THE INTERNATIONAL ASSOCIATION FOR PATTERN RECOGNITION

IAPR Newsletter

www.iapr.org

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Special Issue

with highlights from the 25th INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION

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From the EXCO

IAPR ExCo 2020-2022: Communicating and Working Together

by Arjan Kuijper, IAPR Secretary

Communication is an important goal for the ExCo: communication with the Governing Board (GB), with the Standing and Technical Committees, within the ExCo, and, of course, with the IAPR Community as a whole. With you, the IAPR Community, in mind, the ExCo has created the IAPR Spring 2021 Survey, an anonymous, short, online form focusing on your opinions and attitudes in the face of the pandemic and our recovery from it as an international research community. Please take a few minutes to respond and let us know your thoughts

This issue of the *IAPR Newsletter* is dedicated to ICPR 2020, held digitally in virtual Milano. The Highlights section of this Newsletter has Comments from the General Chairs, reports on workshops, tutorials and challenges, invited talk abstracts, announcements of awards, and news from the IAPR GB Meeting.

At the GB meeting the new ExCo was elected—ready to serve you! With the overarching goal of improving communication, as our first action point, we decided to actively use the "new digital way of life" and meet quarterly via Zoom. Although it's challenging to find a meeting slot during the day, as this ExCo spans almost the complete globe, it's easier (and much less expensive) than organising physical meetings.

So what happens at the beginning of an ExCo term? Well, there are many administrative issues to be addressed, starting with leadership of the Standing (SC) and Technical Committees (TC). All TC Chairs and Vice Chairs have been appointed and confirmed, and contact information can

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be found in the TC News section of this issue and at the IAPR website. With respect to the SCs for the 2020-22 term, chairs have been selected and the committee members will be finalized soon. (The Prize Committees for the King-Sun Fu, J. K. Aggarwal, and Maria Petrou Prizes are handled separately and require a GB vote, all of which will happen soon.)

A warm thank you to all who serve in the TCs and SCs!

Besides these organizational things, we also look forward and think of ways to improve the visibility of the IAPR, making it more attractive to more researchers in the field. This naturally includes people in countries that already have an IAPR member society and also those in countries that could become new member organisations. As new member societies are added, geographical inclusivity will be considered.

By the way—inclusion: together with equality and diversity are of course important topics that are in focus of our activities. The new Standing Committee on Equality, Diversity, and Inclusion will help the IAPR set and achieve goals in these areas.

The IAPR is getting old. Well old…. Let's say the IAPR has become a mature adult. As we approach the IAPR's 50th Anniversary, we're planning celebrations for the "golden anniversary"!

A sad part of an organization reaching a milestone like this is that founders and other key contributors start to pass away. The previous issue of the Newsletter was devoted to the memory and contributions of one of the IAPR's Founders, Herb Freeman, and it is with great sadness that the ExCo reports the passing of Prof. Guy Lorette. Please see the In Memoriam section of this issue.

To keep the memory and honour the activities of these founders and their successors, the ExCo proposed and the GB approved the formation of a new committee to introduce a new IAPR award.

So, the ExCo looks forward to working with the technical and standing committees as well as the IAPR member societies through the Governing Board representatives. These groups form the pillars of the IAPR Community. Likewise, the biennial ICPR provides a venue to set the foundation for each two-year term of IAPR activity. The ExCo is grateful to the organizers of ICPR 2020, who hosted a tremendously successful ICPR despite enormous obstacles.

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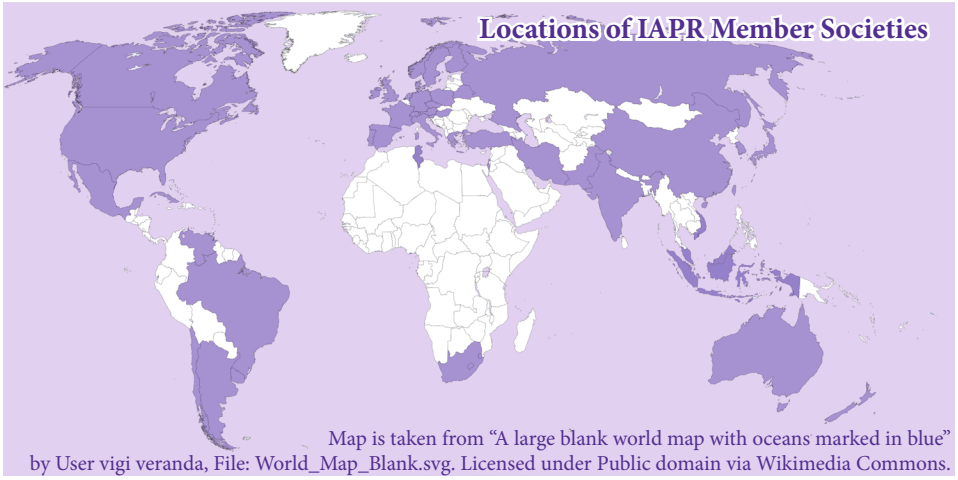

Map is taken from "A large blank world map with oceans marked in blue" by User vigi veranda, File: World_Map_Blank.svg. Licensed under Public domain via Wikimedia Commons.

News from the IAPR Executive Committee

- Please take a moment to complete the IAPR Spring 2021 Survey here: *https://tinyurl.com/iaprsurvey2021*.
- The IAPR is approaching its 50th Anniversary, and the ExCo is planning celebrations for the "golden anniversary". More information to come...
- The new ExCo is meeting quarterly via Zoom. Follow
- New TC Leadership has been confirmed for all IAPR TCs. See TC News in this issue or the IAPR website for contact information.
- Standing Committee chairs for the 2020-22 term have been selected, and the committee members will be finalized soon.
- Prize Committees require a GB vote and will be formed soon
- This ICPR 2020 Special Issue presents highlights of ICPR Virtual Milano. Happy reading! It will whet your appetite for...
- ICPR 2022 will be here before we all know it. In the interim, many other excellent conferences and workshops will take place. Check out the Call for Papers section of the Newsletter now and the IAPR website regularly.
- It is with great sadness that the ExCo reports the passing of Prof. Guy Lorette. Please see In Memoriam in this issue.
- Take care and stay well.

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/*

2021

IWAIPR 2021
VII International Workshop on
Artificial Intelligence and Pattern Recognition
Havana, Cuba
Deadline: May 10, 2021
Dates: Oct. 5--7, 2021

ACPR 2021
6th Asian Conference on Pattern Recognition
Jeju Island, Korea
Deadline: June 29, 2021
Dates: Nov. 9-12, 2021

2022

ICPR 2022
26th International Conference on
Pattern Recognition
Montréal, Québec, Canada
Deadline: TBD
Dates: Aug. 21-25, 2022

IGS 2021
20th Conference of the
International Graphonomics Society
Las Palmas de Gran Canaria, Spain
Deadline: TBD
Dates: moved from Sep.13-15, 2021, to Jun., 2022

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We also look forward to ICPR 2022, which we know will be here before we all know it!

In the interim, many other excellent conferences and workshops will take place. Check out the Call for Papers and Meeting Planner sections of the Newsletter now and the IAPR website regularly for new IAPR meetings.

Enjoy this ICPR 2020 Special Issue – as motivation to write papers and to whet your appetite for attending future conferences. Happy reading!

Take care and stay well.

Arjan

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 42 opportunities listed and more than 10,600 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.

Giorgio Giacinto, IAPR Fellow

Giorgio Giacinto, IAPR Fellow
ICPR 2020, Milan
For contributions to pattern recognition for computer security

Giorgio Giacinto is a Professor of Computer Engineering at the University of Cagliari, Italy, where he serves as the coordinator of the MSc degree in Computer Engineering, Cybersecurity and Artificial Intelligence.

He leads the Computer Security unit of the Pattern Recognition and Applications Lab (PRA Lab) research group. His research interests are in the field of machine learning for cybersecurity to address malware analysis and detection and network traffic analysis.

He is a member of the Executive Boards of the Cybersecurity National Lab and Artificial Intelligence & Intelligent Systems Lab, both within the CINI consortium, Italy. He also represents the Cybersecurity National Lab within the European Cybersecurity Organization (ECSO).

In 2015, he co-founded the spin-off company Pluribus One. He is the author of more than 170 papers in international journals and conferences.

He served as the secretary of the Italian Association for Pattern Recognition (currently named CVPL, formerly known as GIRPR) and in 2020 received the Fellow award from the IAPR. He is also a Senior Member of the IEEE Computer Society and the ACM.

I spent my entire life in Sardinia, one of the main islands in the Mediterranean Sea. Born in the '70s, I was attracted by electronics and computers when still a child: the amazing sounds produced by music synthesizers and the TV programs showing what computers can bring to science and society were the first source of inspiration. At that time, my parents and many other persons didn't understand the potential of this new technology, so I had to wait to get my first computer.

The end of the '80s represented a breakthrough for me. First, I received a book on "Electronics & Music" that opened my mind to the mathematics, technologies, and techniques behind synthesizers and sound processing. Then, in the early '90s, I finally convinced my parents to invest in a personal computer during my degree program in Electrical Engineering. Exchanging files with other students, I was also hit by some "computer viruses" that produced some unexpected behavior in the affected programs: how had that happened? What are the main characteristics of a virus? I started investigating the issue on my own, but the pressure to conclude my degree program forced me to put the topic aside for a while.

In the '90s, Sardinia being one of the poorest regions in Europe (so-called "Objective 1"), a vast amount of funds were given to improve its economy. The University could start an Electronic Engineering degree program and later a Ph.D. program, many high-tech companies were established on the island, and a new Research Center tied with CERN was involved in the early development of the WWW.

Thus, after graduating in Electrical Engineering in 1994, my dreams started to come true. I had plenty of job opportunities to finally begin my journey in Computer Science and Engineering! I decided to enroll in the Ph.D. program on

Pattern Recognition, having Prof. Fabio Roli (a 2004 Fellow Award winner) as my tutor and mentor. During the three years of my Ph.D. I had the opportunity to improve my knowledge and competence in Computer Science and Engineering, explore the pattern recognition and machine learning fields, and provide my contributions to the community in the area of multiple classifier systems.

Within the IAPR community, I met many researchers who have been an enormous source of inspiration: from Italy, during the summer schools organized for Ph.D. students and from the entire world when participating in ICPR conferences. I will never stop expressing my gratitude to the many colleagues and friends who provided me with guidance, constructive criticism, and encouragement.

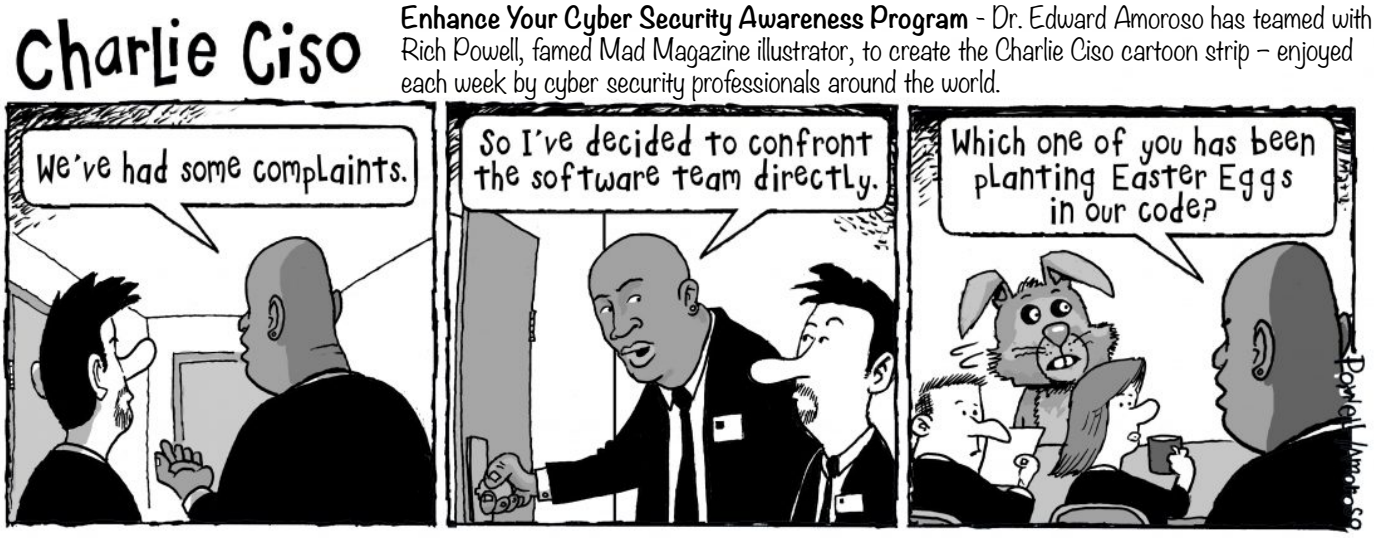
With the new century, I was finally able to turn my passions into a reality entirely. The headquartering of new ".com" companies in Sardinia provided food for thought. My early curiosity in computer viruses, the experience in the administration of a small Unix workstation during the Ph.D. years and the participation in the same years in a full-immersion one-week long course on computer security drove me to embrace the investigation of pattern recognition and machine learning approaches to computer security.

My early years in this field have been devoted to network traffic analysis to spot signs of malicious behaviors. This research field is still a rich source of information as attacks always flow within the network, and detection mechanisms need to be adapted, updated, and enriched in response to the evolution of both attacks and legitimate services. Multiple classifier systems proved to be suitable for fusing different types of information and making it difficult for attackers to avoid detection.

The past decade was characterized by a considerable expansion of my research activities in computer security. Pattern Recognition turned out to be very effective in the static analysis of programs, applications, and files, in general, to detect malicious or at least anomalous components. The study of the underlying file structure and investigation of the essential elements that are part of malicious behaviors allowed the extraction of features that proved to be effective not only from the point of view of attack detection and classification but also for the possibility for attackers to craft attacks that could evade detection.

The continuous modification of attack patterns in response to the improvement in attack detection capabilities, as well as the rapid evolution of cyberspace in terms of novel applications and their pervasiveness in all sectors of human activity, require a greater and deeper effort on the part of the pattern recognition community: methodological contributions tailored to the computer security domain whose characteristics are quite different from the classical domains of images, videos, sounds, and the like, all domains that are related to human sensing; vertical contributions on individual application scenarios, to address the specific characteristics and its impact on the life of individuals and the society as a whole.

Enhance Your Cyber Security Awareness Program - Dr. Edward Amoroso has teamed with Rich Powell, famed Mad Magazine illustrator, to create the Charlie Ciso cartoon strip – enjoyed each week by cyber security professionals around the world.



https://www.tag-cyber.com/media/charlie-cisodia/charlie-ciso

IAPR...The Next Generation

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

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

~Arjan Kuijper, Editor -in-Chief

Sarah Bechtle

Sarah Bechtle is a last PhD candidate in the Autonomous Motion Department at the Max-Planck Institute for Intelligent Systems in Tübingen, with a background in computational neuroscience. Her research interests lie at the intersection between machine learning and robotics, specifically how to use intrinsic learning signals and meta learning for model based approaches. During the course of her PhD she has collaborated with researchers from the CLMC and RESL Lab at the University of Southern California, the Machines in Motion group at New York University, and Facebook AI Research.

Editor's note:
Sarah Bechtle was one of the winners of the Piero Zamperoni Best Student Paper Award at ICPR 2020. The award was shared with Artem Molchanov.

~ Jing Dong, EiC

by Sarah Bechtle, Max Planck Institute, Tübingen, Germany

Briefly: How did you get involved in pattern recognition?

I first got involved in pattern recognition towards the final year of my undergraduate degree. I had to write a paper for a seminar and I chose the topic “affective computing”. I read the book by Rosalind Picard and was very fascinated by this research direction; also the work by Cynthia Breazea using robots to interact with humans in an emotional way seemed very intriguing and extremely exciting to me. After this first involvement with the field, I decided to write my undergraduate thesis about recognizing emotional states of drivers from physiological data while driving. It was only then that I had my first “hands-on” experiences with pattern analysis. Performing experiments, collecting data and analysing this data to uncover relationships that would allow me to make predictions about the drivers' emotional states given measured physiological data. From this initial contact with the field, my interests developed towards the field of robotics and machine learning where I then also decided to pursue my PhD.

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

I’m mostly interested in research that lies at the intersection between machine learning and robotics. The so-called action-perception-learning loop: a robot acts in its environment, perceives its environment and thus collects data from which it can learn. In this loop

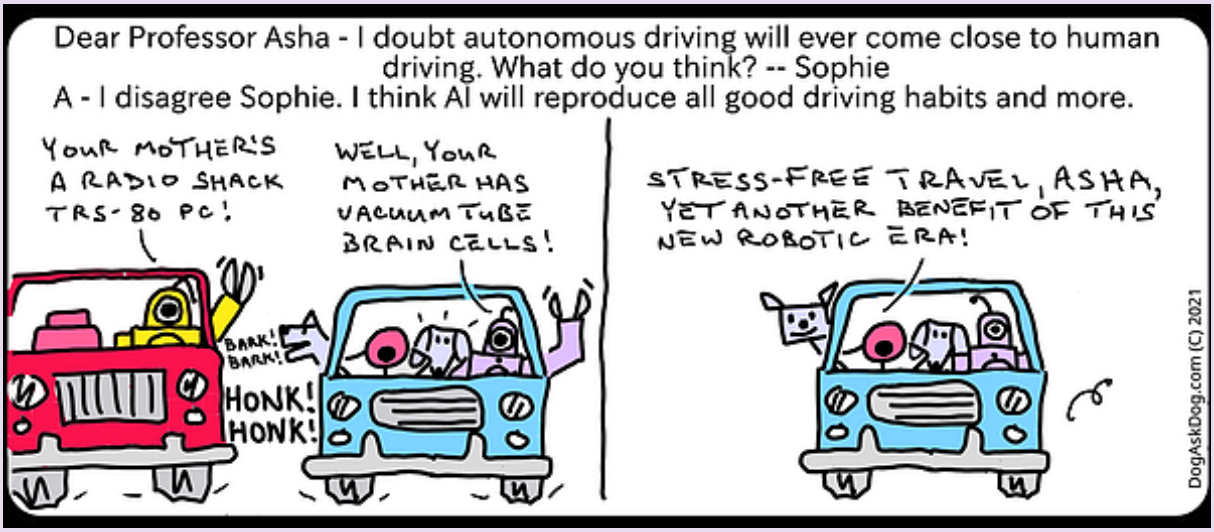
the robot learns from the data it collected, but also can collect the data that it needs to learn. This raises interesting questions about how to most efficiently learn a given task, by deciding how and where to act in the environment to collect the data that leads to the best learning performances.

I'm interested in manipulation and locomotion tasks that require interactions with the environment by creating contact with it. I'm particularly interested in model based reinforcement learning algorithms, that leverage the use of a learned model of the robot or the environment to learn how to act in the environment. The work we presented at ICPR2020 titled Meta-Learning via Learned loss, done in collaboration with Artem Molchanov, Yevgen Chebotar, Edward Grefenstette, Ludovic Righetti, Gaurav Sukhatme, Franziska Meier is about a novel meta learning algorithm. This algorithm leverages bi-level optimization to learn in a self-supervised way the right loss function needed to optimize a task. We show that this approach works on classical regression or classification tasks. But we also show how this can be used on model based and model free reinforcement learning tasks on a simulated robot. In this work, the algorithm presents a strategy to learn how the robot can most efficiently learn how to act in its environment such that a desired task or behaviour can be achieved and the robot succeeds at it: the robot is learning to learn how to do something.

