Volume 2, Number 4
December 2010

Published by the Association for Computing Machinery
Special Interest Group on Multimedia

SIGMM RECORDS

Table of Contents

Association for Computing Machinery

Advancing Computing as a Science & Profession

ISSN 1947-4598
http://sigmm.org/records

SIGMM Records

Volume 2, Number 4, December 2010

Editorial

Dear Member of the SIGMM Community,

Welcome to the last SIGMM Records of 2010!

When you look for the Records on the web pages of SIGMM, located conveniently at http://sigmm.org/records, you will notice that accessing the Records these days brings you to the server that formerly hosted sigmm.org at UT Dallas. The web team is working with the other volunteers who contributed to the old pages in migrating to the new server, which means adapting to a new layout and a completely different CMS. Please don't be annoyed if you find broken links pointing to sigmm.org/path/to/page, please help us to find and fix those problems instead. You can probably still find the content at sigmm.utdallas.edu/path/to/page.

With this issue, we are glad that we can announce the start of a regular column for the Records: The SIGMM Education Column. Sprung out of the work for the Education Portal, Wei Tsang Ooi is going to present selected contributions to the Education Portal in this and future issues of the Records. Don't forget that your multimedia course could also be featured in this column (and be immortalized in the digital library) if you contribute to the Education Portal.

You are reminded of the SIGMM History Archives and can read an introduction to ScientifiCareers, a project dedicated to job opportunities for young researchers in the field of multimedia.

This issue presents to you a full *six* PhD thesis summaries. You should take the time to take of look at those summaries and decide whether you want to read the complete thesis. If you don't find a URL or an ISBN number for the thesis, you can always contact the authors directly.

We have not received a tentative call for proposals for the ACM SIGMM Best PhD Thesis Award, but it will be awarded at ACM Multimedia 2011 in Arizona, and we know from our readers' submissions to the Records that several excellent theses were completed in 2010. To learn more about the submission procedure, we ask you to pay close attention to news on the SIGMM webpage: sigmm.org.

Of course, we provide you also with direct access to the latest papers in TOMCCAP and MMSJ and the IJAMC special issue of NetGames 2009. We conclude the Records for this year with a job announcement and a link to a large, freely available trace.

We wish you good reading with this latest issue of the SIGMM Records, and hope that you have a Happy and Successful New Year 2011!

The Editors
Jun Wang
Stephan Kopf
Yi Cui
Regu Radhakrishnan
Viktor Wendel
Lei Zhang
Wei Tsang Ooi
Carsten Griwodz

Awards for SIGMM members

Abdulmotaleb El Saddik named ACM Distinguished Scientist

Prof. Dr. Abdulmotaleb El Saddik

Abdulmotaleb El Saddik has been named a 2010 Distinguished Scientist by the Association for Computing Machinery (ACM). Professor El Saddik's current research, which provides an excellent bridge between computer science and engineering, is in the area of multimedia communications. In particular, he focuses on the analysis, design and development of haptics audio visual algorithms and of collaborative protocols and applications. He is also a Fellow of IEEE, FEIC and FCAE.

The Distinguished Scientist grade recognizes ACM members who have at least 15 years of professional experience and five years of continuous professional membership, and whose accomplishments in and impact on the computing field have been significant.

Shervin Shirmohammadi receives TOMCCAP Associate Editor of 2010 Award

Editor-in-Chief Ralf Steinmetz (left) presents the award to Associate Editor Shervin Shirmohammadi (right).

Professor Shervin Shirmohammadi is selected as the 2010 Associate Editor of the Year for the ACM Transactions on Multimedia Computing, Communications, and Applications.

SIGMM Education Column

URL: http://sigmm.org/node/11
by Wei Tsang Ooi and Terence Sim (National University of Singapore)

Welcome to the first SIGMM Education Column. The SIGMM Education Column is a new regular column in the SIGMM Record, featuring multimedia-related education activities among the SIGMM communities.

In this first column, we want to highlight the course CS5240 offered at the National University of Singapore, entitled "Theoretical Foundations in Multimedia," designed and taught by Assistant Professor Terence Sim.

The course is aimed at first year Ph.D. students in the Department of Computer Science, preparing them for research in multimedia. As its title suggests, the course covers many fundamental mathematical techniques

commonly used to analyze and solve multimedia research problems.

The course was proposed for two reasons. First, fresh Ph.D. students come from a variety of disciplines from various undergraduate institutions, with most lacking the basic concepts required for multimedia research. For example, students with traditional CS training typically have not learned the Fast Fourier Transform (FFT). On the other hand, those hailing from an engineering background would know the FFT, but are weak in algorithmic analysis. Students therefore need to "level up" to a common body of knowledge suitable for multimedia work. Second, prior to the introduction of this course, many of these fundamental concepts used to be taught in several advanced multimedia courses, in order to address the knowledge gap of new graduate students. This not only duplicated effort, but also took away precious semester time from teaching advanced topics. The need for such a "foundational" course was thus clear.

To meet its goals, CS5240 was carefully designed to cover a selected list of fundamental concepts that are important for multimedia research. Faculty members teaching multimedia courses were consulted to identify a common core to go into CS5240. This initial list was still deemed too ambitious for a one-semester workload, and was further pruned to its current syllabus (see below), covering the main topics of Linear Algebra, Signal Processing, and Statistical Estimation.

Every week, a three-hour lecture covers one concept in depth, after which students read and discuss one or two research papers that apply the said concept to solve a real research problem, ranging from computer vision, image rendering, music retrieval and text classification. Unfortunately, no single textbook covers the whole range of topics in the course, so lecture notes and research papers form the main teaching material. Homework exercises further reinforce the theoretical concepts covered in class, and occasionally include computational assignments (e.g., face recognition using eigenfaces).

