

2020 IEEE International Symposium on Multimedia (ISM 2020)

**Virtual Conference
2 – 4 December 2020**



IEEE Catalog Number: CFP20197-POD
ISBN: 978-1-7281-8698-6

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP20197-POD
ISBN (Print-On-Demand):	978-1-7281-8698-6
ISBN (Online):	978-1-7281-8697-9

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2020 IEEE International Symposium on Multimedia (ISM) **ISM 2020**

Table of Contents

Message from the General Chairs .x.....
Message from the Program Chairs .xi.....

Streaming and Real Time Applications

A Comparative Study of RTC Applications .1.....
Antonio Nistico' (Politecnico di Torino), Dena Markudova (Politecnico di Torino), Martino Trevisan (Politecnico di Torino), Michela Meo (Politecnico di Torino), and Giovanna Carofiglio (Cisco Systems Inc.)

Adaptive Multi-View Live Video Streaming for Teledriving Using a Single Hardware Encoder .9.....
Markus Hofbauer (Technical University of Munich), Christopher B. Kuhn (BMW Group), Goran Petrovic (BMW Group), and Eckehard Steinbach (Technical University of Munich)

Dynamic Segment Repackaging at the Edge for HTTP Adaptive Streaming .17.....
Jesús Aguilar-Armijo (Universität Klagenfurt), Babak Taraghi (Universität Klagenfurt), Christian Timmerer (Universität Klagenfurt), and Hermann Hellwagner (Universität Klagenfurt)

Video Quality

Vid2Pix - A Framework for Generating High-Quality Synthetic Videos .25.....
Oda O. Nedrejord (SimulaMet), Vajira Thambawita (SimulaMet), Steven A. Hicks (SimulaMet), Pål Halvorsen (SimulaMet), and Michael A. Riegler (SimulaMet)

Live Demonstration: Interactive Quality of Experience Evaluation in Kvazzup Video Call .27.....
Joni Räsänen (Tampere University), Aaro Altonen (Tampere University), Alexandre Mercat (Tampere University), and Jarno Vanne (Tampere University)

Video Quality Enhancement Using Deep Learning-Based Prediction Models for Quantized DCT Coefficients in MPEG I-Frames .29.....
Antonio J. G. Busson (PUC-Rio), Paulo R. C. Mendes (PUC-Rio), Daniel de S. Moraes (PUC-Rio), Álvaro M. da Veiga (PUC-Rio), Alan L. V. Guedes (PUC-Rio), and Sérgio Colcher (PUC-Rio)

Best Paper Session

- Better Look Twice - Improving Visual Scene Perception Using a Two-Stage Approach .33.....
Christopher B. Kuhn (BMW Group), Markus Hofbauer (Technical University Munich), Goran Petrovic (BMW Group), and Eckehard Steinbach (Technical University Munich)
- Audio Captioning Based on Combined Audio and Semantic Embeddings .41.....
Ayşegül Özkaya Eren (Başkent University) and Mustafa Sert (Başkent University)
- Towards Scalable Retrieval of Human Motion Episodes .49.....
Petra Budikova (Masaryk University), Jan Sedmidubsky (Masaryk University), Jan Horvath (Masaryk University), and Pavel Zezula (Masaryk University)
- SEAWARE: Semantic Aware View Prediction System for 360-Degree Video Streaming .57.....
Jounsup Park (University of Texas at Tyler), Mingyuan Wu (University of Illinois at Urbana-Champaign), Kuan-Ying Lee (University of Illinois at Urbana-Champaign), Bo Chen (University of Illinois at Urbana-Champaign), Klara Nahrstedt (University of Illinois at Urbana-Champaign), Michael Zink (University of Massachusetts Amherst), and Ramesh Sitaraman (University of Massachusetts Amherst)

