EBU
OPERATING EUROVISION AND EURORADIO

MDN WORKSHOP 2018

Speaker bios & synopsis

TUESDAY 5 JUNE

ARTIFICIAL INTELLIGENCE HANDS-ON DAY (extraction tools, workflow integartion, etc.)
JOANNEUM RESEARCH, RAI, RTS, TRISKEL/GLOOKAST/NHK VALOSSA, VRT, YLE

WEDNESDAY 6 JUNE

UPDATE FROM THE HANDS-ON AI DAY
A short summary of the main outcomes of the first day of the MDN seminar

KIM VILJANEN, YLE &
DR MIKE MATTON is a project manager at VRT. He holds Master degrees in Informatics and Artificial Intelligence from the KULeuven. He obtained his PhD in computer science from the KULeuven in 2009. His Ph.D. research involved example based methods for speech and pattern recognition. He joined the research labs of VRT in October 2009, joining a research team on information management. His main interest are applying AI techniques in the media domain, as well as methods for managing metadata. He has been involved in several European and national projects. He is chair of the expert group on automated information extraction within the EBU and vice-chair of the EBU strategic programme on media information management. As of 2016, he is also a member of the NEM Steering Committee.

IMPROVING YOUR ONLINE TV EXPERIENCE WITH METADATA – WINTER OLYMPICS 2018 AND OTHER PROJECTS
Some TV programs are heavily based on data - such as sport where everything is measured and quantified. In this presentation we discuss how to use such rich data about the subject matter of the TV program to enrich the viewing experience and improve the findability of the content. In addition, we present a solution for how to transmit the data through a complex live TV production chain while maintaining the synchronicity between real-time video and data feeds.

KIM VILJANEN works as a metadata expert and concept designer at the Finnish Broadcasting Company Yle. His primary goal is to improve the findability, visibility and engagement of Yle's online television and radio service Yle Areena. He is on a constant journey to improve the company wide metadata practices using state of the art technologies such as artificial intelligence. Before joining Yle, Kim researched linked data and semantic web technologies at Aalto University and University of Helsinki.

BROADCAST DATA FEED: METADATA PROCESSING AND DISTRIBUTION IN THE OLYMPICS
OBS is the host broadcaster, responsible for providing the image, sound and metadata of the Olympic Games as a service to all broadcast organisations who have purchased the rights. This presentation will give you a brief introduction to the broadcast metadata service of OBS; Broadcast Data Feed. BDF relates sport data to the broadcast transmission, including also scheduling, video and tv graphics logs. Metadata has been widely used in sports events to describe results, but since London 2012, OBS is doing a big effort to link and improve this information with the transmission related metadata. Nowadays, broadcast metadata is becoming more and more important, being a key service for OBS and its clients. In the last Winter Olympics, BDF has processed more than 1.5M messages, making a total of 60M messages distributed worldwide. During the presentation we will dive a bit in the main challenges we had to face: real-time processing, distribution through Internet, showing metadata, synchronization in delayed transmissions and monitoring during the operation.

JOSE ANTONIO SANCHEZ, OBS Computer engineer, specialised in management of software development projects and passionate about technology, in charge of Broadcast Data Feed; metadata service provided by OBS in the Olympic Games

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NORDIG EPG / EVENT MATADATA EXCHANGE FORMAT FOR LIVE AND ON-DEMAND SERVICES
NorDig EPG/Event metadata exchange format, is a standard for B2B exchange of metadata between broadcasters / content provider, network operators and other stakeholder in the distribution chain based on TV-Anytime. The first version was approved 8th of Mars 2018. The work was started up based on an increased need for a common standard what supports both for classical broadcast linear TV service as well for OTT streaming services, catch-up and other non-linear services. It is the intension that the

NorDig / TV-Anytime standard to be used widely between Nordic and Irish Content Providers and Media Operators/Network Providers and others worldwide, for Live and On demand services in cable, satellite, terrestrial, IP-based networks and internet. This presentation will explain the standard. Speakers: Peter Mølsted, chairman for NorDig EPG/Event metadata Group Randi Volle, system architect at NRK AS and member of NorDig EPG/Event metadata Group.

