteers. I am sure the Editor would be happy to publish any ideas you may have about this matter.

Remembering Michael J. B. Duff

IAPR Then and Now..."IAPR Fellowship Awards October 1994"
IAPR Newsletter, Vol. 17 No. 1, January 1995

Michael Duff (President 1990-1992) having a good look at his Fellowship Certificate just given to him by Jake Aggarwal (President 1992-1994)

IAPR Then and Now...Excerpt from "Reminiscences of J. K. Aggarwal, IAPR Fellow, IAPR President 1992-94"
IAPR Newsletter, Vol. 33 No. 1, January 2011

I like to reminisce about a dinner while Michael Duff, IAPR Fellow, was President of IAPR and I was the Treasurer. We had a meeting of the Executive Committee in London. After the meeting, Michael and Susan Duff invited the Committee to their home for dinner. It was a great English dinner. Professor Steve Tanimoto, IAPR Fellow, and I really remember it well. It was very gracious and kind of Duffs to invite us all to their home.

IAPR Then and Now...Excerpt from "Reflections of Former IAPR Newsletter Editors" Michael Duff: 1999 Vol. 21 No. 1 to 2002 Vol. 24 No. 3
IAPR Newsletter, Vol. 40 No. 3, July 2018

Editor's note:

Michael and Susan Duff sent their greetings for this Special Issue of the *IAPR Newsletter* in the form of a recent photograph.

In addition to his four years as Editor of this newsletter, Michael had also served as the IAPR Secretary (1984-1990) and President (1990-92).

In 1992, the IAPR Secretariat was set up under Susan's superb management. She held that position until 2004.

~Arjan Kuijper

CALL for PAPERS
and Workshop and Tutorial Proposals

The 26th International Conference on Pattern Recognition

Montréal, Québec, Canada
August 21-25, 2022

https://iapr.org/icpr2022

Register papers via PaperCept prior to submission	PAPERS	WORKSHOPS	TUTORIALS	CHALLENGES
Registration deadline	Jan. 17, 2022			
Submission deadline	Jan. 24, 2022	Jan. 17, 2022	Mar. 14, 2022	Jan. 28, 2022
Acceptance/Rejection/Revision decision	Mar. 14, 2022	Feb. 14, 2022	Apr. 11, 2022	Feb. 11, 2022
Revision/rebuttal deadline	Apr. 11, 2022			
Final decision on submissions	May 9, 2022			
Camera ready manuscript deadline	Jun. 6, 2022	Jun. 6, 2022	Jun. 6, 2022	Jun. 6, 2022
Early bird registration deadline	Jun. 6, 2022	Jun. 6, 2022	Jun. 6, 2022	Jun. 6, 2022
Presentation dates	Aug. 22-25, 2022	Aug. 21, 2022	Aug. 21, 2022	Aug. 21, 2022

The International Conference on Pattern Recognition (ICPR) is the premier world conference in Pattern Recognition, covering both theoretical issues and applications of the discipline. ICPR 2022 solicits original research for publication in the main conference. Topics of interest include all aspects of Pattern Recognition, Computer Vision, and Image Processing.

General Chairs: Michael Jenkin (Canada), Cheng-Lin Liu (China), and Henrik I. Christensen (USA)	**Program Chairs:** Gregory Dudek (Canada), Zhouchen Lin (China), Ingela Nyström (Sweden), and Simone Marinai (Italy)

Workshop Chairs: Giovanni Farinella (Italy), Jonathan Wu (Canada), Laurence Likforman (France), and Xiang Bai (China)	**Tutorial Chairs:** David Clausi (Canada), Markus Enzweller (Germany), and Umapada Pal (India)	**Challenge Chairs:** Marco Bertini (Italy) and Dimosthenis Karatzas (Spain)

Topics of Interest by Track

Track 1: Artificial Intelligence, Machine Learning for Pattern Analysis

● classification and clustering ● statistical learning theory ● syntactic and structural pattern recognition ● neural network architectures and models ● graph models ● deep learning ● representation learning ● online learning and continual learning ● supervised, unsupervised, self-supervised and semi-supervised learning ● transfer learning and meta learning ● multi-modal and multi-view learning ● active and ensemble learning ● reinforcement learning ● compressed sensing and sparse representation ● large scale learning and big data ● recurrent networks, temporal models and non-feed-forward methods ● low-shot and long-tailed learning ● generative models ●

Track 2 : Computer Vision and Robotic Perception

● early and low-level vision ● stereo and 3D vision ● multiple view geometry ● object detection and recognition ● motion, tracking and video analysis ● deformable models and registration ● learning for vision ● scene analysis and understanding ● action and behavior recognition ● vision and language ● perception for autonomous navigation and/or driving ● vision for robotics, robot navigation and SLAM ● perceptually driven reinforcement learning ●

Track 3: Image, Video, Speech, and Signal Analysis

● sensor array and multichannel signal processing ● image and video processing ● enhancement, restoration and filtering ● segmentation, features and descriptors ● coding, compression and super-resolution ● speech and speaker recognition ● audio and acoustic processing ● computational photography ● models, representations, and techniques for image mining ● image analysis with ill-structured and spatial information ●

Track 4: Biometrics and Human-Machine Interaction

● hard biometrics: face, iris, fingerprint, palmprint ● soft biometrics: skin, hair, ear, vein, facial expression ● gait and behavior ● multi-biometrics ● person identification and re-identification ● human-robot interaction ● brain-computer interfaces ● social robotics ● human body motion and gesture-based interaction ● speech and natural language-based interaction ● affective computing ● surveillance and security ● ethics and fairness issues in the use of biometrics ●

Track 5: Document and Media Analysis

● text and symbol recognition ● handwritten text recognition ● document image analysis ● document understanding ● natural language processing ● scene text detection and recognition ● graphics recognition ● content based image retrieval and data mining ● visual question and answering ● multimedia document analysis ● media analysis for augmented and virtual reality ● multimodal fusion ● table detection, recognition, and structure extraction ● video text detection and recognition ● Human-document interaction ●

Track 6: Biomedical Image Analysis and Informatics

● data-driven modeling of clinical care ● clinical predictive modeling ● biostatistics ● biomedical imaging techniques ● quantitative microscopy ● medical image analysis ● interactive segmentation ● visualization and 3D printing ● medical applications ●

IAPR Ethical Requirements for Authors (*https://iapr.org/constitution/soe.php*)**:** IAPR requires that all authors wishing to present a paper declare that (1) The paper is substantially original and that no paper substantially similar in content has been submitted or will be submitted to any other conference or journal during the review period. (2) The paper does not contain any plagiarism. (3) The paper will be presented by the author or a co-author in person or online. (4) IAPR retains the right to eliminate any papers in violation of these requirements and to exclude the authors of such papers from future IAPR community activities.

In this issue:

IAPR TC4 Biometrics

http://iapr-tc4.org/

Zhenan Sun (National Laboratory of Pattern Recognition, China), Chair
Julian Fiérrez (Universidad Autónoma de Madrid, Spain), Vice Chair

IAPR TC4 organizes several imporant biometrics events each year as well as participating in the broader biometrics community. Please visit the website often for news, resources, and to contribute.

Winter School on Biometrics:
The IAPR/IEEE Winter School on Biometrics 2022 (*https://www.comp.hkbu.edu.hk/wsb2022/*) recently took place in Shenzhen, China. Look for the report in the next issue of the *IAPR Newsletter*.

Summer School on Biometrics: The 19th International Summer School for Advanced Studies on Biometrics for Secure Authentication: Continually Learning Biometrics (*http://biometrics.uniss.it/*) will be held in Alghero, Italy from June 6 to 10, 2022. Due to the current Sars-CoV-2 outbreak the Summer School will be held as a mixed mode event, allowing participation both in physical presence and remotely with videoconference connection. There will be two special keynote lectures from Prof. Anil Jain (Michigan State University) and Prof. Tomaso Poggio (MIT Mc Govern Institute for Brain Research). The application deadline is February 15, 2022.

IJCB 2022:
The 2022 International Joint Conference on Biometrics (*https://iapr.org/ijcb2022*) will be held in Abu Dhabi, United Arab Emirates from October 24 to October 27, 2022. This will be the first biometrics conference to be held in the Middle East. Abu Dhabi is the picturesque capital of UAE, an hour's drive away from Dubai. The deadline for paper submission is April 15, 2022.

More IAPR Technical Committee News

In this issue:

IAPR TC9 Pattern Recognition in Human Machine Interaction

https://iapr.org/tc9

Mariofanna Milanova (University of Arkansas Little Rock, USA), Chair
Xavier Alameda-Pineda (Inria Grenoble Rhône-Alpes, France), Vice Chair
Steering Board: Roland Goecke, Sumantra Dutta Roy, Stefan Scherer, Freidhelm Schwenker

The goal of this IAPR TC9 is to encourage research works in Multimodal Human-Computer Interaction at the intersection of Pattern Recognition, Spatial-Temporal Analysis, Psychology and Social Science.

