In-Programme Personalisation for Broadcast: IPP4B

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ABSTRACT
The IPP4B workshop assembles a group of researchers from academia and industry – BBC R&D, Ericsson and MOG Technologies – to discuss the state of the art and together envisage future directions for in-programme personalisation in broadcasting. The workshop comprises one invited keynote, two invited presentations together with a paper and discussion sessions.

Author Keywords
In-Programme Personalisation; Interactive; Broadcast; TV; Video; Audio; Object-based.

ACM Classification Keywords
H.5.1 Multimedia Information Systems

INTRODUCTION
The growing demand for personalisation provides endless research, development and innovation opportunities for academics and industry. Personalisation is usually interpreted as the generation of personalised playlist, programme guide, product placement and advertising for viewers. However the notion explored in this workshop is the personalisation of audio, video and data elements within the broadcast programme which we are calling In-Programme Personalisation. Consequently, the IPP4B workshop focusses on the automatic personalisation of the streamed content. The likely technology to support these features is object-based media where audio, video and other elements may be placed into existing media and be rendered for consumption by the end viewer.

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In-Programme Personalisation is a radical innovation for broadcast media, where network content can be personalised according to the viewer profiles. However, there are many challenges to face. The aim of the workshop is to explore both the technical issues of In- Programme Personalisation for Broadcast, also the market and production of content. A community of interest needs to be realized in order that best practice, concerted development and standardisation are appropriately addressed in the industry.

KEYNOTE
The keynote entitled "Why don't we yet have in-programme personalisation?" is given by Prof. Marian Ursu from the University of York. According to Prof. Ursu, in-programme personalisation is a concept that applies to both live and pre-recorded TV productions, and, further, to the whole space that lays in-between professional and amateur video narrative production. The keynote addresses the "in-programme personalisation" paradigm with a number of exemplar professional productions made with pre-recorded footage, followed by an exemplar associated technology for automatic real-time editing. It expands the paradigm to live content, building on similarities, highlighting major differences, but, finally, drawing the two (similarities and differences) towards each other. Then, it challenges the borderline between professional and amateur productions, and look at in-programme personalisation for productions made with user-generated pre-recorded content, user-generated live content, and extensions to smart telepresence.

PRESENTATIONS
The presentations report the progress on IPP4B at BBC R&D and at Fraunhofer IDMT.

Mike Armstrong from BBC R&D presents "The workshop Progress towards creating workflows for object-based media at BBC R&D". Specifically, BBC R&D has created a number of object-based experiences - media created as a series of separate objects which can be combined on-the-fly to provide personalisation. However, the process of creating this media has involved the extensive use of spread sheets

and graph databases to describe the narrative and the media, all driven by manual processes and the writing of bespoke software. The most recent Cook-Along Kitchen Experience (CAKE) was created entirely as objects from conception and has enabled BBC to understand the kind of data structures and production tools needed to build to enable object-based media to be produced in a sustainable workflow. BBC has now developed a prototype data model, based on the lessons learnt from CAKE and this is forming the core of a software toolkit from which it is aiming to build usable production tools. The aim is to share these tools with a developing community of practice with partners outside the BBC as well as in-house producers.

Sara Kepplinger from Fraunhofer IDMT presents "The Quality Taxonomy for Scalable Algorithms of Free Viewpoint Video Objects". In this case, quality assessment of free viewpoint video objects includes topics like usability and human factors in production processes, usability and human factors for end viewers, Quality of Experience (QoE) for personalisation, and User Experience (UX) of personalisation. The work analyses opportunities and obstacles, focussing on users' subjective quality of experience. The challenges are to define factors that influence quality, to formulate an adequate measure of quality, and to link the quality of experience to the technical realization within an undefined and ever-changing technical realization process. There are two advantages of interlinking the quality of experience with the quality of service: First, it can benefit the technical realization process, in order to allow adaptability (e.g., based on systems used by the end users). Second, it provides an opportunity to support scalability in a user-centred way, e.g., based on a cost or resources limitation. The outlined results consist of a systematic definition of factors that influence quality, including a research framework, evaluation activities, and lessons learned.

PAPERS

Regado et al. [1] from MOG Technologies from Porto, Portugal, present their project on "New Cloud Services For Product Placement In Television". Over the last years, the video consumption under digital format has dramatically increased together with the number of people watching television through their tablets, smartphones and computers, allowing personalised target advertising. Therefore, the goal of the reported project is to create a cloud based platform that allows an insertion of personalized ads, in real time, focused to the final user. The different objects (ads) are inserted into the viewer's programme, where the choice of which ads to display is made according to the user's location.

Bruno Veloso et al. [2] presented a paper on "On-Line Feature-Based User and Item Profiling", addressing the on-line profiling of users and items, including new user and new items, using both feature frequency and feature rating (FFR). Typically, recommendation algorithms are unable to make recommendations involving new users and items due to the inherent lack of information. To overcome this problem, for each newly arrived entity, a new profile, combining general and individual components, is created. Then, as the number of entity-related events increases, the general component is faded and the individual component is strengthened. In the case of a new user, the FFR stereotype is combined with the individual FFR profile, whereas, in the case of a new item, the FFR cluster profile with the individual item FFR profile.

Ibrahim et al. [3] present their work on "TV Graphics Personalization Using In-Band Events". It is based on the concepts of overlaying personalized TV graphics on the device side, controlled and triggered by DASH in-band events. TV graphics personalization helps engaging viewers in the programme and maximizes the value of information shown to them. Today's TV graphics are encoded within the video making it difficult to modify it afterwards. Also for offerings using HTTP ABR technologies, the graphics are encoded with the video. Graphics become unreadable when the ABR algorithm switches to low quality representation, e.g., due to bad network conditions. Overlaying the graphics on the player side decouples the quality of the graphics from the quality of the video. Each viewer can resolve the events to different auxiliary media according to its profile. Graphics handling is performed at the client side where each client fetches and overlays the auxiliary media to the video, allowing personalization of graphics and provides high quality overlays independent of the current video quality.

CONCLUSION

The IPP4B workshop provides an open forum for the discussion on and advancement of the state of the art. It highlights areas the industry needs to address in terms of practice, standards and recommendations.

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