The topics covered in the course include the Singular Value Decomposition, Matrix Derivatives, the Discrete and Discrete Time Fourier Transforms, Wavelets, Maximum Likelihood Estimation, Expectation Maximization, and Robust Methods. The syllabus of the most recent version (Fall 2010) of the course can be found at the http://www.comp.nus.edu.sg/~cs5240.

The course has been popular since its inception, and is playing an important role in the multimedia research program in the Department of Computer Science, ensuring that all Ph.D. students with intention of pursuing a research in multimedia receive a solid theoretical background in the field. While designed for Ph.D. students in the Department of Computer Science, the course has also attracted students from the Master of Computing program and students from other departments, such as Electrical and Computer Engineering. Students generally find the course tough: the rigor is not what they are used to. But regardless of what grade they eventually get, student invariably feedback, in their later years, how immensely useful the course has been in their research, or in boostrapping their learning of more advanced topics. In this regard, CS5240 has fulfilled its objectives.

SIGMM History Archives

URL: http://sigmm.org/node/39
By the SIGMM Preservation Committee: Mohamed Hefeeda (Simon Fraser University), Cheng-Hsin Hsu (Deutsche Telekom Inc. R&D Lab USA), Ahmed Hamza (Simon Fraser University)

Front page of the History Archives

The History Archives Section of the SIGMM Web Magazine provides a single location for information about all past conferences and workshops organized by the ACM Special Interest Group on Multimedia (SIGMM). The information includes date and place, general chair(s), and a cached copy of each conference/ workshop web site. The archive can found at:

http://sigmm.org/node/39 (Due to the recent move of the SIGMM web server. The portal will soon be back at: http://sigmm.org/Preservation/)

The History Archives Committee seeks your help to correct any mistake and complete any missing

information. If you have any information about the following conferences (or other SIGMM events), please email Mohamed Hefeeda at mhefeeda@cs.sfu.ca.

- ACM Multimedia: 2003, 2000, 1994, 1993.
- NOSSDAV: 1993, 1992, 1991, 1990.
- CIVR: 2004, 2008.
- Workshop on MM and Security: 2007, 2005, 2003, 2002, 2000, 1999.

Introducing ScientifiCareers

URL: http://www.scientificareers.com/
By Marco Bertini

ScientifiCareers (http://www.scientificareers.com/) is a project dedicated to job opportunities for young researchers in the field of Multimedia.

The platform aims to promote the connection between the world of research and the industry, and to stimulate the exchange of expertise between different research teams.

The project was born from the intentions of prof. Alberto Del Bimbo (Univ. of Firenze, Italy) and Shih-Fu Chang (Columbia Univ., USA), co-chairs of ACM Multimedia 2010, the worldwide premier multimedia conference and a key event to display scientific achievements and innovative industrial products.

ScientifiCareers is a free platform where professionals, industries and academic institutions can post their job requests in order to get in contact with young and talented researchers all over the world.

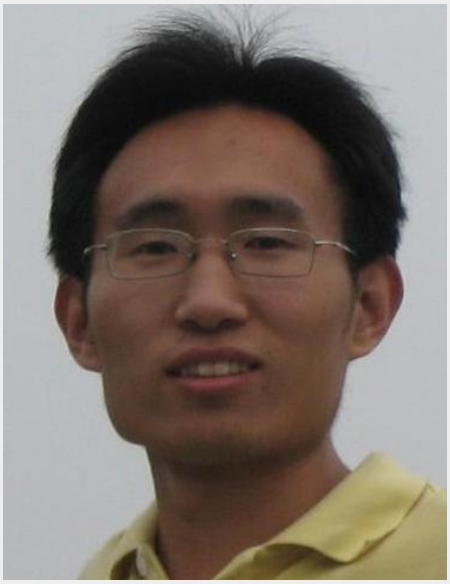
In addition all the people who are interested in jobs in the field of Multimedia can search the job board and apply to the most interesting opportunities.

ScientifiCareers staff is composed of: Marco Bertini, Gianpaolo D'Amico and Andrea Ferracani from MICC, Media Intergration and Communication Centerof the University of Firenze, Italy (http://www.micc.unifi.it).

PhD thesis abstracts

Chunxi Liu

A unified user preference based framework for video content personalization



Nowdays, there are many ways for users to access video resource, and the number of videos grows rapidly. On the other hand, the user's needs become more diversified and personalized. However, people's capacities of using and managing video data have not increased with the growth of the video. The confliction between the user's requirement and the actual technologies results in the 'intention gap' between the users and the video data. In order to meet the diverse need of the user and overcome the 'intention gap', the video content personalization technologies are required. Compared with the traditional video services, the personalization system can better meet the needs of users, improve service quality, and enhance the user experience. Video content personalization technologies have broad application background and market demand, therefore the research is very important.

The traditional personalization recommendation systems, such as the online book recommendation system etc, almost employ the collaborative filtering algorithm. However, the algorithm only considers

the similarity between the users and the items for recommendation, and not considers the content of the data. Therefore, it is not suitable for video content personalization. Some works have been contributed to deal with the video content personalization. However due to the diversity and the complexity of the video data, these works are limited to the specific application environment.

This thesis proposes a unified video content personalization model. In the model, firstly the structure of the videos is analyzed. Then, by considering the user's requirement the contents of the videos are analyzed. Finally, by ranking the video contents according to the user's preference the video content personalization is achieved. In order to verify the validity and generality of the model, the thesis tests it on three different types of videos: news video, online video and sports video. The experimental results show that the model is valid and the generalization capacity is good. The research results of the thesis have strong practical application value, and set up a guideline in the video content personalization domain.

