# Table of Contents

1. Volume 7, Issue 2, August 2015 (ISSN 1947-4598)
2. Call for Nominations: Editor-In-Chief of ACM TOMM
3. MPEG Column: 112th MPEG Meeting
4. ACM SIGMM/TOMM 2015 Award Announcements
5. ACM SIGMM Award for Outstanding Technical Contributions to Multimedia Computing, Communications and Applications
6. Announcement of ACM SIGMM Rising Star Award 2015
8. Awardee
9. Bio of Awardee
10. Honorable Mention
11. Bio of Awardee
12. 2015 ACM Transactions on Multimedia Computing, Communications and Applications (TOMM) Nicolas D. Georganas Best Paper Award
13. TOMM Associate Editor of the Year Award 2015
14. Image indexing and retrieval with Yael
15. Introduction
16. Image indexing
17. Extracting image descriptors
18. Image indexing in Python with Fisher vectors
19. Image indexing in Matlab with inverted files
20. Conclusion
22. Honglin Yu
23. Mario Montagud Climent
24. Rodrigo Laiola Guimarães
25. Sambit Bakshi
26. Recently published
27. IJMIR Volume 4, Issue 1
28. IJMIR Volume 4, Issue 2
29. IJMIR Volume 4, Issue 3
30. NMS Volume 21, Issue 3
Job Opportunities
28 Research Fellow – Knowledge Graphs for Social Media
29 Position of Research Software Engineer Postdoc
29 Fully Funded PhD position on Computer Vision
30 Software Engineer in Multimedia Systems
30 2 PhD positions at TU Delft Multimedia Computing Group
30 Post Doc in Multimedia Systems
31 PhD Position – Aerial image analysis from UAVs
31 Three PhD positions
31 PhD position on Multimedia Indexing

Calls for Contribution
32 CFPs: Sponsored by ACM SIGMM
32 CFPs: Sponsored by ACM (any SIG)
33 CFPs: Sponsored by IEEE (any TC)
35 CFPs: Not ACM-/IEEE-sponsored

Back Matter
39 Notice to Contributing Authors to SIG Newsletters
39 Impressum
Call for Nominations: Editor-In-Chief of ACM TOMM

ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM) The term of the current Editor-in-Chief (EiC) of the ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM) (http://tomm.acm.org/) is coming to an end, and the ACM Publications Board has set up a nominating committee to assist the Board in selecting the next EiC. Nominations, including self-nominations, are invited for a three-year term as TOMM EiC, beginning on 1 January 2016. The EiC appointment may be renewed at most one time. This is an entirely voluntary position, but ACM will provide appropriate administrative support. The EiC is responsible for maintaining the highest editorial quality, for setting technical direction of the papers published in TOMM, and for maintaining a reasonable pipeline of articles for publication. He/she has final say on acceptance of papers, size of the Editorial Board, and appointment of Associate Editors. The EiC is expected to adhere to the commitments expressed in the policy on Rights and Responsibilities in ACM Publishing (http://www.acm.org/publications/policies/RightsResponsibilities). For more information about the role of the EiC, see ACM’s Evaluation Criteria for Editors-in-Chief (http://www.acm.org/publications/policies/evaluation/). Nominations should include a vita along with a brief statement of why the nominee should be considered. Self-nominations are encouraged, and should include a statement of the candidate’s vision for the future development of TOMM. The deadline for submitting nominations is 24 July 2015, although nominations will continue to be accepted until the position is filled. Please send all nominations to the nominating committee chair, Nicu Sebe (sebe@disi.unitn.it). The search committee members are:

- Wei Tsang Ooi (NUS)
- Mary Lou Soffa (University of Virginia), ACM Publications Board Liaison

MPEG Column: 112th MPEG Meeting

This blog post is also available at at bitmovin tech blog and blog.timmerer.com.

The 112th MPEG meeting in Warsaw, Poland was a special meeting for me. It was my 50th MPEG meeting which roughly accumulates to one year of MPEG meetings (i.e., one year of my life I’ve spend in MPEG meetings incl. traveling – scary, isn’t it? … more on this in another blog post). But what happened at this 112th MPEG meeting (my 50th meeting)…

- Requirements: CDVA, Future of Video Coding Standardization (no acronym yet), Genome compression
- Video/JCT-VC/JCT-3D: MPEG-4 AVC, Future Video Coding, HDR, SCC
- Audio: 3D audio
- 3DG: PCC, MIoT, Wearable

As usual, the official press release and other publicly available documents can be found here. Let’s dig into the different subgroups:

Requirements

In requirements experts were working on the Call for Proposals (CIP) for Compact Descriptors for Video...
Analysis (CDVA) including an evaluation framework. The evaluation framework includes 800-1000 objects (large objects like building facades, landmarks, etc.; small(er) objects like paintings, books, statues, etc.; scenes like interior scenes, natural scenes, multi-camera shots) and the evaluation of the responses should be conducted for the 114th meeting in San Diego.

The future of video coding standardization is currently happening in MPEG and shaping the way for the successor of the HEVC standard. The current goal is providing (native) support for scalability (more than two spatial resolutions) and 30% compression gain for some applications (requiring a limited increase in decoder complexity) but actually preferred is 50% compression gain (at a significant increase of the encoder complexity). MPEG will hold a workshop at the next meeting in Geneva discussing specific compression techniques, objective (HDR) video quality metrics, and compression technologies for specific applications (e.g., multiple-stream representations, energy-saving encoders/decoders, games, drones). The current goal is having the International Standard for this new video coding standard around 2020.

MPEG has recently started a new project referred to as Genome Compression which is about the compression of genome information. A big dataset has been collected and experts working on the Call for Evidence (CfE). The plan is holding a workshop at the next MPEG meeting in Geneva regarding prospect of Genome Compression and Storage Standardization targeting users, manufactures, service providers, technologists, etc.

Summer in Warsaw. Photo (c) Christian Timmerer.

Systems

The 5th edition of the MPEG-2 Systems standard has been published as ISO/IEC 13818-1:2015 on the 1st of July 2015 and is a consolidation of the 4th edition + Amendments 1-5.

In terms of MPEG-DASH, the draft text of ISO/IEC 23009-1 3rd edition comprising 2nd edition + COR 1 + AMD 1 + AMD 2 + AMD 3 + COR 2 is available for committee internal review. The expected publication date is scheduled for, most likely, 2016. Currently, MPEG-DASH includes a lot of activity in the following areas: spatial relationship description, generalized URL parameters, authentication, access control, multiple MPDs, full duplex protocols (aka HTTP/2 etc.), advanced and generalized HTTP feedback information, and various core experiments:

- SAND (Sever and Network Assisted DASH)
- FDH (Full Duplex DASH)
- SAP-Independent Segment Signaling (SISSI)
- URI Signing for DASH
- Content Aggregation and Playback COntrol (CAPCO)

In particular, the core experiment process is very open as most work is conducted during the Ad hoc Group (AhG) period which is discussed on the publicly available MPEG-DASH reflector.

MPEG systems recently started an activity that is related to media orchestration which applies to capture as well as consumption and concerns scenarios with multiple sensors as well as multiple rendering devices, including one-to-many and many-to-one scenarios resulting in a worthwhile, customized experience.

Finally, the systems subgroup started an exploration activity regarding real-time streaming of file (a.k.a. TRUFFLE) which should perform a gap analysis leading to extensions of the MPEG Media Transport (MMT) standard. However, some experts within MPEG concluded that most/all use cases identified within this activity could be actually solved with existing technology such as DASH. Thus, this activity may still need some discussions...

Video/JCT-VC/JCT-3D

The MPEG video subgroup is working towards a new amendment for the MPEG-4 AVC standard covering resolutions up to 8K and higher frame rates for lower resolution. Interestingly, although MPEG most of the time is ahead of industry, 8K and high frame rate is already supported in browser environments (e.g., using bitdash 8K, HFR) and modern encoding platforms like bitcodin. However, it’s good that we finally have means for an interoperable signaling of this profile.

In terms of future video coding standardization, the video subgroup released a call for test material. Two sets of test sequences are already available and will be investigated regarding compression until next meeting.

After a successful call for evidence for High Dynamic Range (HDR), the technical work starts in the video...
subgroup with the goal to develop an architecture ("H2M") as well as three core experiments (optimization without HEVC specification change, alternative reconstruction approaches, objective metrics).

The main topic of the JCT-VC was screen content coding (SCC) which came up with new coding tools that are better compressing content that is (fully or partially) computer generated leading to a significant improvement of compression, approx. or larger than 50% rate reduction for specific screen content.

Audio

The audio subgroup is mainly concentrating on 3D audio where they identified the need for intermediate bitrates between 3D audio phase 1 and 2. Currently, phase 1 identified 256, 512, 1200 kb/s whereas phase 2 focuses on 128, 96, 64, 48 kb/s. The broadcasting industry needs intermediate bitrates and, thus, phase 2 is extended to bitrates between 128 and 256 kb/s.

3DG

MPEG 3DG is working on point cloud compression (PCC) for which open source software has been identified. Additionally, there’s new activity in the area of Media Internet of Things (MiToT) and wearable computing (like glasses and watches) that could lead to new standards developed within MPEG. Therefore, stay tuned on these topics as they may shape your future.

The week after the MPEG meeting I met the MPEG convenor and the JPEG convenor again during ICME2015 in Torino but that’s another story…

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ACM SIGMM/TOMM 2015 Award Announcements

The ACM Special Interest Group in Multimedia (SIGMM) and ACM Transactions on Multimedia Computing, Communications and Applications (TOMM) are pleased to announce the following awards for 2015 recognizing outstanding achievements and services made in the multimedia community.

SIGMM Technical Achievement Award: Dr. Tat-Seng Chua, National University of Singapore

SIGMM Rising Star Award: Dr. Yu-Gang Jiang, Fudan University

SIGMM Best Ph.D. Thesis Award: Dr. Ting Yao, City University of Hong Kong (currently Microsoft Research)


TOMM Best Associate Editor Award: Dr. Pradeep K. Atrey, State University of New York, Albany

Additional information of each award and recipient is available on the SIGMM web site. http://www.sigmm.org/

Awards will be presented in the annual SIGMM event, ACM Multimedia Conference, held in Brisbane, Australia during October 26-30, 2015.

ACM is the professional society of computer scientists, and SIGMM is the special interest group on multimedia. TOMCCAP is the flagship journal publication of SIGMM.
The 2015 winner of the prestigious ACM Special Interest Group on Multimedia (SIGMM) award for Outstanding Technical Contributions to Multimedia Computing, Communications and Applications is Prof. Dr. Tat-Seng Chua. The award is given in recognition of his pioneering contributions to multimedia, text and social media processing. Tat-Seng Chua is a leading researcher in multimedia, text and social media analysis and retrieval. He is one of the few researchers who has made substantial contributions in the fields of multimedia, information retrieval and social media. Dr. Chua’s contributions in multimedia dates back to the early 1990s, where he was among the first to work on image retrieval with relevance feedback (1991), video retrieval and sequencing by exploring metadata and cinematic rules (1995), and fine grained image retrieval at segment level (1995). These works helped shape the development of the field for many years. Given the limitation of visual content analysis, his research advocates the integration of text, metadata and visual contents coupled with domain knowledge for large-scale media analysis. He developed a multi-source, multi-modal and multi-resolution framework together with the involvement of human in the loop for such analysis and retrieval tasks. This has helped his group not only publish papers in top conferences and journals, but also achieve top positions in large-scale video evaluations when his group participated in TRECVID in 2000-2006, VideOlympics in 2007-09, as well as winning the highly competitive Star (Multimedia) Challenge in 2008. Leveraging the experience, he developed a large-scale multi-label image test set named NUS-WIDE, which has been widely used with over 600 citations. He recently started a company named ViSenze Pte Ltd (www.visenze.com) to commercialize his research in mobile visual fashion search. In his more recent research work in multimedia question-answering (MMQA), he developed a joint text-visual model to exploit correlation between text queries, text-based answers, and visual concepts in images and videos to return both relevant text and video answers. The early work was carried out in the domain of news video (2003), which has motivated several follow-on works in image QA. His recent works tackled the more complicated “how-to” type QA in product domains (2010-13). His recent works (2013-14) exploited SemanticNet to perform attribute-based image retrieval and use of various types of domain knowledge. His current work aims to build a live, continuous-learning system to support the dynamic annotation and retrieval of images and micro videos in social media streams. In information retrieval and social media research, Dr. Chua focused on the key problems of organizing large-scale unstructured text contents to support question-answering (QA). His works point towards the use of linguistics and domain knowledge for effective large-scale information analysis, organization and retrieval. Given his strong interest in both multimedia and text processing, it is natural for him to venture into social media research that involves the analysis of text, multimedia, and social network contents. His group developed a live social observatory system to carry out research in building descriptive, predictive and prescriptive analytics of multiple live social media streams. The system has been well recognized by peers. His recent work on “multi-screen social TV” won the 2015 Best IEEE Multimedia Best paper Award. Dr. Chua has been involved in most key conferences in these areas by serving as general chair, technical program chair, or invited keynote speaker as well as by leading innovative research and winning many best paper or best student paper awards in recent years. He is the Steering Committee Chair of two international multimedia conference series: ACM ICMR (International Conference on Multimedia Retrieval) and MMM (MultiMedia Modeling). In summary, he is an extraordinarily accomplished and outstanding researcher in multimedia, text and social media processing, truly exemplifying the characteristics of the ACM SIGMM Award for Outstanding Technical Contributions.
Announcement of ACM SIGMM Rising Star Award 2015

ACM Special Interest Group on Multimedia (SIGMM) is pleased to present this year’s Rising Star Award in multimedia computing, communications and applications to Dr. Yu-Gang Jiang. The ACM SIGMM Rising Star Award recognizes a young researcher who has made outstanding research contributions to the field of multimedia computing, communication and applications during the early part of his or her career.