Below is a summary of the committee current activities (December 31, 2021)

Call for papers for MDPI Interdisciplinary Topic (IDT) on Data Analytics and Machine Learning in Artificial Emotional Intelligence

MDPI is an Open Access Journal. This IDT is defined across 5 different MDPI Journals. Please check if your work fits to the call at https://www.mdpi.com/topics/emotional_AI. For more information contact Friedhelm Schwenker friedhelm.schwenker@uni-ulm.de

NVIDIA Deep Learning Workshops

TC-9 offers and delivers FREE organized by NVIDIA Deep Learning workshops, online classes and tutorials. The participants, after accomplishing the tasks, will receive the NVIDIA Certificate. Check out https://www.nvidia.com/en-us/training/online/. For more information contact: mgmilanova@ualr.edu

ACM Multimedia 2022 https://2022.acmmm.org/ Lisbon, Portugal October 20-14, 2022

We are involved in the organisation of ACM Multimedia 2022. After a long period of worldwide confinements and hardships this year we expect to welcome you all in Lisbo. We welcome submissions from several fields such as multimedia, multimedia retrieval, machine learning, artificial intelligence, vision, data sciences, HCI, multimedia signal processing, as well as healthcare, education, entertainment and beyond. For more information contact: xavier.alameda-pineda@inria.fr

Dynamical Variational Autoencoders (DVAE)

We have carried out a thorough technical overview of dynamical variational autoencoders (DVAE), which is a family of deep generative models with a combination of latent variables and internal dynamical models, implemented with deep neural networks and generalizing the variational autoencoder (VAE) to the modeling of sequential data. We investigated the related literature and unified a large set of models into the DVAE with an encompassing definition then studied the characteristics and properties of the models, reimplemented a number of them, and presented a practical benchmark in a long (175 pages) overview paper in Foundations and Trends in Machine Learning [1]. Another article more focused on speech signals appeared at Interspeech 2021 [2].

This investment is expected to have spinoffs in several of our methodological developments, since we are now equipped with a rich library of powerful models and have a much clearer comprehension of their properties. More information can be found here: https://team.inria.fr/robotlearn/dvae/; contact: xavier.alameda-pineda@inria.fr

[1] Girin, L., Leglaive, S., Bie, X., Diard, J., Hueber, T., & Alameda-Pineda, X. (2021). Dynamical Variational Autoencoders: A Comprehensive Review. Foundations and Trends in Machine Learning.
[2] Bie, X., Girin, L., Leglaive, S., Hueber, T., & Alameda-Pineda, X. (2021). A benchmark of dynamical variational autoencoders applied to speech spectrogram modeling. Conference of the International Speech Communication Association (Interspeech), Brno, Czech Republic, 2021.

In this issue:

IAPR TC12 Multimedia and Visual Information Systems

https://iapr.org/tc12

Hugo Jair Escalante (INAOE and CINVESTAV, China), Chair
Henning Müller (HES-SO, Sierre, Switzerland), Vice Chair
Sergio Esclara (University of Barcelona, Spain), Vice Chair
Albert Ali Salah (Utrecht University), Information Officer

The IEEE Conference on Automatic Face and Gesture Recognition 2021 (FG'21 http://iab-rubric.org/fg2021/)was organized fully virtually December 15-18. The conference had 142 accepted papers this year (a 35% acceptance rate), and over 250 attendees. Along with traditional sessions (including oral and poster papers, workshop, special session, doctoral consortium and keynotes), this year's conference featured an "Ask Me Anything" session with Rama Chellappa and Alex Pentland. Because of shifting conference schedules (due to COVID-19), FG will not be held in 2022, but FG'23 is scheduled for 13-17 May 2023, Guangzhou, China.

The GoodBrother EU H2020 COST project has published its first deliverable in the working group WG1, "Social responsibility: Ethical, legal, social, data protection and privacy issues". This report, "State of the art- on ethical, legal and social issues linked to audio and video based Ambient Assisted Living (AAL) solutions" can be freely downloaded at: https://goodbrother.eu/deliverables/

The aim of Goodbrother is to increase the awareness on the ethical, legal, and privacy issues associated with audio- and video-based monitoring and to propose privacy-aware working solutions for assisted living by creating an interdisciplinary community of researchers and industrial partners from different fields (computing, engineering, healthcare, law, sociology) and other stakeholders (users, policy makers, public services), stimulating new research and innovation.

The MediaEval 2021 Workshop was held between 13-15 December 2021, fully online. 12 different multimedia tasks were tackled in the three-day workshop, ranging from water quality assessment using social media resources to prediction and finding insights for wellbeing based on environmental factors, satellite remote sensing, social/news data etc.

The MediaEval Multimedia Evaluation benchmark offers tasks that are related to multimedia retrieval, analysis, and exploration. Participation is open to interested researchers who register. MediaEval focuses specifically on the human and social aspects of multimedia, and on multimedia systems that serve users. MediaEval tasks offer the opportunity for researchers to tackle challenges that bring together multiple modalities (visual, text, music, sensor data).

https://multimediaeval.github.io/editions/2021/

https://www.linkedin.com/groups/8109409/ https://twitter.com/IAPR_TC12

In this issue:

IAPR TC18 Discrete Geometry and Mathematical Morphology
http://www.tc18.org
Benjamin Perret (ESIEE Paris, France), Chair
Sara Brunetti (Università di Siena, Italy), Vice Chair
email: *tc18@tc18.org*

CALL for PAPERS

DGMM Strasbourg 2022

Second Internationlal Conference on Discrete Geometry and Mathematical Morphology

October 24-27, 2022
Strasbourg, France
https://dgmm2022.sciencesconf.org/

Paper submission deadline: April 11, 2022

DGMM 2022 will be the second joint event between the two main conference series of IAPR TC18, the International Conference on Discrete Geometry for Computer Imagery (DGCI) and the International Symposium on
Mathematical Morphology (ISMM).

DGMM offers the opportunity for researchers, students, and practitioners to share and discuss novel high quality research results within the fields of discrete geometry and mathematical morphology, and their applications to image processing and image analysis. Both theoretical and application-focused contributions related to these fields are welcome.

Main topics of interest include (but are not limited to):

Discrete Geometry and Combinatorial Topology; Image Segmentation and Discrete Shape Analysis; Algebraic Theory; Nonlinear Scale Space Theory; Random sets Theory and Geometrical Probability; (max,+)-Mathematics and Idempotent Analysis for Image and Signal Processing; Image Filtering; Computational Mathematical Morphology and Discrete Geometry; Learning based approaches to mathematical morphology and discrete geometry; Applications

Proceedings will be published in Springer's Lecture Notes in Computer Science (LNCS) series.

Full instructions for submitting papers and access to the submission system will soon be available on the conference website: *https://dgmm2022.sciencesconf.org/*

The Organizing Commitee:
Étienne Baudrier, Adrien Krähenbühl, Benoît Naegel, Mohamed Tajine
dgmm2022@icube.unistra.fr

In this issue:

IAPR TC19 Computer Vision for Cultural Heritage Applications

https://iapr.org/tc19

Guillaume Caron (Université de Picardie Jules Verne, France), Chair
Olga Regina Pereira Bellon (Universidade Federal do Parana, Brazil), Vice Chair
Takeshi Oishi (University of Tokyo, Japan), Webmaster
Advisors: Katsushi Ikeuchi, Roberto Scopigno, El Mustapha Mouaddib, and Takeshi Oishi

1) International workshop:

FAPER 2022 - https://sites.google.com/view/faper2022

After the success of the first edition, organized in conjunction with ICPR 2020, the 2nd "International Workshop on Fine Art Pattern Extraction and Recognition" (FAPER 2022) will be held within ICIAP! The aim of the workshop, organized by Gennaro Vessio (Univ. of Bari, Italy), Giovanna Castellano (Univ. of Bari, Italy), Fabio Bellavia (Univ. of Palermo, Italy), Sinem Aslan (Univ. of Venice, Italy and Ege Univ., Turkey), is to provide an international forum for those wishing to present advances in the state-of-the-art, innovative research, ongoing projects, and academic and industrial reports on the application of visual pattern extraction and recognition for a better understanding and fruition of fine arts. The workshop solicits contributions from diverse areas such as pattern recognition, computer vision, artificial intelligence and image processing. The venue will be the wonderful and culturally rich city of Lecce in Southern Italy in May 2022.

2) Special issue: deadline extension

Journal of Imaging

The special issue on "Computer Vision and Robotics for Cultural Heritage: Theory and Applications" (J. Imaging,), with TC19 chairs Guillaume Caron (UPJV, France and CNRS-AIST, Japan) and Olga Bellon (Univ. Federal do Parana, Brazil) as guest editors as well as Ilan Shimshoni (Univ. of Haifa, Israel), has extended its deadline due to several requests until **February 28th 2022**. No more extension will be considered.

Several articles are already in early access and others are under review.

You are invited to submit articles reporting new works within the multidisciplinary field of digital heritage, simultaneously contributing to computer and/or robot vision and digital heritage. Very few waived fee vouchers are still available for members of TC19 (new membership is of course possible). Please contact the guest editors before starting the submission.

Meeting Reports
ICDAR 2021 Section

In this section:

ICDAR 2021 The 16th International Conference on Document Analysis and Recognition

September 5-10, 2021, Lausanne, Switzerland

iapr.org/icdar2021

General Chairs:

Andreas Fischer, University of Applied Sciences and Arts Western Switzerland

Rolf Ingold, University of Fribourg, Switzerland

Marcus Liwicki, Luleå University of Technology, Sweden

by the General Chairs

ICDAR is the premier international event for scientists and practitioners involved in document analysis and recognition, a field of growing importance in the current age of digital transition. In 2021, the 16th edition of this flagship conference was held from September 5-10 in Lausanne, Switzerland.