Advisor(s): Qingming Huang
SIG MM member(s): Qingming Huang
ISBN number: unpublished

JDL

http://www.jdl.ac.cn

Joint Research & Development Laboratory for Advanced Computer and Communication Technologies (JDL) is a research unit specialized on multimedia, communication and intelligent human-computer interaction, aiming at the kernel researches in intelligent wide-band network multimedia systems, as well as the development of the key applications in these fields. JDL was founded in March 1996, originally as a joint laboratory cosponsored by the Motorola US and the National Center on Intelligent Computers (NCIC) Institute of Computing Technology of Chinese Academy of Sciences. From the July 2000, it is cooperated by Institute of Computing Technology and Graduate School Chinese Academy of Sciences. The researchers in the laboratory are from several units: the Research Center for Digital Media of Graduate School CAS, Institute of Computing Technology, School of Computer Science and Technology of Harbin Institute of Technology, College of Computer Science of Beijing University of Technology. There are also some visiting researchers from other domestic/foreign units and industrial companies.

The main research fields of JDL include: audio video coding technologies, content-based information retrieval from mass multimedia data, Biometrics, intelligent human-computer interaction, and applied algorithms. Currently, several projects from the National "973" Program, the National Fund of Sciences, the National Hi-Tech R&D Program of China(863 Program), the Key Technologies R&D Program, and the Knowledge Innovation Program of Chinese Academy of Sciences, are being studied in the lab.

After years of efforts, many original research fruits are achieved in the lab. More than 200 academic papers are published on the domestic and/or international journals or conferences. We are especially advanced on audio video coding technologies, face detection and recognition, content-based multimedia retrieval and multi-perception technologies, in which many innovative contributions have been achieved.

Four more research units are also contained in JDL: the workgroup for the standardization of the Chinese Audio-Video coding/decoding technologies cooperated by the MPEG-China National Body and the China Ministry of Information Industry, the Technical Center of China-America Digital Academic Library Graduate School of Chinese Academy of Sciences, the UNU/NUL Chinese Language Center, the ICT-YCNC Joint Research & Development Lab for face recognition. JDL is always keeping well cooperation with both domestic and international universities, research units and IT companies. Broad cooperation projects are warmly welcome concerning face recognition, di1Ggital library, distance education and digital broadcast etc.

Frank Hopfgartner

Personalised Video Retrieval: Application of Implicit Feedback and Semantic User Profiles

A challenging problem in the user profiling domain is to create profiles of users of retrieval systems. This problem even exacerbates in the multimedia domain. Due to the Semantic Gap, the difference between low-level data representation of videos and the higher concepts users associate with videos, it is not trivial to understand the content of multimedia documents and to find other documents that the users might be interested in. A promising approach to ease this problem is to set multimedia documents into their semantic contexts. The semantic context can lead to a better understanding of the personal interests. Knowing the context of a video is useful for recommending users videos that match their information need. By exploiting these contexts, videos can also be linked to other, contextually related videos. From a user profiling point of view, these links can be of high value to recommend semantically related videos, hence creating a semantic-based user profile. This thesis introduces a semantic user profiling approach for news video retrieval, which exploits a generic ontology to put news stories into its context.

Major challenges which inhibit the creation of such semantic user profiles are the identification of user's long-term interests and the adaptation of retrieval results based on these personal interests. Most personalisation services rely on users explicitly specifying preferences, a common approach in the text retrieval domain. By giving explicit feedback, users are forced to update their need, which can be problematic when their information need is vague. Furthermore, users tend not to provide enough feedback on which to base an adaptive retrieval algorithm. Deviating from the method of explicitly asking the user to rate the relevance of retrieval results, the use of implicit feedback techniques helps by learning user interests unobtrusively. The main advantage is that users are relieved from providing feedback. A disadvantage is that information gathered using implicit techniques is less accurate than information based on explicit feedback.

This thesis focuses on three main research questions. First of all, implicit relevance feedback, which is provided while interacting with a video retrieval system, is studied as information source to bridge the Semantic Gap. Therefore, implicit indicators of relevance are identified by analysing representative video retrieval interfaces. Studying whether these indicators can be exploited as implicit feedback within short retrieval sessions, video documents are recommended based on implicit actions performed by a community of users. Secondly, implicit relevance feedback is studied as potential source to build user profiles and hence to identify users' long-term interests in specific topics. This includes studying the identification of different aspects of interests and storing these interests in dynamic user profiles. Finally, this feedback is exploited to adapt retrieval results or to recommend related videos that match the users' interests. The research questions are analysed by performing both simulation-based and user-centred evaluation studies. The results suggest that implicit relevance feedback can be employed in the video domain and that semantic-based user profiles have the potential to improve video exploration.

Advisor(s): Joemon M. Jose (Supervisor), Keith van Rijsbergen (Supervisor), Alan F. Smeaton (Supervisor)
SIG MM member(s): Joemon M. Jose, Alan Smeaton, Stefan Rueger
http://theses.gla.ac.uk/2132/

The Information Retrieval Group

http://ir.dcs.gla.ac.uk/

The Glasgow Information Retrieval Group has a vigorous programme of research, based on both theory and experiment, aimed at developing novel, effective, and efficient retrieval approaches for all types of information. The group plays a leading role in the international information retrieval community and has set trends in many aspects of IR research. The IR group of Glasgow is one of the oldest and major information retrieval research centres in the world.

The group, part of the School of Computing Science, University of Glasgow, has a long and strong research history in a wide area of information retrieval research from theoretical modelling of the retrieval process to large-scale text retrieval systems building and to the interactive evaluation of multimedia information retrieval systems. The group's interests also include areas such as large-scale and high performance text retrieval, Web information retrieval, Distributed and Peer-to-Peer retrieval, Intranet/Enterprise and Blog search, multilingual retrieval, and the development of novel adaptive interaction techniques. Their research preserves a strong emphasis on theoretically-driven, still practical solutions for large-scale document collections. The group maintains strong links with researchers in Machine Learning and Human-Computer Interaction, as well as with industry through knowledge and technology transfer. Members of the group have also been extensively involved in organising major conferences, workshops and summer schools in the area of information retrieval.