Dr. Yu-Gang Jiang has made fundamental contributions in the area of video analysis and retrieval, especially with innovative approaches to large-scale video concept detection. He has been an active leader in exploring the bag-of-visual-words (BoW) representation for concept detection, providing influential insights on the critical representation design. He proposed the important idea of “soft-weighting” in his CIVR 2007 paper, which significantly advanced the performance of visual concept detection.

Dr. Jiang has proposed several important techniques for video and image search. In 2009, he proposed a novel domain adaptive concept selection method for concept-based video search. His method selects the most relevant concepts for a given query considering not only the semantic concept-to-query relatedness but also the data distribution in the target domain. Recently he proposed a method that generates query-adaptive hash codes for improved visual search, with which a finer-grained ranking of search results can be achieved compared to the traditional hashing based methods. His most recent work is in the emerging field of video content recognition by deep learning, where he proposed a comprehensive deep learning framework to model static, short-term motion and long-term temporal information in videos.

Very promising results were obtained on the widely used UCF101 dataset. As a postdoctoral researcher at Columbia University and later as a faculty member at Fudan University, Dr. Jiang has devoted significant efforts to video event recognition, a problem that is receiving increasing attention in the multimedia community. His extensive contributions in this area include not only innovative algorithm design, but also large benchmark construction, system development, and survey tutorials. He devised a comprehensive system in 2010 using multimodal features, contextual concepts and temporal clues, which won the multimedia event detection (MED) task in NIST TRECVID 2010.

He constructed the Columbia Consumer Video (CCV) benchmark in 2011, which has been widely used. Recently, he continues to lead major efforts in creating and sharing large-scale video datasets in critical areas (including 200+ event categories and 100,000 partially copy videos) as community resources. The high impact of his works is reflected by the high number of citations of his work. His recent paper on video search result organization received the Best Poster Paper Award at ACMMM 2014. His shared benchmark datasets and source codes have been used worldwide. In addition, he has made extensive contributions to the professional communities by serving as conference program chairs, invited speakers, and tutorial experts. In summary, Dr. Yu-Gang Jiang receives the 2015 ACM SIGMM Rising Star Award for his significant contributions in the areas of video content recognition and search.

Bio of Awardee
Dr. Yu-Gang Jiang is an associate professor and doctoral advisor in the School of Computer Science at Fudan University, Shanghai. He directs the Big Video Data Analytics (BigVid) Lab, focusing on the development of novel algorithms and systems to better understand big video data. He has published nearly 80 papers in top venues with 2800+ citations according to Google Scholar (h-index=26). He is an active participant of several international benchmark evaluations. At the U.S. NIST TREC video retrieval evaluation, systems designed by him achieved top performance in 2008 video concept detection task and 2010 multimedia event detection task. He also developed VIREO-374 and CU-VIREO374, two large sets of visual concept classifiers that are popularly used worldwide. His work has led to many awards, including an “Emerging Leader in Multimedia” Award from IBM T.J. Watson Research in 2009, an Early Career Faculty Award from Intel and CCF in 2013, and the prestigious 2014 ACM China Rising Star Award. He has served on the committees of many conferences and is currently a technical program chair of ACM ICMR 2015 in Shanghai.
ACM SIGMM Award for Outstanding PhD Thesis in Multimedia Computing, Communications and Applications 2015

Awardee

ACM Special Interest Group on Multimedia (SIGMM) is pleased to present the 2015 SIGMM Outstanding Ph.D. Thesis Award to Dr. Ting Yao and Honorable Mention recognition to Dr. Britta Meixner.

The award committee considers Dr. Yao’s dissertation entitled “Multimedia Search by Self, External, and Crowdsourcing Knowledge” worthy of the recognition as the thesis proposes an innovative knowledge transfer framework for multimedia search which is expected to have significant impact, especially in boosting the search performance for big multimedia data.

Dr. Yao’s thesis proposes the knowledge transfer methodology in three multimedia search scenarios:

1. Seeking consensus among multiple modalities in the context of search re-ranking,
2. Leveraging external knowledge as a prior to be transferred to a problem that belongs to a domain different from the external knowledge, and
3. Exploring the large user click-through data as crowdsourced human intelligence for annotation and search.

The effectiveness of the proposed framework has been successfully justified by thorough experiments. The proposed framework has substantial contributions in principled integration of multimodal data which is indispensable in multimedia search. The publications related to the thesis clearly demonstrate the major impact of this work in many research disciplines including multimedia, web, and information retrieval. The fact that parts of the proposed techniques have been and are being transferred to the commercial search service Bing further attest to the practical contributions of this thesis. Overall, the committee recognizes the significant impact and contributions presented in the thesis to the multimedia community.

Bio of Awardee

Dr. Ting Yao is an associate researcher in the Multimedia Search and Mining group at Microsoft Research, Beijing, China. His research interests are in multimedia search and computing. He completed a Ph.D. in Computer Science at City University of Hong Kong in 2014. He received the B.Sc. degree in theoretical and applied mechanics (2004), B.Eng. double degree in electronic information engineering (2004), and M.Eng. degree in signal and information processing (2008) all from the University of Science and Technology of China, Hefei, China. The system designed by him achieved the second place in the THUMOS action recognition challenge at CVPR 2015. He was also the principal designer of the image retrieval systems that achieved the third and fifth performance in the MSR-Bing image retrieval challenge at ACM MM 2014 and 2013, respectively. He received the Best Paper Award of ACM ICIMCS (2013).

Honorable Mention

The award committee is pleased to present the Honorable Mention to Dr. Britta Meixner for the thesis entitled: “Annotated Interactive Non-linear Video – Software Suite, Download and Cache Management.”
The thesis presents a fully functional software suite for authoring non-linear interactive videos with downloading and cache management mechanisms for effective video playback. The committee is significantly impressed by the thorough study presented in the thesis with extensive analysis of the properties of the software suite. The implementation which has been made available as open source software along with the thesis undoubtedly has very high potential impact to the multimedia community.

Bio of Awardee

Dr. Britta Meixner received her Master's degree (German Diplom) in Computer Science from the University of Passau, Germany, in 2008. Furthermore, she received the First State Examination for Lectureship at Secondary Schools for the subjects Computer Science and Mathematics from the Bavarian State Ministry for Education and Culture in 2008. She received her Ph.D. degree from the University of Passau, Germany, in 2014. The title of her thesis is "Annotated Interactive Non-linear Video – Software Suite, Download and Cache Management." She is currently a postdoctoral research fellow with the University of Passau, Germany, and will be a postdoctoral research fellow at FXPAL, Palo Alto, CA, USA, starting October 2015. Her research interest is mainly in hypermedia. She is an award winner of the 2015 Award "Women + Media Technology," granted by Germany's public broadcasters ARD and ZDF (ARD/ZDF Förderpreis "Frauen + Medientechnologie" 2015). She was a Reviewer for Springer Multimedia Tools and Applications (MTAP) Journal, an Organizer of the "International Workshop on Interactive Content Consumption (WSiCC)" at ACM TVX in 2014 and 2015, and Associate Chair at ACM TVX2015.

2015 ACM Transactions on Multimedia Computing, Communications and Applications (TOMM) Nicolas D. Georganas Best Paper Award

“A Quality of Experience Model for Haptic Virtual Environments” (TOMM vol.10, Issue 3) by Abdelwahab Hamam, Abdulmalek El Saddik and Jihad Alja’am.

The purpose of the named award is to recognize the most significant work in ACM TOMM (formerly TOMCCAP) in a given calendar year. The whole readership of ACM TOMM was invited to nominate articles which were published in Volume 10 (2014). Based on the nominations the winner has been chosen by the TOMM Editorial Board. The main assessment criteria have been quality, novelty, timeliness, clarity of presentation, in addition to relevance to multimedia computing, communications, and applications.

The winning paper is grounded on the observation that so far there is only limited research on Quality of Experience (QoE) for Haptic-based Virtual Reality applications. In order to overcome this issue, the authors propose a human-centric taxonomy for the evaluation of QoE for haptic virtual environments. The QoE evaluation is applied through a fuzzy logic inference model. The taxonomy also gives guidelines for the evaluation of other multi-modal multimedia systems. This multi-modality was one of the main reasons for the selection of this article and TOMM members expect that it will have an impact on future QoE studies in various sub-fields of multimedia research.

The award honors the founding Editor-in-Chief of TOMM, Nicolas D. Georganas, for his outstanding contributions to the field of multimedia computing and his significant contributions to ACM. He exceedingly influenced the research and the whole multimedia community.

The Editor-in-Chief Prof. Dr.-Ing. Ralf Steinmetz and the Editorial Board of ACM TOMM cordially congratulate the winner. The award will be presented to the authors at the ACM Multimedia 2015 in Brisbane, Australia, and includes travel expenses for the winning authors.
Abdelwahab Hamam received his PhD in Electrical and Computer Engineering from the University of Ottawa, Canada, in 2013. He is currently a postdoctoral research scientist at Immersion in Montreal, Canada focusing in research and development of novel haptic technologies and interactions. He was previously a teaching and research assistant at the University of Ottawa from Jan 2005 to May 2013. He has more than 35 academic papers and pending patent applications. He is the recipient of the best paper award at the 2015 QoMEX workshop. He is the technical co-chair of the 2015 Haptic Audio-Visual Environments and Games (HAVE) Workshop and the co-organizer of the 2015 QoMEX workshop special session on quality of experience in haptics. His research interests include haptic applications, medical simulations, and quality of experience for multimedia haptics.

Abdelmotaleb El Saddik is Distinguished University Professor and University Research Chair in the School of Electrical Engineering and Computer Science at the University of Ottawa. He is an internationally-recognized scholar who has made strong contributions to the knowledge and understanding of multimedia computing, communications and applications. He has authored and co-authored four books and more than 450 publications. Chaired more than 50 conferences and workshop and has received research grants and contracts totaling more than $18 Mio. He has supervised more than 100 researchers. He received several international awards, among others ACM Distinguished Scientist, Fellow of the Engineering Institute of Canada, Fellow of the Canadian Academy of Engineers and Fellow of IEEE and IEEE Canada Computer Medal.

Jihad Mohamed Alja'am received the Ph.D. degree, MS. degree and BSc degree in computing from Southern University (The National Council for Scientific Research, CNRS), France. He was with IBM-Paris as Project Manager and with RTS-France as IT Consultant for several years. He is currently with the Department of Computer Science and Engineering at Qatar University. His current research interests include multimedia, assistive technology, learning systems, human–computer interaction, stochastic algorithms, artificial intelligence, information retrieval, and natural language processing. Dr. Alja’am is a member of the editorial boards of the Journal of Soft Computing, American Journal of Applied Sciences, Journal of Computing and Information Sciences, Journal of Computing and Information Technology, and Journal of Emerging Technologies in Web Intelligence. He acted as a scientific committee member of different international conferences (ACIT, SETIT, ICTTA, ACTEA, ICLAN, ICCCE, MESM, ICENCO, GMAG, CGIV, ICICS, and ICOST). He is a regular reviewer for the ACM computing review and the journal of supercomputing. He has collaborated with different researchers in Canada, France, Malaysia, and USA. He published so far 136 papers, 8 books chapters in computing and information technology which are published in conference proceedings, scientific books, and international journals. He is leading a research team in multimedia and assistive technology and collaborating in the Financial Watch and Intelligent Document Management System for Automatic Writer Identification projects.
TOMM Associate Editor of the Year Award 2015

Annually, the Editor-in-Chief of the ACM Transactions on Multimedia Computing, Communications and Applications (TOMM) honors one member of the Editorial Board with the TOMM Associate Editor of the Year Award. The purpose of the award is the distinction of excellent work for ACM TOMM and hence also for the whole multimedia community in the previous year. Criteria for the award are (1) the amount of submissions processed in time, (2) the performance during the reviewing process and (3) the accurate interaction with the reviewers in order to broaden the awareness for the journal. Based on the criteria mentioned above, the ACM Transactions on Multimedia Computing, Communications and Applications Associate Editor of the Year Award 2015 goes to Pradeep Atrey from State University of New York, Albany, USA.