Organizing an international conference of significant size during the COVID-19 pandemic, with the goal of welcoming at least some of the participants physically, is similar to navigating a rowboat across the ocean during a storm. Fortunately, we were able to work together with partners who have shown a tremendous amount of flexibility and patience including, in particular, our local partners, namely the Beaulieu convention center in Lausanne, EPFL, and Lausanne Tourisme, and also the international ICDAR advisory board and IAPR-TC 10/11 leadership teams who have supported us not only with excellent advice but also financially, encouraging us to setup a hybrid format for the conference.

We were not a hundred percent

sure if we would see each other in Lausanne but we remained hopeful, together with almost half of the attendees who registered for on-site participation. We relied on the hybridization support of a motivated team from the Luleå University of Technology during the pre-conference, and professional support from Imavox during the main conference, to ensure a smooth connection between the physical and the virtual worlds. Indeed, our welcome is extended especially to all our colleagues who were not able to travel to Switzerland this year. We hope you had an exciting virtual conference week, and look forward to seeing you in person again at another event of the active DAR community.

With ICDAR 2021, we stepped into the shoes of a longstanding conference series, which is endorsed by IAPR-TC 10/11 and celebrates its 30th anniversary this year with the 16th edition. The very first ICDAR conference was held in St. Malo, France in 1991, followed by Tsukuba, Japan (1993), Montreal, Canada (1995), Ulm, Germany (1997), Bangalore, India (1999), Seattle, USA (2001), Edinburgh, UK (2003), Seoul, South Korea (2005), Curitiba, Brazil (2007), Barcelona, Spain (2009), Beijing, China (2011), Washington DC, USA (2013), Nancy, France (2015), Kyoto, Japan (2017), and Syndey, Australia (2019).

The attentive reader may have remarked that this list of cities includes several venues for the Olympic Games. This year the conference was be hosted in Lausanne, which is the headquarters of the International Olympic Committee. Not unlike the athletes who were recently competing in Tokyo, Japan, the researchers profited from a healthy spirit of competition, aimed at advancing our knowledge on how a machine can understand written communication. Indeed, following the tradition from previous years, 13 scientific competitions were held in conjunction with ICDAR 2021 including, for the first time, three so-called "long-term" competitions addressing wider challenges that may continue over the next few years.

Other highlights of the conference included the keynote talks given by Masaki Nakagawa, recipient of the IAPR/ICDAR Outstanding Achievements Award (see related article in this issue), and Mickaël Coustaty, recipient of the IAPR/ ICDAR Young Investigator Award, as well as our distinguished keynote speakers Prem Natarajan, vice president at Amazon, who gave a talk on "OCR: A Journey through Advances in the Science, Engineering, and Productization of AI/ML", and Beta Megyesi, professor of computational linguistics at Uppsala University, who elaborated on "Cracking Ciphers with 'AI-in-the-loop': Transcription and Decryption in a Cross-Disciplinary Field".

A total of 340 publications were submitted to the main conference, which was held at the Beaulieu convention center during September 8-10, 2021. Based on the reviews, our Program Committee chairs accepted 40 papers for oral presentation and 142 papers for poster presentation. In addition, nine articles accepted for the ICDAR-IJDAR journal track were presented orally at the conference and a workshop was integrated in a poster session. Furthermore, 12 workshops, 2 tutorials, and the doctoral consortium were held during the pre-conference at EPFL during September 5-7, 2021, focusing on specific aspects of document analysis and recognition, such as graphics recognition, camera-based document analysis, and historical documents (see workshop reports in this section).

The conference would not have been possible without hundreds of hours of work done by volunteers in the organizing committee. First of all, we would like to express our deepest gratitude to our Program Committee chairs, Joseph Lladós, Dan Lopresti, and Seiichi Uchida, who oversaw a comprehensive reviewing process and designed the intriguing technical program of the main conference. We are also very grateful for all the hours invested by the members of the Program Committee to deliver high-quality peer reviews. Furthermore, we would like to highlight the excellent contribution by our publication chairs, Liangrui Peng, Fouad Slimane, and Oussama Zayene, who negotiated a great online visibility of the conference proceedings with Springer and ensured flawless camera-ready versions of all publications. Many thanks also to our chairs and organizers of the workshops, competitions, tutorials, and the doctoral consortium for setting up such an inspiring environment around the main conference. Finally, we are thankful for the support we have received from the sponsorship chairs, from

our valued sponsors, and from our local organization chairs, which enabled us to put in the extra effort required for a hybrid conference setup.

Our main motivation for organizing ICDAR 2021 was to give practitioners in the DAR community a chance to showcase their research, both at this conference and its satellite events. Thank you to all the authors for submitting and presenting your outstanding work. We sincerely hope that you enjoyed the conference and the exchange with your colleagues, be it on-site or online.

ICDAR 2021 AWARDS

2021 IAPR/ICDAR Outstanding Achievements Award

Masaki Nakagawa

"for his outstanding contributions in online handwriting beyond the Latin Alphabet, early integration of handwriting recognition in practically useful systems, and his excellent contributions for the ICDAR community, connecting us with Industry in Asia."

2021 IAPR/ICDAR Young Investigator Award

Mickaël Coustaty

"for his notable contributions in developing systems for historical documents processing and his dedicated commitment to the document analysis community."

IAPR/ICDAR 2021 Best Paper Award:
Weihong Lin, Qifang Gao, Lei Sun, Zhuoyao Zhong, Kai Hu, Qin Ren and Qiang Huo for their paper "ViBERTgrid: A Jointly Trained Multi-Modal 2D Document Representation for Key Information Extraction from Documents"

Itesoft/yooz ICDAR 2021 Best Student Paper Award:
Alexander Mattick, Martin Mayr, Mathias Seuret, Andreas Maier and Vincent Christlein for their paper "SmartPatch: Improving Handwritten Word Imitation with Patch Discriminators"

IAPR/ICDAR 2021 Best Industry Related Paper Award:
Łukasz Garncarek, Rafał Powalski, Tomasz Stanisławek, Bartosz Topolski, Piotr Halama, Michał Turski and Filip Graliński for their paper "LAMBERT: Layout-Aware Language Modeling for Information Extraction"

Liang Qiao, Zaisheng Li, Zhanzhan Cheng, Peng Zhang, Shiliang Pu, Yi Niu, Wenqi Ren, Wenming Tan and Fei Wu for their paper "LGPMA: Complicated Table Structure Recognition with Local and Global Pyramid Mask Alignment"

IAPR/ICDAR 2021 Best Poster Award:
Wenqi Zhao, Liangcai Gao, Zuoyu Yan, Shuai Peng, Lin Du and Ziyin Zhang for their paper "Handwritten Mathematical Expression Recognition with Bidirectionally Trained Transformer"

Zhenzhou Zhuang, Zonghao Liu, Kin-Man Lam, Shuangping Huang and Gang Dai for their paper "A New Semi-Automatic Annotation Model via Semantic Boundary Estimation for Scene Text Detection"

ICDAR WORKSHOPS

14th Workshop on Graphics RECognition (GREC) • 9th Camera-Based Document Analysis & Recognition (CBDAR) • 6th Workshop on Historical Document Imaging and Processing (HIP) • 4th Workshop on Arabic and Derived Script Analysis and Recognition (ASAR) • 3rd Workshop on Computational Document Forensics (IWCDF) • 3rd Workshop on Furture of Document Analysis and Recognition (FDAR) • 3rd Workshop on Machine Learning (WML) • 3rd Workshop on Open Services and Tools for Document Analysis (ICDAR-OST) • 2nd Industrial Applications of Document Analysis & Recognition (WIADAR) • 1st Workshop on Computational Paleography (Paleo)• 1st Workshop on Document Images and Language (DIL) • 1st Workshop on Document Visual Question Answering (DocVQA) • 1st Workshop on Graph Representation Learning for Scanned Document Analysis (GLESDO)

14th IAPR International Workshop on Graphics Recognition

September 5, 2021, Lausanne, Switzerland
https://iapr.org/grec2021

General chair
Jean-Christophe BURIE – La Rochelle Université, France

Program Chairs:
Richard Zanibbi – Rochester Institute of Technology, USA
Motoi Iwata – Osaka Prefecture University, Japan
Pau Riba – Universitat Autònoma de Barcelona, Spain

by the General Chairs

The GREC workshops provide an excellent opportunity for researchers and practitioners at all levels of experience to meet colleagues and to share new ideas and knowledge about graphics recognition methods. The workshops enjoy strong participation from researchers in both industry and academia.

Graphics Recognition is a subfield of document image analysis that deals with graphical entities in engineering drawings, comics, musical scores, sketches, maps, architectural plans, mathematical notation, tables, diagrams, etc. The aim of this workshop is to maintain a very high level of interaction and creative discussions between participants, maintaining a "workshop" spirit, and not being tempted by a "miniconference" model.

The workshop comprised several sessions dedicated to specific topics related to graphics in document analysis and graphic recognition. Each session began with an introductory talk by the session chairs describing the state-of the- art, putting the presented talks in a more global perspective, and stating the current open challenges of session topics. Then this was followed by a number of short talks, proposing solutions to some of the questions or presenting results of the speaker's work. Each session was concluded by a panel discussion.