Ingo Kofler

In-Network Adaptation of Scalable Video Content

This thesis investigates mechanisms and applications for in-network adaptation of scalable video bit streams based on the recent H.264/Scalable Video Coding (SVC) standard. In-network adaptation refers to the adaptation of a video stream by a network element during the stream's transport through the network. The advantages of performing adaptation directly in the network are the availability of local monitoring data and a higher responsiveness according to the current networking conditions. In contrast to previous work in this field, this thesis focuses on the feasibility and realization of in-network adaptation on existing home router platforms. In this context this thesis addresses the following six research objectives. Initially, the relevant transport mechanisms for H.264/SVC and their implications on in-network adaptation (1) were analysed. In the context of this work three different Linux-based router platforms which cover a representative range of residential router devices were used as a basis for further studies and evaluations. In general these platforms can be characterized by rather modest processing capabilities and networking performance. The hardware limitations were identified and quantified in evaluations (2) using both different benchmarks and real network traffic. The offered processing power and memory throughput are roughly 10 to 100 times lower than those of a modern desktop PC. Although their application-layer networking performance is not that low, all platforms fail in fully utilizing their nominal link capacities of 100 and 1000 Mbps, respectively. Based on the known limitations the thesis proposes a stateful, packet-based adaptation mechanism for adapting scalable video bit streams (3). The approach utilizes the RTP payload format for H.264/SVC and represents a light-weight approach for in-network adaptation on the application layer. It further meets the important requirements towards a media-aware network element (MANE) to be signaling aware and to operate statefully. The mechanism was integrated in a proxy service which was deployed on all of the three platforms to prove its feasibility. Experimental evaluations with different video bit streams in standard-definition quality demonstrate the scalability of the approach (4). The results indicate that the proxy service is able to adapt up to 16 concurrent video streams depending on the platform and video bit stream. On two of the three evaluated platforms the proposed approach even allows to handle and to adapt video streams in high-definition quality at bit rates around 15 Mbps. In addition to the proposed H.264/SVC-specific adaptation mechanism, also the applicability of generic metadata-driven adaptation on home router platforms was investigated. In particular, a proof-of-concept study of an XML-metadata-driven approach based on the MPEG-21 generic Bitstream Syntax Description (gBSD) was conducted on the platforms (5). In contrast to

former evaluations that have been done on PC-based platforms, the obtained results indicate that the use of this generic adaptation cannot be recommended on such resource limited network devices. The benefits of using in-network adaptation on home router platforms are finally demonstrated in the context of high-definition streaming over IEEE 802.11 wireless networks (6). Monitoring information regarding the queueing delay, which is obviously available exclusively on the router, is used to control the adaptation of the video according to the varying throughput of the wireless link. This allows to react timely to changing conditions particularly in the case of mobile clients.

Advisor(s): Hermann Hellwagner (1. rapporteur), Carsten Griwodz (2. rapporteur)
SIG MM member(s): Hermann Hellwagner, Carsten Griwodz

Multimedia Communication (MMC)

http://www.uni-klu.ac.at/tewi/inf/itec/mmc/

The research group "Multimedia Communication (MMC)" was founded and is being led by Prof. Hermann Hellwagner. In addition, the group currently has three research assistants, five project staff members, and three administrative and technical staff members.

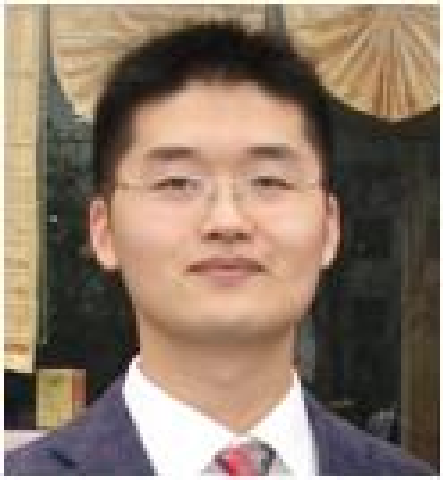
The research activities of the group are in the areas of

- Multimedia communication and QoS provisioning
- Adaptation of multimedia content w.r.t. network, device, and usage contexts
- Use of Scalable Video Coding (SVC) technology in networks and P2P systems
- Adaptive multimedia applications, e.g., IPTV
- Standardization within ISO/IEC MPEG
- Multimedia in disaster management

The focus of the MMC group is clearly on adaptive delivery of audio-visual contents, taking into account, for instance, fluctuating network and environmental conditions that can occur when users are on the move. In particular, the group is currently investigating the use of Scalable Video Coding (SVC) technology in such networks. The group actively participates in several international and national research projects on all levels, ranging from basic research to application-oriented projects and direct cooperation with industry. In teaching, the MMC group covers the technical courses of the Informatics study programme such as Computer Organization, Operating Systems, Computer Networks, Servers and Clusters, Internet QoS, and Multimedia Coding.

Jia Li

Learning-based Visual Saliency Computation



With the rapid development of Internet, the amounts of images and videos are now growing explosively, leading to many new challenges on image/video processing. On one hand, the processing capability of computer is limited and the computational resource should be allocated to the important visual information with high priorities. On the other hand, the analysis results given by computer should be consistent with human cognition. To solve these two problems, this thesis will focus on learning-based visual saliency computation and the main objective can be described as predicting, locating and mining the important visual information that is consistent with human cognition. The main contributions of this thesis can be summarized as follows:

Firstly, this thesis presents a probabilistic multi-task learning approach for computing visual saliency by simultaneously integrating the bottom-up and top-down factors. To the best of our knowledge, it is the first approach that explores the problem of visual saliency computation with the multi-task learning algorithm. In our approach, the bottom-up and the top-down factors are considered simultaneously in a

probabilistic framework. In this framework, a bottom-up component simulates the low-level processes in human vision system using multi-scale wavelet decomposition; while a top-down component simulates the high-level processes to bias the competition of the input visual stimuli. Moreover, we propose a multi-task learning algorithm to optimize the models and model fusion strategies for various scenes. Extensive experiments on several datasets show that this approach demonstrates high robustness and effectiveness in computing visual saliency.