Pradeep K. Atrey is an Assistant Professor at the State University of New York, Albany, NY, USA. He is also an (on-leave) Associate Professor at the University of Winnipeg, Canada and an Adjunct Professor at University of Ottawa, Canada. He received his Ph.D. in Computer Science from the National University of Singapore, M.S. in Software Systems and B.Tech. in Computer Science and Engineering from India. He was a Postdoctoral Researcher at the Multimedia Communications Research Laboratory, University of Ottawa, Canada. His current research interests are in the area of Security and Privacy with a focus on multimedia surveillance and privacy, multimedia security, secure-domain cloud-based large-scale multimedia analytics, and social media. He has authored/co-authored over 100 research articles at reputed ACM, IEEE, and Springer journals and conferences. His research has been funded by Canadian Govt. agencies NSERC and DFAIT, and by Govt. of Saudi Arabia. Dr. Atrey is on the editorial board of several journals including ACM Trans. on Multimedia Computing, Communications and Applications, ETRI Journal and IEEE Communications Society Review Letters. He was also guest editor for Springer Multimedia Systems and Multimedia Tools and Applications journals. He has been associated with over 40 international conferences/workshops in various roles such as Organizing Chair, Program Chair, Publicity Chair, Web Chair, Area Chair, Demo Chair and TPC Member. Dr. Atrey was a recipient of the Erica and Arnold Rogers Award for Excellence in Research and Scholarship (2014), ETRI Journal Best Editor Award (2012), ETRI Journal Best Reviewer Award (2009) and the three University of Winnipeg Merit Awards for Exceptional Performance (2010, 2012 and 2013). He was also recognized as “ICME 2011 – Quality Reviewer” and is invited as a Rising Star Speaker at the SigMM Inaugural Multimedia Frontier Workshop (2015). The Editor-in-Chief Prof. Dr.-Ing. Ralf Steinmetz cordially congratulates Pradeep.

Image indexing and retrieval with Yael

Introduction

Yael is a library implementing computationally intensive functions used in large scale image retrieval, such as neighbor search, clustering and inverted files. The library offers interfaces for C, Python and Matlab.

The motivation of Yael is twofold. We aim at providing:

- core and optimized instructions and methods commonly used for large-scale multimedia retrieval systems
- more sophisticated functions associated with state-of-the-art methods, such as the Fisher vector, VLAD, Hamming Embedding or more generally methods based on inverted file systems, such as selective match kernels.

Yael is intended as an API and does not implement a retrieval system in an integrated manner: only a few test programs are available for key tasks such as k-means. Yet this can be done on top of it with a few dozen lines of Matlab or Python code.

Yael started as an open-source spin-off of INRIA LEAR’s proprietary library Bigimbaz. The objective was to isolate performance-critical primitives that could be re-used in other projects. Yael’s design choices were: implemented
Image indexing and retrieval with Yael

in C for simplicity, but using an object-oriented design (structs with constructors/destructors), interface with Python as high-level language to facilitate administrative tasks.

Yael is designed to handle dense data in float, as it is primarily used for signal processing tasks where the quality of the representation is determined by the number of dimensions rather than the precision of the components. In the Matlab interface, single matrices, and float32 in Python. Yael was designed initially to manipulate matrices in C. It was interfaced for Python using SWIG, which gives low-level access to the full library. An additional Numpy layer (ynumpy) is provided for high-level functions. The most important functions of Yael are wrapped in Mex to be callable from Matlab.

Performance is very important. Yael has computed k-means with hundreds of thousand centroids and routinely manipulate matrices that occupy more than 1/2 the machine’s RAM. This means that it has to be lightweight and 64-bit clean. The design choices of Yael are governed by efficiency concerns more than by portability. As a result, the library may work only with severely down-graded performance if instructions are not provided by the processor. In particular, Yael relies on SSE instructions such as the SSE 4.2 popcnt instruction. The library is maintained for Linux and MacOS. Yael relies on as few external libraries as possible. The only mandatory ones are BLAS/Lapack (for performance). Other libraries (Python’s C interface, Matlab’s mex, Arpack, OpenMP) are optional.

Yael and related packages are downloaded around 600 times per month.

This article addresses the recognition of images of the same scene or object, and how Yael can perform this kind of operation. Here is an example of two images of the same scene that we would like to match:

We will explain how to compute descriptors (aka signatures) for the images, and how to find descriptors that are similar between images.

We are going to work on the 100 first query images of the Holidays dataset, and their associated database examples. The images and associated SIFT descriptors can be downloaded from here: Images and SIFT descriptors.

Image indexing

Imagine a user that has a large image collection with photos of buildings, with as associated metadata the GPS location of the building. Given a new photo of a building, taken with a mobile phone, the user wants to find the location where the photo was taken. This is where image indexing comes into play.

Image indexing means constructing an index referencing the images from a collection. This index has a search function that can be used to retrieve the images that are most similar to a query image.

At build time and search time, the index is stored in RAM. This is orders of magnitude faster than disk-based implementations, such as those used in SQL database engines. However, for large datasets, this requires either a lot of RAM or a very compact representation per image. Yael provides this compact representation, so that you do not need to buy the RAM.

In combination with efficient matrix manipulation environments like Matlab and Numpy, Yael makes the process of building an index and searching in it very simple.

Extracting image descriptors

Local image descriptors are vectors computed each on an area of the image. The areas are selected to contain strong contrast changes, with a 2D signal processing filter. Then the descriptor vector is computed from the gradient or frequency content in the area.
Local descriptors are typically designed to be invariant to some classes of transformations: translations, illumination changes, rotations, etc. At the same time, they should be discriminant enough to distinguish relevant differences on the patches, eg. different patterns on the facade of a building. There is a long line of research on designing local image features with appropriate tradeoffs in terms of invariance / discriminance / computational cost, see for example this comparison of affine covariant features.

In the images above, local descriptors extracted on the skyline ought to be very similar. Therefore, these images should be easy to match.

Local descriptors can be extracted using any local description algorithm, as long as they can be compared with L2 distances, ie. descriptors that are far away in L2 space are also considered different in image content. For example, OpenCV provides an implementation of the SURF descriptor, and VLFeat contains a SIFT implementation.

For this example, we will use the SIFT implementation provided along with the Holidays dataset. In the "Descriptor extraction" section of http://lear.inrialpes.fr/~jegou/data.php, download the executable (there is a Mac OS X version and a Linux version).

The pre-processing applied to images before analyzing them to extract signatures can have a dramatic effect on the retrieval performance. Ideally, images should be equalized so that their luminance is similar and resized into dimensions that are not too different. This can be performed in a number of ways, eg. with Imagemagick. In our case, we'll just use a few command-line utilities from netpbm.

In total, the steps that extract the descriptors from a single image are:

```bash
infnie=xxtc.jpg
outfnie=6$(infnie/).jpg

# Rescaling and intensity normalization
djpeg $infnie | ppmtojpeg | ppmcompress -bpercent=0.01 -gpercent=0.01 -maxpsize=400 | ppmresize -pixels $[600*700] &gt; $outfnie

# Compute descriptors
compute_descriptors -1 $infnie -o $outfnie -lencff

```

This should be applied to all the images that are to be indexed, and the ones that will be queried.

The remainder of this article presents the main functions used in Yael to do image retrieval. They are implemented in the two languages supported by Yael: Python and Matlab.

### Image indexing in Python with Fisher vectors

A global image descriptor is a vector that characterizes the whole image. The Euclidean distance between the descriptors of two images should be higher for different images than for similar images. There are many popular types of global descriptors, like color histograms or GIST descriptors.

Here, we use a statistical tool derived from the Fisher kernel to aggregate the local SIFT descriptors of an image into a global image descriptor: the Fisher vector (FV). See Aggregating local image descriptors into compact codes for more details. You may also be interested in INRIA’s Fisher vector implementation which is a Matlab version of this example, on the complete Holidays dataset.

The most important functions of Yael are available in Python via the ynumpy module. They all manipulate compact float32 or int32 matrices.

The FV computation relies on a training where a Gaussian Mixture Model (GMM) is fitted to a set of representative local descriptors. For simplicity, we are going to use the descriptors of the database we index. To load the database descriptors, use

```python
ynumpy.siftgeo_read(database)
```

This loads the meta component which contains the SIFT descriptor’s meta-information (location and size of the area, orientation, etc.). We do not use this information to compute the FV.

Next we sample the descriptors to reduce their dimensionality by PCA and computing a GMM. This involves some standard numpy code, and the ynumpy.gmm_learn function. For a GMM of size k (let’s set it to 64), we need about $1000 \times k$ training descriptors.
The GMM is a tuple containing the a-priori weights per mixture component, the mixture centres and the diagonal of the component covariance matrices (the model assumes a diagonal matrix, otherwise the descriptor would be way too long).

The training is finished. The next stage is to encode the SIFTs into one vector per image:

All the database descriptors are stacked as lines of a single matrix `image_fvs`, and all queries image descriptors in another matrix `query_fvs`. Then the Euclidean nearest neighbors of each query (and hence the most similar images) can be retrieved with:

Now we display the search results for a few query images. There is one line per query image, which shows the image, and a row of retrieval results. The correct results have a green rectangle around them, negative ones a red rectangle.

Image indexing based on global descriptors like the Fisher Vector is very efficient and easy to implement using Yael. For larger datasets (more than a few tens of thousand images), it is useful to use vector quantization or hashing techniques to perform the nearest-neighbor search faster.

### Image indexing in Matlab with inverted files

In this chapter, we directly index all the local SIFT descriptors of the database images into an indexing structure in RAM called the inverted file. Each SIFT descriptor is assigned an index in \([1,k]\) using a quantization function. The inverted file contains \(k\) lists, one per possible index. When a SIFT from an image is assigned to an index \(1 \leq i \leq k\), the id of this image is added to the list \(i\).

In the example below, we show how to use an inverted file of Yael from Matlab. More specifically, the inverted file we consider supports binary signatures, as proposed in the Hamming Embedding approach described in this paper.

Before launching the code, please ensure that

- You have a working and compiled version of Yael’s matlab interface
- The corresponding directory (‘YAELDIR/matlab’) is in your matlab Path. If not, use the addpath(‘YAELDIR/ matlab’) to add it.

To start with, we define the parameters of the indexing method. Here, we choose a vocabulary of size \(k=1024\). We also set some parameters specific to Hamming embedding.
Hereafter, we show how we typically load a set of images and descriptors stored in separate files. We use the standard MATLAB functions `arrayfun` and `cellfun` to perform operations in batch. The descriptors are assumed stored in the siftgeo format, therefore we read them with the `yael`'s `siftgeo_read` function.

```matlab
sifts = cell();
for i = 1:numel(img_list)
    [sifts{i}, meta] = siftgeo_read(img_list{i});
    sifts{i} = sifts{:};
end
```

Now, we are going to learn the visual vocabulary with k-means and subsequently construct the inverted file structure for Hamming Embedding. We learn it on Holidays itself to avoid requiring another dataset. But note that this should be avoided for a true system, and a proper evaluation should employ an external dataset for dictionary learning.

```matlab
vttrain = [sifts{:}];
vttrain(:,1:2:end) = tic;
C = yael.kmeans(vttrain,k,’niter’,10);
```

We can add the descriptors of all the database images to the inverted file. Here, Each local descriptor receives an identifier. This is not a requirement: another possible choice would be to use directly the id of the image. But in this case we could not use this output for spatial verification. In our case, the descriptor id will be used to display the matches.

```matlab
vtfrbs = yael.ivf.be(k, shts, vttrain, @yael.nn, C);
```

Finally, we make some queries. We compute the number of matches `n_immatches` between query and database images. We invoke the standard MATLAB function `accumarray`, which in essence compute here a histogram weighted by the match weights.

```matlab
Queries = [[1 3 23 42 68 83];
for q = 1:numel(Queries)
    qimg = Queries(q);
    vtfhrs = yael.ivf.query(vtfrbs, aff52(1:sifts(qimg)), sifts(qimg), k);
    % Translate to image identifiers and count number
    % of matches per image
    n_matches = descid_to_imgid(matches(:,iimg));
    n_immatches = hist(n_matches, 1:nimg);
    % Images are ordered by decreasing score
    [~, idx] = sort(n_immatches, 'descend');
    % Display results
end
```

The output looks as follows. The query is the top-left image, and then the queries are displayed. The title gives the number of matches and the normalized score used to rank the images. The matches are displayed in yellow (and the non-matching descriptors in red).

### Conclusion

Yael is a small library that contains many primitives that are useful for image indexing, nearest-neighbor search, sorting, etc. It at the base of several state-of-
the-art implementations of image indexing packages. Reference [1] describes the implementation tradeoffs of some of Yael’s main functions, and provides more references to research papers whose results were obtained with Yael.

In the code above, only the main function calls were shown, see the Yael tutorial for a fully functional version of the code, and the main Yael website for the complete documentation.

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PhD Thesis Summaries

Honglin Yu

Understanding the Popularity Evolution of Online Media: A Case Study on YouTube Videos

Supervisor(s) and Committee member(s): Lexing Xie (chair of panel), Scott Sanner (supervisor), Henry Gardner (advisor)

Understanding the popularity evolution of online media has become an important research topic. There are a number of key questions which have high scientific significance and wide practical relevance. In particular, what are the statistical characteristics of online user behaviors? What are the main factors that affect online collective attention? How can one predict the popularity of online content? Recently, researchers have tried to understand the way popularity evolves from both a theoretical and empirical perspective. A number of important insights have been gained: e.g. most videos obtain the majority of their viewcount at the early stage after uploading; for videos having identical content, there is a strong “first-mover” advantage, so that early uploads have the most views; YouTube video viewcount dynamics strongly correlate with video quality. Building upon these insights, the main contributions of the thesis are: we proposed two new representations of viewcount dynamics. One is popularity scale where we represent each video’s popularity by their relative viewcount ranks in a large scale dataset. The other is the popularity phase which models the rise and fall of video’s daily viewcount overtime; We also proposed four computational tools. The first is an efficient viewcount phase detection algorithm which not only automatically determines the number of phases each video has, but also finds the phase parameters and boundaries. The second is a phase-aware viewcount prediction method which utilizes phase information to significantly improve the existing state-of-the-art method. The third is a phase-aware viewcount clustering method which can better capture “pulse patterns” in viewcount data. The fourth is a novel method of predicting viewcounts using external information from the Twitter network. Finally, this thesis sets out results from large-scale, longitudinal measurement study of YouTube video viewcount history, e.g. we find videos with different popularity and categories have distinctive phase histories. And we also observed a non-trivial number of concave phases. And we also observed a non-trivial number of concave phases. Dynamics like this can not be explained in terms of existing models, and the terminology and tools introduced here have the potential to spark fresh analysis efforts and further research. In all, the methods and insights developed in the thesis improve our understanding of online collective attention. They also have considerable potential usage in online marketing, recommendation and information dissemination e.g. in emergency & natural disasters.