PETER MØLSTED Chairman NorDig EPG/Event Metadata Group and Technical secretary of NorDig Technical Committee Have worked in the broadcast industry since 1985, was as development manager involved in digitization of the first cable tv network in Denmark 1998, coordinator for the Danish DTT infrastructure roll-out in Denmark 2006, responsible for first HbbTV pilot in Denmark 2012. Participant in national, Nordic and European projects on metadata and accessibility including the PSP project DTV4ALL, TV Anytime (ETSI metadata standard). Co-coordinator of the Working Group G, on television accessibility, ITU-T Focus Group on Audiovisual Media Accessibility (Geneva, 2011-2013).

& **RANDI VOLLE** is a system architect at Norwegian Broadcasting Corporation(NRK), where Randi develop systems for program information metadata, including EPG data, and distribution of those. She has been participating in the NorDig EPG/Event Metadata Group from the start in 2015. Her background is from computer science and working in the broadcast industry since 1992.

HARNESSING ARTIFICIAL INTELLIGENCE FOR RADICAL AUTOMATION OF CLOSED CAPTIONING AND LOCALISATION

In this presentation, you will learn how producers and broadcasters of audiovisual material benefit from language technologies to radically automate subtitling processes. Limecraft will share how they optimised speech-to-text technologies to increase their accuracy and operational usability in general. Next, we will discuss the artificial intelligence to cut such transcript into properly timed subtitles. Eventually we will illustrate how machine translation extends the pipeline for localisation purposes. The latter is based on research and development funded by the Creative Media programme of the EU Commission and conducted in collaboration with VRT and BTI Studios.

Dieter Van Rijsselbergen is co-founder and CTO at Limecraft. After obtaining his Master's degree in Computer Science, Dieter joined iMinds/MMlab (now IMEC). In his capacity as an PhD-aspiring researcher, he specialised in GPU-accelerated video processing and metadata-based automation of audiovisual production workflows. More specifically, he had a first hand in a range of ground-breaking innovations that eventually lead to the incorporation of Limecraft. Now, as Limecraft's CTO, he deals with architectural decisions and technology choices to drive Limecraft's platform product and stand-alone applications. Together with our clients, Dieter designs and builds practical solutions and workflows using our Limecraft technology to help them produce better content more efficiently.

LINKING TV VIEWING AND USER'D BEHAVIOUR ON A SMARTPHONE

There are some efforts to develop techniques how to inspire the viewers to buy something or visit somewhere when such objects or places are picked up in the TV program they are watching. It is required to involve specific services associated to content on TV or a web site in order to make viewers do actions. However, simple combination of content and possible services will bring proliferated number of their combinations and still require some actions taken by the viewers, such as typing the search words in the applications or the web pages of the services. Such required actions may decline their motivations to use the services. Therefore, the authors propose the data model that matches of the entities within content with various services and to generate the information for launching the service dynamically. The model is based on the ontology class structure and reasoning. In this paper, effectiveness of the model is shown by the result of prototype applications which call various services to inspire the viewers for subsequent actions in accordance with the content.

MAKOTO URAKAWA studied image processing and earned the master degree of Information Technology in Yokohama National University. He joined NHK (Japan Broadcasting Corporation), which is the public broadcaster in Japan, after graduating from the college in 2005. He worked as an operation engineer of production, playout, and terrestrial broadcasting for the first 5 years. After that, he was in charge of management of developing systems for broadcast and internet services for 5 years. Now he’s been studying about the way of applying the semantic technology to broadcast services at NHK’s Science and Technology Research Laboratories for 4 years.