360-degree video

- Between the Frames - Evaluation of Various Motion Interpolation Algorithms to Improve 360° Video Quality .65.....
Stephan Fremerey (Technische Universität Ilmenau), Frank Hofmeyer (Technische Universität Ilmenau), Steve Göring (Technische Universität Ilmenau), Dominik Keller (Technische Universität Ilmenau), and Alexander Raake (Technische Universität Ilmenau)
- Real-Time Spatio-Temporal Action Localization in 360 Videos .73.....
Bo Chen (University of Illinois at Urbana-Champaign), Ahmed Ali-Eldin (University of Massachusetts Amherst), Prashant Shenoy (University of Massachusetts Amherst), and Klara Nahrstedt (University of Illinois at Urbana-Champaign)
- CooPEC: Cooperative Prefetching and Edge Caching for Adaptive 360° Video Streaming .77.....
Anahita Mahzari (University of Texas at Dallas), Aliehsan Samiei (University of Texas at Dallas), and Ravi Prakash (University of Texas at Dallas)
- Redefine the A in ABR for 360-Degree Videos: A Flexible ABR Framework .82.....
Kuan-Ying Lee (University of Illinois at Urbana Champaign), Andrew Yoo (University of Illinois at Urbana Champaign), Jounsup Park (University of Texas at Tyler), and Klara Nahrstedt (University of Illinois at Urbana Champaign)
- On Subpicture-Based Viewport-Dependent 360-Degree Video Streaming using VVC .85.....
Maryam Homayouni (Nokia Technologies), Alireza Aminlou (Nokia Technologies), and Miska M. Hannuksela (Nokia Technologies)

New Applications

- Measuring Driver Situation Awareness Using Region-of-Interest Prediction and Eye Tracking .91....
Markus Hofbauer (Technical University of Munich), Lukas Püttner (Technical University of Munich), Eckehard Steinbach (Technical University of Munich), Christopher B. Kuhn (BMW Group), and Goran Petrovic (BMW Group)
- Extraction of Frame Sequences in the Manga Context .96.....
Christian Roggia (Animeshon) and Fabio Persia (Free University of Bozen-Bolzano)
- Can You All Look Here? Towards Determining Gaze Uniformity In Group Images .100.....
Omkar N. Kulkarni (University at Albany, SUNY), Vikram Patil (University at Albany, SUNY), Shivam B. Parikh (University at Albany, SUNY), Shashank Arora (University at Albany, SUNY), and Pradeep K. Atrey (University at Albany, SUNY)
- Bonsai Style Classification: A New Database and Baseline Results .104.....
Guilherme H.S. Nakahata (State University of Maringá), Ademir A. Constantino (State University of Maringá), and Yandre M. G. Costa (State University of Maringá)

New Algorithms

- Audio Steganography Algorithm Based on Genetic Algorithm for MDCT Coefficient Adjustment for AAC .111.....
Chen Li (Xi'an Jiaotong University), Xue Zhang (Xi'an Jiaotong University), Tao Luo (Xi'an Jiaotong University), and Lihua Tian (Xi'an Jiaotong University)
- Llama - Low Latency Adaptive Media Algorithm .113.....
Tomasz Lyko (Lancaster University), Matthew Broadbent (Lancaster University), Nicholas Race (Lancaster University), Mike Nilsson (British Telecommunications plc), Paul Farrow (British Telecommunications plc), and Steve Appleby (British Telecommunications plc)
- Structured Pruning of LSTMs via Eigenanalysis and Geometric Median for Mobile Multimedia and Deep Learning Applications .122.....
Nikolaos Gkalelis (Information Technologies Institute, Centre for Research and Technology Hellas) and Vasileios Mezaris (Information Technologies Institute, Centre for Research and Technology Hellas)
- Automatic Sparsity-Aware Recognition for Keypoint Detection .127.....
Yurui Xie (Ryerson Multimedia Research Laboratory) and Ling Guan (Ryerson Multimedia Research Laboratory)

Multimedia in Sport

- Real-Time Detection of Events in Soccer Videos using 3D Convolutional Neural Networks .135.....
Olav A. Nergård Rongved (SimulaMet), Steven A. Hicks (SimulaMet), Vajira Thambawita (SimulaMet), Håkon K. Stensland (SimulaMet), Evi Zouganeli (OsloMet), Dag Johansen (UIT), Michael A. Riegler (SimulaMet), and Pål Halvorsen (SimulaMet)

Computational Method for Optimal Attack Play Consisting of Run Plays and Hand-Pass Plays for Seven-a-Side Rugby .145.....	
	<i>Kotaro Yashiro (Meiji University) and Yohei Nakada (Meiji University)</i>
REP-Model: A Deep Learning Framework for Replacing Ad Billboards in Soccer Videos .149.....	
	<i>Vahid Khorasani Ghassab (Concordia University), Kamal Maanicshah (Concordia University), Nizar Bouguila (Concordia University), and Paul Green (mtl.ai)</i>