In the past, I have also worked on how to seek out uncertainties in the environment to enable better model learning by visiting parts of the state space that have higher predictive uncertainty and thus have a mean prediction that is probably less accurate. I have also worked on how to learn controllers based on their predicted effect on the environment, by simulating through a model what the cause of the controller would be. More recently I have also tried to merge proprioceptive information about the robot states, with perceived visual input. Merging these two modalities enables us to learn models that capture information that is not internally available to the robot but external to the robot's body and perceivable through vision. This enables the robot to perform tasks that involve for example an external object like a cup in a robot's hand.

How can the IAPR help young researchers?

I think IAPR as an association can help young researchers by giving them a platform to present and publicize their work. As a young researcher you face the challenge to get your work out in the public eye, at the same time as a young researcher you try to long-term establish yourself in the field. IAPR can help young researchers with these two challenges by giving them a voice and helping them to amplify it. IAPR can help to put a spotlight on young researchers when the occasions allow, and therefore help them to present their work to a broader audience. Of course conferences and other meetings are an important tool to present once work and create meaningful and interesting connections to other researchers, and IAPR facilitates their organization. Overall I think the biggest help that IAPR can give a young researcher is to create platforms for exchange between researchers, young and senior alike and specifically trying to give a voice to the younger ones.



In Memoriam: Guy Lorette

July 18, 1945 - February 7, 2021

Editor's note:
We were saddened to learn of the passing of Professor Guy Lorette. In this section of the Newsletter, we compile condolence messages from some of his colleagues.

~ Jing Dong, IAPR Newsletter *Editor-in-Chief*

Professor Guy Lorette, one of the pillars of the IAPR in France, passed away on February 7, 2021, in Rennes, France. He is survived by his partner Joëlle, his daughters Anne and Cécile, his son Xavier, and eight lovely grandchildren.

Guy was born in Vézilly, Champagne, France in 1945. He received his Engineering degree and Ph.D in Engineering from INSA Lyon in 1967 and 1970 respectively. His State Ph.D. in Science, obtained in 1983, was dealing with methods for automatic processing of point and line images in pattern recognition with applications to scene analysis, recognition of handwritten signatures and words.

He started his career as a faculty member at the University of Paris XII, Créteil. Then he moved to Brittany where he became full professor at the Institute for Higher Education in Computer Science and Communication (IFSIC), University of Rennes 1. He actively contributed in the field of handwriting and documents analysis at IRISA from 1987 until his retirement in 2009.

Professor Lorette was chair of IAPR TC11 Reading Systems from 1994 to 1998 and represented France on the Governing Board of IAPR from 1996 to 2002. He was the general chair of the first ICDAR conference held in St-Malo in 1991 and has been president or co-president of many conferences since then: ICPR in Hong Kong (2006), IWFHR in Tokyo (2004) and La Baule (2006) among others. He was regularly involved in the organization of numerous conferences as the keynote speaker, program committee chair or member.

He was one of the emblematic pioneers of the pattern recognition community both in France and at the international level by participating in the establishment and animation of our biggest conferences like ICDAR or CIFED (Colloque International Francophone sur l'Écrit et le Document) as well as of the GRCE (Groupe de Recherche en Communication Écrite), which still drives our research community nowadays.

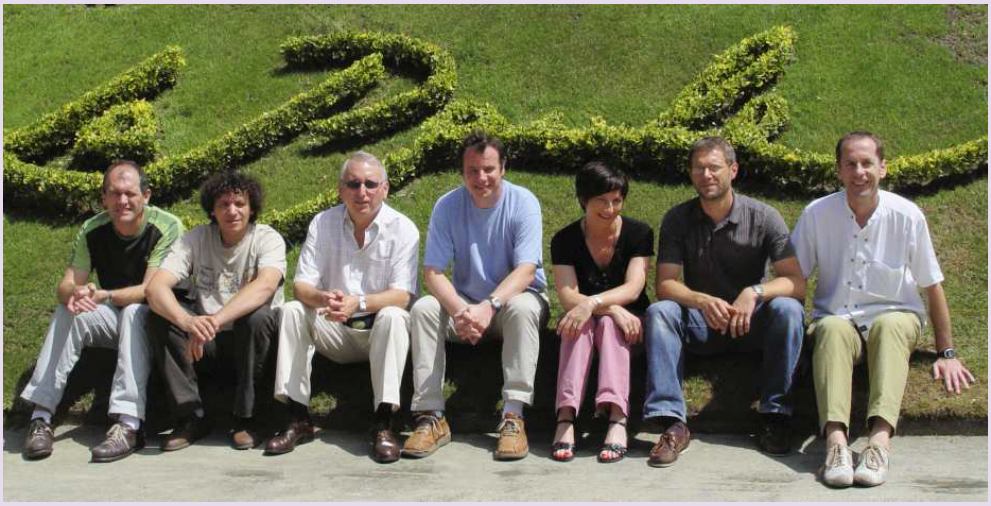
In the opinion of all, beyond his great international scientific career, Guy will be remembered as a very nice person with great joie-de-vivre, kindness, a lot of benevolence and the permanent pleasure of sharing life.

Réjean Plamondon, Polytechnique Montréal
Éric Anquetil, IRISA Rennes

IAPR Then and Now...

"10th IWFHR 2006 in La Baule (France): The organizing committee on the green!"

IAPR Newsletter
Vol. 29 No. 1, January 2007



Last Farewells to Guy Lorette

A last farewell from Réjean

He was a friend of mine… (The Byrds)

Guy left us but, he didn't take all of our memories with him. From our first meeting in Montreal at ICPR in 1984—a meeting strategically suggested by Jean-Claude Simon (Colonel Simon, as we dared to call him secretly at the time)—followed by a few sabbatical months with him at Créteil in 1985, to lay our first paper, a survey on signature verification (Pattern Recognition 1989), our friendship was forged.

From the launch of the first ICDAR in St-Malo in 1991, to his visionary IWFHR 1998 keynote speech on the "Situation of handwriting research at the Dawn of the Third Millennium", Guy has gradually left his mark in our community, humbly, always on call when needed.

What remains of our great friendship? Articles that have aged well, students who we have co-directed with love and devotion, memories of good times spent together in Paris, Rennes and all over this strange planet that gave us birth...and the firm conviction of having come to Earth at the right time. We were pampered and lucky to meet each other.

Life goes on… now without him… light, with a strain on our heart… heavy, with lots of light memories that help us to continue, to pursue our passion for research and training.

Guy you will be forever etched in my mind with happy memories and, if there is really something on the other side of the wall you just walked through, I'm sure you will wave to me, wave to us, and assist us in the quests of our most daring dreams.

Thank you, Guy, for everything you have done for our community and have a good last trip!

Your great friend, Réjean

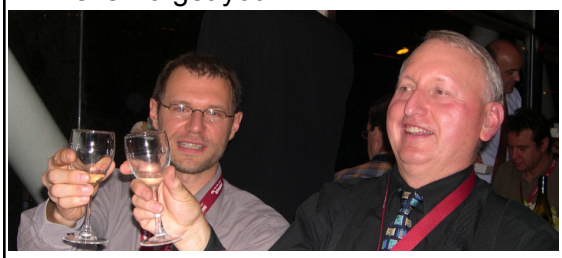
A last farewell from Éric

Guy was a true friend who taught me a lot both professionally and on a human level. He accompanied my first steps in research by directing my PhD with great kindness and complicity.

He shared with me his passion for handwriting, traveling and conferences. His enthusiasm in the organization of the IWFHR in La Baule in 2006 will remain a highlight of my career.

I will remember him as such a nice person who always had wonderful communicative joie-de-vivre with a lot of generosity.

Guy, you have often guided my steps, I will never forget you.



Thank so much Guy.
Éric

IAPR Then and Now...

Excerpt from Getting to know...
Réjean Plamondon, IAPR Fellow.
"No straight lines:
writing my own story"

IAPR Newsletter, Vol. 36 No. 3, July 2014

In 1984, the 7th ICPR was held in Montréal, and my students and I presented papers on signature verification with our accelerometer pens. Jean-Claude Simon attended my talk. At the end, he approached me in his typical direct way: "Plamondon, great talk! Do you know Guy Lorette? He's working on signatures, too, and he's here. Come with me, I'll introduce him to you." I replied, "Yes, Sir!"

Last Farewells to Guy Lorette

A Farewell to Guy Lorette

It is with deep sadness that we share the news of the demise of our beloved colleague, Prof. Dr. Guy Lorette on February 7, 2021, in Rennes, France. Prof. Lorette was a prominent member of the IAPR community. He assumed the chair-ship of TC11 from 1994 to 1998 and represented France on the Governing Board of the IAPR from 1996 to 2002. He was also the executive member of conferences like ICDAR, IWFHR, and CIFED, which are core research platforms of our community. Besides his immense scientific contributions and valuable affiliation with IAPR, Prof. Lorette was a man of great kindness and will always be remembered for his in-depth insights, forward thinking, and big heart.

We extend our heartfelt sympathies and prayers to Prof. Lorette's family and intimate friends. He'll be truly missed by all of us.

Faisal Shafait, TC11 Chair
Dimosthenis Karatzas, Past TC11 Chair

Sorry to hear of the passing of Guy Lorette, a scholar and a gentleman.

I had the pleasure of getting to know Guy when we decided to start the first ICDAR conference in the early 1980s. This first conference was organized by Guy in St. Malo, France. I also attended an IWFHR that he hosted later in Normandy, France.

Guy Lorette had many contributions to on-line handwriting recognition. I travelled with him by French train to one of these settings and enjoyed my informal conversations with him.

My condolences to his family and to the large number of students that he influenced.

Sargur Srihari

A last farewell from Bertrand

It is with great sadness that I learned of the passing of Guy.

We were in the same research team since I joined it in 1992, as a young PhD student. Guy was one of the pioneers of our scientific community. He knew how to transmit his knowledge and he supported many young researchers.

I remember him as a very kind and benevolent man. Guy loved to travel and I had the pleasure to accompany him many times to different conferences around the world. All these good moments will remain in my memory.

Bertrand Coüasnon, IRISA Rennes

Last Farewells to Guy Lorette

Guy was at the forefront for pushing his French colleagues to get involved in the international document analysis recognition community. He represented us for many years on the IAPR Governing Board.

He organized and chaired the very first ICDAR conference, in Saint Malo in 1991. This was the start of a very interesting journey for our document analysis community and also a kind of kick-off for much deeper French involvement in IAPR TC10 and TC11. And we are still involved!

Guy was a very kind and friendly person; it was always a pleasure to meet him, discuss with him.Rest in peace, Guy. We are many who have lots of fond memories of you.

Prof. Karl Tombre
Université de Lorraine - Vice-president for European and Intl. Strategy
Former president of the IAPR (2006-2008)
Former chair of IAPR TC10 (1992-1996)

Guy Lorette was a wonderful person and an important researcher who promoted and accelerated international exchange and cooperation in the field of document analysis and recognition.

Andreas Dengel

I would like to express my deepest sympathies for Prof. Guy Lorette's passing.

I will never forget his kindness and gentle attitude—Even though I was just a young researcher, Prof. Lorette kindly spoke to me like a friend and gave me several suggestions at several conferences.

Let me thank Prof. Lorette again and send my condolences.

Seiichi Uchida

A Last Message from Masaki Nakagawa

Dear Guy,

We've been working on online recognition, digital ink, pen interfaces, tablet applications and more, so I owe you a lot of ideas. I remember the conversations with you while enjoying food and wine at many conferences and the visit to Rennes very vividly.

Masaki Nakagawa

Guy, what a sad news all of a sudden!

We have jointly held workshops in Korea and France in a row with great success. The Korean participants were very grateful for your dedication. As the invited speaker at the IWFHR held in Daejeon, Korea, you gave a clear explanation of the state of the art on handwriting technology.

The memories of the conversations we shared while working as GB members are also new to my memory. Rest in peace.

Young-Bin Kwon

Last Farewells to Guy Lorette

It is with great sorrow to hear of the passing of my friend and colleague Prof. Guy Lorette in France. I met Guy about 35 years ago, probably at one of the ICPR's. Due to common interest in handwriting recognition, we became good friends.

Back in 1990, at the 1st IWFHR in Montreal, I talked to Guy about my idea of organizing an international conference on document analysis, which had become an emerging topic around that time. He was quite interested in that, and we started to organize the first ICDAR (Int. Conf. on Document Analysis and Recognition) in St. Malo near Rennes in France at the end of September 1991. We co-chaired the conference and attracted a lot of researchers there with great success. Since then, ICDAR has gone around the world several times with the 16th ICDAR to take place in September 2021 in Lausanne, Switzerland.

I remember that Guy had published an extensive survey paper on signature verification in the journal of Pattern Recognition and contributed a lot on real-time handwriting recognition. He had also taken part in numerous IAPR & TC 11 activities, and co-chaired the 18th ICPR in Hong Kong in August 2006.

We thank Prof. Lorette for his valuable contributions to the handwriting and document analysis community, and we wish to convey our deepest sympathy to his relatives and friends.

Ching Y. Suen, Director of CENPARMI, Concordia University

IAPR Then and Now...Conference Announcement

IAPR Newsletter, Vol. 13 No. 4, February 1991

The First International Conference on Document Analysis and Recognition

Saint-Malo, France

30 September 2 - October 1991

The domain of automatic analysis, recognition, modelling, and understanding of documents has gained considerably in the last few years. Automatic intelligent processing of documents is at the intersection of many fields of research, especially of computer science, image analysis, pattern recognition, artificial intelligence, studies on language, reading, and handwriting. This first Intenational Conference intends to provide an international forum for the development and the dissemination of new ideas, basic research, and issues concerning practical applications of both off-line and on-line processing in the domains of automatic analysis and recognition of documents.

The conference will include prominent guest speakers, presentations of refereed papers, and poster presentations, as well as exhibits of experimental systems and commercial products. It is the first of a series which will be held every two years in conjunction with the *International Workshop on Frontiers in Handwriting Recognition*.

Timetable

15th February 1991	full paper submittal
15th May l99l	notification of acceptance
30th June 1991	full paper camera ready

Contact

Prof. Guy Lorette (Conference Chairman)
Université de Rennes
Rennes
FRANCE

CALL for PAPERS

August 21-25 • Montréal, Québec

26TH International Conference on Pattern Recognition

https://iapr.org/icpr2022

*** Check the website for details of submission dates ***

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

TRACKS

1 Artificial Intelligence, Machine Learning for Pattern Analysis
- Ambra Demontis (Italy)
- Battista Biggio (Italy)
- Dacheng Tao (Australia)

2 Computer and Robot Vision
- Olga Bellon (Brazil)
- Kosta Derpanis (Canada)
- Ruzena Bajcsy (USA)
- Ko Nishino (Japan)

3 Image, Speech, Signal and Video Processing
- Regina Lee (Canada)
- Ana Fred (Portugal)
- Jingdong Wang (China)
- Vera Yashina (Russian Federation)

4 Biometrics and Human-Computer Interaction
- Julian Fiérrez (Spain)
- Kerstin Dautenhahn (Canada)
- Richa Singh (India)

5 Document Analysis and Recognition
- Alicia Fornés (Spain)
- Alexandra Branzan Albu (Canada)
- Koichi Kise (Japan)
- Faisal Shafait (Pakistan)

6 Biomedical Imaging and Informatics
- Lukas Käll (Sweden)
- Ismail Ben Ayed (Canada)
- Hamid Abbasi (New Zealand)

IAPR Technical Committee News

For this ICPR 2020 Special issue of the IAPR Newsletter *the TC News section provides a list of all IAPR TCs with their websites and leadership boards. Future issues will share current happenings in the TCs.*

~Jing Dong, IAPR Newsletter *EiC*

IAPR TC1 Statistical Pattern Recognition Techniques
https://sites.google.com/view/iapr-tc1/home
Simone Scardapane (Sapienza University of Rome, Italy), Chair
Ambra Demontis (University of Cagliari, Italy), Vice Chair

IAPR TC2 Structural and Syntactic Pattern Recognition Techniques
[website under construction]
Andrea Torsello (Ca' Foscari University of Venice, Italy), Chair
Bai Xiao (Beihang University, China), Vice Chair
Luca Rossi (Queen Mary University, UK), Vice Chair

IAPR TC3 Neural Networks & Computational Intelligence
http://iapr-tc3.diism.unisi.it/index.html
Hazem Abbas (Ain Shams University, Egypt), Chair
Mirco Ravanelli (Université de Montréal, Canada), Vice Chair

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 TC5 Computer Vision for Underwater Environmental Monitoring
http://web.uvic.ca/~maiah/
Maia Hoeberechts (University of Victoria, Canada), Chair
Alexandra Branzan Albu (University of Victoria, Canada), Vice Chair

IAPR TC6 Computational Forensics
https://sites.google.com/site/compforgroup/
Chang-Tsun Li (Deakin University, Australia), Chair
Nicolas Sidere (La Rochelle University, France), Vice Chair
Victor Sanchez (University of Warwick, UK), Newsletter Editor
Xufeng Lin (Deakin University, Australia), Information Officer and Webmaster
Mickael Coustaty (City University of La Rochelle, France), Dataset Curator

IAPR TC7 Remote Sensing and Mapping
http://iapr-tc7.ipb.uni-bonn.de/
Ribana Roscher (University of Bonn, Germany), Chair
Charlotte Pelletier (Université Bretagne Sud, France), Vice Chair
Sylvain Lobry (Paris Descartes University, France) Vice Chair

IAPR TC9 Pattern Recognition in Human Machine Interaction
https://neuro.informatik.uni-ulm.de/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

IAPR TC10 Graphics Recognition
http://iapr-tc10.univ-lr.fr/
Jean-Christophe Burie (La Rochelle University, France), Chair
Miki Ueno (Osaka Institute of Technology, Japan), Vice Chair

IAPR TC11 Reading Systems
http://www.iapr-tc11.org/
Faisal Shafait (National University of Sciences and Technology NUST, Pakistan), Chair
Jihad El-Sana (Ben-Gurion University of the Negev, Israel), Vice Chair

IAPR TC12 Multimedia and Visual Information Systems
http://iapr-tc12.info
Hugo Jair Escalante (INAOE and CINVESTAV, China), Chair
Henning Müller (HES-SO, Sierre, Switzerland), Vice Chair
Martha Larson (Delft University, The Netherlands), Vice Chair
Sergio Esclara (University of Barcelona, Spain), Vice Chair
Albert Ali Salah (Utrecht University), Information Officer

IAPR TC15 Graph-Based Representations
https://iapr-tc15.greyc.fr/
Donatello Conte (Université de Tours, France), Chair
Vincenzo Carletti (University of Salerno, Italy), Vice Chair

IAPR TC16 Algebraic and Discrete Mathematical Techniques in Pattern Recognition and Image Analysis
http://iapr-tc16.eu/
Davide Moroni (ISTI, NRC, Pisa, Italy), Chair
Dietrich Paulus (University of Koblenz-Landau, Germany), Vice Chair
Vera Yashina (Russian Academy of Sciences, Russian Federation), Vice Chair and Newsletter Ed.
Igor Gurevich (Russian Academy of Sciences, Russian Federation), Honorary Chair
Maria Antonietta Pascali (ISTI, NRC, Pisa, Italy), Scientific Secretary

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

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

ICPR 2020

25th INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION
Milan, Italy 13 | 18 September 2020

General Chairs
Rita Cucchiara, Alberto del Bimbo, Stan Sclaroff

Highlights

Comments from the General Chair

IAPR Prize Lectures:
K. S. Fu Prize
Ching Yee Suen

J. K. Aggarwal Prize
Abhinav Gupta

Maria Petrou Prize
Maja Pantic

Keynote Talk Abstracts:
- Mihaela van der Schaar
- Max Welling
- Pietro Perona
- David Doermann

Workshop Reports

Tutorial Reports

Challenge Reports

2020 IAPR Fellows

ICPR 2020 Paper Awards:
- BIRPA and Zamperoni
- Best Scientific Papers
- Best Student Papers
- Elsevier *Pattern Recognition* Journal Awards

2020 Meeting of the IAPR Governing Board

Comments from the ICPR 2020 General Chairs

The 25th International Conference on Pattern Recognition, ICPR2020 Virtual-Milano, convened online January 10-15, 2021. We originally planned for a Fall 2020 conference in Milano, but we pivoted to a virtual format due to the health and travel concerns associated with the global pandemic. While going virtual meant we could not meet for ICPR2020 in-person in Milano, we are pleased to report that ICPR2020 Virtual-Milano set new attendance records for ICPR: in total, we had 2,541 registered attendees from 56 countries worldwide. And, the virtual conference was highly interactive, with real-time live-streamed sessions of talks and panels, and attendees meeting together in Gather Town virtual ballrooms for live posters and demo sessions as well as industry expos, social meetups, and virtual Milano city tours. In addition to the main conference, the ICPR2020 program included 46 live workshops and 8 tutorials, along with a broad range of cutting-edge industrial demos, challenge sessions, and panels.