THE ANALYTICS PLATFORM IN TV2-SUMO
TV 2 Sumo has an ambition to become more customer-centric in its operations, and the use of Lean Start-up methodology will be a key going forward. For supporting this, we need to have good measuring systems and be able to use this data to make a better product (and make a profitable business). We started early in 2017 where we saw the need to re-think how we collect and gather data from our players, subscriptions and other data. This laid the foundation for establishing what is now the Analytics Platform in TV 2. In this presentation, we will share our experiences in building this platform, as well as an overview of the architecture, technology and principles we use. Most important is though how we will be using this data in our operation, where we will be covering topics ranging from GDPR to Machine Learning. Lastly we will present what we think will be the Key Success Factors to create customer and business value.

FRODE DRØNEN, TV2 NORWAY has almost 20 years experience working with digitalization in various lines of business, ranging from banking, ecommerce, consulting and media. He has a burning passion for customer experience combined with insights and automation. As a product owner for the Analytics Platform he heads up a cross-functional team enabling TV 2 to become more customer centric in its operation.

NRK uses algorithms for automation, do you?
Short walk through of projects, proof-of-concepts and software involving machine learning at NRK

ROBERT ENGELS, NRK Holding a PhD from the University of Karlsruhe for research conducted in the area of Machine Learning, Robert has applied and build solutions containing machine learning and semantic technology in the areas automotive, telecom and media, broadcasting as well as digital experiences for public in musea and libraries.

Deep learning to index and search the RTS video archive
In this presentation, we will review the internal development of facial recognition, its integration into the content management system and its use. We will also present ongoing work based on AI technologies like speaker identification and visual search.

PIETRO REZZONICO - Product owner, Data and Archives department, Swiss Radio Television (RTS) &
ANTOINE MERCIER is a data scientist at RTS. He is working for 2 years at RTS, in a project to bring artificial intelligence to analyse archives.

A REPORT ON ARTIFICIAL INTELLIGENCE IN JAPAN
This presentation will report on some recent trials NHK STRL(Science and Technology Research Laboratories) has been conducting with developed AI tools. It will start with an introduction of Smart Production Laboratories which recently established in STRL. Then we will pick up some trial systems and briefly describe their features and current situations. Finally a video retrieval system that has been just launched last month will be described with its details.

MASANORI SANO, NHK received the B.E, and the M.E. degrees in electronic engineering from Waseda Univeristy, and the Ph.D degree in informatics from The Graduate University for Advanced Studies. He joined NHK (Japan Broadcasting Corporation) in 1994 and started working at a local branch broadcasting station. Since 1997 he has been researching at NHK STRL (Science and Technology Research Laboratories). His research interests include information extraction from media, multimodal information integration, and metadata production systems. At present, he is a senior research engineer and leading several projects. He has also been involved with standardization in MPEG, EBU, ABU and ARIB

THURSDAY 7 JUNE

MULTIPLE DRONE CINEMATOGRAPHY

Unmanned Aerial Vehicles (UAV), commonly known as drones, have become nowadays useful for a plethora of services, such as scientific data collection, agricultural applications and, quite obviously, for media production. Drones' potential in our domain is getting higher thanks to several winning features from both the motion and the shooting perspective. The MULTIDRONE project aims at developing an innovative and intelligent multi-drone platform for media production, mainly for outdoor event coverage. The scenario envisaged by the project is the one in which the director interfaces with the system platform communicating general and concise event coverage instructions following a well-defined multi-drone shooting taxonomy and expressed in a machine-readable metadata format. As a result of this Human-Computer Interaction (HCI), a mission plan is computed, consisting of feasible flight trajectories that comply with any relevant legal restrictions. MULTIDRONE methodology aims at streamlining the whole drone shooting process, spanning the entire continuum from eliciting editorial requirements, media production software/hardware specifications, algorithm research and development, system design, system implementation/integration, benchmarking/validation and end-user trials. In addition, it includes researching the necessary multiple drone AI-based active perception functionalities, as well as multi-view audio/video (AV) capture intelligence, targeting novel, robust techniques, capable of operating in real-world conditions. Research towards AV perception is to provide, both before and during production, a semantic world model for drone team navigation, AV production planning and execution, to track in real-time and in real-world conditions, for production purposes, individual shooting targets or target groups.