The Computational Social Science (CSS@CS) Lab of ANU
URL: http://css.cecs.anu.edu.au/

The Computational Social Science (CSS@CS) Lab is located within the Research School of Computer Science at the Australian National University. We collaborate closely with the Machine Learning and Optimization research groups in NICTA, and a growing set of ANU researchers in the social sciences. We focus on laying the computational foundations from large amounts of social and behavioral data. The outcome of our work puts a strong emphasis on actionable insights, and in the long-term influence on policy.
Mario Montagud Climent  

Design, Development and Evaluation of an Adaptive and Standardized RTCP-based IDMS Solution  

Supervisor(s) and Committee member(s): Co-Supervisor: Prof. Fernando Boronat (UPV, Spain)  
Co-Supervisor: Dr. Pablo Cesar (CWI, Amsterdam)  
URL: http://hdl.handle.net/10251/48549  
ISBN: http://hdl.handle.net/10251/48549

Nowadays, we are witnessing a transition from physical togetherness towards networked togetherness around media content. Novel forms of shared media experiences are gaining momentum, allowing geographically distributed users to concurrently consume the same media content while socially interacting (e.g., via text, audio or video chat). Relevant use cases are, for example, Social TV, networked games and multi-party conferencing.

However, realizing enjoyable shared media services faces many challenges. In particular, a key technological enabler is the concurrent synchronization of the media playout across multiple locations, which is known as Inter-Destination Multimedia Synchronization (IDMS). This PhD thesis presents an inter-operable, adaptive and accurate IDMS solution, based on extending the capabilities of RTP/RTCP standard protocols (RFC 3550). Concretely, two new RTCP messages for IDMS have been defined to carry out the necessary information to achieve IDMS. Such RTCP extensions have been standardized within the IETF, in RFC 7272. In addition, novel standard-compliant Early Event-Driven (EED) RTCP feedback reporting mechanisms have been also designed to enhance the performance in terms of interactivity, flexibility, dynamism and accuracy when performing IDMS.

The designed IDMS solution makes use of globally synchronized clocks (e.g., using NTP) and can adopt different (centralized and distributed) architectural schemes to exchange the RTCP messages for IDMS. This allows efficiently providing IDMS in a variety of networked scenarios and applications, with different requirements (e.g., interactivity, scalability, robustness…) and available resources (e.g., bandwidth, latency, multicast support…). Likewise, various monitoring and control algorithms, such as dynamic strategies for selecting the reference timing to synchronize with, and fault tolerance mechanisms, have been added. Moreover, the proposed IDMS solution includes a novel Adaptive Media Playout (AMP) technique, which aims to smoothly adjust the media playout rate, within perceptually tolerable ranges, every time an asynchrony threshold is exceeded.

Prototypes of the IDMS solution have been implemented in both a simulation and in real media framework. The evaluation tests prove the consistent behavior and the satisfactory performance of each one of the designed components (e.g., protocols, architectural schemes, master selection policies, adjustment techniques…). Likewise, comparison results between the different developed alternatives for such components are also provided. In general, the obtained results demonstrate the ability of this RTP/RTCP-based IDMS solution to concurrently and independently maintain an overall synchronization status (within allowable limits) in different logical groups of users, while avoiding annoying playout discontinuities and hardly increasing the computation and traffic load.

To check the contributions of the PhD thesis, please visit my website: https://sites.google.com/site/mamontor/

Finally, this poster gives an overall overview of the PhD thesis:
Interactive and Immersive Media (IIM) R&D Group; Distributed and Interactive Systems (DIS) Group
URL: http://www.dis.cwi.nl/

IIM Group: IIM is an emerging research group composed of professors, researchers and students, most of them belonging to the Polytechnic University of Valencia (UPV, Spain), in particular to the Gandia Campus. Its main research line is the design and evaluation of interactive and distributed multimedia systems, mainly focusing on synchronization (especially Inter-Destination Media Synchronization – IDMS - and Hybrid Synchronization) and Quality of Experience (QoE) aspects. Additionally, IIM group is also very interested in other research topics, such as web-based communications, development of immersive scenarios, 3D virtual reality environments, networked multimedia games, Motion Capture (MOCAP), gesture interaction and control, and Multi-Sensorial Media (MulSeMedia) experiences.

DIS Group: DIS group focuses on modeling and controlling complex collections of media objects (including real-time media and sensor data) that are interactive and distributed in time and space. The group’s fundamental interest is in understanding how the various notions of ‘time’ influence the creation, distribution and delivery of complex content in a customizable manner.

Rodrigo Laiola Guimarães
Socially-Aware Multimedia Authoring

Supervisor(s) and Committee member(s): Dick C. A. Bulterman (advisor), Pablo Cesar (advisor), Anton Eliens (opponent), Frank van Harmelen (opponent), Janet Murray (opponent), Maria da Graça Pimentel (opponent), Susanne Boll (opponent).
URL: http://dare.ubvu.vu.nl/handle/1871/49959

Creating compelling multimedia productions is a non-trivial problem. This is true for both professional and personal content. For professional content, extensive production support is typically available during creation. Content assets are well structured, content fragments are professionally produced with high quality, and production assets are often highly annotated (within the scope of the production model). For personal content, nearly none of these conditions exist: content is a collection of assets that are structured only by linear recording time, of mediocre technical quality (on an absolute scale), and with only basic automatic annotations. These conditions limit the options open to casual authors and to viewers of rich multimedia content in creating and receiving focused, highly personal media presentations. The problem is compounded when authors want to integrate community media assets: media fragments donated from a potentially wide and anonymous recording community. In this thesis we reflect on the traditional multimedia authoring workflow and we argue that a fresh new look is required.

Our experimental methodology aims at meeting the requirements needed for social communities that are not addressed by traditional authoring and sharing applications. We focus on the particular task of supporting socially-aware multimedia authoring, in which the relationships within particular social groups can be exploited to create highly personal media experiences. Our framework is centered on empowering users in telling stories and commenting on personal media artifacts, considering the long-term social context of the user. The work has been evaluated through a number of prototype tools that allow users to explore, create, enrich and share rich multimedia artifacts. Results from our evaluation process provide useful insights into how a socially-aware multimedia authoring and sharing system should be designed and architected, for helping users in recalling personal memories and in nurturing their close circle relationships.
The work reported in this thesis has been carried out at the VU University Amsterdam and at the Centrum Wiskunde & Informatica (CWI), under the auspices of the group Distributed and Interactive Systems (DIS). The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7/2007-2013) under grant agreement no. ICT-2007-214793.

PhD Thesis cover

TA2: MyVideos concept video

TA2: MyVideos manual test edit

Distributed and Interactive Systems (DIS)
URL: http://www.cwi.nl/research-groups/distributed-and-interactive-systems

The group focuses on modeling and controlling complex, collections of media objects (including real-time media and sensor data) that are interactive and distributed in time and space. The group’s fundamental interest is in understanding how the various notions of ‘time’ influence the creation, distribution and delivery of complex content in a customizable manner.

Sambit Bakshi

Periocular Localization and Feature Extraction for Human Recognition

Supervisor(s) and Committee member(s): Pankaj K. Sa (supervisor), Banshidhar Majhi, Bidyadhar Subudhi, and Sukadev Meher (Advisors)

The advent of biometric system as a next-generation solution towards bringing social and national security to a technically-achievable scenario. This paradigm of authentication has easily taken over the classical token-based and knowledge-based systems. The last decade has seen researches claiming face and iris to be the most promising two traits. Iris produces high accuracy with extremely high-resolution near-infrared (NIR) images, and face is capable of producing moderate accuracy even from low resolution images. To bridge the gap between these two, periocular (periphery of ocular) biometric came into highlight and researchers have initially established its ability to yield accurate recognition.

This thesis attempts to design a periocular biometric system. Periocular region can be considered as the region around eye where features, that can participate in uniquely identifying an individual, are existing. So, starting from eye, while moving away from eye, periocular region ranges up to the portion where the skin becomes smooth and no feature is available. Hence periocular biometric, unlike most common segmentation application, cannot be localized through edge detection.

The first part of the thesis investigates to identify four trait-specific localization techniques. For achieving perfect localization, (a) conformation of the localization to human anthropometry, (b) high accuracy from a localized image, (c) conformation to human judgement, and (d) subdivision of eye portion are done. The second part concentrates to design a suitable feature extraction method for periocular biometric. The thesis presents a novel Phase Intensive Global Pattern (PIGP) which is shown to able to extract gross as well as subtle features and work well for images without rotation. The next part of the thesis incorporates and ensures scale-invariant and rotation-invariant properties into PILP, and this modified version is termed as Phase Intensive Local Pattern (PILP). PILP is experimentally proven to work well for NIR databases as well as visual-spectrum (VS) databases. Ability of PILP to identify
A large number of potential keypoints and extraction of high-dimensional (128D) feature from them results in the high accurate performance of PILP. However, this type of phase-difference based keypoint detection and oriented histogram based large feature extraction is extremely time-consuming and the feature vector, being so large, invites a reduction technique to be employed. The next part of the thesis hence develops a post-reduction technique to reduce the feature vector size and thereby the matching time. Reduced PILP (R-PILP) is developed from PILP by classifying keypoints through verifying the degree of monotonic nature in them. Experiments show that R-PILP is a little less accurate than PILP but R-PILP is faster as compared. All results in the thesis have been derived on four standard publicly available databases: BATH and CASIAv3 (NIR databases), and UBIRISv2 and FERETv4 (VS databases). Comparative analysis have been made with existing landmark techniques like Circular Local Binary Pattern (CLBP), Walsh Mask, Scale Invariant Feature Transform (SIFT), and Speeded Up Robust Features (SURF). It has been observed that these features consistently work equally well on NIR databases. However, performance of existing techniques degrade rapidly when experimented on VS databases. Though the proposed techniques suffers degradation, but outperforms the existing techniques with a high margin. The localization technique, and three progressively developed features PIGP, PILP, and R-PILP complete the objective of developing the periorcular biometric system.
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- Minkyung Kim, Dong-Wook Lee, Kangseok Kim: Hierarchical structured data logging system for effective lifelong management in ubiquitous environment
- Shingchern D. You, Wei-Hwa Chen: Comparative study of methods for reducing dimensionality of MPEG-7 audio signature descriptors
- Jeong-Hoon Lee, Wook-Shin Han, Kyoung Hwan An: Towards intelligent in-vehicle sensor database management systems

MTAP Volume 74 Issue 11

Editor-in-Chief: Borko Furht
URL: http://link.springer.com/journal/11042/74/11/page/1
Published: June 2015

- Oussama Benrhouma, Houcemeddine Hermassi: Security analysis and improvement of a partial encryption scheme
- Yujuan Sun, Junyu Dong, Muwei Jian, Lin Qi: Fast 3D face reconstruction based on uncalibrated photometric stereo
- Hizamawi Madzin, Roziai Zainuddin: IFM3IRS: Information fusion retrieval system with knowledge-assisted text and visual features based on medical conceptual model
- Md. Zia Uddin, Mohammad Mehedi Hassan: A depth video-based facial expression recognition system using radon transform, generalized discriminant analysis, and hidden Markov model
- Ricardo Dias, Manuel J. Fonseca, Nelson Silva: EnContRA: a generic multimedia information retrieval meta-framework
- Louis Anegekuh, Lifeng Sun, Emmanuel Ifeachor: Encoding and video content based HEVC video quality prediction
- Zhenyong Fu, Zhiwu Lu, Horace H. S. Ip, Hongtao Lu: Local similarity learning for pairwise constraint propagation
- Guanghua Song, Zhitang Li, Juan Zhao, Jun Hu, Hao Tu: A reversible video steganography algorithm for MVC based on motion vector
- Gensheng Zhang, Wei Wang, Sung Shin, Carrie B. Hruska: Fourier irregularity index: A new approach to measure tumor mass irregularity in breast mammogram images
- Esmat Rashedi, Hossein Nezamabadi-pour, Saeed Saryazdi: Information fusion between short term learning and long term learning in content based image retrieval systems
- Chia-Chen Lin, Xiao-Long Liu, Wei-Liang Tai: A novel reversible data hiding scheme based on AMBTC compression technique
- Zarko Stanisavljevic, Bosko Nikolic, Igor Tatijalja: A classification of eLearning tools based on the applied multimedia
- M. Sultan Zia, M. Afzan Jaffar: An adaptive training based on classification system for patterns in facial expressions using SURF descriptor templates
- Daniela Pohl, Abdelhamid Bouchachia: Social media for crisis management: clustering approaches for sub-event detection
- Yukino Ikegami, Setsuo Tsuruta: Hybrid method for modelless Japanese input using N-gram based binary classification and dictionary
Recently published