Multimedia in Education

Visual Summarization of Lecture Video Segments for Enhanced Navigation .154.....	
	<i>Mohammad Rajiur Rahman (University of Houston), Shishir Shah (University of Houston), and Jaspal Subhlok (University of Houston)</i>
A Clustering-Based Method for Automatic Educational Video Recommendation Using Deep Face-Features of Lecturers .158.....	
	<i>Paulo R. C. Mendes (PUC-Rio), Eduardo S. Vieira (PUC-Rio), Alan L. V. Guedes (PUC-Rio), Antonio J. G. Busson (PUC-Rio), and Sérgio Colcher (PUC-Rio)</i>
Automatic Identification of Keywords in Lecture Video Segments .162.....	
	<i>Raga Shalini Koka (University of Houston), Farah Naz Chowdhury (University of Houston), Mohammad Rajiur Rahman (University of Houston), Thamar Solorio (University of Houston), and Jaspal Subhlok (University of Houston)</i>
MPEG-DASH Users Quality of Experience Enhancement for MOOC Videos .166.....	
	<i>Dorsaf Sebai (ENSI) and Emna Mani (ISAMM)</i>

Music

Multi-View Neural Networks for Raw Audio-Based Music Emotion Recognition .168.....	
	<i>Na He (University of Technology Sydney) and Sam Ferguson (University of Technology Sydney)</i>
Multimodal Classification of Emotions in Latin Music .173.....	
	<i>Leonardo G. Catharin (State University of Maringá), Rafael P. Ribeiro (Federal University of Technology Paraná), Carlos N. Silla Jr. (Pontifical Catholic University of Paraná), Yandre M. G. Costa (State University of Maringá), and Valeria D. Feltrim (State University of Maringá)</i>
Remixing Music with Visual Conditioning .181.....	
	<i>Li-Chia Yang (Georgia Institute of Technology) and Alexander Lerch (Georgia Institute of Technology)</i>
Melody-Conditioned Lyrics Generation with SeqGANs .189.....	
	<i>Yihao Chen (Georgia Institute of Technology) and Alexander Lerch (Georgia Institute of Technology)</i>

Video Summarization

Audiovisual, Genre, Neural and Topical Textual Embeddings for TV Programme Content Representation	197
<i>Saba Nazir (University College London), Taner Cagali (University College London), Mehrnoosh Sadrzadeh (University College London), and Chris Newell (BBC Research and Development)</i>	
Closing-the-Loop: A Data-Driven Framework for Effective Video Summarization	201
<i>Ran Xu (Purdue University), Haoliang Wang (Adobe Research), Stefano Petrangeli (Adobe Research), Viswanathan Swaminathan (Adobe Research), and Saurabh Bagchi (Purdue University)</i>	
An Effective Rotational Invariant Key-Point Detector for Image Matching	206
<i>Thanh Hong-Phuoc (Ryerson University) and Ling Guan (Ryerson University)</i>	
SumBot: Summarize Videos Like a Human	210
<i>Hongxiang Gu (University of California, Los Angeles), Stefano Petrangeli (Adobe Research), and Viswanathan Swaminathan (Adobe Research)</i>	
FID: Frame Interpolation and DCT-Based Video Compression	218
<i>Yeganeh Jalalpour (Portland State University), Li-Yun Wang (Portland State University), Wu-Chi Feng (Portland State University), and Feng Liu (Portland State University)</i>	
Weights Generation in Image Captioning Using Part of Speech: A Deep Learning Approach	N/A
<i>Tiago do Carmo Nogueira (Instituto Federal Baiano), Cássio Dener Noronha Vinhal (Federal University of Goiás), Gélson da Cruz Júnior (Federal University of Goiás), and Matheus Rudolfo Diedrich Ullmann (Federal Institute of Bahia)</i>	

MTEL Workshop

AR4OER: A Semantic Platform for Open Educational Augmented Reality Resources	227
<i>Christian Grévisse (University of Luxembourg), Carina Martins Gomes (University of Luxembourg), and Steffen Rothkugel (University of Luxembourg)</i>	
Two Types of Flows Admission Control Method for Maximizing All User Satisfaction Considering Seek-Bar Operation	233
<i>Keisuke Ode (Shibaura Institute of Technology) and Sumiko Miyata (Shibaura Institute of Technology)</i>	
Deriving Strategies for the Evaluation of Spaced Repetition Learning in Mobile Learning Applications from Learning Analytics	239
<i>Florian Schimanke (HSW - University of Applied Sciences) and Robert Mertens (HSW - University of Applied Sciences)</i>	

Author Index	245
--------------------	-----