Previous GREC workshops were held at Penn State University (USA, 1995), Nancy (France, 1997), Jaipur (India, 1999), Kingston (Canada, 2001), Barcelona (Spain, 2003), Hong Kong (China, 2005), Curitiba (Brazil, 2007), La Rochelle

(France, 2009), Seoul (South Korea, 2011), Lehigh University (USA, 2013), Nancy (France, 2015), Kyoto (Japan, 2017), Sydney (Australia, 2019).

For this 14th edition of GREC, the authors had the opportunity to submit short or long papers depending of the maturity of their research. We selected 12 papers from 8 different countries, 9 long papers and 3 short papers. Each submission was reviewed by two experts. We would like to take this opportunity to thank the program committee members and sub-reviewers for their meticulous efforts.

For this edition, a great keynote titled “All about Free-Hand Sketch” was given by Prof. Timothy Hospedales from University of Edinburgh. he shared with us his work on sketch recognition. We also organized two general discussions between participants. The topic of the first one was “Graphic Recognition and Creativity” where we try to answer to the question: “How can graphics recognition facilitate creativity” ? The second discussion was about “Data for Handwritten Graphics Recognition”. Nowadays, data became a major element in the recognition process. Participants shared their opinion on the question: “How can we generate large annotated corpora for handwritten/hand-drawn graphics recognition” ?

Due to the health situation, the workshop was organized as a hybrid event. Despite these complicated conditions, we welcomed around 50 people on site and more than 60 participants attended to the event online.

GREC 2021 was once again a successful event where researchers working on Graphic Recognition shared their work in this area of research.

Full access to the program and list of presented papers is available from the GREC 2021 website (https://iapr.org/grec2021/). Accepted papers have been published in the ICDAR proceedings.

IAPR Then and Now...
Workshop on Graphics Recignition (GReC'97)
IAPR Newsletter Vol. 20 No. 1, January 1988

Workshop on Graphics Recognition (GREC'97)

August 22-23, 1997 Nancy, France

Around 60 persons from 16 different countries attended this event, which was organised by IAPR TC-10. The largest national groups came from the USA and France (15 persons each), followed by Japan (7 particpants). Around 40 participants came from academicvinstitutions(universities, research centres) and around 20 from industry or other organisations.

The scientific program was organised into six topical sessions: vectorisation and separation, interpretation of engineering drawings, recognition of business graphics and forms, analysis of maps, diagrammes and symbol recognition, and performance evaluation. Each session started with an introduction to the state of the art of the addressed topic by a leading scientist. This was followed by short, to-the-point presentations of the technical contributions. Each session was concluded by an open 25 minutes panel discussion, where conclusions were drawn for the different topics and the audience interacted with the speakers and with each other.

These discussions were of high quality, and we had several thorough exchanges on the big challenges in graphics recognition.

An international graphics recognition contest was also organised during the workshop. This contest aimed at testing the participants' ability to segment text from graphics and to recognise graphical primitives such as lines, arcs, and circles, both solid and dashed. Three commercial software packages and one academic software package participated in this contest.

In addition to the proceedings of the workshop [...], we are preparing a book which will include a selection of articles in revised form, reports from the panel discussions and from the contest, etc. This book will be published by Springer Verlag in the Lecture Notes in Computer Science series, and should come out in Spring 1998.

These days gave also the opportunity to have useful and rich exchanges on an informal basis, during lunches, coffee breaks and social events.

At the end of the workshop, it was decided that the next workshop would be held in connection with ICDAR'99, somewhere in India.

KarI Tombre,
LIVRIA Lorraine & CRIN/CNRS

CBDAR 2021

ICDAR 2021 Workshop on Camera-Based Document Analysis and Recognition

September 6, 2021, Lausanne, Switzerland

website: *https://cbdar2021.univ-lr.fr* **twitter:** *https://twitter.com/cbdar_workshop*

Workshop Organizers:

Muhammad Muzzamil Luqman, L3i Laboratory, La Rochelle University, France
Sheraz Ahmed, DFKI, Kaiserslautern, Germany

by Muhammad Muzzamil Luqman

The CBDAR community aims to move away from the comfort zone of scanned paper documents and to investigate the innovative ways of capturing and processing both paper documents and other types of human-created information in the world around us. Over the last one and a half decades since the first edition of CBDAR in 2005, the research focus has shifted many times, but the CBDAR workshop's mission—to provide a natural link between document image analysis and the wider computer vision community by attracting cutting edge research on camera-based document image analysis—has remained very relevant.

CBDAR 2021 received eight submissions, coming from four countries (Brazil, India, Japan, USA). The Program Committee comprised 12 renowned and expert researchers of the community. Each submission was carefully reviewed by three expert reviewers, and six papers were selected for presentation in the workshop (an acceptance rate of 75%). The participation of attendees from both academia and industry has always remained an essential aspect of CBDAR workshops, and the program of this 9th edition was carefully crafted to appeal to both. For CBDAR 2021, there were six oral presentations in two oral sessions plus a keynote talk by Professor Koichi Kise (Osaka Prefecture University, Japan) on the topic of "Beyond Camera-Based Document Analysis and Recognition: Towards Camera-Based Human Document Interactions".

The CBDAR 2021 best paper award, with a cash prize from the MDPI Journal of Imaging, was presented to the paper titled "Transfer Learning for Scene Text Recognition in Indian Languages" by Sanjana Gunna, Rohit Saluja and C.V. Jawahar.

CBDAR 2021 was a half day event with a possibility of both onsite and online participation. The workshop was very well attended, both online and on-site at EPFL Lausanne (Switzerland). Despite many parallel workshops and the COVID restrictions, there was an average presence of around 30 participants during different sessions.

The proceedings of CBDAR 2021 are available with the ICDAR 2021 proceedings, and the presentation slides of keynote & oral presentations are available on the CBDAR 2021 website. A photo timeline from CBDAR 2021 is available on the CBDAR twitter handle. Readers of this report are invited to follow us on twitter (@cbdar_workshop) to stay informed about CBDAR workshops.

We would like to thank all the reviewers for their meticulous reviewing efforts and for their participation in selection of the best paper award. We would also like to thank the MDPI Journal of Imaging for sponsoring the CBDAR 2021 best paper award and the European Regional Development Fund Program "Interreg Atlantic Area Program in the framework of the CircularSeas Project" for supporting the successful organization of CBDAR 2021. Last but not least, a big thanks to the local organizers for facilitating the successful organization of the workshop.

HIP 2021
6th International Workshop on Historical Document Image Processing

September 6, 2021, Lausanne, Switzerland
website: *https://blog.sbb.berlin/hip2021/*

General Chair:
Apostolos Antonacopoulos, PRImA Research Lab, University of Salford, UK

Honorary Chair:
William Barrett, Brigham Young University, Utah, USA

Program Chairs:
Maud Ehrmann, EPFL CDH DHI DHLAB
Christian Clausner, PRImA Research, U. Salford, UK

Organizing Chair:
Clemens Neudecker
Berlin State Library, Germany

by the Workshop Chairs

HIP'21 followed the tradition of previous editions that took place in Beijing (2011), Washington (2013), Nancy (2015), Kyoto (2017) and Sydney (2019), with one difference: the workshop took place in a hybrid mode due COVID-19 travel restrictions. Despite this context, interest in HIP'21 remained as high as in previous editions, with up to 100 delegates online and 30 on site.

Papers presenting original research in the general field of analysis and processing of historical documents were solicited for the scientific programme, ranging from optical character recognition—including on ancient languages—and document segmentation to handwriting recognition and table processing. The quality of submitted papers was very impressive. Out of 30 submissions 12 were accepted for presentation at the workshop and included in the proceedings. The 30 papers submitted represented thirteen different countries with 111 authors in total: Argentina (1), Canada (1), China (2), Czechia (3), France (32), Germany (17), Israel (3), Russia (6), Sweden (3), Switzerland (16), Turkey (2), United Kingdom (9), and the USA (18). Each submitted paper was carefully peer-reviewed by two to three researchers in the field from the equally internationally diverse programme committee.

Machine learning, such as convolutional and recurrent neural networks, continued to be an important topic in the submissions. Related to this were submissions on training with mixed sources and on the release of various open-access annotated datasets. Finally, it could be observed that research has become much more diverse with regard to covered languages and scripts as the field evolves.

As in previous years, the HIP'21 proceedings have been published in the ACM Digital Library and are now available at *https://dl.acm.org/doi/proceedings/10.1145/3476887*.

The workshop programme (single track, all oral presentations) included four sessions on Optical Character Recognition, Segmentation, Datasets & Databases and Methods & Models, as well as a discussion round on challenges and trends in the field. A number of authors shared their presentation slides which are now available at *https://blog.sbb.berlin/hip2021/#program* together with the online live questionnaire results (AhaSlides). Sadly, the half-day cultural visit had to be cancelled due to COVID-19 restrictions.

We would like to thank all authors, reviewers, participants and everyone else who had a hand in HIP'21. Special thanks go out to the sponsor FamilySearch for their generous and continued support of the HIP workshop series as well as the ICDAR 2021 organisers for taking care of the local and virtual arrangements and general coordination with the main conference.

ASAR 2021

ICDAR 2021 Workshop on Arabic and derived Script Analysis and Recognition (4th ed.)