For the first time, the ICPR main conference employed a two-round review process similar to journal submissions, with new papers allowed to be submitted in either the first or the second rounds and papers submitted in the first round and not accepted allowed to be revised and re-submitted for second round review. In the first round, 1,554 new submissions were received, out of which 554 (35.6%) were accepted and 579 (37.2%) were encouraged to be revised and re-submitted. In the second round, 1,696 submissions were received (496 revised and 1,200 new), out of which 305 (61.4%) of the revised submissions and 552 (46%) of the new submissions were accepted. Overall, there were 3,250 submissions in total, and 1,411 were accepted, out of which 144 (4.4%) were included in the main conference program as orals and 1,263

(38.8%) as posters (4 papers were withdrawn after acceptance). Thus, it was the largest ICPR conference ever, with the most submitted papers and the most selective acceptance rates ever for ICPR, attesting both the increased interest in presenting research results at ICPR and the high scientific quality of work accepted for presentation at the conference.

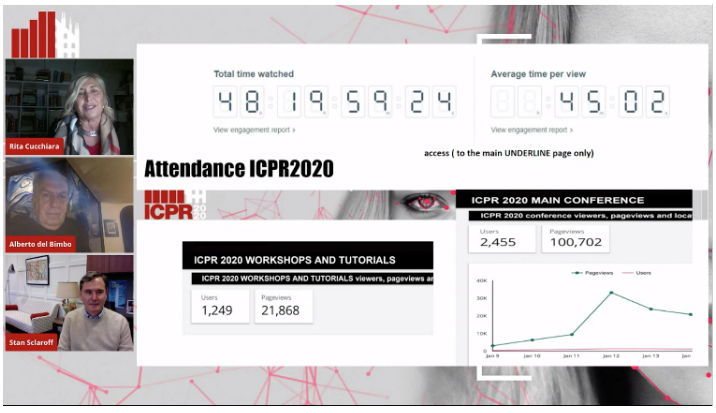
We were honored to feature seven exceptional Keynotes in the program of the ICPR2020 main conference: Ching Yee Suen (IAPR 2020 King-Sun Fu Prize), Maja Pantic (IAPR 2020 Maria Petrou Prize), and Abhinav Gupta (IAPR 2020 J.K. Aggarwal Prize), Mihaela van der Schaar, Max Welling, Pietro Perona and David Doermann. Several best paper prizes were awarded, including the Piero Zamperoni Award for the best paper authored by a student, the Best Industry Related Paper Award (BIRPA), and Best Paper Awards for each of the five tracks of the ICPR2020 main conference, as described elsewhere in this special IAPR Newsletter.

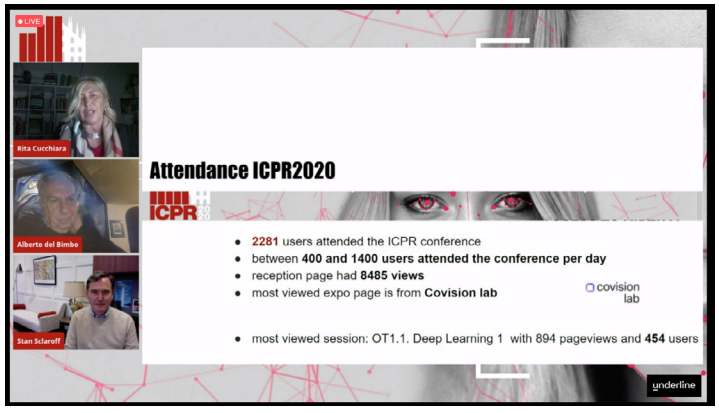
The five tracks of the ICPR2020 main conference included: (1) Artificial Intelligence, Machine Learning for Pattern Analysis, (2) Biometrics, Human Analysis and Behavior Understanding, (3) Computer Vision Robotics and Intelligent Systems, (4) Document and Media Analysis, and (5) Image and Signal Processing.

The best papers presented at the main conference now have the opportunity for publication in expanded format in upcoming special issues of the following journals: Computer Vision and Image Understanding; IEEE Trans. on Biometrics, Behavior, and Identity Science; IET Biometrics; Machine Vision and Applications; Multimedia Tools and Applications; and Pattern Recognition Letters.

The success of such a large conference would not have been possible without the help of many people. We deeply appreciate the vision, commitment, and leadership of the ICPR2020 Program Chairs: Kim Boyer, Brian C. Lovell, Marcello Pelillo, Nicu Sebe, Rene Vidal, and Jingyi Yu. Our heartfelt gratitude also goes to the rest of the main conference organizing team, including the Track and Area Chairs who all generously devoted their precious time in conducting the review process and in preparing the program, and the reviewers, who carefully evaluated the submitted papers and provided invaluable feedback to the authors. For this ICPR, their effort was considerably higher given that many of them reviewed for both submission rounds. We also want to acknowledge the efforts of the conference committee, including the Challenge Chairs, Demo and Exhibit Chairs, Local Chair, Financial Chairs, Publication Chair, Tutorial Chairs, Web Chairs, Women in ICPR Chairs, and Workshop Chairs. Many thanks, also, for the efforts of the dedicated staff who performed the crucially important work behind the scenes, including the members of the ICPR2020 Organizing Secretariat. Underline did a great job with their online platform. Throughout the planning process, the advice and guidance from the IAPR ExCo were most appreciated. Finally, we are grateful to the conference sponsors for their generous support of the ICPR2020 conference.

Rita Cucchiara, Alberto Del Bimbo, and Stan Sclaroff
ICPR2020 General Chairs





Winner of the 2020 K. S. Fu Prize

Ching Yee Suen

Concordia University, Montréal, Québec, Canada

For pioneering research and exeptional contributions to handwriting recognition and document understanding in theory, practice, and education

From Handwriting to Human Personality and Facial Beauty

This talk will start with a discussion on the sound and meaning of names (like “King-Ching” and “Sun-Suen”). It will recap pioneering research on printed and handwritten characters, and our original ideas in promoting and facilitating the global exchange of concepts and results, from publications to the creation of new workshops and conferences. Various efforts of uniting the strength of scientists and experts in the different parts of the world will be highlighted. Recognition techniques based on in depth research and extensive experiments, plus explorations of perceptual studies will be summarized together with practical applications. Comments on the immense popularity of writing messages on mobile devices will be made. We will introduce techniques of linking handwritten samples and drawings (such as the Wartegg test) to human personality (such as the Big Five Psychological Traits). This talk will conclude with our recent analyses of the effects of makeup colour space, texture, contrast, and golden ratios to assess human beauty and the transformation of cGANs to produce desirable beauty scores without altering the identity of female faces.

Biography

Dr. Ching Y. Suen is the Director of CENPARMI and the Honorary Chair in AI & Pattern Recognition of Concordia University, Montreal, Canada. Prof. Suen has served at numerous national and international professional societies as President, Vice-President, Governor, and Director. He has published about 200 papers in the proceedings of IAPR conferences and journals, 45 invited/keynote speeches at international conferences, and more than 350 regular papers at other conferences and journals, plus 200 invited talks at companies and academic institutions around the world. He has been the Principal Investigator or Consultant of 30 international industrial projects. Dr. Suen has published 7 conference proceedings and 16 books involving handwriting recognition, thinning methodologies, font analysis, multiple classifiers, detection of fake coins, and human beauty. He is the recipient of numerous awards. Prof. Suen has supervised 120 doctoral and master’s students to completion, and guided/hosted 100 long-term visiting scientists and professors. He is a fellow of the IEEE (since 1986), IAPR (1994), and the Academy of Sciences of the Royal Society of Canada (1995). Currently, he is the Emeritus Editor-in-Chief of the journal of Pattern Recognition, an Adviser or Associate Editor of 5 journals, and Editor of a new book series on Language Processing and Pattern Recognition. He is not only the founder of four conferences: ICDAR, IWFHR/ICFHR, ICPRAI, and VI, but has also organized many international conferences including ICPR, ICDAR, ICFHR, ICPRAI, and ICCPOL, and as the Honorary Chair of several conferences.

Editor's note: Please also see the Concordia University announcement https://www.concordia.ca/news/stories/2021/02/15/concordian-receives-top-honour-in-pattern-recognition.html about this high honor.

~Jing Dong, IAPR Newsletter *EiC*

Winner of the 2020 J. K. Aggarwal Prize

Abhinav Gupta

Carnetig Mellon University and Facebook AI Research, USA

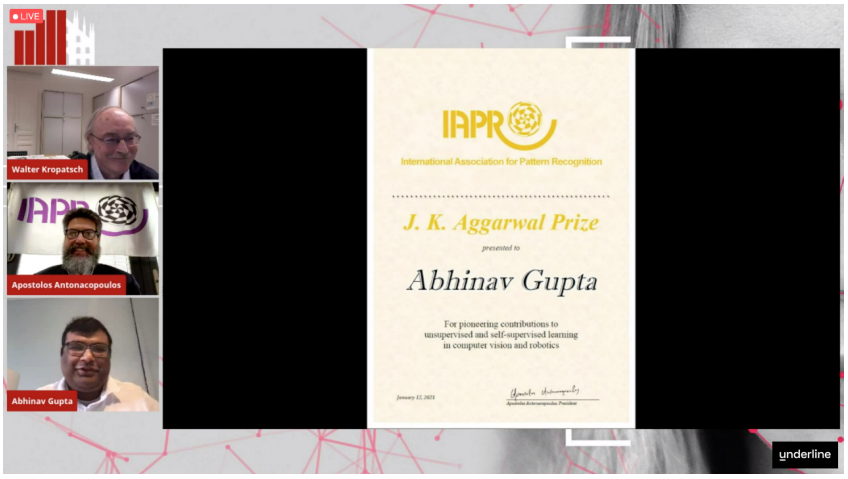
For pioneering contributions to unsupervised and self-supervised learning in computer vision and robotics

Towards Self-supervised Curious Robots

In the last decade, we have made significant advances in the field of computer vision thanks to supervised learning. But this passive supervision of our models has now become our biggest bottleneck. In this talk, I will discuss our efforts towards scaling up and empowering visual and robotic learning via self-supervised learning. First, I will then describe how self-supervised learning can be used for passive visual representation learning. I will describe some of the pitfalls of recent approaches and ways to overcome them. Next, I will discuss how embodiment is crucial for self-supervised learning — our agents live in the physical world and need the ability to interact in the physical world. Towards this goal, I will finally present our efforts in large-scale learning of embodied agents in robotics. Finally, I will discuss how we can move from passive supervision to active exploration — the ability of agents to create their own training data.

Biography

Abhinav Gupta is an Associate Professor at the Robotics Institute, Carnegie Mellon University and Research Manager at Facebook AI Research (FAIR). Abhinav's research focuses on scaling up learning by building self-supervised, lifelong and interactive learning systems. Specifically, he is interested in how self-supervised systems can effectively use data to learn visual representation, common sense and representation for actions in robots. Abhinav is a recipient of several awards including ONR Young Investigator Award, PAMI Young Researcher Award, Sloan Research Fellowship, Okawa Foundation Grant, Bosch Young Faculty Fellowship, YPO Fellowship, IJCAI Early Career Spotlight, ICRA Best Student Paper award, and the ECCV Best Paper Runner-up Award. His research has also been featured in Newsweek, BBC, Wall Street Journal, Wired and Slashdot.



Editor's note: Please also see the Carnegie Mellon University announcement https://www.cs.cmu.edu/news/gupta-wins-aggarwal-prize-self-supervised-learning.

~Jing Dong, IAPR Newsletter *EiC*

Winner of the 2020 Maria Petrou Prize

Maja Pantic

Imperial College and Facebook Research, UK

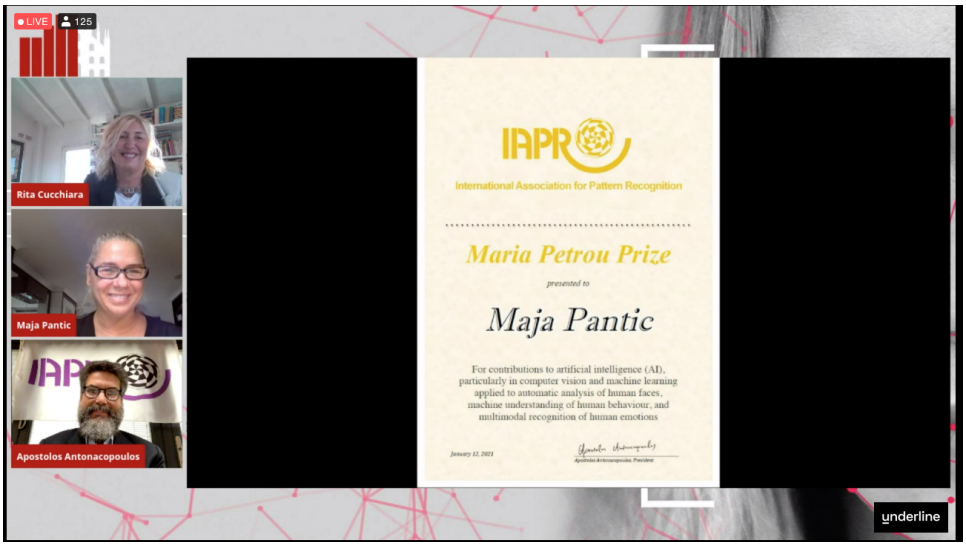
For contributions to artificial intelligence (AI), particularly in computer vision and machine learning applied to automatic analysis of human faces, machine understanding of human behaviour, and multimodal recognition of human emotions

Emotional AI, Faces & Deep Fakes

This talk is about emotional AI, about machine learning and computer vision methods developed for various human-centric AI applications, and about the technology behind generating “fake video news”.

Biography

Maja Pantic obtained her PhD degree in computer science in 2001 from Delft University of Technology, the Netherlands. Until 2005, she was an Assistant/ Associate Professor at Delft University of Technology. In 2006, she joined the Imperial College London, Department of Computing, UK, where she is Professor of Affective & Behavioural Computing and the Head of the iBUG group, working on machine analysis of human non-verbal behaviour. From April 2018 to April 2020, she was the Research Director of Samsung AI Research Centre in Cambridge. In April 2020, she joined Facebook as an AI Scientific Research Lead in Facebook London. Prof. Pantic is one of the world’s leading experts in the research on machine understanding of human behavior including vision-based detection, tracking, and analysis of human behavioral cues like facial expressions and body gestures, and multimodal analysis of human behaviors like laughter, social signals, and affective states. Prof. Pantic received various awards for her work including BCS Roger Needham Award, awarded annually to a UK based researcher for a distinguished research contribution in computer science. She is a Fellow of the UK’s Royal Academy of Engineering, an IEEE Fellow and an IAPR Fellow.



ICPR 2020 Keynote Speakers and Talk Abstracts

Editor's note: In addition to the three IAPR Prize Lectures, ICPR 2020 featured four Invited Keynote Speakers.
~Jing Dong, IAPR Newsletter *EiC*

Mihaela van der Schaar
University of Cambridge, UK

AutoML and interpretability: powering the machine learning revolution in healthcare

https://www.micc.unifi.it/icpr2020/index.php/mihaela-van-der-schaar/

AutoML and interpretability are both fundamental to the successful uptake of machine learning by non-expert end users. The former will lower barriers to entry and unlock potent new capabilities that are out of reach when working with ad-hoc models, while the latter will ensure that outputs are transparent, trustworthy, and meaningful. In healthcare, AutoML and interpretability are already beginning to empower the clinical community by enabling the crafting of actionable analytics that can inform and improve decision-making by clinicians, administrators, researchers, policymakers, and beyond. This keynote presents state-of-the-art AutoML and interpretability methods for healthcare developed in our lab and how they have been applied in various clinical settings (including cancer, cardiovascular disease, cystic fibrosis, and recently Covid-19), and then explains how these approaches form part of a broader vision for the future of machine learning in healthcare

Max Welling
University of Amsterdam and Qualcomm, NL

Equivariant graph neural networks and their applications

https://www.micc.unifi.it/icpr2020/index.php/max-welling/

Graph neural networks and their cousins transformers are becoming increasingly popular. For instance, one of the key components of Alphafold is an SE(3) equivariant transformer. In this talk I will review our work on graph neural networks, including the following extensions: gauge equivariant mesh-CNNs for deep learning on manifolds, natural graph neural networks for very general anisotropic graph convolution kernels, equivariant transformers for graph convolutions that are equivariant w.r.t. the rotation (and translation) group SO(3), and, time permitting, graph convolutional flow models.