Secondly, this thesis proposes a cost-sensitive rank learning approach for visual saliency computation. To the best of our knowledge, it is the first approach that formulates the problem of visual saliency computation in a rank learning framework. For the video dataset with sparse eye-fixations, this approach avoids the explicit selection of reliable positive and negative samples. Instead, all the positive and unlabeled data are directly integrated into a cost-sensitive rank learning framework. Experimental results show that the rank learning framework can simultaneously take the influences of local visual attributes and pair-wise ``target-distractor'' correlations into account, resulting in better performance on the video dataset with sparse eye fixations.

Thirdly, this thesis presents a multi-task rank learning approach for visual saliency computation. In this approach, the problem of visual saliency computation is formulated in a multi-task rank learning framework to infer multiple saliency models that apply to different scene clusters. In the training process, this approach can infer multiple visual saliency models simultaneously. With an appropriate sharing of information across models, the generalization ability of each model can be greatly improved. Extensive experiments on the eye-fixation dataset show that our approach is highly effective in computing visual saliency in various scenes.

Fourthly, the thesis proposes a novel approach for salient object extraction by using complementary saliency maps. Then a video advertising system is developed to demonstrate its feasibility. This system consists of mainly two modules: the pull advertising module and the push advertising module. In these two modules, the interesting/salient objects are extracted through simple user interactions or complementary saliency maps, respectively. These interesting/salient objects, along with the user preferences, are used to provide content-related and user-targeted ads in a low-intrusive way. In the future, this system will be integrated by HuaWei, a worldwide well-known telecommunication company, into their intelligent streaming media service products.

In summary, this thesis investigates three important issues in learning-based visual saliency computation. Moreover, tentative studies have been carried out on salient object extraction and its application in saliency-based video advertising. To the best of our knowledge, this thesis presents a systematic study on how to apply machine learning into visual saliency computation for the first time. Moreover, this thesis demonstrates the feasibility and effectiveness of learning-based visual saliency computation. This will spark a great interest of research in the related communities in years to come.

Advisor(s): Wen Gao
SIG MM member(s): Wen Gao
http://www.jdl.ac.cn/doc/JiaLiPhdThesis.pdf

JDL

http://www.jdl.ac.cn

Kalman Graffi

Monitoring and Management of Peer-to-Peer Systems

The peer-to-peer paradigm has had large success in content distribution and multimedia communication applications on the Internet. In a peer-to-peer network, the participating nodes create an infrastructure to provide a desired functionality and offer their resources to host an application in a distributed manner.

Besides the functional requirements of an application, the non-functional requirements to achieve a high service quality are also an important part of successful peer-to-peer networks and a major challenge is to meet these requirements in networks with unreliable nodes. In contrast to traditional centralized approaches where the quality can be measured and controlled, in a distributed environment it is challenging both to capture the status and performance of the whole distributed system in one point of time and to control its general behavior. In this dissertation, we focus on the monitoring and management of peer-to-peer systems.

We systematically engineer SkyEye.KOM, a fully decentralized monitoring mechanism that provides both a precise status snapshot of the peer-to-peer system and enables queries for peer capacities, such as bandwidth or storage capacities, in a large-scale peer-to-peer system. It considers individual load limits of the peers and ensures that no peer is overloaded. The core tree topology of SkyEye.KOM is established and maintained solely with protocol-relevant messages. It is based on local peer identifier calculations and using the underlying peer-to-peer overlay. As a second step, we focus on the management of peer-to-peer systems and introduce P3R3O.KOM and SkyNet.KOM, two solutions to manage both the reservation of available capacities in the peer-to-peer system and the system behavior in a fully decentralized and efficient manner. P3R3O.KOM is a peer-to-peer protocol for reliable long-term resource reservation that overcomes the limitations of traditional peer-to-peer services, which typically are host only by single peers and cease once the service providing peer fails. Resource reservations are fulfilled with adjustable guarantees (even 100%) in the presence of strong churn through the automated and fully decentralized management of the resource provision redundancy. With SkyNet.KOM, we present a fully decentralized approach for automated management of peer-to-peer systems following the principles of autonomic computing. It allows the user or system provider to set service quality goals for the peer-to-peer system, which are automatically verified by the monitoring solution SkyEye.KOM and analyzed, aligned and enforced by the other components of SkyNet.KOM. Preset quality goals for the peer-to-peer system are reached and held through automated systematic re-configuration of the individual components of the peer-to-peer system. At the end, we present LifeSocial.KOM, a peer-to-peer-based platform for online social networks that incorporates the proposed monitoring mechanism to show the feasibility and application scope of the monitoring and management solutions.

The impact of the thesis is to be seen in extending the applicability of the peer-to-peer paradigm to quality critical applications and scenarios. Through the monitoring approach, a system provider is able to observe and judge the quality of the peer-to-peer system. Regarding the function of capacity-based peer search, the capacities in a peer-to-peer system may be addressed and used to a full extent, allowing for the creation of applications with rich functionality using a wide set of capacities. Through the proposed management mechanisms, these capacities can also be used reliably in the presence of churn to host services and to establish the peer-to-peer paradigm as a serious and reliable alternative to traditional IT architectures. Additionally, through the automated quality control proposed with SkyNet.KOM, quality-controlled peer-to-peer applications may be created and operated, despite being hosted on a large-scale network of unreliable nodes. Lastly, peer-to-peer-based online social networks show the potential to become the next large application area for the peer-to-peer paradigm. LifeSocial.KOM is one of the first in this category and presents a viable approach for quality-aware peer-to-peer applications that satisfies the needs of both users and system providers.