- Li Sun, Wenjuan Sheng, Yiqing Liu: Background modeling and its evaluation for complex scenes
- Azeeim Irshad, Muhammad Sher, Eid Rehman: A single round-trip SIP authentication scheme for Voice over Internet Protocol using smart card
- J. Chambers, W. Yan, A. Garhwal, M. Kankanhalli: Currency security and forensics: a survey
- Lei Bao, Jianjiang Lu, Yang Li, Yanwei Shi: A saliency detection model using shearlet transform
- Roberto Yus, Eduardo Mena, Sergio Illari: MultiCAMBA: a system for selecting camera views in live broadcasting of sport events using a dynamic 3D model
- Zijia Lin, Guiguang Ding, Mingqing Hu: Image auto-annotation via tag-dependent random search over range-constrained visual neighbours
- Jiyan Wu, Yanlei Shang, Xiupan Qiao, Bo Cheng: Robust bandwidth aggregation for real-time video delivery in integrated heterogeneous wireless networks
- Chunlong Hu, Liyu Gong, Tianjiang Wang, Qi Feng: Effective human age estimation using a two-stage approach based on Lie Algebrized Gaussians feature
- Zhaozheng Hu, Takashi Matsuyama, Shohei Nobuhara: Cell-based visual surveillance with active cameras for 3D human gaze computation
- Wentao Fan, Nizar Bougila: Face detection and facial expression recognition using simultaneous clustering and feature selection via an expectation propagation statistical learning framework
- Tomasz Marciński, Agata Chmielewska, Radosław Weychan: Influence of low resolution of images on reliability of face detection and recognition
- Mariusz Marzec, Robert Koprowski, Zygmunt Wróbel: Automatic method for detection of characteristic areas in thermal face images
- Michał Grega, Seweryn Šedivý: Urban photograph localization using the INSTREET application—accuracy and performance analysis
- Mikołaj Leszczuk, Šukasl Dudek, Marcin Witkowski: Classification of video sequences into chosen generalized use classes of target size and lighting level
- Lin-Lin Tang, Chun-Ta Huang, Jeng-Shyang Pan: Dual watermarking algorithm based on the Fractional Fourier Transform
- Janusz Cichowski, Andrzej Czyżewski, Bożena Kostek: Analysis of impact of audio modifications on the robustness of watermark for non-blind architecture
- Piotr Guzik, Andrzej Matiolski, Andrzej Dziech: Real data performance evaluation of CAISS watermarking scheme
- Nikolai Stoianov, Manuel Urueña, Marcin Niemiec: Integrated security infrastructures for law enforcement agencies

MTAP Volume 74 Issue 12

Editor-in-Chief: Borko Furht Issue Editors: Andrzej Dziech, Remigiusz Baran, Mikołaj Leszczuk
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Special issue on “Intelligent Processing for Citizen Security”

- Andrzej Dziech, Remigiusz Baran, Mikołaj Leszczuk: Guest Editorial: Intelligent Processing for Citizen Security
- Szymon Drgas, Adam Dabrowski: Speaker recognition based on multilevel speech analysis on Polish corpus
- Eva Kiktova-Vozarikova, Jozef Juha, Anton Cizmar: Feature selection for acoustic events detection
- Józef Kotus: Multiple sound sources localization in free field using acoustic vector sensor
- Andrzej Glowacz, Marcin Kmieć, Andrzej Dziech: Visual detection of knives in security applications using Active Appearance Models
- Remigiusz Baran, Andrzej Glowacz, Andrzej Matiolski: The efficient real- and non-real-time make and model recognition of cars
- K. Kopaczewski, M. Szczodrak, A. Czyzewski: A method for counting people attending large public events
- Jialiang Peng, Qiong Li, Ahmed A. Abd El-Latif: Linear discriminant multi-set canonical correlations analysis (LDMCCA): an efficient approach for feature fusion of finger biometrics
- Chi-Wen Hsieh, Hsiao-Chuan Liu, Chih-Yen Chen: An investigation of pixel resonance phenomenon in color imaging: the multiple interpretations of people with color vision deficiency
- Imane Daoudi, Khalid Idrissi: A fast and efficient fuzzy approximation-based indexing for CBIR
- Telmo Zarraonandia, Paloma Diaz, Ignacio Aedo: Designing educational games through a conceptual model based on rules and scenarios
- Inmaculada Remolar, Alejandro García, Cristina Rebollo: Developing a virtual trade fair using an agent-oriented approach
- Qiujie Li: A computer vision attack on the ARTIFACIAL CAPTCHA
- Zhan Lin, Jin-Ye Peng, Guo-Hua Gong, Xiao-Jiang Chen: Video recommendation based on multi-modal information and multiple kernel

MTAP Volume 74 Issue 13

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Recently published

- Trung Kien Dang, Marcel Worringer, The Duy Bui: Building 3D event logs for video investigation
- Hyungwook Kim, Sojeong Lim, Sungwook Yu: Fast intra-mode decision method for luma and chroma blocks for H.264/AVC
- Aqeel ur Rehman, Xiaofeng Liao, Ayesha Kulsoom...: Selective encryption for gray images based on chaos and DNA complementary rules
- Shangfei Wang, Zhilei Liu, Yachen Zhu, Menghua He...: Implicit video emotion tagging from audiences’ facial expression
- Sang Min Yoon, Gang-Joon Yoon, Tobias Schreck: User-drawn sketch-based 3D object retrieval using sparse coding
- Wei Q. Yan, J. Chambers, A. Garhwal: An empirical approach for currency identification
- Ana Lucila Sandoval Orozco...: Analysis of errors in exif metadata on mobile devices
- Yuanning Liu, Youwei Wang, Xiaodong Zhu: Novel robust multiple watermarking against regional attacks of digital images
- Victor Sandonis, Ignacio Soto, Maria Calderon...: CATMISS: context-aware transparent mobility for IMS services
- Cencen Zhong, Zhenjiang Miao: Multi-label audio concept detection using correlated-aspect Gaussian Mixture Model
- Masoud Afrakhteh, Inkyu Moon, Jeong-A Lee: Double phase modular steganography with the help of error images
- Xiang Pan, Yongqiang Ye, Jianhong Wang, Xudong Gao...: Noncausal fractional directional differentiator and blind deconvolution: motion blur estimation
- Bingwen Jin, Weidong Geng: Correspondence specification learned from master frames for automatic inbetweening
- Xiaojian Liu, Weiqiang Wang: An effective graphic cut scene text localization with embedded text segmentation
- Qiang Chen, Bin Fang, Yong-Mei Yu, Yan Tang: 3D CAD model retrieval based on the combination of features
- Yung-Sung Huang, Bin-Chang Chieu: Architecture for video streaming application on heterogeneous platform
- Shang-Lin Hsieh, Chun-Che Chen, Chuan-Ren Chen: A novel approach to detecting duplicate images using multiple hash tables
- Chang-Yong Ri, Min Yao: Bayesian network based semantic image classification with attributed relational graph
- Byungjoon Chang, Sanghun Park, Insung Ihm: Diffuse global illumination in particle spaces

Published: July 2015

- Neil Y. Yen, Chengcui Zhang, Agustinus Borgy Waluyo...: Social Media Services and Technologies Towards Web 3.0
- Xiaokang Zhou, Wei Wang, Qun Jin: Multi-dimensional attributes and measures for dynamical user profiling in social networking environments
- Yu-Jong Jang, Jin Kwak: Digital forensics investigation methodology applicable for social network services
- Cheol-Rim Choi, Hwa-Young Jeong, Jong Hyuk Park...: Relative weight evaluation of the factors inducing social media service use
- Aun Irata, M. Arfan Jaffar, Munnan Saeed Muhammad: Content based image retrieval in a web 3.0 environment
- Hwa-Young Jeong, Bong Hwa Hong, Jong Hyuk Park: User tailored cloud-learning system using SNS and learning resources
- Jason C. Hung, Neil Y. Yen, Hwa-Young Jeong...: Adaptive mechanism for schedule arrangement and optimization in socially-empowered professional sports games
- Iram Fatima, Sajal Halder, Muhammad Aamir Saleem...: Smart CDSS: integration of Social Media and Interaction Engine (SMIE) in healthcare for chronic disease patients
- Ing-Jr Ding, Chih-Ta Yen: Enhancing GMM speaker identification by incorporating SVM speaker verification for intelligent web-based speech applications
- Tzu-I Yang, Chorng-Shiu Koong, Chien-Chao Tseng: Game-based image semantic CAPTCHA on handset devices
- Kalyan Goswami, Byung-Gyu Kim, Jeong-Bae Lee...: Fast video encoding algorithm for efficient social media service
- Bo Wu, Xiaokang Zhou, Qun Jin: Participatory information search and recommendation based on social roles and networks
- Cheonshik Kim, Ching-Nung Yang: Watermark with DSA signature using predictive coding
- M. Shamim Hossain, Stefan Goebel...: Guest editorial: advances in multimedia for health
- Nguyen Thuy An, Cong-Thinh Huynh, ByungKwan Lee...: An efficient block classification for media healthcare service in mobile cloud computing
- Mohammad Mehedi Hassan: Cost-effective resource provisioning for multimedia cloud-based e-health systems
- Parisa Pouladzadeh, Shervin Shirmohammadi...: Cloud-based SVM for food categorization
- Parisa Pouladzadeh, Shervin Shirmohammadi...: Erratum to: Cloud-based SVM for food categorization
- Yoshiyuki Kawano, Keiji Yanai: FoodCam: A real-time food recognition system on a smartphone
- Sandro Hardy, Tim Dutz, Josef Wiemeyer, Stefan Göbel...: Framework for personalized and adaptive game-based training programs in health sport

MTAP Volume 74 Issue 14

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ACM SIGMM Records
Vol. 7, No. 2, August 2015
23
http://sigmm.org/records
Recently published

- Ghulam Muhammad, Mehed Masud, Abdulhameed Alelaiwi: Spectro-temporal directional derivative based automatic speech recognition for a serious game scenario
- Ju Shen, Changpeng Ti, Anusha Raghunathan: Automatic video self modeling for voice disorder
- Sharbani Pandit, Krishanu Sarker, Md. Abdur Razzaque: An energy-efficient multi constrained QoS aware MAC protocol for body sensor networks
- Joseph Malloch, Stephen Sinclair, Marcelo M. Wanderley: Distributed tools for interactive design of heterogeneous signal networks
- Xu Chen, Yue Zhao: A linear approach for determining camera intrinsic parameters using tangent circles
- Ran Wang, Mankun Xu, Xijian Ping, Tao Zhang: Steganalysis of JPEG images by block texture based segmentation
- Xianyi Chen, Xingming Sun, Huiyu Sun, Lingyun Xiang: Histogram shifting based reversible data hiding method using directed-prediction scheme
- Xuanping Zhang, Yangyang Xiao, Zhongmeng Zhao: Self-embedding fragile watermarking based on DCT and fast fractal coding
- Sajid Nazir, Dejan Vukobratović, Vladimir Stanković: Detection of saliency maximally stable color regions
- Chuan Qin, Chin-Chen Chang, Tai-Jung Hsu: Reversible data hiding scheme based on exploiting modification direction with two steganographic images
- Toon De Pessemier, Isabelle Stevens, Lieven De Marez: Analysis of the quality of experience of a commercial voice-over-IP service
- A. Ouled Zaid, M. Hachani, W. Puech: Wavelet-based high-capacity watermarking of 3-D irregular meshes
- Alessio Degani, Marco Dalai, Riccardo Leonardi: Comparison of tuning frequency estimation methods
- Linwei Zhu, Yun Zhang, Xu Wang, Sam Kwong: View synthesis distortion elimination filter for depth video coding in 3D video broadcasting
- Myoung Beom Chung, Hyunseung Choo: Near wireless-control technology between smart devices using inaudible high-frequencies
- Mohammed Khalili, Abdullah Adib: Informed audio watermarking based on adaptive carrier modulation
- Mohammad Ali Akhaee, Sayed Mohammad Ebrahim Sahraeian: Scaling-based watermarking with universally optimum decoder
- Haozheng Fu, Peng Zhang, Wei Huang, Liang Wang: Empirical mode decomposition based blind audio watermarking
- Yifang Liu, Yunfeng Zhang, Caiming Zhang: A fast algorithm for YCbCr to perception color model conversion based on fixed-point DSP
- Hongbo Yang, Xia Hou: Texture segmentation using image decomposition and local self-similarity of different features
- Lu Lu, Yi-Ju Zhan, Qing Jiang, Qing-ling Cai: A method for action recognition based on pose and interest points
- Yasushi Akiyama, Sageev Oore, Carolyn Watters: Framework for constructing task-space to support novice multimedia authoring

MTAP Volume 74 Issue 15

Editor-in-Chief: Borko Furht
URL: http://link.springer.com/journal/11042/74/15/page/1
Published: July 2015

