GUEST EDITORIAL

Guest editorial special issue on quality of experience for multimedia applications

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In recent years, the ubiquity of multimedia services along with the proliferation of mobile devices and the demand for new audio and video applications are changing the lifestyle of users. The multimedia era is allowing users to create, distribute, and access content in ubiquitous way and cost-effectively, while providers explore new ways to increase their revenues. The efficient delivery of real-time multimedia services over emerging diverse and heterogeneous systems is a challenging research goal. The interoperability of applications, transport and network protocols as well as the demand for improved Quality of Experience (QoE) create new challenges and opportunities for further research on novel communication protocols, architectures, and methods to efficiently support current and future multimedia networking systems.

In 2010, the Third International Future Multimedia Networking (FMN 2010) workshop was organized in Kraków, Poland and achieved a success attracting numerous submissions from various countries. FMN 2010 produced a high quality peer reviewed technical programme with an acceptance rate at around 24% and addressed important aspects of future multimedia systems with a focus on QoE.

Authors of selected papers from FMN 2010 were invited to submit extended versions of their papers in order to be considered for inclusion in this Special issue on Future Multimedia.

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These papers were peer-reviewed again and then further revised by the authors.

The paper '*Standard Multimedia Conferencing in the wild: the Meetecho Architecture*' presents a conferencing architecture called Meetecho. The paper embraces an engineering approach, by describing an actual implementation of an open source centralized video-conferencing system capable of offering an advanced communication experience to end-users through the effective exploitation of mechanisms such as session management and floor control. Meetecho has been designed to be fully compliant with the latest standard proposals coming from both the IETF and the 3GPP and can be considered as an outstanding example of a real-time application built around the SIP protocol. The paper discusses both the design of the overall conferencing framework and the most important issues faced during the implementation phase.

The paper '*QoS-RRC: An Overprovisioning-centric and Load Balance-aided Solution for Future Internet QoS-oriented Routing*' introduces the Quality of Service (QoS)-Routing and Resource Control (QoS-RRC), a set of Generic Path (GP)-compliant facilities. QoS-RRC complements GP architecture with QoS-oriented routing, with the aid of load balancing to select paths that comply with session-demands while keeping residual bandwidth to increase user experience. To address scalability issues, QoS-RRC operates on the basis of an overprovisioning-centric approach to achieve cost-effectiveness in terms of state storage, signaling load and network operations. An initial QoS-RRC performance evaluation was carried out in Network Simulator v.2 (NS-2), which showed that there had been drastic improvements in the flow delay experience and bandwidth use over a range of relevant state-of-the-art solutions. Moreover, the impact of QoS-RRC on the user experience (compared to current IP QoS and routing standards) has been evaluated, by analyzing the main objective and subjective QoE metrics, namely Peak Signal to Noise Ratio (PSNR), The Structural Similarity Index (SSIM), Video Quality Metric (VQM) and Mean Opinion Score (MOS).

The paper '*A Fuzzy Queue-aware Routing Approach for Wireless Mesh Networks*' presents a variation of the Wireless Mesh Network (WMN) routing protocol Optimized Link State Routing (OLSR), to achieve QoE requirements for multimedia applications. It is based on the dynamic choice of metrics and in a Fuzzy Link Cost (FLC) to determine the best routes for multimedia packets. Simulations were carried out to show the benefits of the proposed metric regarding user experience compared to existing versions of OLSR.

The paper '*Content Driven QoE Assessment for Video Frame Rate and Frame Resolution Reduction*' presents two No-Reference (NR) metrics mapping frame rate or resolution into MOS. Both models use simple to calculate parameters expressed by sequence spatial and temporal information. The models were estimated and verified upon distinctive video sequence sets. The considered frame rate change varies from 5 to 30 frames per second. The considered resolutions changes from Sub Quarter Common Intermediate Format (SQCIF) to Standard Definition (SD).

The paper '*Framework for the Integrated Video Quality Assessment*' addresses the design challenges of an integrated framework using a number of comprehensive functional modules. The framework integrates objective quality assessment models of Artifacts Measurement (AM) and Quality of Delivery (QoD) approaches. Only the best fit models are activated by the framework considering requirements of individual evaluation tasks. The paper also introduces the recent work of realizing key functional modules of the framework. Joint subjective experiments between two institutes have also been carried out to evaluate the implementation. Experimental results demonstrate the concept of an integrated framework and show the effectiveness of its key modules in estimating the quality level of video services.

In the paper '*An Adaptive Motion-Compensated Approach for Video De-Interlacing*', an adaptive, edge-preserving motion-compensated approach for video de-interlacing is proposed. The algorithm preserves strong edges and interpolates the missing pixels along the contours depending on the motion-degree of the region to which they belong. The proposal is optimized to reduce heavy computation, which is the main drawback of motion-compensated de-interlacing algorithms. Therefore it provides complexity scalability as a trade-off tool between performance and computation time. Experiments demonstrate a significant gain in reconstruction quality as compared to other de-interlacing implementations.

We wish to thank all the authors for considering this special issue of Multimedia Tools and Applications Journal as a venue for submitting their papers. We express our gratitude to all reviewers who devoted their precious time in providing valuable feedback on all the papers considered for this special issue.

Finally, we thank the Editor-in-Chief, Professor Borko Furht, for his great support and encouragements. We would also like to take this opportunity to thank Springer staff for their unconditional support and time throughout the preparation of this issue.

We hope that this special issue will provide a valuable source of reference for researchers, designers, engineers, and developers working in the area of multimedia networking.

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Mikołaj Leszczuk received the M.Sc. degree in electrical engineering and the Ph.D. degree in telecommunications from the AGH University of Science and Technology, Krakow, Poland, in 2000 and 2006, respectively. In 2000, he joined the Department of Telecommunications at the AGH University of Science and Technology, where he is currently an Assistant Professor. He spent his scholarship leaves at Charles III University of Madrid, Spain. He is the member of the IEEE. He has been a consultant to governmental institutions and telecom operators in modern telecommunication networks. His research interests include multimedia, QoE (Quality of Experience) and security. He has/had actively participated in eContentPlus,

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