ICPR 2020 Keynote Speakers and Talk Abstracts (continued)

Peitro Perona
Caltech (California Institute of Technology) and Amazon Web Services, USA

Measuring algorithmic bias in face analysis—towards an experimental approach

https://www.micc.unifi.it/icpr2020/index.php/pietro-perona/

Measuring algorithmic bias is crucial both to assess algorithmic fairness, and to guide the improvement of algorithms. Current methods to measure algorithmic bias in computer vision, which are based on observational datasets, are inadequate for this task because they conflate algorithmic bias with dataset bias. To address this problem I will propose experimental methods for measuring algorithmic bias of face analysis algorithms, which manipulates directly the attributes of interest, e.g., gender and skin tone, in order to reveal causal links between attribute variation and performance change. The method is based on generating synthetic "transects" of matched sample images that are designed to differ along specific attributes while leaving other attributes constant. A crucial aspect of our approach is relying on the perception of human observers, both to guide manipulations, and to measure algorithmic bias. Besides allowing the measurement of algorithmic bias, synthetic transects have other advantages with respect to observational datasets: sampling attributes more evenly, allowing for more straightforward bias analysis on minority and intersectional groups, enabling prediction of bias in new scenarios, reducing ethical and legal challenges, and they are economical and fast to obtain, helping make bias testing affordable and widely available. The method is validated by comparing it to a study that employs the traditional observational method for analyzing bias in gender classification algorithms. The two methods reach different conclusions. While the observational method reports gender and skin color biases, the experimental method reveals biases due to gender, hair length, age, and facial hair

David Doermann
University of Buffalo, USA

Document Integrity in an AI World

https://www.micc.unifi.it/icpr2020/index.php/david-doermann/

Traditionally documents have been used as a means for preserving information over both space and time. Ideally, the information is honestly created, accurately recorded, clearly represented, and, if properly protected, can serve as a trusted record to be consulted at a later time. However, we find that with traditional documents, the provenance can be questioned with respect to authorship, ownership, or accuracy of the information they contain because these proper safeguards do not always exist. Nevertheless, we can safely assume that humans created an overwhelming majority of them, and if they are modified, humans changed them. And forensic techniques exist to help restore their integrity. But what happens in a world where one can no longer assume an "overwhelming majority" of information has been honestly created, remains unmanipulated, or has even been authored by humans? This talk will explore the challenges of ensuring the integrity of documents that are being created in a world where AI systems are able to author and manipulate content at will. And what are the issues that need to be addressed in order to ensure that the historical content we are creating now remains believable in the future.

3DHU 2020: 3D Human Understanding

An ICPR 2020 Workshop, January 10, 2021

https://sites.google.com/unifi.it/3dhu2020

10 paper submissions; 7 acceptances; 25-30 participants

Workshop Organizers:

Claudio Ferrari, University of Florence
Giuseppe Lisanti, University of Bologna
Stefano Berretti, University of Florence
Liming Chen, École Centrale Lyon
Di Huang, Beihang University
Xiaoming Liu, Michigan State University

Invited Speakers:

Federico Tombar, TU Munich, DE
Anup Basu, U. Alberta, CA

The significant recent advancements in research fields such as robotics, autonomous driving, or human-machine interaction strongly renewed the interest in understanding the 3D world. In this context, interpreting the behavior of humans represents a crucial step towards the development of systems able to naturally blend into the real world.

Other than that, 3D data represents a richer source of information compared to 2D images or video sequences, and the development of new affordable and accurate 3D acquisition sensors is making the application of machine learning algorithms possible in real scenarios, further posing new challenges and practical issues.

The goal of this workshop is to bring together and unify research efforts in the field of 3D human understanding, spanning a variety of both theoretical and applicative topics. In the context of human analysis, there are several technical problems that are still open and that this workshop aims to address.

AIDP 2021: Intl Workshop on AI for Digital Pathology

An ICPR 2020 Workshop, January 10, 2021

http://prisca.unina.it/aidp2020/

11 paper submissions; 6 acceptances; 30 participants

Workshop Organizers:

Nadia Brancati, ICAR-CNR, IT
Giuseppe De Pietro, ICAR-CNR, IT
Maria Frucci, ICAR-CNR, IT
Maria Gabrani, IBM Research, CH
Daniel Riccio, U. of Naples Federico II, IT

Invited Speaker:

Nasir Rajpoot, University of Warwick, UK.

The Keynote speaker, Dr. Nasir Rajpoot of the University of Warwick, presented a thorough overview of the domain along with results from their Tissue Analytics Lab showing the potential of Computational Pathology in elucidating biological mechanisms, specifically in cancer research.

The topics of the contributed talks highlighted some of the challenges of AI in Digital Pathology.

- Presentations by Geetank Raipuria and Niccolò Marini addressed the problem of availability of labeled data (prostate cancer) by using teacher/student paradigms, learning from noisy annotations or generalizing.
- Anjani Dhragadhariya's work was based on performing NLP of the prostate cancer pathology reports to predict Gleason grade.
- The absence of local annotations was again discussed from the perspective of Multiple Instance Learning. In his talk, Ido Ben-Shaul proposed a method based on Montecarlo dropout to perform certainty-based pooling to classify whole slides based on the patches thought to carry more evidence of the disease.
- On the topic of stain Normalization, the talk by Yash Sharma proposed a cyclic adversarial mechanism to obtain a stain normalization that would keep the structural similarity.
- Finally, there was a thorough analysis of the data leakage phenomenon and its impact on evaluation metrics by Nicole Bussola.

AIHA 2020: AI for Healthcare Applications

An ICPR 2020 Workshop, January 10, 2021

http://lia.unicas.it/AIHA2020/schedule.html

41 paper submissions; 31 acceptances; 25-30 participants

Workshop Organizers:
Alessandro Bria, Nicole Dalia Cilia,
Francesco Fontanella, and Claudio Marrocco,
U. Cassino and Southern Lazio, IT

Invited Speakers:
Nico Karssemeijer,
Ex co-chair of DIAG at Radboud UMC
Founder of ScreenPoint
Co-founder of Volpara

Most of the medical data collected from healthcare systems are recorded in digital format. The increased availability of these data has enabled a number of artificial intelligence applications. Specifically, machine learning can generate insights to improve the discovery of new therapeutic tools, to support diagnostic decisions, to help in the rehabilitation process, to name a few. Researchers coupled with expert clinicians can play an important role in turning complex medical data (e.g., genomic data, online acquisitions of physicians, medical imagery, etc.) into actionable knowledge that ultimately improves patient care. In the last years, these topics have drawn clinical and machine learning research which ultimately led to practical and successful applications in healthcare. The purpose of this workshop was to present recent advances in artificial intelligence techniques for healthcare applications.

CADL 2020: Intl Workshop on Computational Aspects of DL

An ICPR 2020 Workshop, January 11, 2021

http://www.cadl.it/

19 paper submissions; 12 acceptances; 50-60 participants

Workshop Organizers:
Frederic Pariente, NVAITC, FR
Iuri Frosio, NVIDIA, US
Lorenzo Baraldi, UNIMORE, IT
Claudio Baecchi, U. of Florence, IT

Invited Speaker:
Adam Henryk Grzywaczewski, NVIDIA, UK
Tom Gibbs, NVIDIA, US
Mirko Cestari, CINECA, IT

The ICPR workshop on “Computational Aspects of Deep Learning” focused on the development of optimized deep neural network architectures and on the optimization of existing ones, also onto highly scalable systems. This includes the training on large-scale or highly-dimensional datasets, the design of novel architectures and operators for increasing the efficacy or the efficiency in feature extraction and classification, the optimization of hyperparameters to enhance model’s performance, solutions for training in multi-node systems such as HPC clusters.

CAIHA 2020: 1st WS on Computational and Affective Intelligence in Healthcare Applications: Vulnerable Populations

Jointly held with Designing AI in Support of GOOD Mental Health (GOOD)

An ICPR 2020 Workshop, January 10, 2021

https://rpal.cse.usf.edu/CAIHA2020/index.html#intro

13 paper submissions; 8 acceptances; 25-30 participants

Workshop Organizers:
Ghada Zamzmi, NIH, US
Sameer Antani, NIH, US
Michel Valstar, U. of Nottingham, UK
Shaun Canavan, U. of South Florida, US
Dmitry Goldgof, U. of South Florida, US
Rangachar Kasturi, U. of South Florida, US
Yu Sun, U. of South Florida, US

Invited Speakers:
Rosalind Picard, MIT, US
Jiebo Luo, University of Rochester, US

The intelligent monitoring of patients' conditions and affective states can: 1) lead to better understanding of their pattern; 2) provide consistent and continuous assessment, and hence prompt intervention; 3) expedite the early hospital discharge; and 4) decrease the family stress and financial burden. Though the intelligent monitoring of affective states has been around for the past several years, integrating contextual, personalized, uncertainty, and multimodal information recorded specifically from vulnerable populations has been less explored. This workshop provides an interdisciplinary forum for the exchange of ideas on novel applications, new datasets, current challenges, and future directions to enhance healthcare of vulnerable populations.

CARE 2020: 1st Intl WS on pattern recognition for positive teChnology And eldeRly wEllbeing

An ICPR 2020 Workshop, January 11, 2021

http://phuselab.di.unimi.it/CARE2020/

14 paper submissions; 11 acceptances; 20 participants

Workshop Organizers:
Raaella Lanzarotti, U. di Milano, IT
Nicoletta Noceti, UniGe, IT
Claudio de'Sperati, UniSR, IT
Francesca Odone UniGe, IT
Giuliano Grossi U. di Milano, IT

Invited Speaker:
Hatice Gunes, University of Cambridge, UK
Andrea Gaggioli, U. Cattolica di Milano, IT

Positive Technology (PT) is a new paradigm investigating how ICT-based applications and services can be used to foster positive growth of individuals, organizations, and society. It refers to technologies designed for improving the quality of personal experience with the goal of increasing wellness, and generating strengths and resilience in individuals, organizations, and society. Thanks to the advances in sensor technologies, and scientic findings, this field is rapidly growing and its application for monitoring and promoting elderly wellbeing has become a concrete possibility.

The boundaries of the topics pertinent to the workshop were very wide, and ranged from works purely on perception aspects—from face expressions and body gesture analysis, to social interaction assessment—to approaches including an explicit action toward the user—as techniques for mood induction.

CBIR 2020: Content-Based Image Retrieval: where have we been, and where are we going

Jointly held with VIQA and TAILOR Workshops
under the title Visual-Textual Image Understanding and Retrieval (VTIUR)

An ICPR 2020 Workshop, January 10, 2021

https://sites.google.com/unimib.it/cbir2020/home?authuser=0

4 paper submissions; 4 acceptances; 20 participants

Workshop Organizers:
Marco Bertini, U. of Florence, IT
Gianluigi Ciocca, U. of Milano-Bicocca, IT
Simone Santini, U. Autonoma de Madrid, ES
Raimondo Schettini, U. of Milano-Bicocca, IT

Invited Speakers:
Arnold Smeulders, U. of Amsterdam, The NL
Alberto Del Bimbo, U. of Firenze, IT

In this workshop we investigated the Content Based Image Retrieval (CBIR) twenty years after the "early years" to try to see what the mature years will look like. By analysing the past, its successes and its failures, we looked for guidance for the future. To this end, the workshop wanted to bring together researchers to share new methods, applications, reviews, and insights related to recent trends and directions in CBIR.

CVAUI 2020: 4th Workshop on Computer Vision for Analysis of Underwater Imagery

Flagship event of IAPR TC5 *Computer Vision for Underwater Environmental Monitoring*

Sponsored by the IAPR; An ICPR 2020 Workshop, January 10, 2021

https://www.iapr.org/cvaui2020

9 paper submissions; 6 acceptances

Workshop Organizers:
Maia Hoeberechts, U. of Victoria, CA
Alexandra Branzan Albu, U. of Victoria, CA

Invited Speaker:
Michael Jenkin, York University, CA

Monitoring marine ecosystems is of critical importance for gaining a better understanding of their complexity, including the effects of climate change and other anthropogenic influences on the ocean environment. Recordings of underwater video data and static images are collected with Internet-connected fixed and PTZ cameras and mobile systems, which observe a variety of biological processes. These systems generate an unprecedented volume of visual data which motivates the advancement of techniques for automated analysis of underwater imagery, for both fixed and mobile camera systems. This emerging and rapidly growing field imposes a series of unique challenges, which need to be tackled by the computer vision community in collaboration with biologists and ocean scientists. The contributions presented at CVAUI 2020 spanned the topics of underwater robotics, underwater image enhancement, and species classification and enumeration. As the flagship event of IAPR TC 5 Technical Committee, Computer Vision for Underwater Environmental Monitoring, the workshop also provided a forum for researchers to share and discuss state-of-the-art methods and applications for underwater image analysis.

DEEPRETIAL 2020: 2nd WS on Deep Understanding Shopper Behaviours and Interactions in Intelligent Retail Environments

An ICPR 2020 Workshop, January 11, 2021

https://deepretail.dii.univpm.it/

16 paper submissions; 8 acceptances; 200 participants (on average for the day)

Scientific Committee:
Sebastiano Battiato, U. di Catania,IT
Cosimo Distante, ISASI CNR
Marina Paolanti, U. Politecnica delle Marche
Luigi Di Stefano, Università di Bologna
Giovanni Marina Farinella, U. di Catania, IT
Primo Zingaretti, U. Politecnica delle Marche
Alessandro Bruno, Bournemouth University - UK
Annalisa Milella, CNR

Industrial Committee:
Massimo De Benedictis, IPSOS - France, IT
Luigi Caniglia, Acqua & Sapone - IT
Fioravante Allegrino, Sogeda - IT, Poland
Julian Oberndoerfer, ERA Europe - DE
Stefan Shemann, Harald Wypior, GKF - DE
Luca Di Camillo, Luxottica - US, IT
Joe Baer, Zen Genius - US
Nicola Evoli, James Damian Grottini - IT, US
Vito Micunco, Software Design - IT
Lorenzo Vorabbi, Datalogic - IT
Patrizia Gabellini, Valerio Placidi Grottini Lab - IT

Invited Speakers:
Francesco Marzoni, Nestlè, CH & Alexandre Alahi, EPFL, Stanford University, US

Invited from Industry (panel);
Berty Jacob (Unilever); Paola Romagnoli (Birra Moretti); Livio Martucci (IRI); Francesco Mammana (LG Electronics Italia); Andrea Laudadio (TIM Academy & Development); Alessandro Barchetti (Unes); Marco Zanardi (Retail Institute of IT); Valerio Placidi (Grottini Lab Srl)

DL-HAU 2020: DL for Human-Centric Activity Understanding

An ICPR 2020 Workshop, January 11, 2021

http://staff.ustc.edu.cn/~tzzhang/dl-hau2020/

17 paper submissions; 10 acceptances; 40-50 participants

Workshop Organizers:
Lamberto Ballan, University of Padova, IT
Jingen Liu, JD AI Research, Silicon Valley, US
Ting Yao, JD AI Research, Beijing, CN
Tianzhu Zhang, U. of Science and Technology, CN

Invited Speaker:
Dima Damen, University of Bristol, UK
Xavier Alameda-Pineda, INRIA, FR
Prof. Jiebo Luo, University of Rochester, US

Understanding human activity and thus effectively collaborating with humans is critical for some artificial intelligence systems. It is a very challenging problem which involves multiple tasks such as human action detection, person tracking, pose estimation, human-object interaction, and so on. Each of them has been independently developed into a research sub-area. Among them, however, there may exist some connections, which can be leveraged to boost the recognition. The purpose of this workshop was to bring together the research on human activity understanding, which hopefully can trigger more discussions on cross-task recognition and inspire new research ideas for human-centric activity understanding. This workshop encourages multi-task pattern recognition research, such as joint action detection and person tracking, joint event segmentation and recognition, joint pose tracking and estimation, and so on.

DLPR 2020: 3rd Intl Wshp on Deep Learning for PR

An ICPR 2020 Workshop, January 11, 2021

https://dlpr2020.github.io/home/index.html

28 paper submissions; 14 acceptances; about 45 participants

Workshop Organizers:

Yongchao Xu, Huazhong U. Sci. & Tech., CN
Meina Kan, Inst. Computing Technology, CAS, CN
Xiang Bai, Huazhong U. Sci. & Tech., CN
Shiguang Shan, Inst. Computing Tech., CAS, CN
Jingdong Wang, Microsoft Research Asia
Chunhua Shen, University of Adelaide, AU
Gang Hua, Wormpex AI Research, US

Invited Speaker:

Liang Zheng, Australian National University

Deep Learning (DL), which can be treated as the most significant breakthrough in the past 10 years in the field of pattern recognition (PR) and machine learning (ML), has greatly affected the methodology of related fields like computer vision and achieved terrific progress in both academy and industry. It achieved an end-to-end PR, merging the previous steps of pre-processing, feature extraction, classifier design and post-processing. It is expected that the development of DL theories and applications would further influence the field of PR.

The major goal of this workshop was to provide a platform for researchers or graduate students to report on or exchange their progress. Scope and topics: DL architectures for PR, for object recognition, for document analysis, for semantic segmentation, for scene understanding, multi-modal DL etc.

EDL/AI 2020: Explainable Deep Learning - AI

An ICPR 2020 Workshop, January 11, 2021

https://edl-ai-icpr.labri.fr/

47 paper submissions (including 4 invitations); 8 papers and 12 posters accepted; 91 (peak) participants

Workshop Organizers:

Jenny Benois-Pineau, LABRI/UB, FR
Georges Quénot, LIG/CNRS, FR

Invited Speakers:

Prof. D. Petkovic, San Francisco State Univ., US

Invited Papers:

M. T. Keane, E. Kenny, (IE): *Explanatory Variations for Deep Learning Using Twin Systems*
D. Petkovic, A. Alavi, D. Cai and M. Wong, (US): *Toward Explainable AI: Random Forest Mandel and Sample Explainer*
A. Halnaut, R. Giot, R. Bourqui, D. Auber, (FR): *Pixel oriented visualization of samples across layers of a classification based DNN*
M. Oussalah, (FI): *AI Explainability. A Bridge between Machine Vision and Natural Language Processing*

Panel:

R. Cucchiara (UNIMORE, IT), P. Radeva (UB, SP), G. Quenot (CNRS-LIG, FR), J. Benois-Pineau (UB, FR), D. Petkovic (SFSU, US), animator D. Petkovic (SFSU, US)

The recent focus of the AI and Pattern Recognition (PR) communities on supervised learning approaches, particularly Deep Learning (DL)/AI, resulted in a considerable increase of performance of PR and AI systems but also raised the question of the trustworthiness and explainability of their predictions for decision-making. Instead of developing and using DL as a black box and adapting known Neural Networks (NN) architectures to a variety of problems, the goal of explainable DL/AI is to propose methods to “understand” and “explain” how these systems produce their decisions. AI systems may produce errors, can exhibit overt or subtle bias, may be sensitive to noise in the data, and often lack technical and judicial transparency and explainability. These shortcomings raise many ethical and policy concerns that impede wider adoption. In various PR and AI application domains (e.g., health, ecology, autonomous cars, security) it is mandatory to understand how the predictions are correlated with the information perception and decision making by the experts.

EgoApp 2020: 2nd WS on Applications of Egocentric Vision

An ICPR 2020 Workshop, January 10, 2021

https://egoappworkshop2020.wordpress.com/

7 paper submissions; 5 acceptances; around 50 (peak) participants

Workshop Organizers:

Maya Aghaei, NHL Stenden, NL
Cigdem Beyan, Istituto Italiano di Tecnologia, IT
Fernando De la Torre, Facebook Research, US
Vittorio Murino, Huawei Technologies, IE
Lorenzo Natale, Istituto Italiano di Tecnologia, IT
Alessio Del Bue, Istituto Italiano di Tecnologia, IT

Invited Speaker:

Walterio Mayol-Cuevas, University of Bristol, UK
Danica Kragic, Royal Institute of Technology, SE

Egocentric vision offers a unique manner to record actions as they are performed by the user, gathering important visual data about the life of the user and bystanders. Nonetheless, egocentric vision, as compared to the conventional (3rd person) vision, introduces novel computational challenges.

Efficient tools will help understand how the user manipulates certain objects, with whom interacts, how many calories consumed in a day, how long each of these activities lasted etc. Related technologies act as assistive technologies not only for patients in need, but also for healthy people who seek additional support in their daily living, i.e. by a humanoid robot. Within EgoApp, besides covering the conventional topics around applications of egocentric vision, we intended to deal visual perception of the robot environment, with special emphasis on methodologies and approaches for analysis of images and videos acquired from the point of view of a robot with their related challenges.