Advisor(s): Prof. Dr.-Ing. Ralf Steinmetz (Supervisor), Prof. Carmen Guerrero Lopez, Ph.D. (Referee)
SIG MM member(s): Prof. Dr.-Ing. Ralf Steinmetz
http://tuprints.ulb.tu-darmstadt.de/2248/

Multimedia Communications Lab (KOM), TU Darmstadt, Germany

http://www.kom.tu-darmstadt.de/

The Multimedia Communications Lab (KOM) is led by Prof. Dr.-Ing. Ralf Steinmetz and strives to work towards the vision of seamless communications, whereby people worldwide independent of their location as well as the used end-systems and devices are able to communicate and work with each other efficiently and effectively.

To reach this goal KOM works on mechanisms for the realization of QoS, security, adaptivity and context-awareness in systems and networks. We address in particular networks (e.g. p2p and mobile networks), communication services (e.g. IP based communication services), IT architectures (e.g. service oriented architectures), and media contents (media for information and knowledge sources, and community applications).

Application areas for the research at KOM are, for example, E-Business, E-Finance, and E-Learning.

Razib Iqbal

An Architecture for Federated Video Processing and Online Streaming

Today access to video is available via numerous multimedia enabled devices through a wide variety of network types. What is required is a mechanism to ensure that users can receive different qualities of video proportional to their device capabilities and network conditions. In this thesis, we propose an online adaptive video streaming approach which uses the Peer-to-Peer (P2P) paradigm to not only distribute the content using peers' bandwidth, but also adapt the video using peers' processing power, while taking into account receiver heterogeneity, watermarking, and perceptual encryption.

The proposed adaptive video streaming architecture aims at online video adaptation with streaming in P2P overlays to serve heterogeneous devices including small handhelds. Participating peers therefore contribute with both bandwidth and CPU power. We used the MPEG-21 generic Bitstream Syntax Description (gBSD) as a content metadata format and implemented a 3-in-1 adaptation-watermarking-encryption system for compressed-domain adaptation of video in a P2P fashion. Simulation is used to manifest that the design is robust, reliable, and suitable for multi-participant real-time collaboration and real-life deployment. System performance is validated against an analytical model also developed in the thesis.

The specific contributions made in this thesis are:

- A P2P adaptive streaming architecture supporting simultaneous adaptation and streaming of video contents:
  - The adaptive video streaming architecture utilizes content metadata and compressed-domain video processing techniques to meet real-time video adaptation needs.
- A mathematical model for the adaptive video streaming design to find the optimum solution at a given time:
  - The model is based on the Linear Programming problem and considers the relationship among all parameters that affect the efficiency of the streaming, and computes the trade-offs that exist between service fairness and system efficiency.
- A taxation-based minimum contribution scheme:
  - Minimum contribution requirement ensures that resources allocated to serve a peer are commensurate with that peer's contribution rate.
  - A concept of fairness constraint is also introduced to ensure maximum service response by enabling equal service distribution to all the participating peers.
- A compressed-domain spatial and temporal video adaptation scheme:
  - Joint spatiotemporal adaptations are evaluated to observe the real-time performance of the proposed compressed-domain adaptation mechanism.
- A digital watermarking based authentication scheme.
- A perceptual encryption scheme:
  - Both the authentication and encryption schemes can be operated in an intermediary node along with the adaptation operations. The encryption scheme is also spatiotemporal adaptation resilient.

Advisor(s): Shervin Shirmohammadi (supervisor), Mohamed Hefeeda (external examiner), Abdulmotaleb El Saddik (internal examiner)
SIG MM member(s): Shervin Shirmohammadi
http://www.site.uottawa.ca/~shervin/theses/2010-RazibIqbal.pdf

Distributed and Collaborative Virtual Environment Research

Lab (DISCOVER Lab), University of Ottawa, Canada

http://www.discover.uottawa.ca/

Research at the DISCOVER Lab is directed towards the enhancement of next generation human-human communication through advanced multimedia technology and virtual environments. Through our many projects, we are developing new ideas and technology that will make easy-to-use virtual environments a reality. Research projects at the DISCOVER lab typically fall into the following categories:

- Networked Games and Collaborative Virtual Environments
- Multimedia Systems and Applications
- 3D Physical Modelling and Animation
- Intelligent Sensor Networks and Ubiquitous Computing
- Haptics and Teleoperation
- Multimedia-Assisted Biomedical Engineering

Event and publication reports

TOMCCAP, Volume 6, Issue 4, November 2010

Editor-in-Chief: Ralf Steinmetz
Date: November 2010
URL: http://tomccap.acm.org/
Sponsored by ACM SIG Multimedia

The Transactions on Multimedia Computing, Communication and Applications are the SIGMM's own Transactions. As a service to Records readers, we provide direct links to ACM Digital Library for the papers of the latest TOMCCAP issue.

Papers

- Ralf Steinmetz: *Obituary to our dear friend professor Dr. Nicolas D. Georganas, PhD.*
- Thomas Haenselmann: *Foreword to the special issue on multimedia sensor fusion*
- Xiangyu Wang, Mohan Kankanhalli: *MultiFusion: A boosting approach for multimedia fusion*
- Girija Chetty, Matthew White: *Multimedia sensor fusion for retrieving identity in biometric access control systems*
- Gerald Friedland, Chuohao Yeo, Hayley Hung: *Dialocalization: Acoustic speaker diarization and visual localization as joint optimization problem*
- Abu Saleh Md Mahfujur Rahman, M Anwar Hossain, Abdulmotaleb El Saddik: *Spatial-geometric approach to physical mobile interaction based on accelerometer and IR sensory data fusion*
- Zhenyu Yang, Wanmin Wu, Klara Nahrstedt, Gregorij Kurillo, Ruzena Bajcsy: *Enabling multiparty 3D tele-immersive environments with ViewCast*
- Damien Marshall, Séamus Mcloone, Tomás Ward: *Optimizing consistency by maximizing bandwidth usage in distributed interactive applications*
- Long Vu, Indranil Gupta, Klara Nahrstedt, Jin Liang: *Understanding overlay characteristics of a large-scale peer-to-peer IPTV system*

MMSJ, Volume 16, Issue 6, November 2010

Editor-in-Chief: Thomas Plagemann
Date: November 2010
URL: http://www.springer.de

The Multimedia Systems Journal is the first journal publication sponsored by ACM SIGMM and today published exclusively by Springer Verlag. As a service to Records readers, we provide direct links to Springer Verlag's Digital Library for the papers of the latest MMSJ issue.