September 6, 2021, Lausanne, Switzerland
https://asar2021.wixsite.com/home

Organizing Committee:
Adel M. Alimi, University of Sfax, Tunisia
Bidyut Baran Chaudhur, Indian Statistical Institute, Kolkata, India
Fadoua Drira, University of Sfax, Tunisia
Tarek M. Hamdani, University of Monastir, Tunisia
Amir Hussain, Edinburgh Napier University, Scotland, UK
Imran Razzak, Deakin University, Australia

ASAR 2021 was organized by the REGIM Lab (University of Sfax, Tunisia).

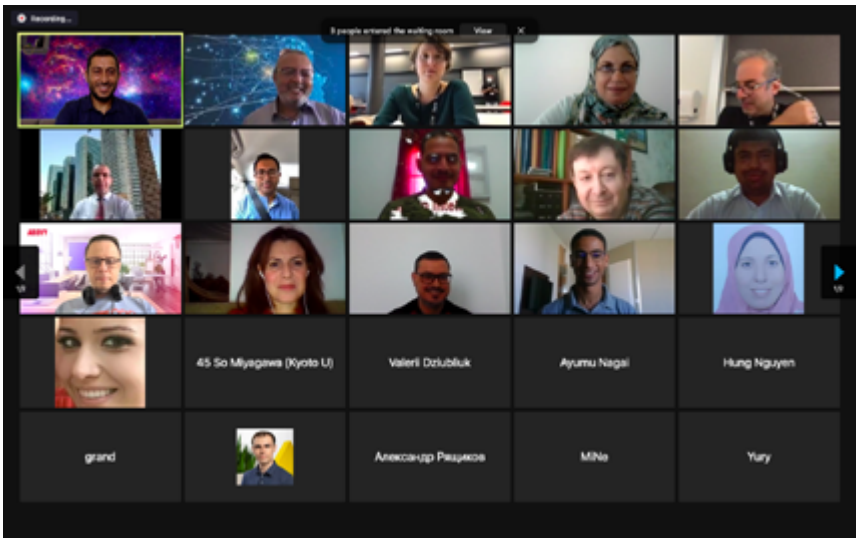
The ASAR workshops provide an excellent opportunity for researchers and practitioners at all levels of experience to meet colleagues and to share new ideas and knowledge about Arabic and derived script document analysis and recognition methods. The workshop enjoys strong participation from researchers in both industry and academia.

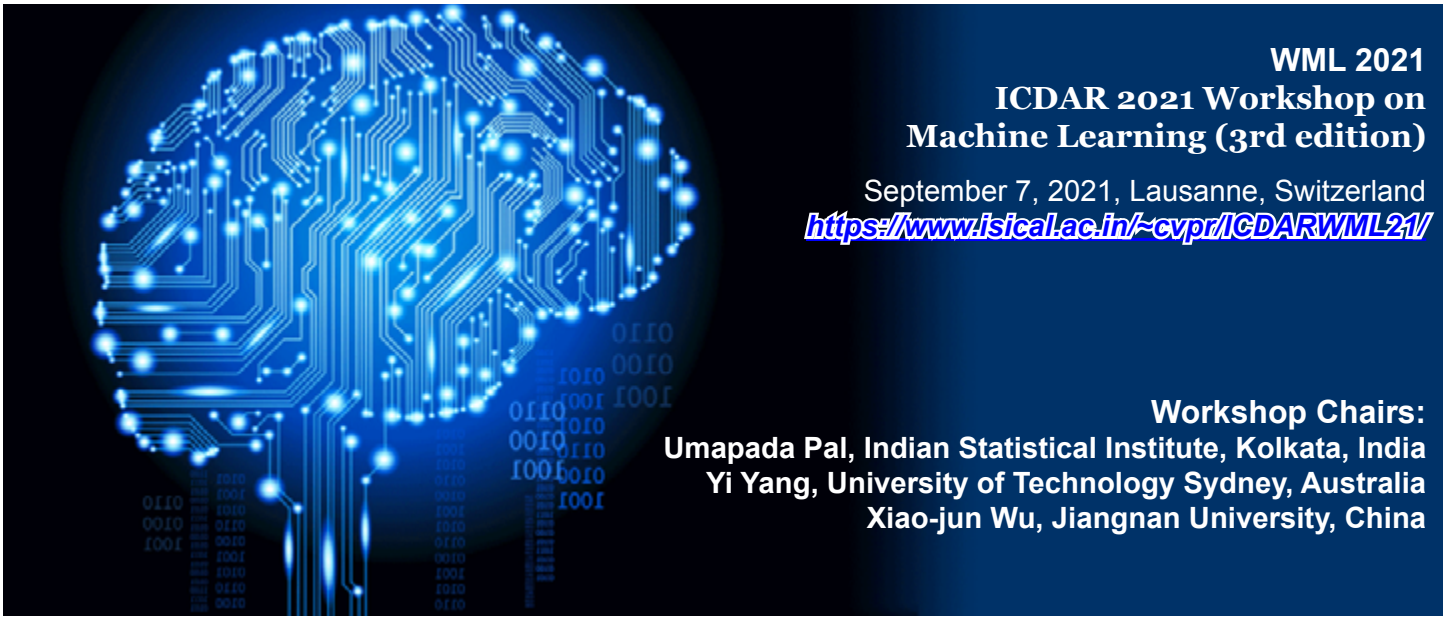
In this 4th edition of ASAR we received 16 submissions, coming from 10 different countries. Each submission was reviewed by three expert reviewers. The Program Committee of the workshop comprised 21 members, that generated a total of 42 reviews. We would like to take this opportunity to thank the program committee members and sub-reviewers for their meticulous reviewing efforts!

Taking into account the recommendations of the Program Committee members, we selected 10 papers for presentation in the workshop, resulting in an acceptance rate of 62.5%.

We have included in this edition of ASAR a Keynote Speech, by Dr. Sourour Njah and Dr. Houcine Boubaker form the University of Sfax, Tunisia, “Deep On-line Handwriting Analysis based on Beta Elliptic Strokes and Fuzzy Perceptual Codes Transformers”. We would also like to thank the organizations that have supported us, especially the ICDAR organizers.

We hope you enjoyed the workshop and we were very happy to welcome you to the 4th edition of the International Workshop on Arabic and derived Script Analysis and Recognition in Lausanne on September 6th!





In order to facilitate innovative collaboration and engagement between the document analysis community and other research communities such as computer vision and images analysis, etc., this ICDAR Workshop on Machine Learning (WML) was organized online from Lausanne, Switzerland on September 7, 2021, before the ICDAR 2021 main conference, and this was the 3rd edition of this workshop.

The first WML was held in Osaka, Japan, in 2017, and the 2nd one in Sydney, Australia, in 2019. This workshop provides an excellent opportunity for researchers and practitioners at all levels of experience to meet colleagues and to share new ideas and knowledge about machine learning and its applications in document analysis and recognition.

The workshop continues to enjoy strong participation from researchers in both industry and academia. More than 60 participants attended WML 2021 in online mode, whereas more than 100 participants attended WML-2019 workshop physically in 2019.

In this 3rd edition of ICDAR WML we received 18 submissions, coming from 13 countries. Each submission was reviewed by at least two expert reviewers (a total of 61 reviews for 18 submissions, an average 3.38 reviews per paper).

The Program Committee of the workshop comprised of 34 members from 16 countries of the world. Taking the recommendations of the Program Committee into account, we selected 12 papers for presentation in the workshop.

The workshop was a one day program with 12 oral paper presentations and two keynote talks. The keynote talks were delivered by two well-known researchers:

- Prof. Yi Yang of Faculty of Engineering and Information Technology, University of Technology Sydney (UTS), Australia. Title of this keynote was 'Visual Understanding from Video Data'.
- Dr. Xiaojun Chang of Department of Data Science and AI, Faculty of Information Technology, Monash University Clayton Campus, Australia. Title of this keynote was 'Efficient Neural Architecture Search'.

The proceedings of the workshop was published by Springer in the Lecture Notes in Computer Science book series (LNCS 12917).

We would like to take this opportunity to thank all of the researchers who have shown interest in this workshop by contributing papers. We also thank our Program Committee Chairs and members for their time and effort in reviewing submissions. Finally, we wish to thank all other members of the workshop.

ICDAR-OST 2021
3rd International Workshop on Open Services and Tools for Document Analysis

September 5, 2021, Lausanne, Switzerland

Workshop Chairs:

Fouad Slimane, University of Fribourg, Switzerland
Lars Vögtlin, University of Fribourg, Switzerland
Oussama Zayebe, iCoSys–Institut des systems complexes–HES-SO//Fribourg, Switzerland

by Lars Vögtlin

ICDAR-OST 2021 was held in hybrid mode in conjunction with the ICDAR 2021; The previous edition in Sydney (2019).

The ICDAR-OST workshop was a great opportunity for researchers to meet colleagues and to share new ideas and knowledge about open-services and tools. In Lausanne, we were happy to welcome over 10 participants in person and 30 online to the workshop.

Thanks to the 20 members of the program committee, each submitted paper was carefully peer-reviewed by two to three knowledgeable researchers. Six papers were submitted from different countries of which two papers were accepted. They were presented in two oral sessions spread over half a day. An interesting keynote speech about recent research was given by Dr. Marcel Gygli (Fachhochschule Nordwestschweiz FHNW, Switzerland), followed by highly interactive discussions.

At the end of the Workshop we had a very stimulating discussion led by Marcel Gygli, whom we want to thank again at this point.

ICDAR-OST'21 was, thanks to the participants, a highly interactive workshop with many fruitful discussions concerning open-services and tools.