ETTAC 2020: 1st WS on Eye Tracking Techniques, Applications and Challenges

An ICPR 2020 Workshop, January 10, 2021

https://vision.unipv.it/ettac2020/

14 paper submissions; 9 acceptances; about 25 participants

Workshop Organizers:

Marco Porta, University of Pavia, IT
Paweł Kasprowski, Silesian Univ. of Tech., Poland
Luca Lombardi, University of Pavia, IT
Piercarlo Dondi, University of Pavia, IT

Invited Speakers:

Olivier Le Meur, from Univ. Rennes, FR

Eye tracking technology is becoming more and more widespread nowadays, also thanks to the recent availability of cheap commercial devices. At the same time, novel techniques are constantly pursued to improve the precision of gaze detection, and new ways to fully exploit the potential of eye data are continuously explored. Whatever the considered use context, be it Human-Computer Interaction, user behavior understanding, biometrics, or others, pattern recognition often plays a relevant role. The purpose of the ETTAC workshop was to present recent eye tracking research that directly or indirectly exploits any form of pattern recognition.

FAPER 2020: Intl. WS on Fine Art Pattern Extraction and Recognition

Sponsored by the IAPR; An ICPR 2020 Workshop, January 11, 2021

https://www.iapr.org/faper2020

15 paper submissions; 14 acceptances; 20-25 participants on average

Workshop Organizers:
Gennaro Vessio, University of Bari, IT
Giovanna Castellano, University of Bari, IT
Fabio Bellavia, University of Palermo, IT

Invited Speaker:
Fabio Remondino, Fondazione Bruno Kessler, IT

The workshop was intended to provide an international forum for those wishing to present state-of-the-art advances, innovative research, ongoing projects and academic and industrial reports on the application of pattern extraction and recognition in fine arts. The workshop solicited contributions from diverse areas, such as pattern recognition, computer vision, artificial intelligence and image processing.

Accepted papers offered various contributions focusing on different fine arts including painting, sculpture, architecture, photography and historical documents. On the one hand, some contributions addressed and revised the problem of high-level semantic analysis and interpretation of the artwork. On the other hand, further contributions focused on solutions for the preservation and restoration of fine arts. The workshop program was completed by an invited talk on machine and deep learning methods for semantic segmentation of 3D heritage data, given by Fabio Remondino of FBK - Fondazione Bruno Kessler, Italy.

Fruitful discussions and exchanges arose during the paper presentation. The precious and interested participation and contribution laid the foundations for a new edition of the workshop in the future.

FBE 2020: Workshop on Facial and Body Expressions, micro-expressions and behavior recognition

An ICPR 2020 Workshop, January 10, 2021

https://micc.unifi.it/FBE2020/

11 paper submissions; 7 acceptances; about 35 participants

Workshop Organizers:
Federico Becattini, University of Florence, IT
Vittorio Murino, University of Verona, IT
Federico Pernici, University of Florence, IT
Moi Hoon Yap, Manchester Metropolitan Univ., UK

Invited Speakers:
Guoying Zhao, University of Oulu, FI

FBE is a venue for researchers working in the field of human behavior understanding. The workshop has a specific focus on low-level characteristics, either facial or related to the human body, aiming at understanding high-level concepts, such as recognizing actions or emotions. In general, low-level expressions and behaviors are more difficult to recognize than high-level ones, due to the fine-grained nature of the problem. It is also a fact that with the recent technological advancement, the means of data acquisition and processing have also dramatically improved, enabling new applications and analyses. To reliably understand facial micro-expressions, for example, there are both spatial and temporal issues to take into account. On the one hand it is necessary to either acquire and process high-resolution images or rely on different kinds of data such as high-quality depth maps. On the other hand, micro-expressions occur over an extremely short timespan (<500ms) and might not even be detectable with conventional low-framerate cameras. If some years ago it was not possible to acquire this kind of data and process it, now it certainly is.

FGVRID 2020: Fine-Grained Visual Recognition and re-IDentification

An ICPR 2020 Workshop, January 11, 2021

https://fgvrid.github.io/

12 paper submissions; 7 acceptances

Workshop Organizers:

Shiliang Zhang, Peking University, CN
Guorong Li, Univ. of Chinese Academy of Sciences
Weigang Zhang, Harbin Inst. of Tech., Weihai, CN
Qingming Huang, Univ. of Chinese Academy of Sci.
Nicu Sebe, University of Trento, IT

Invited Speakers:

Alberto Del Bimbo, University of Florence, IT
Rita Cucchiara, UNIMORE, IT
Weishi Zheng, Sun Yat-sen University, CN
Elisa Ricci, University of Trento, IT

The ubiquitous surveillance cameras are generating huge amount of videos. Automatic video content analysis and recognition are thus desirable for effective utilization of those data. Fine-Grained Visual Recognition and Re-Identification (FGVRID) aims to accurately identify visual objects and match re-appearing targets, e.g., persons and vehicles, from a large set of images and videos. It has the potential to offer an unprecedented possibility for intelligent video processing and analysis,as well as to explore the promising applications on public security.The FGVRID workshop aimed to bring together researchers from fine-grained visual categorization, as well as person/vehicle ReID communities, and to foster discussions and exchange of ideas between them.The workshop had four invited talks and seven oral presentation covering event detection, person re-identification, fine-grained visual recognition, domain adaption, and video summarization, etc.

GOOD 2020: Designing AI in Support of Good Mental Health

Jointly held with the 1st WS on Computational and Affective Intelligence in Healthcare Applications: Vulnerable Populations (CAIHA)

An ICPR 2020 Workshop, January 10, 2021

https://goodmentalhealth.ai/good-icpr2020.html

11 paper submissions; 7 acceptances; about 35 participants

Workshop Organizers:

Ajay Chander, Fujitsu Labs of America
Martha Russell, Stanford University, US
Anssi Smedlund, Aalto University, Ilmarinen, FI

The world is experiencing a mental health crisis that is in need of immediate attention. It is estimated that 1 out of 5 people globally have had a mental illness, and at least 3 out of 5 people have had experiences of mental illness. The American Psychiatric Association estimates that 50% of mental illness begins by age 14, and 75% of mental illness begins by age 24. These ages are some of the most technologically connected segments of our life span, providing unique opportunities for technological solutions to play a key role in addressing this crisis. This domain comes with unique challenges. In several mental health scenarios, there isn't a high degree of agreement between experts on the ground truth of a situation, and culture and its dynamism adds complexity. Datasets can be small or noisy as they capture human expression during periods of desired change. There is a large cohort of trained providers who would like to use technology well to expand their scale, and to augment their efficacy. There are several other community-centered ecosystems - school, work, religion, others - that play a key role in good mental health and can benefit from technology that leverages their presence. And technology can augment all aspects of fostering good mental health: awareness, assessment, mediation, and maintenance. The mental health crisis is a huge opportunity for the research, design, and deployment of AI/ML-assisted systems to improve good mental health at scale and the GOOD series of scientific workshops and global meetups brings together experts from academia, government, and industry to discuss and chart the path forward together.

HAVAIUC 2020: 1st Intl. WS on Human and Vehicle Analysis for Intelligent Urban Computing

An ICPR 2020 Workshop, January 11, 2021

https://havaiuc.github.io/

Workshop Organizers:
Wu Liu, JD AI Research, Beijing, CN
Hailin Shi, JD AI Research, Beijing, CN
Yunchao Wei, U. of Technology Sydney, AU
Dan Zeng, Shanghai University, CN
Jiebo, Luo, University of Rochester, US

Invited Speakers:
Stan Z. Li, Westlake University, CN
Tony Han, WeRide, US
Si Liu, Beihang University, CN

The goals of this workshop were to:

1. bring together the state of the art research on human and vehicle analysis for intelligent urban computing;
2. call for a coordinated effort to understand the opportunities and challenges emerging in human and vehicle analysis
3. identify key tasks and evaluate the state-of-the-art methods
4. showcase innovative methodologies and ideas
5. introduce interesting real-world intelligent urban computing systems or applications
6. propose new real-world datasets and discuss future directions.

IADS 2020: Integrated Artificial Intelligence in Data Science

Merged with the Workshop o Cognitive Robotics (IWCR)

An ICPR 2020 Workshop, January 11, 2021

http://www.ikelab.net/news-events/ads-workshop-icpr-2020/

22 paper submissions; 15 acceptances; about 20 participants

Workshop Organizers:
Jerry Chun-Wei Lin, HVL, Norway
Stefania Tomasiello, University of Tartu, Estonia
Gautam Srivastava, Brandon University, CA

Invited Speakers:
Philippe Fournier-Viger
Harbin Institute of Technology, Shenzhen, CN

The beneficial deployment of AI in science, medicine, technology, humanities and social sciences has already been shown. Data science, also referred to as pattern analytics and mining, can be used to retrieve useful and meaningful information from the databases, which is helpful in making efficient decisions and strategies regarding different domains and applications. In particular, due to the exponential growth of data in recent years, the dual concept of big data and AI has given rise to many research topics, such as scale-up behaviour from the former classical algorithms.

A recent challenge is also represented by the integration of multiple AI technologies, as emerging from different fields (e.g. vision, security, control, bio-informatics), in order to develop efficient and robust systems interacting in the real world. In spite of the tremendous progress on core AI technologies over the last years, the integration of such competencies into larger systems that are reliable, transparent and maintainable is still at the beginning stage. There are still numerous open issues both from the theoretical and practical perspective.

IML 2020: 1st Intl. WS on Industrial Machine Learning

An ICPR 2020 Workshop, January 10, 2021

https://sites.google.com/view/iml2020

Workshop Organizers:

Francesco Setti, University of Verona, IT
Luigi Di Stefano, University of Bologna, IT
Paolo Rota, University of Trento, IT
Vittorio Murino, University of Verona, IT
Massimiliano Mancini, Univ. of Tüebingen, DE

Invited Speakers:

Emanuele Frontoni, U. Politecnica delle Marche, IT
Andreas François Vermeulen, Sopra Steria, UK

With the advent of Industry 4.0 paradigm, data has become a valuable resource and asset for manufacturers. Data from many sources are now cheaper than ever to be collected and stored. With such an amount of data, automated learning methods must be applied to produce value, a market estimated at more than $200B worldwide. Through the use of ML techniques manufacturers can use data to significantly impact their bottom line by greatly improving production efficiency, product quality, and employee safety.

The introduction of ML in industry has many benefits that can result in advantages well beyond efficiency improvements, opening doors to new opportunities for both practitioners and researchers. Some direct applications of ML in manufacturing include predictive maintenance, supply chain management, logistics, quality control, human-robot interaction, process monitoring, anomaly detection and root cause analysis to name a few. The aim of this workshop was to draw attention to the importance of integrating ML technologies and ML-based solutions into the manufacturing domain, while addressing the challenges and barriers to meet the specific needs of this sector.

IMTA-VII 2020: Image Mining. Theory and Applications

Conducted by IAPR TC16 *Algebraic and Discrete Mathematical Techniques in PR and IA*

Sponsored by the IAPR; An ICPR 2020 Workshop, January 11, 2021

http://iapr.org/imta2020

34 paper submissions; 31 acceptances; 20 participants on average with about 35 at peak

Workshop Organizers:

Igor Gurevich, FRC-CSC, RAS, RU
Davide Moroni, ISTI, CNR, Pisa, IT
Dietrich Paulus, University Koblenz-Landau, DE
Vera Yashina, FRC-CSC, RAS, RU

Invited Speakers:

I. Gurevich and V. Yashina, RAS, RU
Gerhard Ritter, University of Florida, Gainesville, US
M. A. Pascali and D. Moroni, ISTI-CNR, IT
Bernd Radig Munich Technical University, DE

The primary purpose of the IMTA workshops has been to provide the fusion of modern mathematical approaches and techniques for image analysis/pattern recognition with the requests of applications. Image mining methods are able to extract knowledge and to highlight patterns, enabling very important applications such as medical diagnosis, robotics, technical diagnosis and non-destructive testing, precision agriculture, novel industrial support system, remote sensing, anthropogenic and ecological forecasting and monitoring, and many others. The technological advances and the increase of storage capability support the growth of large and detailed, but possibly noisy, image datasets. Hence, IMTA-VII-2020 topics are of utmost relevance being the perfect humus for giving rise to significant collaborations with other emerging fields, both theoretical and applied; e.g. computational topology, algebraic lattice methods, or machine learning, together with new concepts and trends, such as topological features and invariants and their computation for digital images, representations and compression of nD images based on topology, Descriptive Image Algebras and Descriptive Image Models and Representations and, based on them multi-level multiple image classifiers, lattice-based learning from time-series, images by video/image mining, applications of fuzzy lattices in pattern recognition, and many others.

IWBDAF 2020: Intl. WS on Biometric Data Analysis & Forensics

An ICPR 2020 Workshop, January 11, 2021

https://scf.di.unisa.it/iwbdaf/

Workshop Organizers:
Andrea Francesco Abate, University of Salerno, IT
Giuseppe Cattaneo, University of Salerno, IT
Andrea Bruno, University of Salerno, IT

Keynote 1:
Modesto Castrillòn Santana
Universidad de Las Palmas de Gran Canaria

Keynote 2:
V. Sovr. Riccardo Improta
Italian Postal Police – CNCPO
Avv. Mario Ianulardo
Computer Crimes Lawyer

Law Enforcement Agencies (LEA) around the world are increasingly using biometric technologies for crime scene analysis. The goal of the workshop was to propose new techniques and methodologies for the study of biometric evidence on the crime scenes, taking particular care of the data coming from IoT devices, eventually adopting them from other well-studied fields of Digital Forensics.

IWCR 2020: Workshop on Cognitive Robotics

Merged with the Integrated Artificial Intelligence in Data Science (IADS)

An ICPR 2020 Workshop, January 11, 2021

https://isair.site/iwcr2020/

Workshop Organizers:
Tohru Kamiya, Kyushu Institute of Technology, Japan
Shenglin Mu, Ehime University, Japan

Invited Speakers:
Fuchun Sun, Tsinghua University, CN
Yanchun Zhang, Victoria University, AU

The integration of artificial intelligence and robotic technologies has become a topic of increasing interest for both researchers and developers from academic fields and industries worldwide. It is foreseeable that artificial intelligence will be the main approach of the next generation of robotics research. The aim of this symposium was to provide a platform for young researchers to share up-to-date scientific achievements in this field.

MadiMA 2020: 6th Intl WS on Multimedia Assisted Dietary Mgt

An ICPR 2020 Workshop, January 11, 2021

https://madima.org/

9 summissions; 9 acceptances; about 50 participants

Workshop Organizers:
Stavroula Mougiakakou, Univ. of Bern, CH
Giovanni Maria Farinella, University of Catania, IT
Keiji Yanai, Univ. of Electro-Communications, Japan
Dario Allegra, University of Catania, IT

Invited Speakers:
Benny Lo
Imperial College London, UK

Anastasios Delopoulos
Aristotle U. of Thessaloniki, GR

The main scope of MADiMa2019 is to bring together researchers from the diverse fields of engineering, computer science and nutrition who investigate the use of information and communication technologies for better monitoring, assessment and management of food intake. The combined use of multimedia, machine learning algorithms, ubiquitous computing and mobile technologies permit the development of applications and systems able to monitor the dietary behavior, analyze food intake, identify eating patterns and provide feedback to the user towards healthier nutrition. The researchers presented and demonstrated their latest progress and discussed novel ideas in the field. Besides the technologies used, emphasis was given to the precise problem definition, the available nutritional databases, the need for benchmarking multimedia databases of packed and unpacked food and the evaluation protocols.

MAES 2020: Machine Laerning Advances Environmental Science

An ICPR 2020 Workshop, January 10, 2021

https://sites.google.com/view/maes-icpr2020/

21 paper submissions; 15 acceptances; 25 participants

Workshop Organizers:
Francesco Camastra, Parthenope University, IT
Friedrich Recknagel, University of Adelaide, AU
Antonino Staiano, Parthenope University, IT

Invited Speakers:
Friedrich Recknagel, University of Adelaide, AU
Michele Scardi, University of Rome Tor Vergata, IT

Nowadays, natural and environmental data are growing steadily in volume, complexity, and diversity to Big Data, mainly driven by advanced sensor technology. By now, it's ordinary for scientists to cope with complex decision-making processes for assessing potential impacts or risks associated with a given specific threat and for understanding behaviors and dynamics of natural phenomena, e.g., when simulating the export of nutrients from river basins to forecast salinity, to forecast ozone levels, to predict air pollution and the functional characteristics of ecosystems, to model algal growth and transport in rivers, to assess the risk of mortality of sensible species associated with the deliberate release of genetically modified organisms or plants in the environment, and to analyze the degradation of pesticides in soils used in agriculture through the analysis of physical and chemical parameters, just to name a few. Machine Learning (ML) can offer superior techniques for unraveling complexity, knowledge discovery, and predictability of Big Data environmental science. In this context, the aim of the workshop was to provide a state-of-the-art survey of environmental research topics that can benefit from ML methods and techniques, and also a forum for researchers and practitioners working in both fields.

Manlearn 2020: Manifold Learning from Euclid to Riemann

An ICPR 2020 Workshop, January 11, 2021

https://sites.google.com/view/manlearn2020/

3 paper acceptances; 35 participants

Workshop Organizers:
Mohamed Daoudi
IMT Lille Douai, CRIStAL UMR CNRS, FR
Mehrtash Harandi
Monash University, AU
Vittorio Murino
University of Verona, IT, Huawei Technologies Ltd., IE, &
Istituto Italiano di Tecnologia, IT

Invited Speakers:
Ha Quang Minh
RIKEN-AIP Tokyo, Japan
Xavier Pennec
Université Côte d'Azur and Inria, FR
Shantanu Joshi
University of California Los Angeles, US
Nicolas Boumal
EPFL, CH

ManLearn was a half day workshop. This workshop explored the latest development in machine learning techniques developed to work on/benefit from the non-linear manifolds. We have discussed the challenges and future directions related to the application of non-linear geometry, Riemannian manifolds in computer vision and machine learning.

MANPU 2020: 4th Intl WS on coMics ANalysis, Processing and Understanding

Endorsed by the IAPR; An ICPR 2020 Workshop, January 10, 2021

http://manpu2020.imlab.jp/

5 paper submissions; 4 acceptances; 25 participants

Workshop Organizers:

Jean-Christophe Burie, Univ. of La Rochelle, FR
Motoi Iwata, Osaka Prefecture University, Japan
Miki Ueno, Osaka Institute of Technology, Japan

Invited Speaker:

Ryosuke Yamanishi, Kansai University, Japan

Comics is a medium constituted of images combined with text and other visual information in order to narrate a story. Nowadays, comic books are a widespread cultural expression, and the market of comics continues to grow. Moreover, from the research point of view, comics images are attractive targets because the structure of a comics page includes various elements (such as panels, speech balloons, captions, leading characters, and so on), the drawing of which depends on the style of the author and presents a large variability. Therefore comics image analysis is not a trivial problem and is still immature compared with other kinds of image analysis.