Papers

- Pradeep K. Atrey, M. Anwar Hossain, Abdulmotaleb El Saddik and Mohan S. Kankanhalli: *Multimodal fusion for multimedia analysis: a survey*
- Aylin Kantarci: *Bandwidth-effective streaming of educational medical videos*
- Petros Belimpasakis and Anne Saaranen: *Sharing with people: a system for user-centric content sharing*

IJAMC, Volume 4, Issue 4

Special issue editors: Maha Abdallah, Mark Claypool and Tristan Henderson
Editor-in-Chief: Abdulmotaleb El Saddik
Date: 2010
URL: http://www.inderscience.com/browse/index.php?journalID=67&year=2010&vol=4&issue=4
Reported by: Shervin Shirmohammadi

The Network and Systems Support for Games (NetGames) workshop is a major forum that brings

together researchers and developers from both academia and industry to discuss and understand the network and systems issues in networked games. Networked games have become an active and mainstream area of research, with games papers appearing at venues such as ACM SIGCOMM and ACM Multimedia, but NetGames has continued to flourish as a venue for presenting early and exciting work. The eighth iteration of the NetGames workshop was held in Paris, France in November 2009. This special issue presents extended versions of six selected papers from this event.

Papers

- Hanghang Qi, David Malone, Dmitri Botvich: *Optimisation of capacity in various 802.11 gaming scenarios*
- Chien-Hao Chien, Shun-Yun Hu, Jehn-Ruey Jiang, Chuan-Wei Cheng: *Bandwidth-aware Peer-to-Peer 3D streaming*
- Paul B. Beskow, Andreas Petlund, Geir A. Erikstad, Carsten Griwodz, Pal Halvorsen: *Reducing game latency by migration, core-selection and TCP modifications*
- Alexandru Iosup, Vlad Nae, Radu Prodan: *The impact of virtualisation on the performance and operational costs of Massively Multiplayer Online Games*
- John L. Miller, Jon Crowcroft: *Group movement in World of Warcraft Battlegrounds*
- Mirko Suznjevic, Maja Matijasevic: *Why MMORPG players do what they do: relating motivations to action categories*

Calls for contributions

Events sponsored by SIGMM

The 21th International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV)

Full paper Deadline: February 24, 2011
Event location: Vancouver, BC, Canada
Event date: June 2-3, 2011
URL: http://nss.cs.ubc.ca/nossdav2011/

For NOSSDAV 2011, we will accept papers on broad ranges of topics related to the transmission and presentation of digital audio/video objects. We are particularly interested in soliciting articles that discuss system-level support for distributed social media, as well as papers that focus on enabling multimedia applications in distributed cloud.

The Third International Conference on Internet Multimedia Computing and Service (ICIMCS)

Full paper Deadline: May 1, 2011
Event location: Chengdu, China
Event date: August 1-3, 2011
URL: http://sist.swjtu.edu.cn/icimcs/

ICIMCS will focus on a wide variety of key issues and new approaches, which aim to tackle problems arising from the fast-growing internet multimedia and the users' requirements on multimedia service.

ACM International Conference on Multimedia (MM)

Full paper Deadline: April 11, 2011
Event location: Scottsdale, AZ, USA
Event date: November 28 - December 1, 2011
URL: http://acmmm2011.utdallas.edu

ACM Multimedia 2011 is the worldwide premier multimedia conference and a key event to display scientific achievements and innovative industrial products. The conference offers to scientists and practitioners in the area of multimedia plenary, scientific and technical sessions, tutorials, competitions, panels and discussion meetings on relevant and challenging research questions. ACM Multimedia 2011 will also provide the opportunity of interaction between artists and engineers with the aim of reflecting on the impact of multimedia technologies on contemporary digital culture.

Other ACM events

Fifth ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC)

Full paper Deadline: March 27, 2011
Event location: Ghent, Belgium
Event date: August 23-26, 2011
URL: http://www.icdsc.org

Technological developments in imaging, processing, and networking have created an opportunity for multi-disciplinary approaches to applications based on vision. ICDSC will accept papers from multiple fields such as computer vision, pervasive computing, embedded systems and sensor networks.

10th International Conference on Entertainment Computing (ICEC)

Full paper Deadline: April 15, 2011
Event location: Vancouver, Canada
Event date: October 5-8, 2011
URL: http://www.icec2011.org/

The IFIP International Conference on Entertainment Computing explores the application of computational technology to entertainment. ICEC welcomes submissions on the design, engineering, application and theory of entertainment technology.

International Conference on Multimodal Interaction (ICMI)

Full paper Deadline: May 13, 2011
Event location: Alicante, Spain
Event date: November 14-18, 2011
URL: http://www.acm.org/icmi/2011/

ICMI is the premium international forum for multimodal signal processing and multimedia human-computer interaction. The conference will focus on theoretical and empirical foundations, varied component technologies, and combined multimodal processing techniques that define the field of multimodal interaction analysis, interface design, and system development.