ALBERTO MESSINA started as a research engineer with RAI in 1996, when he completed his MS Thesis about objective quality evaluation of MPEG2 video. After starting his career as a designer of RAI's Multimedia Catalogue, he has been involved in several internal and international research projects in digital archiving, automated documentation, and automated production. His current interests are from file formats and metadata standards to content analysis and information extraction algorithms. R&D coordinator since 2005, he leads research on Automated Information Extraction & Management/Information and Knowledge Engineering, where he is author of more than 80 publications. He has extensive collaborations with national and international research institutions, in research projects and students tutorship. He has a PhD in Business and Management, with a specialisation in the area of Computer Science. He has been active member of several EBU Technical projects, and now he leads the EBU Strategic Programme on Media Information Management. He worked in many European funded projects including PrestoSpace, PrestoPrime, TOSCA-MP, IBC Award - winning VISION Cloud, BRIDGET and currently in MULTIDRONE. He has served in the Programme Committee of many international conferences, including Web Intelligence 2009-2013 and 2016, Machine Learning and Applications 2009-2013, MMM 2012, CIKM 2016. He's ACM Professional member since 2005 and nominated Contract Professor of Multimedia Archival Techniques at Politecnico di Torino from 2012 to 2015. He actively participates in International Standardisation bodies, mainly in EBU and MPEG, where he contributed to MPEG-A, MPEG-7 and MPEG 21 extensions.

TAGGING AT YLE. FINNISH HIGH SCHOOL MATRICULATION EXAMS AND OTHER USE CASES

Every spring and autumn about 40 000 Finnish high school (general upper secondary education) students take part in national matriculation exams. The Finnish Broadcasting Company Yle has developed for them a web and mobile service where they can prepare themselves for the exams by answering questions from earlier exams. The service contains almost 35 000 questions in Finnish and Swedish in more than 20 school subjects from the last 10 years. In summer 2017, all the questions were stored in a database and a big part of them tagged manually with both high school courses and topics. The high school courses were created in advance as concepts in Wikidata and the topics came from the same vocabulary used to tag content at Yle in general. Thanks to this tagging, the questions can now be searched both in Finnish and in Swedish by school courses and by topics in our service. The student can e.g. get all the questions related to the content of third history course in high school or all the questions earlier asked about topics like "World War Two" or "evolution". The presentation will also give a review of recent developments in tagging methods and practices at Yle, earlier presented at EBU MDN workshop in summer 2016. Beside high school matriculation exams other current use cases for tags in Yle online services and applications will also be presented.

PIA VIRTANEN works as producer at Yle Internet Media at the Finnish Broadcasting Company Yle developing methods and practises of describing content, especially tagging of online content. She is responsible for leading the technical development needed for company-wide solutions in tagging, for data maintenance of the common "Yle vocabulary" as well as for supporting and instructing journalists in their tagging processes. Pia Virtanen is a trained translator and information specialist / librarian and working since 2005 at Yle (earlier in Library & Information Services, Yle Archives and Yle Factual).

CONNECTING COMMERCIAL PRODUCTS LIKE MAM TO A MODERN INFRASTRUCTURE – ORIGO LAST STAGE

NRK have for the last few years been working on a project to modernize our production and archiving solution. The project includes concepts and systems like a Metadatabank, a new MAM-system for video assets, a archive for sound-content, and a lot of

discussions on how this all should work together. Some of this has been done in-house, while other parts are bought and implemented in partnership with vendors. The presentation will show a few of the discussions, concepts and choices we made during the process of choosing, implementing and working with a bought MAM-system into our in-house systems.

OLE ANDREAS JOHNSEN, NRK Been working in NRK for the last 11 years, mostly on technology projects related to production of video for both linear and non-linear platforms.