IAPR Then and Now...
Forthcoming Conferences, Workshops and Events
IAPR Newsletter Vol. 14 No. 2, August 1991

Date	Event	Location	Contact [Sponsor]
4-6 Sep 1991	The Sixth International Conference on Image Analysis and Processing	Villa Olmo, Lake Como, Italy	[conference address]
17-19 Sep 1991	4th International Conference on Computer Analysis of Images and Patterns (CAIP'91)	Dresden, Germany	Conference Secretariat, CAIP 91
23-27 Sep 1991	Second International Workshop on Frontiers in Handwriting Recognition	Bonas, France	Prof. Sebastiano Impedovo
24-26 Sep 1991	British Machine Vision Conference (BMVC91)	Glasgow, UK	Tanya Oliver (BMVC91)
30 Sep-2 Oct 1991	First International Conference on Document Analysis and Recognition	Saint-Malo, France	Prof. Guy Lorette (Conference Chairman)
4-6 Dec 1991	Digital Image Computing: Techniques and Applications (DICTA-91)	Melbourne, Australia	Australian Pattern Recognition Society (APRS)
9-14 Feb 1992	Impage Processing—Implementations and Systems	San Jose, California, USA	SPIE
7-9 Apr 1992	4th International Conference on Image Processing and its Applications	Maastricht, The Netherlands	IPA Secretariat
30 Aug-3 Sep 1992	11th International Conference on Pattern Recognition	The Hague, The Netherlands	11th ICPR Secretariat, Delft University of Technology

WIADAR 2021
2nd Wksh on Industrial Applications of Doc. Analysis and Recognition

September 9, 2021, Lausanne, Switzerland

A workshop of posters showcasing industrial achievements in the field of Document Analysis

Organizing Chairs:
Elisa Barney Smith, Boise State University, USA
Vincent Poulain d'Andecy, Yooz, France
Hiroshi Tanaka, Fujitsu Limited, Japan

by the Organizing Chairs

WIADAR is an effort to make information about innovative industrial applications available to the general ICDAR attendee.

There is a lot of innovative work being conducted in industry, or in public administrations, or in universities in partnership with industry or public administrations. Usually, the aim of applied research for industrial innovation is to break through two main dimensions: performance (highest success with lowest critical error, together with specific constraints) and the user scope (application to a new domain, ability to adapt the application to another domain with a null or minimized effort). Hence, the nuance is that scientists target the methodology (how) when industrial fellows target the application (what).

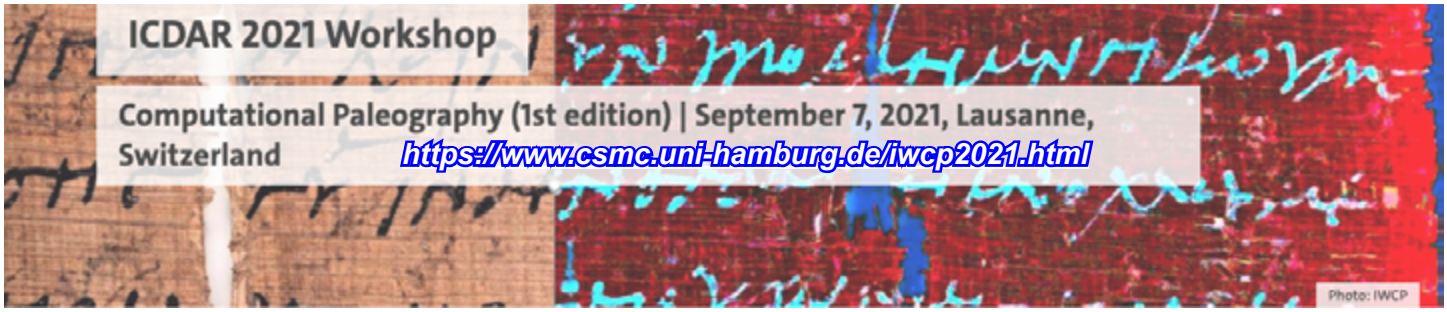
Most applied research reuses, combines, tunes and trains existing methods with the advantage of accessing large corpuses of data. Industrial researchers either adapt or create methods with scientific innovations, but also with heuristics, workarounds, shortcuts, and whatever can to pragmatically reach the target for an acceptable scope. Furthermore, we recognize that when industrial researchers create a real novel approach, the business strategy in industrial competition prevents disclosure of the information. Hence, that applied research might not be able to be submitted at ICDAR.

All these works are of interest to attendees of ICDAR, because experiments with large real-life datasets provide pragmatic feedback on technologies. They really demonstrate the state- of-the-art limitations, infer a ranking of technology performances and, both workarounds or optimizations may point out some new perspectives needed for research. In addition, it highlights end-user problems and needs. i.e. It may infer academic perspectives. We do believe that, even if an application is not scientifically original or not clearly described, the result status and discussions around this method have a strong value for ICDAR attendees.

The Workshop was 100% poster format. It had nine submissions resulting in five accepted posters. two of the posters were onsite, the others were fully virtual.

We hope we will continue this new tradition with a 3rd instance of WIDAR held as a satellite workshop to ICDAR 2023 in San Jose. We encourage all industrial researchers to participate.

ONSITE POSTERS



General Chairs:
Isabelle Marthot-Santaniello, Universität Basel, Basel, Switzerland
Hussein Mohammed, Universität Hamburg, CSMC, Hamburg, Germany

Computational paleography is an emerging field investigating new computational approaches for analyzing ancient documents. Paleography, understood as the study of ancient writing systems (scripts and their components) as well as their material (characteristics of the physical inscribed objects), can benefit greatly from recent technological advances in computer vision and instrumental analytics.

Computational paleography, being truly interdisciplinary, creates opportunities for experts from different research fields to meet, discuss, and exchange ideas. Collaborations between manuscript specialists in the humanities rarely overcome the chronological and geographical boundaries of each discipline. However, when it comes to applying optical, chemical, or computational analysis, these boundaries are often no longer relevant.

Computer scientists are keen to confront their methodologies with actual research questions based on solid data. Natural scientists open new perspectives by focusing on the physical properties of the written artefacts. In many cases, only a collaboration between experts from the three communities can yield significant results.

In this workshop, we aimed to bring together specialists from the different research fields analyzing handwritten scripts on ancient artefacts. It mainly targeted computer scientists, natural scientists, and humanists involved in the study of ancient scripts. By fostering discussion among the three communities, it facilitated future interdisciplinary collaborations that tackle actual research questions on ancient manuscripts.

The first edition was held in hybrid form on September 7, 2021, in Lausanne, Switzerland, in conjunction with ICDAR 2021. We had two invited speakers: Peter Stokes from Université PSL (Paris Sciences & Lettres), France, and Sebastian Bosch from the CSMC, Universität Hamburg, Germany. The Program Committee was selected to reflect the interdisciplinary nature of the field.

For this first edition, we welcomed two kinds of contributions: short papers and abstracts. We received a total of 11 submissions. Each short paper was reviewed by two members of the Program Committee via EasyChair and five out of six were accepted.

A single blind review was used for the short paper submissions, but the authors were welcome to anonymize their submissions. The five abstract submissions were evaluated and accepted by the organizers, and were published separately by the organizers in a dedicated website.

The workshop had a total of 70 participants from all three disciplines (27 on-site and 43 online).

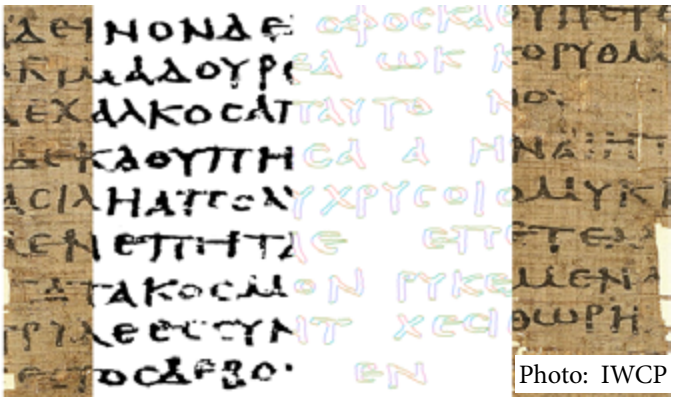


Photo: IWCP

DIL 2021
Ist International Workshop on Document Images and Language

September 6, 2021, Lausanne, Switzerland
https://dil2021.github.io/

Workshop Chairs:

Andreas Dengel (DFKI & University of Kaiserslautern, Germany)
Cheng-Lin Liu (CASIA, China)
David Doermann (University of Buffalo, USA)
Errui Ding (Baidu Inc., China)
Hua Wu (Baidu Inc., China)
Jingtuo Liu (Baidu Inc., China)

The first edition of the workshop on Document Images and Language was held on September 6th, 2021. It was a virtual meeting that provided a platform for researchers from both computer vision and natural language processing areas to share their ideas and excellent work on multi-modality document analysis and recognition.