- Chungsoo Lim, Joon-Hyuk Chang: Efficient implementation techniques of an SVM-based speech/music classifier in SMV
- Jia-Lien Hsu, Chien-Chang Huang: Designing a graph-based framework to support a multi-modal approach for music information retrieval
- Zhenjun Tang, Xianquan Zhang, Weiwei Lan: Efficient image encryption with block shuffling and chaotic map
- Yankui Sun, Yafeng Dong, Zesheng Tang: Internet-based interactive visualization method of 3D lunar model with texture
- Md. Abdur Rahman: Multimedia environment toward analyzing and visualizing live kinematic data for children with Hemiplegia
- Longyu Zhang, Jamal Saboune, Abdulmoteleb El Saddik: Development of a haptic video chat system
- Yongzhao Zhan, Jiayao Sun, Dejiao Niu, Qirong Lin: A semi-supervised incremental learning method based on adaptive probabilistic hypergraph for video semantic detection
- Mohammad Sharif, Ayyaz Hussain, Muhammad Arfan Jaffar: Fuzzy similarly based non local means filter for Rican noise removal
- Rong Zhang, Rang-Ding Wang: In-camera JPEG compression detection for doubly compressed images
- Antonios Danelakis, Theoharis Theoharis: A survey on facial expression recognition in 3D video sequences
- Antonios Danelakis, Theoharis Theoharis: Erratum to: A survey on facial expression recognition in 3D video sequences
- Chongbo Zhou, Chuancai Liu: An efficient segmentation method using saliency object detection
- Lin Wu, Xiaodi Huang, Chengyuan Zhang, John Shepherd: An efficient framework of Bregman divergence optimization for co-ranking images and tags in a heterogeneous network
- Tuan Duc Nguyen, Somjit Arch-int, Ngamnij Arch-int: A novel secure block data-hiding algorithm using cellular automata to enhance the performance of JPEG steganography

ISSN 1947-4598
http://sigmm.org/records
Vol. 7, No. 2, August 2015

ACM SIGMM Records
• Minwoo Jung, Kabsu Han, Jeonghun Cho: Advanced verification on WBAN and cloud computing for u-health environment
• Wonho Suh: Mobile computing traffic simulation framework
• Chung-Pyo Hong, Cheong-Ghil Kim, Kuinam J. Kim....: A polymorphic service management scheme based on virtual object for ubiquitous computing environment
• Juhye Yook, Jinsul Kim: The advanced Korea—computer access assessment system (K-CAAS) on smart mobile cloud environment
• Heungmo Ryang, Unil Yun, Gwangbum Pyun, Gangin Lee....: Ranking algorithm for book reviews with user tendency and collective intelligence
• Young-Min Kang, Do-Hoon Lee, Hwan-Gue Cho: Mutilpean anisotropic microfacet model for iridescent surfaces
• Almetwally M. Mostafa, Ahmed E. Youssef: PRP: A primary replacement protocol based on early discovery of battery power failure in MANETs
• Zhiyong Zhang, Zhen Wang, Danmei Niu: A novel approach to rights sharing-enabling digital rights management for mobile multimedia
• Sung-Jong Eun, Hyeonjin Kim, Jung-Wook Park....: Effective object segmentation based on physical theory in an MR image
• Cheong Gihl Kim, Kuinam J. Kim, JungHoon Lee: NAND flash memory system based on the Harvard buffer architecture for multimedia applications
• Kazuaki Aihara, Terumasa Aoki: Motion dense sampling and component clustering for action recognition
• Shin Jin Kang, Soo Kyun Kim: Automated spatio-temporal analysis techniques for game environment
• Donggeun Lee, Sang-woo Chang, Sang-sun Lee: Analysis and design on efficient message relay methods in VANET
• PyungKoo Park, SeongMin Yoo, HoYang Ryu, Jaehyung Park....: A Service-oriented DDoS detection mechanism using pseudo state in a flow router
• Hang Tu, Neeraj Kumar, Jongsung Kim, Jungtaek Seo: A strongly secure pairing-free certificateless authenticated key agreement protocol suitable for smart media and mobile environments
• Hwan-Seok Yang, Dong-Hwi Lee, Seung-Jae Yoo: A study on stable web server system using virtualization technology against attacks
• Naruemon Wattanapongsakorn, Chalermpol Charnsripinyo: Web-based monitoring approach for network-based intrusion detection and prevention

Recently published

MTAP Volume 74 Issue 16

Editor-in-Chief: Borko Furht
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• Seungwon Oh, Minsoo Hahn, Jinsul Kim: Dynamic EKF-based SLAM for autonomous mobile convergence platforms
• Seung-Bo Park, Joon Mo Ryu, Jae Kyeong Kim: A group arousal analysis based on the movement synchronization of audiences
• Ahyoung Lee, Ilkyeon Ra: Performance analysis of ad hoc routing protocols based on selective forwarding node algorithms
• Won Hyung Lee, DongHwi Lee: Improvement of evidence collection module using live response technology on a windows system
• Sang-min Lee, Haesung Tak, Kieung Park, Hwan-Gue Cho....: PSIM: pattern-based read simulator for RNA-seq analysis
• Syh-Yuan Tan, Wei-Chuen You, Boon-Hock Lim: An implementation of enhanced public key infrastructure
• Sunyoung Kang, Hyuncheol Kim, Seungae Kang: Virtual private network for wellness sports information
• Kwang Cheol Park, Hoon Shin, Won Hyung Park....: New detection method and countermeasure of cyber attacks in mix networks
• Kuo-Hui Yeh, Kuo-Yu Tsai, Chuan-Yen Fan: An efficient certificateless signature scheme without bilinear pairings
• Wonhyuk Lee, Seunghaye Kim, Sunyoung Kang, TaeYeon Kim....: A virtualized network model for wellness information technology research
• Xiyuan Yin, Dae-Hwan Kim, Chung-Pyo Hong....: Advanced feature point transformation of corner points for mobile object recognition
• Hyun Jong Lee, Wonhyuk Lee, Seunghaye Kim, Minki Noh....: A revised cache allocation algorithm for VoD multicast service
• Daewon Park, Suhyun Park: E-Navigation-supporting data management system for variant S-100-based data

MTAP Volume 74 Issue 17

Editor-in-Chief: Borko Furht
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Published: September 2015

• Vishnu Monn Baskaran, Yoong Choon Chang, Jonathan Loo....: Design and implementation of parallel video combiner architecture for multi-user video conferencing at ultra-high definition resolution
• Yu Sun, Zhidan Feng, Reshma R. Ginnavaram: A direct non-buffer rate control algorithm for real time video compression
• Lichao Su, Tianqiang Huang, Jianmei Yang: A video forgery detection algorithm based on compressive sensing
• Mehran Iranpour, Reza Safabakhsh: Reducing the embedding impact in steganography using Hamiltonian paths and writing on wet paper
• Xiao-Qin Cao, Zhi-Qiang Liu: Sequential Markov random fields for human body parts tracking
• S. Avinash Ramakanth, R. Venkatesh Babu: Synthetic image super resolution using FeatureMatch
• Yuan-Hsiang Chang, Hui-Lun Liao, Li-Der Jeng: An interactive multimedia storyboard demonstration system
• Haodong Li, WeiQi Luo, Jiwu Huang: Anti-forensics of double JPEG compression with the same quantization matrix
• Ahlem Walha, Ali Wali, Adel M. Alimi: Video stabilization with moving object detecting and tracking for aerial video surveillance
• Hsin-Ju Hsieh, Berlin Chen, Jeih-weih Hung: Histogram equalization of contextual statistics of speech features for robust speech recognition
• Jung-San Lee, Hsiao-Shan Wong, You-Ren Chen: Stable watermarking technique based on XNOR operation and scale relationship
• Shangbo Zhou, Fuping Zhang, Muhammad Abubakar Siddique: Range Limited Peak-Separate Fuzzy Histogram Equalization for image contrast enhancement
• G. S. Kalra, R. Talwar, H. Sadawarti: Adaptive digital image watermarking for color images in frequency domain
• Tomáž Vodlan, Marko Tkalič, Andrej Košir: The impact of hesitation, a social signal, on a user’s quality of experience in multimedia content retrieval
• Himanshu Agarwal, Balasubramanian Raman: Blind reliable invisible watermarking method in wavelet domain for face image watermark
• G. Nur Yilmaz: A no reference depth perception assessment metric for 3D video
• Li Jun, Zhang Mingmin, Pan Zhigeng, Wang Shengbo: Creating real body model of dressed human based on fat extent of body
• Hui Feng, Langxiong Gan, Hefei Ling, Fuhao Zou: A generic collusion attack optimization strategy for traditional spread-spectrum and quantization index modulation fingerprinting
• Qingming Leng, Ruimin Hu, Chao Liang, Yimin Wang: Person re-identification with content and context re-ranking
• Márcio Soares, Paula Viana: Tuning metadata for better movie content-based recommendation systems
• Swati Nigam, Ashish Khare: Multiresolution approach for multiple human detection using moments and local binary patterns
• Mennatallah M. Sadek, Amal S. Khalifa: Video steganography: a comprehensive review
• Wenjie Liu, Anhong Wang, Chin-Chen Chang, Zhihong Li: A grouped-scalable secret image sharing scheme
• Mohamed Dahmane, Sylvie Cossette, Jean Meunier: Conditional Gabor phase–based disparity estimation applied to facial tracking for person–specific facial action recognition: a preliminary study
• Yong Suk Choi: Effectiveness of game based learning to minimize boolean functions
• Xiaomeng Wu, Kunio Kashino: Interest point selection by topology coherence for multi-query image retrieval
• Wen-Chao Yang, Ling-Hwei Chen: Reversible DCT-based data hiding in stereo images
• Guangmin Choe, Tianjiang Wang, Fang Liu, Chunhua Choe: Visual tracking based on particle filter with spline resampling
• Gao Pengcheng, Wu Jiangqin, Lin Yuan, Xia Yang: Fast Chinese calligraphic character recognition with large-scale data
• Zui Zhang, Oscar Perez Concha, Massimo Piccardi: Tracking people under heavy occlusions by layered data association
• Gil-Je Lee, Kee-Young Yoo: An improved double image digital watermarking scheme using the position property
• Bin Liu, Haojie Li, Xianyong Jia, Hui Zhang, Rui Huang: An object segmentation method for the color slow-motion videos based on adjacent frames gradual change
• Kyis Essmaeel, Luigi Gallo, Ernesto Damiani: Comparative evaluation of methods for filtering Kinect depth data
• David Boon Liang Bong, Bee Ee Khoo: Objective blur assessment based on contraction errors of local contrast maps
• Claire-Hélène Demarty, Cédric Penet: VSD, a public dataset for the detection of violent scenes in movies: design, annotation, analysis and evaluation

MTAP Volume 74 Issue 18

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Recently published

- Zhanpeng Huang, Guanghong Gong, Liang Han: Physically-based smoke simulation for computer graphics: a survey
- Gwangmin Choe, Tianjiang Wang, Fang Liu, Chunhwa Choe...: An advanced association of particle filtering and kernel based object tracking
- Fei Yang, Feng Yang, Xiuli Li, Jie Tian: Ray feature analysis for volume rendering
- Hao Zhang, Ruolin Wang, Wenjiang Liu, Mengtian Rong: Fusion-based edge-sensitive interpolation method for deinterlacing
- Silvia Llorente, Jaime Delgado, Xavier Maroñas...: Definition of standards-based building blocks for multimedia content management
- Clara Cruz-Ramos, Mariko Nakano-Miyatake...: Face region authentication and recovery system based on SPIHT and watermarking
- Wanru Xu, Zhenjiang Miao, Qiang Zhang: Projection transform on spatio-temporal context for action recognition
- Di Xiao, Mimi Deng, Xinyi Zhu: A reversible image authentication scheme based on compressive sensing
- Shuhui Wang, Tao Lin, Kailun Zhou, Peijun Zhang...: Pseudo-2D-matching based enhancement to high efficiency video coding for screen contents
- Shuvendu Rana, Nikanta Sahu, Arjit Sur: Robust watermarking for resolution and quality scalable video sequence
- Yifeng Zheng, Jianxiu Jin: A novel image encryption scheme based on Hénon map and compound spatiotemporal chaos
- Chi-Man Pun, Xiao-Chen Yuan: Histogram modification based image watermarking resistant to geometric distortions
- Cheng Shi, Fang Liu, Qiguang Miao: Pan-sharpening via regional division and NSST
- Jiabei Zeng, Biao Leng, Zhang Xiong: 3-D object retrieval using topic model
- Habib Louafi, Stéphane Coulombe, Umesh Chandra: Robust QoE-aware prediction-based dynamic content adaptation framework applied to slides documents in mobile Web conferencing
- Tai-Ming Chang, Chia-Bin Hsieh, Pao-Chi Chang: An enhanced direct chord transformation for music retrieval in the AAC transform domain with window switching
- S. Kavitha, R. J. Anandhi: A survey of image compression methods for low depth-of-field images and image sequences
- Pan Gao, Qiang Peng, Wei Xiang: Error-resilient multi-view video coding using Wyner-Ziv techniques
- Laura Pozueco, Xabiel Garcia Pañeda, Roberto García...: Adaptation engine for a streaming service based on MPEG-DASH
- Cong Liu, Hefei Ling, Fuhao Zou, Yunfei Wang, Hui Feng...: Local and global structure preserving hashing for fast digital fingerprint tracing
- Jie Shen, Ying-Jue Cai, Lei Luo: A context-aware mobile web middleware for service of surveillance video with privacy
- Ghada Besbes, Hajer Baazauoi-Zghal: Modular ontologies and CBR-based hybrid system for web information retrieval
- Jan De Cock, Heinz Hofbauer, Thomas Stütz, Andreas Uhl...: An industry-level blu-ray watermarking framework
- Jan De Cock, Heinz Hofbauer, Thomas Stütz, Andreas Uhl...: Erratum to: An industry-level blu-ray watermarking framework
- Tong Lu, Yukang Jin, Feng Su...: Content-oriented multimedia document understanding through cross-media correlation
- Marija Punt, Milan Z. Bjelica, Vladan Zdravkovic...: An integrated environment and development framework for social gaming using mobile devices, digital TV and Internet
- Hanzou Wu, Hongxia Wang, Hong Zhao, Xiuying Yu: Multi-layer assignment steganography using graph-theoretic approach
- Gangyi Jiang, Junming Zhou, Mei Yu, Yun Zhang...: Binocular vision based objective quality assessment method for stereoscopic images
- Pierfrancesco Bellini, Paolo Nesi, Marco Serena: MyStoryPlayer: experiencing multiple audiovisual content for education and training