For the fourth MANPU edition, the review process was carried out by the Program Committee consisting of 19 outstanding researchers, all of whom are specialists of comics analysis, processing and understanding. The presentations widely covered the topics related to comics researches, for example, comics analysis, comics image generation, and utilization of comics. The 4 accepted papers were published by Springer, https://link.springer.com/book/10.1007/978-3-030-68780-9.

MMDLCA 2020: Multi-Modal DL: Challenges and Application

An ICPR 2020 Workshop, January 11, 2021

https://sites.google.com/view/manlearn2020/

19 paper submissions; 11 acceptances; about 50 participants

Workshop Organizers:

Zhineng Chen, Chinese Academy of Sciences, CN.
Xirong Li, Renmin University of China, CN
Efstratios Gavves, U. of Amsterdam, NL
Mei Chen, Microsoft Cloud & AI, US
Ioannis (Yiannis) Kompatsiaris, CERTH-ITI, GR

Invited Speakers:

Henning Muller, University of Geneva, CH
Ting Yao, JD AI Research, CN

Deep learning is now recognized as one of the key software engines that drives the new industrial revolution. The majority of current deep learning research efforts have been dedicated to single-modal data processing. Pronounced manifestations are deep learning based visual recognition and speech recognition. Although significant progress has been made, single-modal data is often insufficient to derive accurate and robust deep models in many applications.

Our digital world is by nature multi-modal, combining different modalities of data such as text, audio, images, animations, videos and interactive content. Multi-modal is the most popular form for information representation and delivery. For example, posts for hot social events are typically composed of textual descriptions, images and videos. For medical diagnosis, the joint use of medical imaging and textual reports is also essential. Multi-modal data is common for humans to make accurate perceptions and decisions. Multi-modal deep learning that is capable of learning from information presented in multiple modalities and consequently making predictions based on multi-modal input is much in demand.

MMForWild 2020: MultiMedia FORensics in the WILD

An ICPR 2020 Workshop, January 11, 2021

http://manpu2020.imlab.jp/

22 paper submissions; 12 acceptances

Workshop Organizers:

Mauro Barni, University of Siena, IT
Sebastiano Battiato, University of Catania, IT
Giulia Boato, University of Trento, IT
Hany Farid, University of California, Berkeley, US
Nasir Memon, New York University, US

Invited Speaker:

Giovanni Tessitore, Scientific Police Service Rome, IT
Fernando Pérez-González, University of Vigo, ES

The rapid growth of multimedia collections worldwide opens new challenges to multimedia technology with respect to crime prevention and investigation. The protection of images, video, and audio data from illegal use, as well as its exploitation in forensics and intelligence, have become serious challenges as the sheer data volume renders a full manual inspection by an expert impossible. Tools are needed to support the protection, management, processing, interpretation, and visualization of multimedia data in the different steps of the investigation process. Many exciting solutions for related problems have been developed in the multimedia research community (including knowledge extraction, categorization, indexing, browsing and visualization. The problem with many of these is that they work well in controlled but often fail to provide reliable answers in real-life conditions.

MMForWILD sought to offer a forum for proposing multimedia forensic solutions meeting the operational needs of forensics and intelligence operators. It intended to offer a venue for theory- and data-driven techniques addressing the trustworthiness of media data and the ability of verifying their integrity to prevent harmful misuses, seeking solutions at the edge of signal processing, deep learning, multimedia analysis.

MOI2QDN 2020: WS on Metrification and Optimization of Input Image Quality in Deep Networks

An ICPR 2020 Workshop, January 11, 2021

https://sites.google.com/my.westminster.ac.uk/moi2qdn/home

12 paper submissions; 7 acceptances; about 50 participants

Workshop Organizers:

Zhineng Chen, Chinese Academy of Sciences, CN.
Xirong Li, Renmin University of China, CN
Efstratios Gavves, U. of Amsterdam, NL
Mei Chen, Microsoft Cloud & AI, US
Ioannis (Yiannis) Kompatsiaris, CERTH-ITI, GR

Invited Speakers:

Henning Muller, University of Geneva, CH
Ting Yao, JD AI Research, CN

Recent years have seen significant advances in image processing and computer vision applications based on Deep Neural Networks (DNNs). This is a critical technology for a number of real-time applications including autonomous vehicles, smart cities, and industrial computer vision. Often deep neural networks for such applications are trained and validated based on the assumption that the images are artefact-free. However, in most real-time embedded system applications the images input to the networks have variations external conditions as well as artefacts introduced by the imaging process. Data augmentation methods are exploited to expand the subset of trained images. Such data augmentation often may result in improved performance of the network for artefact-specific images but also degrades the performance of DNNs for artefact-free images. Despite recent advances in the interpretability and explainability of deep neural models, DNNs remain widely systems whose operational boundaries cannot be explained or otherwise quantified. It is therefore not clear the level of distortions networks can tolerate, or the exact reasons for any network performance degradation. MOI2QDN workshop addresses the issues of performance quantification in DNNs and explores recent advances in the systematic analysis of image quality variations in the performance of DNNs.

MPRSS 2020: 6th IAPR TC9 Multimodal Pattern Recognition of Social Signals in Human-Computer Interaction

An IAPR TC9 *Pattern Recognition in Human Machine Interaction* event

Sponsored by the IAPR; An ICPR 2020 Workshop, January 10, 2021

http://iapr.org/mprss2020

10 paper submissions; 8 acceptances; about 30 participants

Workshop Organizers:
Friedhelm Schwenker, Ulm University, DE
Mariofanna Milanova, U of Arkansas Little Rock, US

Invited Speaker:
Dilana Hazer-Rau, Ulm University, DE
Xavier Alameda-Pineda, INRIA/Université Grenoble-Alpes, FR
StffenWalter, Ulm University, DE
Mariofanna Milanova, U of Arkansas at Little Rock, US

Research in the field of intelligent human-computer-interaction has made considerable progress in methodology and applications. However, building intelligent artificial companions capable of interacting with humans, in the same or similar way humans interact with each other, remains a major challenge for future research in the field of emotional artificial intelligence. Pattern recognition and machine learning methodology play a major role in this pioneering field of research. The MPRSS 2020 workshop at the ICPR conference, as well as the previous five MPRSS events, was focussing on methodological aspects pattern recognition and machine learning in applications such as social signal processing, including multimodal emotion recognition, classification of stress, and pain intensity estimation.

PaMMO 2020: Perception and Modelling for Manipulation of Objects

An ICPR 2020 Workshop, January 10, 2021

https://sites.google.com/view/pammo-icpr2020

Workshop Organizers:
Markus Vincze, Vienna University of Technology
Andrea Cavallaro, Queen Mary University of London
Berk Calli, Worcester Polytechnic Institute
Krystian Mikolajczyk, Imperial College London
Mihai Andries, IMT Atlantique

Invited Speakers:
Francesc Moreno-Noguer, UPC Barcelona
Lorenzo Natale, IIT
Ville Kyrki, Aalto University
Mikko Lauri / Ge Gao, U Hamburg
Tatiana Tommasi, U Torino
David Held, CMU
Guillem Alenya, CIRC
Vikash Kumar, FAIR

PaMMO focused on recent advances, open problems, and next steps to be taken in recognition and modelling for the handover and manipulation of everyday objects. The Workshop included invited talks by prominent researchers from different disciplines (e.g., vision and robotics for object manipulation), an open discussion, interactive videos and demos accompanied by posters.

Object recognition, modelling, and pose estimation of objects for robot manipulation has achieved great advances in recent vision and robotics conferences (e.g., 6D pose challenges at vision conferences). However, vision still struggles with recognition under partial occlusions (e.g., in clutter or when an object is held by a human) and robots are still unable to handle everyday objects under realistic conditions in home, care, and service settings. Despite significant recent advances in data-driven grasping and manipulation, there are still considerable challenges to be addressed at the intersection of perception, robotics hardware, learning and grasp prediction.

PATCAST 2020: International Workshop on Pattern Forecasting

An ICPR 2020 Workshop, January 11, 2021

https://sites.google.com/di.uniroma1.it/patcast

2 paper submissions; 2 acceptances

Workshop Organizers:

Marco Cristani, University of Verona, IT
Fabio Galasso, Sapienza University of Rome, IT
Kris Kitani, Carnegie Mellon University, US
Siyu Tang, ETH Zürich, CH

Invited Speakers:

Thomas Brox + Osama Makansi, U. Freiburg, DE
Dino Zardi, University of Trento, IT
Carolina García Martos, U. Politécnica de Madrid, ES
Giovanni Maria Farinella, U. of Catania, IT
Marco Bee, University of Trento, IT
Novella Bartolini, Sapienza University, IT
Pratik Prabhanjan Brahma, Volkswagen, US
James Harrison, Stanford University, US

Anticipating patterns has become a crucial activity in recent years, due to the combined availability of huge amounts of data, techniques for exploiting noisy information, transferring knowledge across domains, and the need of forecasting services within many heterogeneous domains, from computer science to environmental sciences, from economics to robotics and from bioinformatics to social sciences and humanities. A growing spectrum of applications in self-driving cars, weather forecasting, financial market prediction, real-time epidemic forecasting, and social network modeling need to be explored within a same venue.

This first workshop aimed to identify commonalities, gather lessons learnt across domains, discuss modern and most successful techniques, and foster the exchange of new ideas. PATCAST addresses the general problem of forecasting patterns. This is not just limited to a specific domain, but rather intended to cross-fertilize different disciplines. By doing so, it highlights possible general-purpose approaches that may be applied to a large span of data types, promoting and motivating further study in specific directions. As an example, techniques for predicting the diffusion of epidemies are currently adopted to forecasting activities within social networks. We are convinced that many other hybridations are ready to be explored. The workshop gathers contributions from researchers and practitioners from different domains, to share current best algorithms and practices, to foster dis- cussion among diverse communities and to define common grounds for joint progress, within the general artificial intelligence and pattern recognition.

PatReCH 2020: 2nd Intl. WS on PR for Cultural Heritage

Endorsed by IAPR TC 19 *Computer Vision for Cultural Heritage Applications*

An ICPR 2020 Workshop, January 11, 2021

http://lia.unicas.it/patrech2020/

Workshop Organizers:

Francesco Colace, University of Salerno, IT

Dario Allegra and Filippo Stanco
University of Catania, IT

Mario Molinara and Alessandra Scotto di Freca
University of Cassino and Southern Lazio, IT

Invited Speakers:

Antonio Picariello, University of Cassino Federico II, IT
Davide Tanasi, University of South Florida, US

PatReCH 2020 focuses on issues in exploiting, analyzing and manipulating useful information in the huge number of digitized artifacts and information that come from the past. In recent years, progress in machine learning and pattern recognition algorithms to deal with the acquired data allows researchers to better exploit the contained information, generate the best digital representation, and provide automatic or semiautomatic tools for supporting archaeologists and researchers in the field. Thus, the aim of this workshop was to bring together the work of many experts in this multidisciplinary subject to highlight these advances from a wide-angle perspective, as well as to stimulate new theoretical and applied research for better characterizing the state-of-the-art in this subject.

PRAConBE 2020: Pattern Recognition and Automation in Construction & the Built Environment

An ICPR 2020 Workshop, January 10, 2021

https://praconbe2020.iti.gr/

11 paper submissions; 9 acceptances; ~20 participants

Workshop Organizers:

Giorgos Sfikas, Visiting Lecturer at U. of Ionnina, GR
Athanasios Tsakiris, CERTH/ITI, GR
Dimitrios Giakoumis, CERTH/ITI, GR
Dimosthenis Ioannidis, CERTH/ITI, GR
Dimitrios Tzovaras, CERTH/ITI, GR

Invited Speakers:

Frédéric Bosché, University of Edinburgh, UK

The workshop covers a topic that is rapidly gaining attention in recent years, with a continually increasing number of research papers, research groups, projects and applications in various subfields of applying pattern recognition-related methods to automating different facets of the construction and renovation process.

The architecture, engineering and construction industry, an economic sector of significant importance (annual revenues of approx. US$10 trillion, or about 6% of global GDP), is expected to be radically transformed by digitalizing ever more aspects of the construction model, thereby boosting productivity, managing complexity and enhancing worksite safety and quality. Pattern recognition is central to this process of transformation, with computer vision, signal & image processing, machine learning applications increasingly finding uses of great impact to the field.

At the same time, as novel problems arise corresponding to new applications in automating construction, the need for novel models and methods of pattern recognition is becoming ever-more urgent, in a process that is revitalizing and beneficial for both pattern recognition as a research field, as well as the construction industry.

PRRS 2020: 11th IAPR Intl. Workshop on PR in Remote Sensing

A Flagship Event of IAPR TC 7 *Remote Sensing and Mapping*

Sponsored by the IAPR; An ICPR 2020 Workshop, January 11, 2021

http://iapr.org/prrs2020

12 paper submissions; 9 acceptances; 2 withdrawn; ~35 participants

Workshop Organizers:

Ribana Roscher, University of Bonn, DE
Gabriele Cavallaro, FZ Jülich, DE
Jie Shan, Purdue University, US
Eckart Michaelsen, Fraunhofer-IOSB, DE
Uwe Stilla, Technische Universitaet Muenchen, DE

Invited Speaker:

Bertrand Le Saux, European Space Agency

As a sponsored event of the International Association for Pattern Recognition (IAPR), the Pattern Recognition in Remote Sensing Workshop serves as an event bringing together researchers from both pattern recognition and remote sensing, with emphasis on the application of pattern recognition methods to remotely sensed data.

The steady progress in the development of new remote sensing devices and remote sensing technology has led to ever increasing data and new challenges. Thus, need arises to apply the latest methods of machine learning and pattern recognition for automated analysis of this kind of data. This workshop provided an ideal forum for spreading and exchanging the latest experiences of international researchers.

RISS 2020: 3rd International Workshop on Research & Innovation for Secure Societies

An ICPR 2020 Workshop, January 11, 2021

http://campus.pub.ro/RISS2020/

5 paper submissions; 5 acceptances; ~30 participants

Workshop Organizers:

Bogdan Ionescu, U. Politehnica of Bucharest, RO
Tiberio Uricchio, University of Florence, IT
Marian Buric, Protection and Guard Service, RO
Răzvan Roman, Protection and Guard Service, RO
Vincent Charvillat, University of Toulouse, FR
Marco Cristani, University of Verona, IT

Invited Speakers:

Vincent Charvillat, University of Toulouse, FR
Francesco Setti, University of Verona, IT

With the accelerated advances of communications and storage technologies, access to critical information acquired from various sensors and sources has been significantly eased. Manipulation and processing of such high amounts of diverse data is still a steady challenge, and most of the existing solutions involve the use of human resources. However, security threats are now at a very large scale, requiring very different security solutions which can make use of interdisciplinary approaches. In this context, computer-assisted or automated technologies are now becoming more and more attractive to substitute expensive human resources in the decisional systems.

RRPR 2020: 3rd Workshop on Reproducible Research in PR

An IAPR Tc18 *Discrete Geometry and Mathematical Morphology* event

Endorsed by the IAPR; An ICPR 2020 Workshop, January 11, 2021

https://rrpr2020.sciencesconf.org

18 paper submissions; 13 acceptances; 25-30 participants

Workshop Organizers:

Bertrand Kerautret, LIRIS, de Lyon 2, FR
Miguel Colom, Centre Borelli, ENS Paris-Saclay, FR
Daniel Lopresti, Lehigh University, US
Pascal Monasse, LIGM, École des Ponts Paris, FR
Jean-Michel Morel, Centre Borelli, ENS Paris-Saclay, FR
Hugues Talbot, CentraleSupelec, Paris, FR

Invited Speaker:

Roberto Di Cosmo
Nicolas Bonneel

The thirteen presented papers were organized into three main categories. The first consisted of papers that focused on reproducible research frameworks. The second category of papers focused on reproducible research results and addressed different topics ranging from intrusion detection, emotion recognition algorithms, and biological structure modeling using tree defect analysis and vesselness filters. The last category included ICPR companion papers describing implementation and reproduction details that are an absolute requirement for reproducibility. Videos of the pre-recorded presentations are available on the workshop's website.

Invited talks: Roberto Di Cosmo “Preserving source code in Software Heritage: a foundation for reproducibility” and Nicolas Bonneel “Code Replicabliity”.

Proceedings will be published by Springer in the LNCS series. Finally, the "Reproducible Label in Pattern Recognition" defined to highlight the reproducible aspects of the RRPR and ICPR works was once again proposed and will remain active (https://github.com/RLPR).

TAILOR 2020: Texture Analysis and cLassificatiOn and Retrieval

Jointly held with CBIR and VIQA Workshops under the title Visual-Textual Image Understanding and Retrieval (VTIUR)

An ICPR 2020 Workshop, January 10, 2021

http://campus.pub.ro/RISS2020/

3 paper submissions; 3 acceptances; ~20 participants

Workshop Organizers:

Francesco Bianconi, University of Perugia, IT
Claudio Cusano, University of Pavia, IT
Antonio Fernández, University of Vigo, ES
Paolo Napoletano, University of Milan-Bicocca, IT

Texture is among the most important visual properties that determine the appearance of materials, and therefore plays a pivotal role in this context. As a consequence, texture analysis has been an area of intense research activity in computer vision since early on.

In recent years, research in the field has been shifting from 'hand-designed' descriptors towards data-driven, 'learnt' approaches (Deep Learning). The applicability of this paradigm to textures analysis, recognition and retrieval, however, is yet to be understood. It is also unclear how previous knowledge from the 'hand-crafted' era can be conveniently integrated with Deep Learning models to produce flexible, robust and computationally cheap image descriptors for texture recognition.

The aim of this workshop is to provide a forum for scientists and practitioners concerned with theory and applications of texture analysis, classification and retrieval.

VAIB 2020: visual observation and analysis of Vertibrate And Insect Behavior

An ICPR 2020 Workshop, January 11, 2021

https://homepages.inf.ed.ac.uk/rbf/vaib20.html

14 paper submissions; 9 acceptances; 31 participants

Workshop Organizers:

Robert Fisher (Chair), University of Edinburgh, UK
John Hallam, University of Southern Denmark
Sergio Palazzo, University of Catania, IT

Although online (Zoom), there were 9 oral presentations, particularly on the topics of "Insects" and "Monkeys & Apes". The goal of this workshop is to stimulate and bring together the current research in this area, and provide a forum for researchers to share expertise. The methods that researchers use can be applied to a variety of species at different sizes, such as fruit and house flies, crickets, cockroaches and other insects, farmed and wild fish, mice and rats, commercial farm animals such as poultry, cows and horses, and wildlife monitoring, etc. One aspect that they all have in common is video data.

As we wanted to make this more of a discussion workshop, we encouraged work-in-progress presentations. Consequently, only four-page extended abstracts were double-blind reviewed. More details, including the program and PDFs from the abstracts can be found at: https://homepages.inf.ed.ac.uk/rbf/vaib20.html.

VIQA 2020: Video and Image Question Answering (VIQA): building a bridge between visual content analysis and reasoning on textual data

Jointly held with CBIR and TAILOR Workshops under the title Visual-Textual Image Understanding and Retrieval (VTIUR)

An ICPR 2020 Workshop, January 10, 2021

https://sites.google.com/view/viqa2020

2 paper submissions; 2 acceptances; 20-25 participants

Workshop Organizers:

Alex Falcon, FBK and University of Udine, IT
Giuseppe Serra, University of Udine, IT
Oswald Lanz, FBK, IT
Rainer Stiefelhagen, Karlsruhe Institute of Technology, DE
Makarand Tapaswi, Inria Paris, FR

In this workshop we dealt with Video and Image Question Answering, two interesting topics at the interface of Computer Vision and Natural Language Processing, which require intelligent models to understand multimodal information and to reason about them in order to produce meaningful answers to content-related questions. To this end, the workshop aimed at finding new directions to tackle these problems, by bringing together researchers and practitioners both from academia and industry.