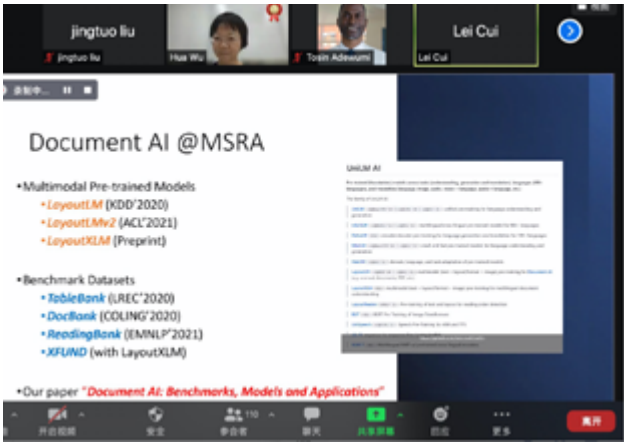
In order to understand the messages captured in the multimodal nature of documents, various techniques from Natural Language Processing (NLP), such as Named Entity Recognition and Linking, Visual Questions answering, and Text Classification, can be combined with the traditional methods of OCR, Layout Analysis, and Logical Labeling that were well established in the ICDAR community. With the growing application of transformer from NLP to computer vision, more works on the fusion of document image and language have arisen.

DIL 2021 received 11 submissions from eight countries (China, France, Germany, India, Japan, Sri Lanka, USA, Vietnam). Each paper was carefully reviewed by three reviewers and nine were accepted after the discussion of chairs, three for oral presentation (15 minutes) and six for poster presentation (five minutes). As the workshop was held virtually, every accepted paper got the chance of online presentation.

Finally, the best paper award was presented to "A Span Extraction Approach for Information Extraction on Visually-Rich Documents" by Tuan-Anh D. Nguyen, Hieu M. Vu, Nguyen Hong Son, and Minh-Tien Nguyen.

In addition to the paper presentations, we invited three well-known experts and researchers to give keynote talks.

- "Visual Information Extraction for Document Understanding" by Prof. Lianwen Jin (South China University of Technology),
- "Document AI: Benchmarks, Models and Applications" by Lei Cui (MSRA),
- "Using Knowledge Graphs for Document Analysis Scenarios in Corporate Memories" by Heiko Maus (German Research Center for Artificial Intelligence).



DIL 2021 was quite a success that over 100 participants attended the online meeting and there were also some on-site audience. The talks and papers received intensive discussion, indicating the enthusiasm for the new multi-modality sub area in document analysis and recognition.

We would like to take this opportunity to thank again all the PC members, reviewers, authors and participants of DIL 2021 for their contribution to this successful event.

DocVQA 2021
Workshop on Document Visual Question Answering

September 6, 2021, Lausanne, Switzerland
https://sites.google.com/view/docvqaworkshop2021/

Organizers:
Minesh Mathew, IIT Hyderabad, India
Ruben Perez Tito, Computer Vision Centre, Spain
Dimosthenis Karatzas, Computer Vision Centre, Spain
C. V. Jawahar, IIT Hyderabad, India
R. Manmatha, Amazon, India

by Ruben Perez Tito

The "Document Visual Question Answering" (DocVQA) workshop took place in hybrid form, in the context of ICDAR 2021, on September 6th. The workshop was met with great success, having a full room on site and many more participants online.

Document Visual Question Answering, the topic of this workshop, is a generic paradigm for purpose-driven document analysis and recognition, where natural language questions drive the information extraction and document understanding processes. It was introduced at CVPR in 2020 and ICDAR 2021 through this workshop and an associated competition (*https://rrc.cvc.uab.es/?ch=17*).

The workshop started with a welcome session and the presentation of the associated ICDAR 2021 DocVQA Competition, where the problem, datasets, metrics and competition results were explained. Subsequently, the competition winners and runner-up explained their methods.

Competition winners talks:

- Dawid Jurkiewicz - DocVQA Task3 Winner - Applica AI: Text-Image-Layout Transformer approach to Visual Question Answering
- Ryota Tanaka - DocVQA Task3 Runner up- IG-BERT: Learning Text-Icon-Layout Representations and Arithmetic Operations for Infographic Understanding
- Jianglong He - DocVQA Task2 Winner- Infrrd-RADAR (Retrieval of Answers by Document Analysis and Re-ranking)

Following this, the workshop hosted a set of invited talks from top researchers on Document Understanding and Visual Question Answering.

- Dr. Brian Price (Adobe Research) – "Understanding Data Visualizations via Question Answering"
- Dr. Amanpreet Singh (Facebook Research) – "Towards models that can read and reason about scene text"
- Dr. Yijuan Lu (Microsoft Research) – "Scene Text-Aware Pre-training for Text-VQA and Text-Caption"

To conclude the workshop, a Panel Discussion was carried out, moderated by Dimosthenis Karatzas, with four invited panelists from academia and industry Dr. Brian Price (Adobe Research), Dr Anand Mishra (IIT Jodhpur), Prof. David Doermann (Univ. Buffalo) and Dr. Filip Graliński (Applica.AI) who provided insights about DocVQA and discussed on the evolution of the field.

Conference Chair:
Alexander Tuzikov, United Institute of Informatics Problems, NAS of Belarus, Minsk, Belarus

Conference Vice-Chair:
Sergey Ablameyko, Belarusian State University, Minsk, Belarus

Program Committee Co-Chair / Chief Event Officer:
Alexei Belotserkovsky, United Institute of Informatics Problems, NAS of Belarus, Minsk, Belarus

Program Committee Co-Chair:
Marina Lukashevich, Softeq, Minsk, Belarus

by Alexei Belotserkovsky

The 15th International Conference on Pattern Recognition and Information Processing (PRIP'2021) was hosted by the United Institute of Informatics Problems of the National Academy of Sciences of Belarus.

Since 1991, the United Institute of Informatics Problems, the Belarusian State University, and the Belarusian State University of Informatics and Radioelectronics have been traditional venues for scientists, researchers, and engineers to exchange up-to-date technical knowledge and new ideas, and to experience and discuss developments in the fields of pattern recognition, information processing, machine learning, and computer vision. However, now, when physical meetings, especially with foreign colleagues, are significantly limited, it was decided to hold PRIP'2021 completely online.

This year, the Conference, for the first time, had a motto: "Artificial intelligence: Facing the Challenges". In modern information society, it is impossible to ignore these issues. Quite the contrary: it is difficult to find a field of computer science where machine learning methods are not applied. However, for organizers, the Conference motto means not only this. The main challenge was the need to preserve the traditions of a scientific event, while changing both the format and organizing approach, taking into account that the global scientific and educational community has already developed certain standards for large-scale online events. We managed to make PRIP'2021 interesting both for regular participants of the Conference and for the new generation of scientists.

In fact, it is not so difficult to organize an online event with parallel sections on the basis of well-known virtual platforms. Although, connecting to one section or to another, is hardly easier than physically moving between conference rooms. But what if the same audience is interested in the reports from

different sections? The online format allowed to expand the time frame. This year, the Conference was held in a single information stream and was broadcast on YouTube for four days. The total duration of the broadcasts was over 30 hours! During this time, 75 speakers from 18 countries, including the USA, Canada and China, took the floor, despite the time difference. As for the Conference proceedings, 90 applications were submitted, but only 53 reports were accepted after peer-reviewing for presentation at the Conference. Finally, we have published the materials of 143 co-authors.

The topics of the Conference usually include theoretical and applied aspects of computer vision, processing and recognition of signals and images, the use of distributed resources and high-performance systems. This year it was "flavored" with questions of Artificial Intelligence.

Belarusian scientists have their achievements both nationally and globally within the framework of large projects in this area. Of course, a feature of this conference was the speeches of famous foreign scientists, including Professor Ruslan Salakhutdinov from Carnegie Mellon University (USA), Professor Jos Roerdink from the University of Groningen (Netherlands), Professor Frederick Leymarie from the University of London (UK), Professor Henning Müller from the University of Geneva (Switzerland), Professor Axil Mosig from the Ruhr-University of Bochum (Germany), Dr. Andrei Gabrielian from the National Institute of Allergy and Infectious Diseases of NIH (USA).

For the first time in the history of PRIP, the GÉANT Association, a fundamental element of the infrastructure that provides a pan-European network for the needs of science and education, became a Conference partner. Within the framework of a GÉANT Session, participants were able to communicate with invited speakers from the Netherlands, Great Britain, Armenia, Italy, Greece, Poland, and Croatia. A highlight was the joint performance by Pierre-Philippe Mathieu, Director of the Φ-Lab Explore Office at the European Space Agency, and his colleagues.

Despite the fact that Artificial Intelligence is actively entering our daily life, there are still ongoing discussions about the effectiveness of these methods, as well as possible abuse of AI technologies. This formed the basis for a virtual panel discussion organized on the last day of the Conference by participants from Belarus, Armenia, Great Britain, Germany, and Croatia.

An integral part of physical events is informal communication between participants. There is no and cannot be a full virtual substitute for such communication; nevertheless, the organizers of PRIP'2021 made an attempt to keep up with the major world events of the pandemic period. Thus, many participants participated with enthusiasm in the Virtual Café, where one could go beyond the scope of their presentations in an informal “setting”.

The months of preparation are over, the Conference is over. It is wrong to think that organizing and conducting an online event is easier than offline. This is a different level, the level when the presentation of scientific results is a task no less important than obtaining the results. This was the PRIP'2021 Conference, the detailed history of which can be found on the website (*https://www.prip.by/2021/*) and on the Youtube channel.