MTAP Volume 74 Issue 9

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- Cheng-Chieh Chiang, Huei-Fang Yang: Quick browsing and retrieval for surveillance videos
- Enrico Masala, Fabio De Vito, Juan Carlos De Martin: On the effects of sender-receiver concealment mismatch on multimedia communication optimization
- R. Varalakshmi, V. Rhymond Uthariaraj: Huffman based conditional access system for key distribution in digital TV multicast
- Ayan SEAL, Debotosh Bhattacharjee, Mita Nasipuri...: UGC-JU face database and its benchmarking using linear regression classifier
- Yunyoung Nam: Loitering detection using an associating pedestrian tracker in crowded scenes
- Eugen Dedu, Wassim Ramadan, Julien Bourgeois: A taxonomy of the parameters used by decision methods for adaptive video transmission
- Lihua Tian, Nanning Zheng, Jianru Xue, Ce Li: Authentication and copyright protection watermarking scheme for H.264 based on visual saliency and secret sharing
- Gianluigi Ciocca, Claudio Cusano, Raimondo Schettini: Image orientation detection using LBP-based features and logistic regression
- Faisal Arafsha, Kazi Masudul Alam...: Design and development of a user centric affective haptic jacket
Job Opportunities

Research Fellow – Knowledge Graphs for Social Media

**Constructing Knowledge Graphs from Social Media Streams**

The Australian National University (ANU) is offering one postdoc research fellow position on machine learning for constructing knowledge graphs for social media streams.

Knowledge graphs have become powerful sources for web search, but an equivalent source about things and their relations in pictures and videos is still an open problem. This project develops core techniques to learn image-centric knowledge graphs by connecting large collections of image/video and their descriptions to existing knowledge bases with encyclopedic, lexical, and commonsense knowledge. Such multimedia knowledge graphs will be used to advance automated understanding of text and multimedia, as well as social events and other user-generated content.

The research position seeks to advance both machine learning methods and formulating relation learning problems. The position would suit early to mid career researchers interested in new methods and models on:

- relation learning from large scale online data.
- images to text and text to images.
- learning on graphs and sequences.

The ANU is a highly-ranked research-intensive university (world-wide rankings – QS: 25th, Times: 48th, Shanghai ARWU 66th). The postdoc research fellow will be located at the strong ANU AI research group, with frequent interactions with NICTA Machine Learning group of 20+ researchers on machine learning and data science. Career development opportunities include possible contribution to teaching, the ability to apply for independent grants with the ARC, inter-disciplinary collaborations, or work with government/industry.

The intended duration for this appointment is 3 years, the annual salary starts at AUD 83K+ per year, plus benefits.

Candidates with the following background are encouraged to apply:

- a solid machine learning and mathematical background
- in-depth understanding with at least one inference paradigms
- a willingness to formulate and validate machine learning problems
- experiences working with large, real-world datasets a plus

The research will be conducted under the supervision of Dr Lexing Xie. We accept applications until September 30, 2015 or until position is filled afterwards. The preferred start time is late 2015 or early 2016. Interested candidates may write to lexing.xie@anu.edu.au including a CV, along with a few words explaining how well their technical background matches the topic areas above.

Employer: The Australian National University
Expiration date: Wednesday, November 4, 2015
**Position of Research Software Engineer Postdoc**

Columbia University Digital Video and Multimedia Lab (www.ee.columbia.edu/dvmm) has a position for a postdoc or research associate that can serve as the group lead in managing large-scale research software codes, data, and demo systems. Besides participation in original research related to multimedia data mining, deep learning, affective computing or interactive visualization, he or she will be in charge of developing and managing a robust software infrastructure for various research projects in the group. The infrastructure includes wiki based documentation, large-scale data management, issue and project tracking, software API design, code repository and review, etc. The position is available immediately. If interested, please contact Dr. Tao Chen <tc2650@columbia.edu>.

**Requirements:**
Background and experience in research and development of image and video processing, multimedia and computer vision. Experience in developing and managing large software systems. Excellent project management skills and proficiency in English communication.

Employer: Columbia University Digital Video and Multimedia Lab
Expiration date: Monday, November 30, 2015
More information date: http://www.ee.columbia.edu/dvmm

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**Fully Funded PhD position on Computer Vision**

**Project description:**
The visual effects due to the interaction between the illumination and the objects of a scene usually decrease the performance of computer vision algorithms for scene understanding. Therefore, detecting and eliminating such effects from images is a crucial step for many computer vision applications. This step is even more important in advanced driver assistance systems where the lighting conditions can vary dramatically in a short period of time. The aim of this research is to explore the visual cues related to shadow identification. To achieve this goal, we propose to study how shadows can be processed in a hierarchical bio-inspired framework using convolutional neural networks. In these multi-layer networks the output of one layer is the input of the next one and the complexity of the features processed increases at each stage of the hierarchy. In such framework we aim to indentify the visual cues that are important for shadow detection and how they can be combined to design effective shadow removal algorithms. The final goal is to apply these shadow removal algorithms to boost the results of several applications related to autonomous driving such as road segmentation and pedestrian detection.

This proposal is related to the research project MILETRANS (Deep study of intrinsic scene properties to minimize lighting effects in vision-based intelligent transportation systems).

**Terms and conditions**
Duration: 4 years (subject to a positive evaluation at the end of each year). Ultimately, the appointment must lead to the completion of a PhD thesis.

**Salary:** 1368.50€ gross per month.

**Selection criteria**
The ideal candidate for the position must have:
• B.Sc. and M.Sc. in Computer Science, Electrical Engineering, Computer Engineering, Telecommunications, or a related field (concluded by the time you join).
• A background in computer vision and/or computational colour science.
• Excellent academic transcripts.
• Proficiency in spoken and written English (please note: Spanish is not required).
• Good communication skills.
• High level of motivation and a strong interest in a scientific career.

**APPLY NOW THROUGH THE ONLINE FORM AT:**
https://sede.micinn.gob.es/ayudaspredoctorales/

Project related to this position:
Reference: TIN2014-61068-R
Title: Estudio de las propiedades intrínsecas que permiten minimizar los efectos de iluminación en sistemas inteligentes de transporte basados en visión.

The application deadline is June 29th, 2015 15:00 (GMT +1).
Contact Dr. Robert Benavente at robert@cvc.uab.cat if you need assistance with the application process.

**Required documents:**
• Copy of the passport (only for foreign students not living in Spain)
• CV (in English or Spanish)
• Copy of the University Academic transcripts of your B.Sc. and M.Sc. degrees (grades and date of achievement)

Information about the Computer Vision Center can be found at http://www.cvc.uab.cat and about the 'Colour in Context' research group at http://cic.uab.cat/

Employer: Computer Vision Center, Universitat Autònoma de Barcelona
Software Engineer in Multimedia Systems

Qatar Computing Research Institute (QCRI) is seeking candidates for software engineer or senior software engineer positions. Software engineers at QCRI work closely with researchers on designing and developing research software prototypes. The candidates will work on cutting-edge research projects that of interest to major media companies, such as AlJazeera and beIN Sports. Some of these projects are in collaboration with researchers from the MIT CSAIL lab through a long-term strategic partnership between QCRI and MIT. More information can be found at http://ds.qcri.org, under the Cloud Applications and Services theme.

Requirements:
– BSc in computer science or related fields with at least three years of experience (seven years for senior software engineer). We also welcome candidates with MSc and PhD.
– Strong software engineering and development skills with different tools and languages (mainly C, Java, Python).
– Background in video/image processing.

QCRI (http://www.qcri.qa) is a national research institute conducting world-class applied computing research that transforms the way we interact with each other, enables new discoveries, and accelerates development of society. QCRI offers a unique opportunity for strong research careers and a highly competitive compensation package including attractive tax-free salary, excellent medical insurance, annual paid leave, and more.

To apply, please send your resume to Dr. Mohamed Hefeeda: mhefeeda@qf.org.qa.

Post Doc in Multimedia Systems

Qatar Computing Research Institute (QCRI) is seeking candidates for Postdoctoral Researcher positions with strong experience in large-scale multimedia systems, multimedia networking, video processing, 3D video communications, and cloud-support for multimedia. The candidates will work on cutting-edge research projects that not only produce high-quality research papers, but also actual systems with practical impact. Some of these projects are in collaboration with researchers from the MIT CSAIL lab through a long-term strategic partnership between QCRI and MIT. These research projects are also of interest to major media companies, such as AlJazeera and beIN Sports. More information can be found at http://ds.qcri.org, under the Cloud Applications and Services theme.

The contract will be for 1—2 years, and can be renewed. Candidates must have by the time of joining a PhD in computer science or related fields from a top-tier university, with strong record of accomplishments and publications.

QCRI (http://www.qcri.qa) is a national research institute conducting world-class applied computing research that transforms the way we interact with each other, enables new discoveries, and accelerates development of society. QCRI offers a unique opportunity for strong research careers and a highly competitive compensation package including attractive tax-free salary, furnished accommodation, excellent medical insurance, annual paid leave, and more.

To apply, please send your resume to the project leader, Dr. Mohamed Hefeeda: mhefeeda@qf.org.qa.<mhefeeda@qf.org.qa>.)
PhD Position – Aerial image analysis from UAVs

The ADAS team is looking for a highly motivated student who wants to pursue a PhD on “Aerial image analysis from unmanned aerial vehicles” at the Computer Science Department, Universitat Autònoma de Barcelona, Spain.

The research project demands solving computer vision problems from moving cameras on aerial vehicles. It may involve topics such as:

- Remote sensing
- Semantic segmentation
- Object detection
- Simultaneous Localisation and Mapping

Candidates should have a strong mathematical background, good programming skills in matlab and C/C++, and knowledge in computer vision and image processing.

Interested candidates must send an e-mail to:

dciencies.computacio@uab.cat

with an expression of interest for the profile “Computer Vision – On-Board Vision / Aerial Imaging” and attaching the following documentation:

- A copy of the DNI or passport
- CV
- A certificate of the academic record
- A copy of the official certificate of the university degree

The deadline is 12th June 2015.

The grant terms and conditions are detailed in the following document:

http://www.uab.cat/Document/344/175/Bases13ConvPIF_ENG,0.pdf

More information is available on the following links:

http://dcc.uab.cat/


Daniel Ponsa,
The research will focus in particular on mechanisms to automatically construct semantic classifiers, and on fusion techniques for the results of these classifiers. The recombination aspects will involve methods for the selection of important segments, followed by an assembly strategy according to the expected objective. A specific attention will be paid to evaluation techniques that will allow to measure the performance of different approaches.