W4PR 2020: Women at ICPR Workshop

An ICPR 2020 Workshop, January 10, 2021

https://homepages.inf.ed.ac.uk/rbf/wicpr20.html

no submissions: the workshop's purpose was to exchange ideas about women in research; ~20 participants

Workshop Organizers:

Alexandra Branzan Albu, University of Victoria, CA
Maria De Marsico, Sapienza University of Rome, IT

Committee Members:

Lale Akarun, Bogazici University, TR
Irene Amerini, Sapienza University of Rome, IT
Marcella Cornia, UNIMORE, IT
Robert Fisher, University of Edinburgh, UK
Ingela Nyström, Uppsala University, SE

Invited Speakers:

Ingela Nyström, Uppsala University, SE
Linda O'Gorman, IAPR, US

Panelists:

Ingela Nyström, Uppsala University, SE
Rita Cucchiara, UNIMORE, IT
Sergey Ablameyko, Belarusian State University, BY
Irene Amerini Sapienza University of Rome, IT
Richa Singh, IIT Jodhpur, IN
Robert Fisher, Univ. of Edinburgh, UK (moderator)
Marcella Cornia, UNIMORE, IT (panel assistant)

The first Women at ICPR workshop (W4PR) has pointed out the still existing minor role of women in research, both academic and industrial. At the same time it celebrated women's contributions to the IAPR. Its aim was to start a possible series of events fostering a culture embracing inclusiveness and diversity values within IAPR. The devised mean to reach this goal is the creation of opportunities for young and senior women scientists to interact and connect with each other.

The workshop included two invited talks, a panel discussion, and small group breakout sessions.

WAAMI 2020: Workshop on Analysis of Aerial Motion Imagery

An ICPR 2020 Workshop, January 11, 2021

https://waami.github.io/

9 acceptances; 15+ participants

Workshop Organizers:

Kannappan Palaniappan, University of Missouri, US
Filiz Bunyak, University of Missouri, US
Hadi Aliakbarpour, University of Missouri, US
Heesung Kwon, Army Research Laboratory, US
Priya Narayanan, Army Research Laboratory, US

Invited Speaker:

Kannappan Palaniappan, University of Missouri, US

In recent years, there has been an exponential increase in aerial motion imagery due to advances in airborne sensor technologies, rising adoption of manned and unmanned aerial vehicles (UAVs), and the emergence of new applications associated with these technologies including aerial surveillance, traffic monitoring, search and rescue, disaster relief, and precision agriculture. We are witnessing a growing need for robust aerial image and video analysis capabilities to take full advantage of this data and to address the pressing needs of its applications. Novel methods, particularly those relying on artificial intelligence/machine learning (AI/ML) approaches, coupled with rapid advances in computational hardware (more powerful, lighter weight, lower energy, lower cost computing platforms) are revolutionizing the image processing, pattern recognition, computer vision fields and offer potential solutions to these pressing needs.

WAAMI aims to bring together researchers from academia, government, and industry to address the needs involving analysis of aerial motion imagery in a diverse set of application areas.

WMWB: IAPR TC4 WS on Mobile and Wearable Biometrics

An IAPR Tc4 *Biometrics* event

Sponsored by the IAPR; An ICPR 2020 Workshop, January 11, 2021

http://iapr.org/wmwb2020

13 paper submissions; 8 acceptances; 25-30 participants

Workshop Organizer:

Emanuele Maiorana, Roma Tre University, IT

Invited Speaker:

Richard Guest, University of Kent, UK

Mobile devices are widely used by people all over the world, with almost 3 billion users interacting with smartphones or tablets in their daily life. In addition to personal communication, devices have a variety of other applications: accessing the Internet, storing personal data, making payments, and gaining access to restricted services or areas.

With the rise of the Internet of Things, a growth trend similar to the one characterizing mobile devices in the recent past is now observed for wearable devices such as smartwatches and activity trackers, that is, smart electronic devices equipped with micro-controllers that can be incorporated into clothing or worn on the body as implants or accessories.

Most of the services made available through the aforementioned technologies are related to security- and privacy-sensitive tasks, and it is therefore of paramount importance to design workable and effective solutions to implement automatic recognition systems within mobile and wearable devices. Biometric systems certainly represent the most interesting alternative to achieve this goal.

The TC4 Workshop on Mobile and Wearable Biometrics (WMWB) represented a forum for researchers and practitioners working on the evolving areas of pattern recognition techniques for mobile and wearable biometric recognition systems. The workshop also aimed at promoting further collaboration within the researchers working in this research paradigm, bringing together research and industry partners, and stimulating interest for research in practical aspects of mobile and wearable biometrics. Experiences from ongoing H2020 European Projects were also shared.

Cause-and-Effect in a Tensor Framework

An ICPR 2020 Tutorial, January 10, 2021

http://web.cs.ucla.edu/~maov/icpr2020tutorial

Tutorial Presenters:

M. Alex O. Vasilescu (UCLA, US) and Ivan Oseledets (Skoltech, RU)

Developing causal explanations for correct results or for failures from mathematical equations and data is important in developing a trustworthy artificial intelligence, and retaining public trust. Causal explanations are germane to the "right to an explanation" statute, i.e., to data driven decisions, such as those that rely on images. Computer graphics and computer vision problems, also known as forward and inverse imaging problems, have been cast as causal inference questions consistent with Donald Rubin's quantitative definition of causality, where "A causes B" means "the effect of A is B", a measurable an d experimentally repeatable quantity. Computer graphics may be viewed as addressing analogous questions to forward causal inference that addresses the "what if" question, and estimates a change in effects given a delta change in a causal factor. Computer vision may be viewed as addressing analogous questions to inverse causal inference that addresses the "why" question which we define as the estimation of causes given a forward causal model, and a set of observations that constrain the solution set.

Tensor factor analysis is a suitable and transparent framework for modeling the mechanism of data formation, and disentangling the causal factors of data formation. Tensor factor analysis has been successfully employed on imaging data in computer vision, and computer graphics, but the approach is data agnostic. In machine learning, tensor dimensionality reduction has been employed to reduce the parameters of convolutional neural networks (CNN), and ease the deployment of CNNs on devices with limited computational resources.

In the first part of the tutorial, M. Alex O. Vasilescu provided definitions for causality, linear tensor rank-R and the multilinear tensor rank, rank-(R1, R2,...,R M). The forward causal inference models discussed and developed were based on employing Multilinear PCA (MPCA), Multilinear ICA (MICA), Kernel MPCA/MICA, and Generalized Block Tensor Factorization. A mathematical specification for inverse causal inference was introduced.

In the second part of the tutorial, Ivan Oseldets discussed how neural network architectures can be tensorized and how tensor factorizations, such as TensorTrain and Hierarchical Tucker computation can result in state-of-the-art art performance with large parameter savings and computational speed-ups on a wide range of applications.

Change and Anomaly Detection in Images, Signals & Datastreams

An ICPR 2020 Tutorial, January 10, 2021

https://boracchi.faculty.polimi.it/Tutorials/AnomalyAndChangeDetectionTutorial_ICPR2020.html

Tutorial Presenters:

Giacomo Boracchi (Politecnico di Milano, DEIB) and Diego Carrera (STMicroelectronics, Agrate Brianza)

Change and anomaly detection problems are ubiquitous in science and engineering. The prompt detection of changes or anomalies is often a primary concern, as changed/anomalous samples provide precious information for understanding the dynamics of a monitored process, and for activating suitable countermeasures. Our tutorial presents a rigorous formulation of the change and anomaly-detection problems that fit many signal/image analysis applications, and describes in detail the most important approaches in the literature, following the machine-learning perspective of supervised, semi-supervised and unsupervised monitoring tasks. Special emphasis will be given to detection methods based on learned models, which are often adopted to handle images and signals. In particular, these will be divided into traditional models (including autoencoders, learned projections and dictionaries yielding sparse representations) and deep learning models (including CNNs, deep-one-class classifiers and deep generative models). The tutorial is accompanied by various examples where change/anomaly detection algorithms are applied to solve real world problems in health monitoring, quality control and fraud detection.

DeepFake generation and detection

An ICPR 2020 Tutorial, January 10, 2021

https://www.micc.unifi.it/icpr2020/index.php/tutorial-1/

Tutorial Presenters:

Matthias Niessner (Technical University of Munich, DE) and Luisa Verdoliva (Univ. Federico II of Naples, IT)

With the availability of powerful and easy-to-use media editing tools, falsifying images and videos has become widespread in the last few years. Coupled with ubiquitous social networks, this allows for the viral dissemination of fake news, raising huge concerns on multimedia security. This scenario became even worse with the advent of deep learning. New, sophisticated methods have been proposed to accomplish manipulations that were previously unthinkable (e.g., deepfake).

This tutorial presents the most relevant methods for generation and detection of manipulated media.

For generation the main techniques based on deep learning will be presented, with focus on those based on both graphics and neural network based methods such as generative adversarial networks or cutting edge neural rendering techniques. Both images and videos will be considered, but also the combination of multiple modalities including audio, and text associated with the underlying imagery.

For detection the most reliable deep learning based approaches will be presented, with focus on those that enable domain generalization. Results will be presented on challenging datasets and realistic scenarios, such as the spreading of manipulated images and videos over social networks. In addition, the robustness of such methods to adversarial attacks will be analyzed.

Graph-based Methods for Methods for Learning and Inference Problems in Pattern Analysis

An ICPR 2020 Tutorial, January 11, 2021

https://www.micc.unifi.it/icpr2020/index.php/tutorial5/

Tutorial Presenters:

Antonio Robles-Kelly (Deakon University, AU) and Francisco Escalano (University of Alicante, ES)

This tutorial provides a detailed study of graph-based methods in pattern recognition. The course aims at covering the fundamental principles of stochastic, spectral, probabilistic and manifold-based methods related with graphs and their applications to segmentation and grouping, matching, classification and recognition.

The tutorial will also cover recent trends and developments related to deep networks and link inference in the structural pattern analysis space.

The tutorial was designed to give attendees who are working in problems akin to pattern recognition, computer vision and artificial intelligence an insight into the concepts, methods and tools essential for conducting effective research in graph-based methods. Upon successful completion of the tutorial, the attendees will also have the knowledge required to understand the nature of graph-based methods and the settings in which they are most effective.

Interactive Art and Pattern Recognition

An ICPR 2020 Tutorial, January 10, 2021

https://www.micc.unifi.it/icpr2020/index.php/tutorial4/

Tutorial Presenter:

Larry O'Gorman (Nokia Bell Labs, US)

In the 1960s a group of New York City artists began a program called Experiments in Art and Technology (E.A.T) to enhance their artwork via signal recognition technologies. The signals at that time were mainly audio and wireless radio, but in the time since this has expanded to image, video, augmented and virtual reality (AR/VR), and most recently Generative Adversarial Networks (GANs).

The objective of many of these artists is to make their artwork interactive by having it react to activity of their audience. Whatever the signals the artist uses to capture the activity, the field that encompasses all the methods is pattern recognition.

In this tutorial, I sought to present a number of aspects of this marriage of art and technology. History, including examples of many artworks, was presented from beginnings to present day. Many sensors were described from fundamental stereo microphones for localization to the Kinect for body part recognition. Signal processing and computer vision methods were described as well as "tricks" such as the combination of visible and invisible (IR) lighting to make art that is technology-transparent.

The audience reacted with good questions and I hope this leads attendees to appreciate this type of artwork and perhaps collaborate with artists by contributing their own pattern recognition expertise.

More than 20 years of High-Dynamic-Range imaging: history, state of the art, improvements and limits

An ICPR 2020 Tutorial, January 11, 2021

https://www.micc.unifi.it/icpr2020/index.php/tutorial7/

Tutorial Presenters:

Alessandro Rizzi (University of Milan, IT)

High Dynamic Range (HDR) imaging is a continuously evolving field of research, innerly linked to computer vision. More than twenty years ago HDR started to be popular with the seminal paper of Debevec and Malik proposing multiple exposures to attempt to capture a wider range of scene information. Today, the evolution continues in the current sales of HDR televisions using new technologies like OLED and Quantum Dot.

What makes HDR imaging a complex problem is that it is controlled by optics, signal-processing and human visual limits and each one of these factors plays a fundamental role. Moreover, more than one approach is possible to face HDR, and the solution depends on the chosen goal.

After a detailed description of the dynamic range problem, this course focused on all the different possible goals of the HDR pipeline: reproducing light field, reproducing appearance, improving image aesthetic and visibility. For each goal a careful analysis of characteristics, limits and ground truth was presented. The course aimed at replacing myths with measurements about the limits of accurate camera acquisition (range and color) and the usable range of light for displays presented to human vision. It discussed the principles of tone rendering and the role of HDR spatial comparisons.

Multiple Parametric Models Fitting

An ICPR 2020 Tutorial, January 11, 2021

https://www.micc.unifi.it/icpr2020/index.php/tutorial6/

Tutorial Presenter:
Luca Magri (Politecnico Milano, IT), Daniel Barath (CMP, CZ), Guobao Xiao (Minjiang University, CN), Eleanora Maset (University of Udine, IT), and Andrea Fusiello (University of Udine, IT)

The problem of estimating multiple parametric models that fit data corrupted by noise and outliers is an ubiquitous task in PR and is at the core of many CV applications. Typical examples can be found in 3D reconstruction, where multi-model fitting is employed either to estimate multiple rigid moving objects or to produce intermediate geometric interpretations of reconstructed 3D point clouds. Other scenarios include face clustering, body-pose estimation and motion segmentation, just to name a few. In the last years, the need for compact and abstract representations of low level data has inspired research efforts towards the design of automatic methods that can aggregate visual content in higher level structures and multi-model fitting has attracted increasing interest. In this tutorial, we present an overview on the problem of multi-model fitting from complementary perspectives. Specifically, a general formulation of the multi-model fitting problem that fits with many CV applications is introduced. This provides a common context within which three main state-of-the-art approaches are presented. In particular, the tutorial covers the problem of multi model fitting from:

- a perspective based on the optimization of an energy;
- a perspective based on preference analysis;
- a perspective based on hypergraph.

Synchronization: a general framework for mosaicking, 3D reconstruction, matching and segmentation problems

An ICPR 2020 Tutorial, January 11, 2021

https://www.micc.unifi.it/icpr2020/index.php/tutorial8/

Tutorial Presenters:
Federica Arrigoni (University of Trento, IT), Eleonora Maset (University of Udine, IT), Florian Bernard (Technical University of Munich, DE), and Andrea Fusiello (University of Udine, IT)

The synchronization problem has attracted a lot of attention in the community thanks to its application in a variety of Computer Vision tasks. The goal of "synchronization" is to infer the unknown states of a network of nodes, where only the ratio (or difference) between pairs of states can be measured. Typically, states are represented by elements of a group, such as the Symmetric Group or the Special Euclidean Group. The former can for example represent local labels of a set of features, as it occurs in multi-view matching applications. The latter can for example represent camera reference frames (e.g., in the context of structure from motion or pose graph optimization), or local coordinates of 3D points when dealing with 3D registration. Other applications include image mosaicking (where states are represented as homographies) and motion segmentation (where states are represented as binary matrices). The synchronization problem can be modeled as a graph where nodes correspond to the unknown states and edges encode the pairwise measures, and it is well-posed only if such a graph is connected.

Solving a synchronization problem is equivalent to imposing cycle consistency, that is the property that the composition of relative measures along any cycle in the graph gives the identity. Cycle consistency has also been employed by recent techniques that jointly optimize neural networks across multiple domains. In practice measures are corrupted by errors, thus the task is to address synchronization in a way that such errors are globally compensated.

ICPR 2020 Highlights - Challenges 1-8

#1 - CHART-Infographics 2020: Competition on HArvesting Raw Tables from Infographics

An ICPR 2020 Challenge, January 12, 2021

https://chartinfo.github.io/

Challenge Organizers:

From the University at Buffalo, US
Kenny Davila
Srirangaraj Setlur
Venu Govindaraju

From Adobe Research
Chris Tensmeyer
Sumit Shekhar
Hrituraj Singh

Description: Visualizations can be helpful tools for the communication of complex ideas, and among these we find statistical charts. In many scenarios, charts are the only source used to share raw data. For these and other reasons, there is a growing interest in the creation of methods for automated data extraction from chart images. However, most existing methods are tested on small scale datasets of real charts or large scale synthetic data only, with few to no comparisons with previous methods. This competition aims to change this by providing large scale annotated datasets for the advancement of the chart recognition community. Our competition divides the Chart Recognition challenge into a pipeline of 6 tasks commonly targeted in the literature, and we also consider a seventh task to evaluate end-to-end systems. Datasets and tools generated by our challenge are now publicly available.

Results: A total of 7 teams submitted results for different subsets of task. We used a scoring system that awarded each team points for their ranking on each leaderboard for each task and dataset. The overall winner of the 2020 edition was DeepBlueAI from China.

#2 - Pollen Challenge

An ICPR 2020 Challenge, January 12, 2021

https://iplab.dmi.unict.it/pollenclassificationchallenge/

Challenge Organizers:

From Università degli Studi di Catania, IT: Alessandro Ortis, Sebastiano Battiato, Francesco Guarner, and Francesca Trenta
From University of Turin, IT: Consolata Siniscalco and Lorenzo Ascari
From Agri Competence Center: Ferrero HC: Eloy Suárez and Tommaso De Gregorio

Pollen grain classification has a remarkable role in many fields from medicine, to biology and agronomy. The aim of the proposed challenge is the automatic classification of pollen grain images exploiting Pollen13K, the largest dataset of microscope pollen grain images, collected from aerobiological samples (https://iplab.dmi.unict.it/pollengraindataset/dataset). The microscope images of the samples have been digitalized and processed through a proper image processing pipeline to detect and extract four classes of objects, including three species of pollen grain and an additional class of objects that could be often mis-classified as pollen (e.g., air bubbles, dust, etc.). More than 13.000 objects have been detected and labelled by aerobiology experts.

Task description: A set of images related to objects detected in microscope images were given to participants, where each depicted object belongs to one of the defined classes. Segmentation mask of each object was also provided to allow methods that exploit the localization of the salient regions in images or data augmentation. Participants were asked to correctly classify the highest number of objects. Moreover, the proposed methods also addressed with the imbalance in the data, which represents one challenge of pollen grain classification in real-world scenarios. Test images were released, without the ground truth classes, nor the segmentation masks.

Acknowledgement: The research was carried out thanks to the collaboration with Ferrero HCo, that financed the project and allowed the collection of aerobiological samples from hazelnut plantations. We would like to thank ICPR 2020 organizers and tutorial chairs for hosting the challenge and its emerging community.