FIMS FOR ON-PREMISES AND CLOUD-BASED AUTOMATIC METADATA EXTRACTION
An interface for automated metadata extraction (AME) has been specified as part of FIMS 1.3, with the definiton of AME services and their parameters still ongoing in MIM-AI/SCAIE. In order to align FIMS better with cloud-based implementations, a purely REST and JSON based version of basic FIMS services has been proposed in late 2017, based on cloud infrastructure. In this contribution, we present our FIMS AME implementation, that follows leaner design, but is a standalone implementation, that can be deployed in local, cloud and hybrid scenarios. We demonstrate this implementation with connecting it to a set of existing metadata extraction services.

WERNER BAILER is a key researcher of the audiovisual media group at the Digital - Institute of Information and Communication Technologies at JOANNEUM RESEARCH in Graz, Austria. He received a degree in Media Technology and Design in 2002 for his diploma thesis on motion estimation and segmentation for film/video standards conversion. His research interests include digital film restoration, audiovisual content analysis and retrieval as well as multimedia metadata. He is contributing to multimedia standardization activities in the MPEG and EBU/AMWA FIMS.

COMPLIANCY OF FULLY AUTOMATED SUBTITLING
Since september 2017 NPO operates a fully automatic workflow for subtitling (heraing impaired) of political clipcontent using a third party cloud based speech2text solution. How compliant is the outcome of this proces with user expectations? First results of an extensive enquiry are shared.

Erik Buitinga works for NPO Access Services since 1997. Started out as a subtitle editor, then held a staff function for some time. Since 2004 responsible for all Access Services related techniques at NPO, with a special interest in speech technology and metadata. Patricipated in a number of projects related to implementing speech technology based automation in the subtitling practice.
ERIK BUITINGA, NPO

The archives approach to AI - current mining-activities at SRF

CHRISTIAN VOGG, SRF, started his professional career as a print journalist, then worked for radio, TV and online for 20 years at Westdeutscher Rundfunk (WDR) in Cologne. As senior advisor to the CEO at WDR he was involved in the digital strategy. Later he and his team developed the WDR Mediathek (AV- Online-Portal). After setting up a model of how to manage metadata throughout WDR he joined EBU and served as Head of Radio and Music, managing the world's biggest music exchange as well as being active in radio and cross media strategies including DAB+. In his current position as Head of D+A (Documentation and Archives) and Data Manager at Swiss Radio and TV (SRF) Christian is next to the archiving and research business responsible for the improvement of metadata driven workflows.

SUBTITLING AND AUTOMATIC SPEECH RECOGNITION: HOW CLOUD BASED MACHINE LEARNING CAN INCREASE PRODUCTIVITY
This presentation covers the latest technologies available for Cloud based speech recognition as it relates to subtitling video content. Because speech engines rely on the quality of audio to create results, there are mistakes and missing words that need to be added by a human during quality control. However, these corrections and archives of previously subtitled content can be used to train artificial intelligence to increase accuracy. We will cover key techniques to help get the best results and provide a description of the end-to-end workflow for subtitling that includes cloud based speech-to-text.

GIOVANNI GALVEZ is now the product manager for the Telestream captioning and subtitling products. He has helped networks such as NBC Universal, Fox, Turner, and AMC migrate to a file-based workflow for TV and Internet closed captioning. He has given seminars and presentations at FCC, PBS Techcon, National Association for the Deaf and the NAB conference. In the first quarter of 2011, he helped develop the first software to convert TV closed captioning CEA-608 to SMPTE TTML file format for the web. In January 2016, his team received a National Emmy Award for Technology and Engineering on 'Standardization and Pioneering Development of Non-Live Broadband Captioning'.

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MDN WORKSHOP WRAP-UP AND DISCUSSION

TORMOD VÆRVÅGEN, NRK - Educated as an audio- and video engineer at Gjøvik University College in 1989. Worked at NRK radio as recording and balancing engineer until the end of 1999. From 2000 development of services for mobile devices and web in NRK. Invention of the gluon system integration tool, development of metadata and xml services. From 2010 working as systems architect. Co-chair of MIM-AI, and the chair of the Metadata developer network. Active in the development of the EBUCore and EBU CCDM.