Requirements

Education Level / Degree: Computer Engineering or Master Degree (with honors)

Technologies: strong knowledge in:
- Machine learning
- Signal processing
- C/C++ and/or Matlab programming

Other skills / specialties:
- English is mandatory, French is just a plus

Application

The application must include (I, II and III):
- I-Curriculum Vitae
- II-Motivation letter
- III-Names and addresses of three references

Applications should be submitted by e-mail to secretariat [at] eurecom [dot] fr with the reference: MM_BM_PhD_MM_INDEXING

Events are everywhere! We find them in life-log applications and emergency response systems as well as in domains like cultural heritage, news, sports, and surveillance. Thus, we can understand events as natural abstraction of human experience. The goal of this workshop is to present and discuss the human-centered understanding of … Read more →

MMCOMMONS @ ACM MM 2015

ACM MM 2015 Workshop on Multimedia COMMONS - Community-Organized Multimodal Mining: Opportunities for Novel Solutions

Location: Brisbane, Australia
More information: http://www.mmcommons.org/
Sponsored by ACM SIGMM

Building flexible, accurate multimedia analysis and retrieval systems requires massive amounts of annotated data as ground truth input. The MMCOMMONS workshop will kick off the development of a research community focused on annotation of large-scale datasets such as YFCC100M. The workshop intends to lay the groundwork for future data challenges … Read more →

CFPs: Sponsored by ACM (any SIG)

TOMM

ACM Transactions on Multimedia Computing, Communication and Applications

Special issue on Trust Management for Multimedia Big Data

Submission deadline: 01. October 2015
Special issue
More information: http://tomm.acm.org/pdf/
TOMM_TrustManagementMultimediaBigData_CFP.pdf
Sponsored by ACM

Existing solutions of trust management for multimedia big data are imperfect or in-comprehensive. Multimedia big data brings additional challenges to trust management research with regard to the security and privacy of multimedia, the efficiency and accuracy of multimedia.
Calls for Contribution

process and the dependability and quality of processing results. This … Read more →

**ImmersiveMe2015 @ ACM MM 2015**

**Immersive Media Experiences 2015**

Submission deadline: 08. July 2015
Location: Brisbane, Australia
Sponsored by ACM

Immersive media has the potential for strong impact on users’ emotions and their sense of presence and engagement. This workshop takes place in the middle of a media revolution where users are expecting to take part in the action by interacting with and generating content and to experience immersive and … Read more →

**CrowdMM2015 @ ACM MM 2015**

**International Workshop on Crowdsourcing for Multimedia**

Location: Brisbane, Australia
More information: http://www.crowdmm.org
Sponsored by ACM

Crowdsourcing offers a time- and resource-efficient method for collecting large volumes of input for system design and evaluation... Yet, crowdsourcing remains notoriously difficult to exploit effectively in multimedia settings: the challenge arises from the fact that a community of users or workers is a complex and dynamic system highly sensitive … Read more →

**NetGames 2015**

**The 14th International Workshop on Network and Systems Support for Games**

Submission deadline: 21. August 2015
Location: Zagreb, Croatia
Dates: 03. December 2015 -04. December 2015
More information: http://netgames2015.fer.hr/
Sponsored by ACM

The 14th International Workshop on Network and Systems Support for Games (NetGames 2015) will be held in Zagreb, Croatia on December 3-4, 2015. NetGames brings together researchers and practitioners from academia and industry across the globe to present their latest research on the challenges of today’s networked games, and to … Read more →

**ACM Mobiwac 2015**

**13th ACM International Symposium on Mobility Management and Wireless Access**

Submission deadline: 12. June 2015
Location: Cancun (Mexico)
More information: http://adscom.it.uc3m.es/mobiwac
Sponsored by ACM

The MOBIWAC series of events are intended to provide an international forum for the discussion and presentation of original ideas, recent results and achievements by researchers, students, and systems developers on issues and challenges related to mobility management and wireless access protocols. To keep up with the technological developments, we … Read more →

**ICSC-SMM’16**

**The Fifth IEEE International Workshop on Semantic Multimedia**

Submission deadline: 15. November 2015
Location: Laguna Hills, California, USA
Dates: 03. February 2016 -05. February 2016
More information: http://rvc.eng.miami.edu/icsc_smm16
Sponsored by IEEE
Calls for Contribution

CCNC 2016
IEEE Consumer Communications and Networking Conference
Submission deadline: 2 August 2015
Location: Las Vegas, USA
Dates: 9 January 2016 - 12 January 2016
Sponsored by IEEE

TDT 2012
Social, P2P and Multimedia Networking, Services and Applications Track, 13th Annual IEEE Consumer Communications and Networking Conference (CCNC2016)
Submission deadline: 10 July 2016
Location: Las Vegas, Nevada, USA
Dates: 9 January 2016 - 12 January 2016
Sponsored by IEEE

ITNAC 2015
25th International Telecommunication Networks and Applications Conference
Submission deadline: 31 July 2015
Location: Sydney, Australia
Dates: 18 November 2015 - 20 November 2015
More information: http://www.itnac.org.au
Sponsored by IEEE

IEEE ISM 2015
IEEE International Symposium on Multimedia
Submission deadline: 17 July 2015
Location: Miami, Florida USA
Dates: 14 December 2015 - 16 December 2015
More information: http://www.ieee-ism.org
Sponsored by IEEE

Hot-MMCS @ CCSNA, GLOBECOM 2015
Special Session "Hot-MMCS: Hot Topics on Multimedia Communication Systems"
Submission deadline: 1 July 2015
Location: San Diego, CA, USA
Dates: 6 December 2015 - 10 December 2015

IIT’15
11th International Conference on Innovations in Information Technology
Submission deadline: 15 July 2015
Location: Dubai, UAE
Dates: 01 November 2015 - 03 November 2015
More information: http://www.it-innovations.ae
Sponsored by IEEE

CCNC 2016
IEEE Consumer Communications & Networking Conference
Submission deadline: 28 June 2015
Location: Las Vegas, USA
Dates: 9 January 2016 - 12 January 2016
Sponsored by IEEE

IEEE ICSC 2016
IEEE International Conference on Semantic Computing 2016
Submission deadline: 14 September 2015
Location: Laguna Hills, CA, USA
Dates: 03 February 2016 - 05 February 2016
More information: http://www.ieee-icsc.org
Sponsored by IEEE

IoTAAL
IEEE International Workshop on Internet of Things for Ambient Assisted Living (IoTAAL) In conjunction with IEEE GLOBECOM 2015
Submission deadline: 1 July 2015
Location: San Diego (CA), USA
Dates: 06 December 2015 - 10 December 2015
More information: http://www.itc.dii.univpm.it/iotaal
Sponsored by IEEE

WMNC 2015
8th IFIP Wireless and Mobile Networking Conference (WMNC 2015)
Submission deadline: 15 June 2015
<table>
<thead>
<tr>
<th>Conference Name</th>
<th>Event Details</th>
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<tbody>
<tr>
<td>ICTC 2015</td>
<td>The 6th International Conference on Information and Communication Technology Convergence</td>
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<td></td>
<td>Location: Munich, Germany</td>
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<td>Dates: 05. October 2015 -07. October 2015</td>
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<td>Sponsored by IEEE</td>
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<td>MMSP 2015</td>
<td>2015 International Workshop on Multimedia Signal Processing</td>
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<td>Location: Jeju, Korea</td>
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<td>Sponsored by IEEE</td>
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<td>CFPs: Not ACM-/IEEE-sponsored</td>
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<td>IQSP’2016</td>
<td>Image Quality and System Performance 2016</td>
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<td>Location: Xi'an, China</td>
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<td>Sponsored by IEEE</td>
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<tr>
<td>BigData2016</td>
<td>The Third International Conference on Data Mining, Internet Computing, and Big Data</td>
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<td>Location: Mevlana University, Konya, Turkey</td>
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<td>More information: <a href="http://sdiwc.net/conferences/bigdata2016/">http://sdiwc.net/conferences/bigdata2016/</a></td>
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<td>MobiMedia2016</td>
<td>9th EAI INTERNATIONAL CONFERENCE ON MOBILE MULTIMEDIA COMMUNICATIONS</td>
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<td>Submission deadline: 01. February 2016</td>
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<td>Location: Xi'an, People's Republic of China</td>
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<td>More information: <a href="http://www.mobimedia.org/2016/show/home">http://www.mobimedia.org/2016/show/home</a></td>
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<td>VBS 2016</td>
<td>Video Browser Showdown @ MMM 2016</td>
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<td>Submission deadline: 20. September 2015</td>
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<td>Location: Miami, USA</td>
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<td>More information: <a href="http://www.videobrowsershowdown.org">http://www.videobrowsershowdown.org</a></td>
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<td>ICETC 2016</td>
<td>The Third International Conference on Education Technologies and Computers (ICETC2016)</td>
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<td>Location: Lebanese University</td>
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<td>More information: <a href="http://sdiwc.net/conferences/icetc2016/">http://sdiwc.net/conferences/icetc2016/</a></td>
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<td>MTAP</td>
<td>Springer Multimedia Tools and Applications</td>
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<td>INTERACTIVE MEDIA: TECHNOLOGY AND EXPERIENCE</td>
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<td>Submission deadline: 20. December 2015</td>
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<td>Special issue</td>
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<td>More information: <a href="http://wsicc.net/">http://wsicc.net/</a></td>
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<td>MIKE 2015</td>
<td>International Conference on Mining Intelligence and Knowledge Exploration 2015</td>
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<td>Submission deadline: 20. August 2015</td>
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<td>ADS’16</td>
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<td>1st International Workshop on Accessible Devices and Services (ADS’16)</td>
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<td>FIRE 2015</td>
<td>25. August 2015</td>
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<td>Forum for International Retrieval Evaluation</td>
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<td>The Second International Conference on Cognitive Internet of Things Technologies (COIOTE2015)</td>
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<td>IWSAC2015</td>
<td>07. September 2015</td>
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<td>3rd International Workshop on Security Assurance in the Cloud</td>
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<td>NTCIR-12 Lifelog</td>
<td>01. January 1972</td>
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<td>NTCIR-12 Lifelog Access and Retrieval (Lifelog) Pilot Task</td>
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<td>11th International Conference on Semantic Systems</td>
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<td>SoMeRA @ ICDM 2015</td>
<td>20. July 2015</td>
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<td>2nd International Workshop on Social Media Retrieval and Analysis</td>
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<tr>
<td>DSVCC @ IEEE CloudCom 2015</td>
<td>01. August 2015</td>
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<tr>
<td>International Workshop on Delay-Sensitive Video Computing in the Cloud</td>
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<td>Calls for Contribution</td>
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<td><strong>IEEE MMSP 2015</strong></td>
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<td>Location: Xiamen, China</td>
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<td>More information: <a href="http://www.mmsp2015.org">http://www.mmsp2015.org</a></td>
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<td><strong>Mobiwac 2015</strong></td>
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<td>Submission deadline: 12. June 2015</td>
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<td>Location: Cancun (Mexico)</td>
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<td><strong>Summer School: Storytelling</strong></td>
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<td>Summer School &quot;Storytelling, Digital Media &amp; Museums&quot;</td>
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<td>Submission deadline: 12. June 2015</td>
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<td>Location: Museum Schloss Moyland, Bedburg-Hau</td>
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<td>More information: <a href="http://www.digitalbeuysstory.net/information.html">http://www.digitalbeuysstory.net/information.html</a></td>
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<td><strong>KSE 2015</strong></td>
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<td>7th International Conference on Knowledge and Systems Engineering</td>
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<td>Location: Ho Chi Minh city, Vietnam</td>
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<td>Dates: 08. October 2015 -10. October 2015</td>
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<td><strong>PCM 2015</strong></td>
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<td>Pacific-Rim Conference on Multimedia 2015</td>
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<td>Submission deadline: 15. May 2015</td>
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<td>Location: Korea</td>
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<td><strong>Communications and Streaming @ ISM 2015</strong></td>
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<td>IEEE International Symposium on Multimedia (ISM 2015)</td>
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<td><strong>ATNAC2015</strong></td>
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<td>2015 Australasian Telecommunication Networks and Applications Conference</td>
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<td>Submission deadline: 01. June 2015</td>
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<td>Location: Sydney, Australia</td>
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<td>More information: <a href="http://www.atnac.org">http://www.atnac.org</a></td>
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<td><strong>CrowdMM 2015 @ ACM MM 2015</strong></td>
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<td>Fourth International ACM Workshop on Crowdsourcing for Multimedia</td>
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<td>Location: Brisbane, Australia</td>
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<td>More information: <a href="http://www.crowdmm.org">http://www.crowdmm.org</a></td>
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<td><strong>YFGC @ ACM MM 2015</strong></td>
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<td>Yahoo-Flickr Event Summarization Challenge at ACM Multimedia 2015</td>
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<td>Submission deadline: 06. July 2015</td>
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Calls for Contribution

More information: http://www.acmmm.org/2015/call-for-contributions/multimedia-grand-challenges/

Real-Time Energy-aware Circuits and Systems for HEVC and for its 3D and SVC Extensions

Submission deadline: 20. September 2015
Special issue

CyberSec 2015

The Fourth International Conference on Cyber Security, Cyber Welfare, and Digital Forensic

Submission deadline: 29. September 2015
Location: Sampoerna University, Jakarta, Indonesia
More information: http://sdiwc.net/conferences/cybersec2015/

ISSRMET 2015

The International Conference on Information System Security, Robotics Modeling, and E-Commerce Transactions

Submission deadline: 14. September 2015
Location: Dubai, UAE
More information: http://sdiwc.net/conferences/issrmet2015/

InfoSec 2015

The Second International Conference on Information Security and Cyber Forensics

Submission deadline: 15. October 2015
Location: University of Cape Town
More information: http://sdiwc.net/conferences/infosec2015/

SISAP 2015

8th International Conference on Similarity Search and Applications

Submission deadline: 11. May 2015
Location: Glasgow, UK

ASM @ ACM MM 2015

The International Workshop on Affect and Sentiment in Multimedia

Location: Brisbane, Australia

DIPDMWC2015

The Second International Conference on Digital Information Processing, Data Mining, and Wireless Communications (DIPDMWC2015)

Submission deadline: 30. October 2015
Location: Dubai, UAE
More information: http://sdiwc.net/conferences/dipdmwc15/

AIPR2016

The Third International Conference on Artificial Intelligence and Pattern Recognition (AIPR2016)

Submission deadline: 19. August 2016
Location: Lodz, Poland
More information: http://sdiwc.net/conferences/aipr2016/

SEEDA-CECNSM 2015

The South-East Europe Design Automation, Computer Engineering, Computer Networks, and Social Media Conference (SEEDA-CECNSM 2015)

Submission deadline: 25. August 2015
Location: Kastoria, Greece
More information: http://sdiwc.net/conferences/seeda-cecnsm2015/

JRTIP

Springer Journal of Real-Time Image Processing
More information: http://www.sisap.org/2015/

**PCM 2015**

Pacific-Rim Conference on Multimedia

Submission deadline: 30. April 2015  
Location: Gwangju, Korea  
More information: http://pcm2015.gist.ac.kr/

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