#3 - EndoTect 2020: A Competition on Automatic Disease Detection in the Gastrointestinal Tract

An ICPR 2020 Challenge, January 13, 2021

https://www.endotect.com/

Challenge Organizers:

Steven A. Hicks (SimulaMet & OsloMet), Debesh Jha (SimulaMet & U. Tromsø),
Vajira Thambawita (SimulaMet), Pål Halvorsen (SimulaMet & OsloMet),
Hugo L. Hammer (SimulaMet & OsloMet), and Michael A. Riegler (SimulaMet)

Description: The human digestive system is prone to suffer from numerous diseases and abnormalities throughout a human lifetime. Some of these may be life-threatening and pose a severe risk to a patient's health and well-being. The EndoTect challenge aims to motivate the development of models that help medical experts find common anomalies in the gastrointestinal (GI) tract. Using HyperKvasir, a large dataset containing images taken from several endoscopies, the participants compete in three tasks, each focusing on a specific requirement for making it useful in a real-world medical scenario. This year, the challenge consisted of three tasks. The first task involved classifying images from the GI tract into 23 distinct classes. The second on efficient classification measured by the amount of time spent processing each image. The last task was to segment colon polyps automatically.

Results: There were six submissions. For the detection task, team howard achieved the best MCC score of 0.903 using ResNet-152 and a custom hybrid loss. For the efficient detection task, team howard delivered the best average frames per second of 129 while also keeping a high classification performance at 0.765 MCC. For the segmentation task, team aggcmab obtained the highest IoU score of 0.871 using a double encoder-decoder network.

#5 - ICPR 2020 Competition on Text Block Segmentation on a NewsEye Dataset

An ICPR 2020 Challenge, January 14, 2021

https://www.mathematik.uni-rostock.de/forschung/projekte/citlab/projects/text-block-segmentation-competition-icpr2020/

Challenge Organizers:

Johannes Michael, Max Weidemann, Bastian Laasch and Roger Labahn

Description: This competition deals with the task of Text Block Segmentation to analyze the structure of historical newspaper pages. In contrast to many existing segmentation methods, instead of working on pixels we want to cluster baselines / textlines into text blocks / paragraphs. Therefore, we introduce a new measure based on a Baseline Detection evaluation scheme. Still, common pixel-based approaches could participate without restrictions. Working on baseline level addresses directly the application scenario where for a given image the contained text should be extracted in blocks for further investigations.

Results: We had two different tracks (simple layout, complex layout) and three total submissions.

Winning results for simple track: 0.999 F-Value

Winning results for complex track: 0.954 F-Value

#6 - 2nd Grand Challenge of 106-Point Facial Landmark Localization

An ICPR 2020 Challenge, January 14, 2021

https://fllc-icpr2020.github.io/home/

Challenge Organizers:
Hailin Shi (JD Cloud & AI), Yinglu Liu (JD Cloud & AI), Xiangyu Zhu (Chinese Academy of Sciences), Peipei Li (JD Cloud & AI), Zhenan Sun (Chinese Academy of Sciences)

Description: Facial landmark localization is to predict the locations of a set of predefined key points on facial images. It is a very crucial step in numerous face related applications, such as face alignment for recognition, facial pose estimation, face image synthesis. The purpose of this competition is to make effort towards benchmarking lightweight facial landmark localization, which enables efficient system deployment. The challenge dataset contains more than 24,000 images with larger variations in identity, pose, expression and occlusion. Besides, a strict limit of model weights is employed for computational efficiency (the upper bound of computational complexity is 1 GFLOPs, and the upper bound of model size is 20MB). It has received a lot of attention from both academia and industrial practitioners.

Results: There were more than 70 teams registered in the competition. 15 teams participated in the validation phase, and 9 of them entered in the final test phase.

The champion of the competition is Xu et al. from SogouAI. Huang et al. from OPPO Research Institute achieved the second place, and third place went to Tong et al. from the Vision Intelligence Center of Meituan.

Other Challenges @ ICPR2020:

#4 - Products-10K: Large Scale Product Recognition Challenge

https://products-10k.github.io/

#7 - AcTiVComp20: Competition on Superimposed Text Detection and Recognition in Arabic News Video Frames

https://diuf.unifr.ch/main/diva/AcTiVComp/

#8 - The 2020 CORSMAL Challenge Multi-modal fusion and learning for robotics

http://corsmal.eecs.qmul.ac.uk/ICPR2020challenge.html

ICPR 2020 Highlights - IAPR Fellows

Xiang Bai (China)
For contributions to shape representation, contextual visual similarity, and camera-based document analysis

Sanghamitra Bandyopadhyay (India)
For contributions to machine learning, computer vision, and bioinformatics

Joachim Buhmann (Switzerland)
For contributions to pattern recognition and statistical machine learning theory

Roberto Cipolla (UK)
For contributions to geometric models in computer vision and scene understanding

Paolo Ettore Gamba (Italy)
For contributions to data fusion and remote sensing

Ashish Ghosh (India)
For contributions to neural and deep learning, and to image and video analysis

Giorgio Giacinto (Italy)
For contributions to pattern recognition for computer security

NOTE: Plesae see Giorgio Giacinto's feature article in "Getting to Know...IAPR Fellows" in this issue.
~ Jing Dong, EiC

Ran He (China)
For contributions to biometrics, face recognition, and applications

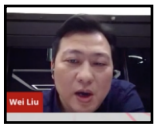
Adrian Hilton (UK)
For contributions to the fields of 3D and 4D computer vision with applications in healthcare, design and entertainment

Katsushi Ikeuchi (Japan)
For fundamental contributions to computer vision applied to robotics and man-machine interaction

Tianzi Jiang (China)
For contributions in pattern recognition toward the understanding of brain organization and dysfunctions using neuroimaging

Adam Krzyzak (Canada)
For contributions to statistical pattern recognition and machine learning, and for service to IAPR

Stan Z. Li (China)
For outstanding contributions to face recognition research and applications



Wei Liu (China)
For contributions to machine learning, computer vision, and remote sensing

Xiaoming Liu (USA)
For contributions to face and video analysis

Jiwen Lu (China)
For contributions to human action recognition and applications

Nasir Memon (USA)
For contributions to machine learning, biometrics, multimedia forensics, cryptography, and steganography

Yingli Tian (USA)
For contributions to automatic facial expression analysis and human activity understanding

Meng Wang (China)
For contributions to multimedia content analysis and recognition

Ying Wu (USA)
For contributions to visual motion and pattern analysis in computer vision

Josiane Zerubia (France)
For contributions to stochastic image modeling for classification, segmentation, and object detection in remote sensing

Daoqiang Zhang (China)
For contributions to fuzzy clustering, dimensionality reduction, and medical image analysis

Guoying Zhao (Finland)
For contributions to video analysis and affective computing

ICPR 2020 Best Paper Awards

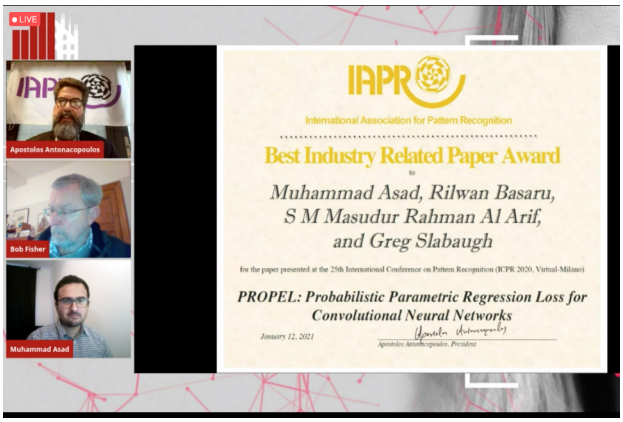
Best Industry Related Paper Award

presented to

Muhammad Asad, Rilwan Basaru, S M Masudur Rahman Al Arif, and Greg Slabaugh

for the 25th ICPR paper

"PROPEL: Probabilistic Parametric Regression Loss for Convolutional Neural Networks"



Piero Zamperoni Best Student Paper Award

presented to

Sarah Bechtle and Artem Molchanov

for the 25th ICPR paper

"Meta Learning via Learned Loss"

by

Sarah Bechtle, Artem Molchanov, Yevgen Chebotar, Edward Grefenstette, Ludovic Righetti, Gaurav Sukhatme, Franziska Meier

NOTE:
Sarah Bechtle is the author of the IAPR...The Next Generation column in this issue of the IAPR newsletter.
~Jing Dong, EiC

ICPR 2020 Best Scientific Paper Awards

Track: Artificial Intelligence, Machine Learning for Pattern Analysis

Xinxing Su, Yuchen Yuan, Xiangbo Su, Zhikang Zou, Shilei Wen, and Pan Zhou

"HANet: Hybrid Attention-aware Network for Crowd Counting"

Track: Biometrics, Human Analysis and Behavior Understanding

Andrea D'Eusanio, Stefano Pini, Guido Borghi, Roberto Vezzani, and Rita Cucchiara

"RefiNet: 3D Human Pose Refinement"

Track: Computer Vision, Robotics and Intelligent Systems

Mamshad Nayeem Rizve, Ugur Demir, Praveen Tirupattur, Aayush Jung Rana, Kevin Duarte, Ishan Rajendrakumar Dave, Yogesh Rawat, and Mubarak Shah

"Gabriella: An Online System for Real-Time Activity Detection in Untrimmed Security Videos"

Track: Document and Media Analysis

Mengbiao Zhao, Wei Feng, Fei Yin, Xu-Yao Zhang, and Cheng-Lin Liu

"Mutually Guided Dual-Task Network for Scene Text Detection"

Track: Image and Signal Processing

Xiaoqiang Zhou, Junjie Li, Zilei Wang, Ran He, and Tieniu Tan

"Image Inpainting with Contrastive Relation Network"

ICPR 2020 Best Student Paper Awards

Track: Artificial Intelligence, Machine Learning for Pattern Analysis

Aliaksei Mikhailiuk

"Active Sampling for Pairwise Comparisons via Approximate Message Passing and Information Gain Maximization"

Authors: Aliaksei Mikhailiuk, Clifford Wilmot, María Pérez-Ortiz, Dingcheng Yue, and Rafał K. Mantiuk

---

Track: Biometrics, Human Analysis and Behavior Understanding

Roberto Casula

"Are Spoofs from Latent Fingerprints a Real Threat for the Best State-Of-Art Liveness Detectors?"

Authors: Roberto Casula, Giulia Orrù, Daniele Angioni, Xiaoyi Feng, Gian Luca Marcialis, and Fabio Roli

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Track: Computer Vision, Robotics and Intelligent Systems

Jingyang Zhang

"Learning Stereo Matchability in Disparity Regression Networks"

Authors: Jingyang Zhang, Yao Yao, Zixin Luo, Shiwei Li, Tianwei Shen, Tian Fang, and Long Quan

---

Track: Document and Media Analysis

Mohamed Ali Souibgui

"A Few-shot Learning Approach for Historical Ciphered Manuscript Recognition"

Authors: Mohamed Ali Souibgui, Alicia Fornés, Yousri Kessentini, and Crina Tudor

---

Track: Image and Signal Processing

Gonul Degirmendereli

"Estimating Static and Dynamic Brain Networks by Kulback-Leibler Divergence from fMRI Data"

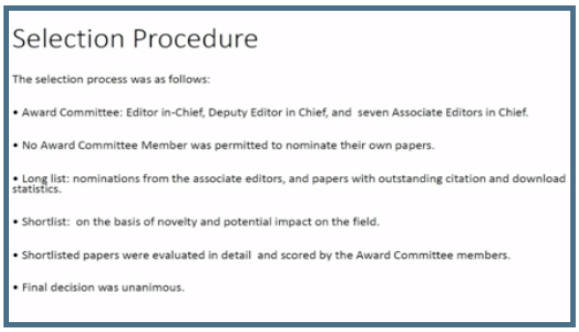
Authors: Gonul Degirmendereli and Fatos Yarman Vural

Elsevier Awards presented at ICPR 2020

The *Pattern Recognition Journal* Awards were presented by Edwin Hancock (University of York, UK), EiC.

"Every two years at ICPR, the *Pattern Recognition Journal* awards two best paper awards for papers that appeared in the preceding two years of the issues published by the journal. Today, I'm going to make the presentation for the best papers that appeared in the 2017 and 2018 issues of the journal.

"First of all, I'd like to thank the journal's publisher, Sweitze Roffel, who has provided the financial support for these awards and also sponsorship for a lecture at the ICPR this year in memory of Robert Ledley who was the first EiC of the PRJ about 52 years ago."



Elsevier *Journal of the Pattern Recognition Society*
Pattern Recognition Best Paper Award for 2017

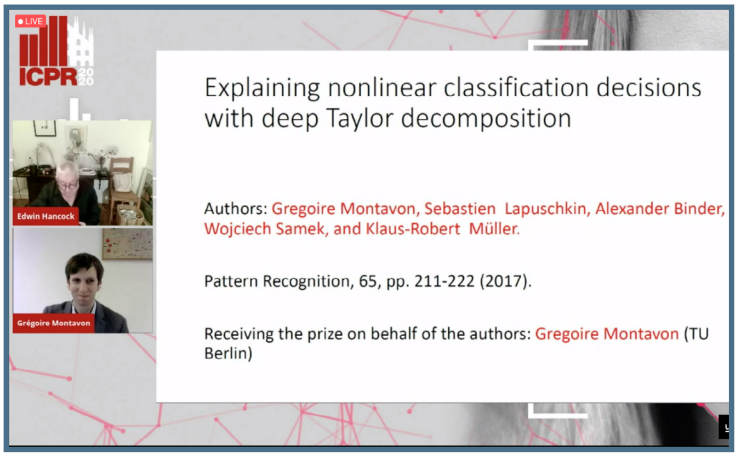
presented to

Gregoire Montavon, Sebastien Lapuschkin, Alexander Binder, Wojciech Samek and Klaus Robert Műller

for the paper entitled

"Explaining nonlinier classification decisions with deep Taylor decomposition"

Pattern Recognition. Volume 65, pp. 211-222 (2017).



Elsevier *Journal of the Pattern Recognition Society*
Pattern Recognition Best Paper Award for 2018

presented to

Battista Biggio and Fabio Roli

for the paper entitled

"Wild patterns: Ten years after the rise of adversarial machine learning"

Pattern Recognition. Volume 84, pp. 317-331 (2018).

The 2020 Meeting of the IAPR Governing Board

The IAPR Governing Board (GB) meets every two years during the ICPR conference. Representatives from all of the IAPR's member societies get together to discuss and vote on matters of high importance to the governance of the IAPR. For ICPR 2020, the meeting took place over two days via Zoom.

Some of the key outcomes of the 2020 GB Meeting are listed below. (See the IAPR News at the IAPR website and future issues of the *IAPR Newsletter* for more information as it becomes available.)

- Given the exceptional circumstances posed by the global COVID pandemic, the ExCo moved to not suspend societies (delaying action until the next GB Meeting) despite non-payment of dues, and the GB approved.
- ICPR 2020 was hugely successful on every measure. Please see Comments from the General Chairs in this issue.
- ICPR 2022 will be hosted in Montréal, Canada. Around May 2022 a decision regarding the format (in-person/online/hybrid) will be made.
- ICPR 2024 will be hosted by ISI Kolkata (India). The venue was selected from among four bids of excellent quality.
- TC20 *Pattern Recognition for Bioinformatics* remains suspended. There were some efforts in 2018 and 2019 to reactivate this TC. Any interest? Contact the IAPR Secretariat *secretariat@iapr.org*.
- With the passing of Herb Freeman last November, the ExCo asked former IAPR Presidents Kim Boyer and Ingela Nyström to look into a new award to honor his and others' contributions to the IAPR. The GB approved a motion to form a committee to explore this further.
- Equality, Diversity, and Inclusion (EDI) are key organizational values. The ad hoc EDI Committee presented an EDI policy proposal that was adopted by the GB. The GB also approved formation of a Standing Committee to continue work in this area.

Treasurer Bob Fisher, Secretary Arjan Kuijper, First Vice-President Lale Akarun
President Dan Lopresti, Past President Apostolos Antonacopoulos, SecondVice-President Terence Sim

This bulletin board contains items of interest to the IAPR Community

IAPR Spring 2021 Survey

https://tinyurl.com/iaprsurvey2021

it's short
it's anonymous
it helps make *your* IAPR even better

https://iapr.org/icdar2021

ICDAR
LAUSANNE 2021

Registration opening soon...

https://icdar2021.org/registration/

Call for Papers

14th International Workshop on Graphics Recognition

5-6 September 2021, Lausanne, Switzerland, in conjunction with ICDAR 2021

https://grec2021.univ-lr.fr/

Submission deadline : May 17,2021

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 workshop will comprise several sessions dedicated to specific topics related to graphics in document analysis and graphic recognition.

Organization:
General Chair : Jean-Christophe BURIE
Program Co-Chairs : Richard Zanibbi, Motoi Iwata, Pau Riba

Upcoming Special Issues in Pattern Recognition Letters

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

Few-shot Learning for Human-machine Interactions (VSI:FSL-HMI)

Guest Editors: Xianzhi Wang, University of Technology Sydney, Australia - Lina Yao, University of New South Wales, Australia - Yu Zhang, Lehigh University, USA - Jordi Solé-Casals, University of Vic - Central University of Catalonia, Spain

Submission period: July 1-20, 2021

More information at: *https://www.journals.elsevier.com/pattern-recognition-letters/call-for-papers/few-shot-learning-for-human-machine-interactions-fsl-hmi*

Mobile and Wearable Biometrics (VSI: MWB)

Guest Editors: Emanuele Maiorana, Roma Tre University, Italy - Ruggero Donida Labati, University of Milan,Italy - Shiqi Yu, Southern University of Science and Technology, China

Submission Period: Sept. 1-20, 2021

More information at: *https://www.journals.elsevier.com/pattern-recognition-letters/call-for-papers/mobile-and-wearable-biometrics-vsimwb*

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
2021	MAY	CIARP PORTO 2021: 25th Iberoamerican Congress on Pattern Recognition	CIARP 2019	Online - Portugal
		DGMM 2021: 1st Intl. Conf. on Discrete Geometry and Mathematical Morphology		Online - Sweden
	JUN	MCPR 2021: 13th Mexican Congress on Patter Recognition	MCPR 2020	Online - Mexico
	JUL	* DeLTA 2021: 2nd Intl. Conf. on Deep Learning Theory and Applications *	DeLTA 2020	Online
		MVA 2021: 17th International Conference on Machine Vision Applications	MVA 2019	Hybrid or Online - Japan
	AUG	IJCB 2021: 2021 International Joint Conference on Biometrics	ICB 2019	Hybrid - China
	SEP	ICDAR 2021: 16th Intl. Conference on Document Analysis and Recognition	ICDAR 2019	Switzerland
		+ GREC 2021: 14th Intl. Workshop on Graphics Recognition (in conjunction with ICDAR 2021) +	GREC 2021	Switzerland
		PRIP 2021: 15th Intl. Conf. on Pattern Recognition and Information Processing	PRIP 2019	Online - Belarus
	OCT	IWAIPR 2021: VII Intl. Workshop on Artificial Intelligence and Pattern Recognition		Cuba
	NOV	ACPR 2021: 6th Asian Conference on Pattern Recognition	ACPR 2019	Hybrid - Korea
2022	JUN	IGS 2021: 20th Conference of the International Graphonomics Society		Spain
	AUG	ICPR 2022: 26th International Conference on Pattern Recognition	ICPR 2020	Canada

If you haven't already completed the survey, please take a minute now:
IAPR Spring 2021 Survey
https://tinyurl.com/iaprsurvey2021

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June 18, 2021
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https://www.linkedin.com/groups/8159047