IWAIPR 2021
VII International Workshp on Artificial Intelligence and Pattern Recognition

October 5-7, 2021, Havana, Cuba

General and Program Chairs:
Yanio Hernandez Heredia (Universidad de las Ciencias Informáticas, UCI, Cuba)
Jose Ruiz Shulcloper (Universidad de las Ciencias Informáticas, UCI, Cuba)
Vladimir Milián Núñez (Universidad de las Ciencias Informáticas, UCI, Cuba)

Local Organization Chairs:
Jose E. Medina Pagola (Universidad de las Ciencias Informáticas, UCI, Cuba)
Hector R. Gonzales Diez (Universidad de las Ciencias Informáticas, UCI, Cuba)

by The General Chairs

IWAIPR 2021 was organized by Universidad de las Ciencias Informáticas (Cuba), and the Cuban Association for Pattern Recognition (ACRP, member of the IAPR) with the sponsorship of the Cuban Society for Mathematics and Computer Sciences (SCMC) and was endorsed by the International Association for Pattern Recognition (IAPR). Due to COVID-19, IWAIPR 2021 was postponed by a year, and in this edition, for the same reason, the Organizing Committee decided to run scientific program in virtual modality.

Like previous editions, IWAIPR 2021 hosted worldwide participants with the aim of promoting and disseminating ongoing research on mathematical methods and computing techniques for Artificial Intelligence and Pattern Recognition. Moreover, IWAIPR 2021 was a forum for the scientific community to exchange research experience, to share new knowledge, and to increase the cooperation among research groups working in Artificial Intelligence, Pattern Recognition, and related areas.

Scientific contributions and program

IWAIPR 2021 received 73 contributions from nine countries. After a rigorous double-blind reviewing process, where each submission was reviewed by at least three of the 98 highly qualified reviewers, a total of 42 papers authored by 147 authors from 17 countries were accepted (several papers were written in collaboration with authors from different institution and countries). The scientific quality of the accepted papers was above the overall mean rating. The conference submission and review process was supported by Springer Online Conference Service platform.

IWAIPR 2021 was held in a complete remote, on-line mode, a remarkable and excellent experience! We used a system called PICTA for the management of the scientific program. PICTA allows sharing pre-recorded on-demand videos in a very intuitive way, where every video was published as was scheduled, so, the local chair should be focused on the task of moderating the question-answer flow about each video. In general, the system worked well. Having pre-recorded videos turned out to be an excellent idea in case of a poor

connection or differences in time zone (we have exponent from Russia and Japan).

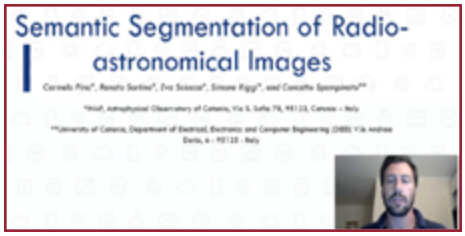
The number of participants fluctuated between 20 and 25 in each session, less than had been expected. Like the most recent editions of the conference, IWAIPR 2021 was a single-track conference, grouped into four sessions: (i) Artificial Intelligence, Data Mining and Applications; (ii) Pattern Recognition and Applications; (iii) Biometrics, Image, and Video Analysis; (iv) Signals Analysis and Processing.

Keynote talks

The scientific program of IWAIPR was honored with one opening keynote talk, setting the bar high from the beginning of the workshop. We welcomed the IAPR Invited Speaker, and IAPR Past President, Prof. Apostolos Antonacopoulos, for a talk entitled “Explainable AI for face morphing attack detection”. Prof. Antonacopoulos leads the Pattern Recognition and Image Analysis (PRImA) research Lab at the School of Computing, Science and Engineering at the University of Salford, UK, where he currently holds the post of Professor of Pattern Recognition.

Awards

The quality of the works presented at IWAIPR 2021 was very satisfying, so, a list of six candidate papers for the Best Paper Award was composed taking into account the best-reviewed papers and the recommendation of the meta-reviewers and programs chairs. After a process of deliberation by our Award Committee (Professors Heydi Mendez-Vazquez, CENATAV Research Director, Cuba; Walter Kropatsch, Vienna University of Technology, Austria, and Gregory Randall, University of the Republic of Uruguay, Uruguay)



the IAPR-IWAIPR Best Paper Award was given to paper: “Semantic Segmentation of Radio-Astronomical Images”, by Carmelo Pino, Eva Sciacca, Simone Riggi (Osservatorio Astrofisico di Catania, INAF, Italy), Renato Sortino and Concetto Spampinato (Dep.of Electrical, Electronics and Computer Engineering, University of Catania, Italy).Working with real and up-to-date data, in this paper, the authors proposed an exploration of multiple semantic segmentation models for the identification of stellar objects in astronomical images, an approach that show a significant improvement over the other methods.

Honorary mention was attributed to the paper “Automatic Classification of Diabetic Foot Ulcers using Computer Vision Techniques” by José Daniel López-Cabrera, Yusely Ruiz-Gonzalez, Roberto Díaz-Amador and Alberto Taboada-Crispi (Informatics Research Center, Universidad Central "Marta Abreu" de Las Villas, Cuba).

This paper proposed using pre-trained neural networks combined with classical approaches, outperforming results compared to previous related work. Also, the problem addressed has significant importance for the medical imaging field.

The awards were announced in the closing session by Prof. Heydi Mendez-Vazquez.

Proceedings

IWAIPR 2021 proceedings, like the predecessor edition, have appeared in the Lecture Notes in Computer Science Series (“Progress in Artificial Intelligence and Pattern Recognition”, Y. Hernandez Heredia, V. Milián Núñez and J. Ruiz-Shulcloper Eds., LNCS 13055, Springer, 2021. https://link.springer.com/book/10.1007/978-3-030-89691-1).

Conclusion

Finally, we invite the Artificial Intelligence and Pattern Recognition communities to attend IWAIPR 2023 in Havana, Cuba.

This bulletin board contains items of interest to the IAPR Community

Upcoming Special Issues in Pattern Recognition Letters

https://www.journals.elsevier.com/pattern-recognition-letters

Face-based Emotion Understanding (VSI:FEU)

Guest Editors: Su-Jing Wang, Chinese Academy of Science - Jingting Li, Chinese Academy of Sciences, China - Moi Hoon Yap, Manchester Metropolitan University - - Wen-Huang Cheng, National Yang Ming Chiao Tung University, China - John See, Heriot-Watt University Malaysia - Xiaopeng Hong, Xi'an Jiaotong University, China - Xiaobai Li, University of Oulu, Finland

Submission period: April 1 2022 - April 20 2022

More information at: *https://www.journals.elsevier.com/pattern-recognition-letters/call-for-papers/face-based-emotion-understanding*

Pattern Recognition for Cyber-Physical-Social Services (VSI:PR4CPSS)

Guest Editors: David (Zhiwei) Gao, Northumbria University, UK - Xiaokang Wang, St. Francis Xavier University, Canada - Carmen Bisogni, University of Salerno, Italy

Submission Period: May 1 2022 – May 20 2022

More information at: *https://www.journals.elsevier.com/pattern-recognition-letters/call-for-papers/pattern-recognition-for-cyber-physical-social-services*

Recent Advances in Deep Learning Model Security (DLMS)

Guest Editors: Guorui Feng, Shanghai University, China - Sheng Li, Fudan University, China - Jian Zhao, Institute of North Electronic Equipment, China - Zheng Wang, The University of Tokyo, Japan

Submission Period: June 1 2022 – June 20 2022

More information at: *https://www.journals.elsevier.com/pattern-recognition-letters/call-for-papers/recent-advances-in-deep-learning-model-security*

Don't miss

CALLS for NOMINATIONS

for IAPR Awards to be presented at

ICPR 2022

King-Sun Fu Prize
J. K. Aggarwal Prize
Maria Petrou Prize
IAPR Fellow Award

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
2022	FEB	ICPRAM 2022: 11th Intl. Conf. on Pattern Recognition Applications and Methods	ICPRAM 2021	**Online**
		VISAPP 2022: 17th Intl. Conf. on Computer Vision Theory and Applications	VISAPP 2021	**Online**
	MAR	ISPR 2022: 22nd Intl. Con.f on Intelligent Systems and Pattern Recognition	ISPR 2020	**Hybrid - Tunisia**
	APR	* IWBF 2022: IEEE Intl. Wkshp. on Biometrics and Forensics *	IWBF 2020	**Austria**
	MAY	IbPRIA 2022: 10th Iberian Conf. on Pattern Recognition and Image Analysis		**Portugal**
		DAS 2022: 15th IAPR Intl Workshop on Document Analysis Systems	DAS 2020	**France**
	JUN	ICPRAI 2022: 3rd Intl. Conf. on Pattern Recognition and Artificial Intelligence		**France**
		IGS 2021: 20th Conference of the International Graphonomics Society		**Spain**
		ICPRS 2022: 12th Intl. Conference on Pattern Recognition Systems	ICPRS 2021	**France**
		MCPR 2022: 14th Mexican Conference on Pattern Recognition	MCPR 2021	**Mexico**
	AUG	ICPR 2022: 26th International Conference on Pattern Recognition	ICPR 2020	**Canada**
	OCT	IJCB 2022: 2022 IAPR/IEEE International Joint Conferenct on Biometrics	IJCB 2021	**UAE**
	NOV	+ ANNPR 2022: 10th IAPR Workshop on Artificial Neural Networks in PR +	ANNPR 2020	**UAE**
2024	DEC	ICPR 2024: 27th International Conference on Pattern Recognition		**India**

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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*

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