EuroITV

Full paper Deadline: January 14, 2011
Event location: Lisbon, Portugal
Event date: June 29-July 1, 2011
URL: http://www.euroitv2011.org/

EuroITV focuses on different aspects of interactive television, e.g. IPTV, mobile TV, digital content production, entertainment computing, usability and user experience evaluation, changes in technical requirements and infrastructure, and future technologies.

Workshop on Network and Systems Support for Games (NetGames)

Full paper Deadline: July 1, 2011
Event location: Ottawa, Canada
Event date: October 6-7, 2011
URL: http://www.discover.uottawa.ca/netgames2011

NetGames brings together researchers and practitioners from both academia and industry to present the latest research results and challenges of today's networked games, and to understand their requirements and possibilities in order to enable the next generation of networked games. NetGames also provides industry keynote and panel discussions. Submissions are sought in any area related to networked games.

Other multimedia-related Events

International Workshop on Content Protection & Forensics (CPAF)

Full paper Deadline: February 05, 2011
Event location: Barcelona, Spain
Event date: July 11-15, 2011
URL: http://www.cemnet.ntu.edu.sg/cpaf2011

This workshop on content protection and forensics is intended to bring forth the current advancements in media content protection and media forensics areas.

Workshop on Multimedia-Aware Networking 2011 (WoMAN)

Full paper Deadline: February 20, 2011
Event location: Barcelona, Spain
Event date: July 11-15, 2011
URL: http://woman2011.ict-alicante.eu/

This workshop solicits novel contributions and breaking results on all aspects of multimedia-aware networking. In particular, workshop papers should describe algorithms, issues and experiences related to content-aware networking and network-aware applications, future (media) Internet architectures, adaptivity, cross-layer design and optimization, applications, and interoperability.

The FTRA 2nd International Workshop on Multimedia and Semantic Technologies (MUST)

Full paper Deadline: January 10, 2011
Event location: Crete, Greece
Event date: June 28-20, 2011
URL: http://www.ftrai.org/must2011/

The 2nd FTRA International Workshop on Multimedia and Semantic Technologies aims at high quality research contributions in multimedia semantic computing, with a focus on how to apply the semantic technologies to the acquisition, generation, storage, processing, and retrieval of large-scale multimedia information.

9th International Workshop on Content-Based Multimedia Indexing (CBMI)

Full paper Deadline: January 14, 2011
Event location: Madrid, Spain
Event date: June 13-15, 2011
URL: http://www-vpu.eps.uam.es/cbmi2011/

CBMI 2011 aims at bringing together the various communities involved in the different aspects of content-based multimedia indexing, retrieval, browsing and presentation.

3rd International Workshop on Advances in Music Information Research (AdMIRe)

Full paper Deadline: February 20, 2010
Event location: Barcelona, Spain
Event date: July 11-15, 2011
URL: http://www.cp.jku.at/conferences/AdMIRe2011/

AdMIRe serves as a forum for theoretical and practical discussions in the fields of Web mining for music information extraction, retrieval, and recommendation as well as in mobile applications and services. Research on multimodal extraction, retrieval, and presentation with a focus on the music and audio domain is especially welcome.

Sixth Workshop on multiMedia Applications over Wireless Networks (MediaWiN)

Full paper Deadline: March 11, 2011
Event location: Kerkyra, Corfu, Greece
Event date: June 28-July 1, 2011
URL: http://mediawin.it.teithe.gr/

MediaWiN is an open forum that aims to promote the research in the field of multimedia services over wireless systems.

Elsevier Journal of Visual Communication and Image Representation (JVCI): Special issue on Recent Advances on Analysis and Processing for Distributed Video Systems

Full paper Deadline: May 30, 2011
Event date: Summer 2012
URL: http://ees.elsevier.com/jvci

Distributed video systems are of increasing importance in many applications, including surveillance, healthcare, entertainment, and unmanned area monitoring. There is an evolution from the static centric-based processing to dynamic collaborative computing and processing among distributed video processing nodes. This evolution is issuing new challenges. This special issue aims to bring together leading researchers and practitioners from around the world to present their latest research results and explore future directions in distributed video systems.

Free Material

Measurement and Analysis of Large DIstributed Virtual EnvironmentS

URL: http://nemesys.comp.nus.edu.sg/projects/maldives/

Previous research in NVE mainly based their design on assumptions on how avatars behave, and use randomly generated movements to evaluate their design. We believe that there is a gap between these assumptions/ randomly generated movements and how real avatar behave. To bridge the gap, we collected mobility traces of 84,208 avatars spanning 22 regions over two months in Second Life, a popular networked virtual environment. We analyzed the traces to characterize the dynamics of the avatars mobility and behavior, both temporally and spatially. We discuss the implications of the our findings to the design of peer-to-peer networked virtual environments, interest management, mobility modeling of avatars, server load balancing and zone partitioning, client-side caching, and prefetching.

Job Opportunities

Research engineer or post-doctoral researcher in hybrid and GPU-accelerated multimedia processing

Employer: Institut Telecom, France
Valid until: Jan 31, 2011

More info: http://www-public.it-sudparis.eu/~horain/OffreCDD.html

In the framework of a French national research project, as a fellow member in a research lab (GpuCV creator) and in connection with dedicated SMEs, you will contribute to software development for the hybrid CPU & GPU platform. You will port encoding algorithms and offer technical exprtise for developing applications.

Back matter

Notice to Contributing Authors to SIG Newsletters

By submitting your article for distribution in this Special Interest Group publication, you hereby grant to ACM the following non-exclusive, perpetual, worldwide rights:

- to publish in print on condition of acceptance by the editor
- to digitize and post your article in the electronic version of this publication
- to include the article in the ACM Digital Library and in any Digital Library related services
- to allow users to copy and distribute the article for noncommercial, educational or research purposes

However, as a contributing author, you retain copyright to your article and ACM will refer requests for republication directly to you.

Impressum