

EU-IST Project Live: Live Staging of Media Events

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Abstract— This paper gives an overview, the main objectives and the first results of the EU IST project Live. This integrated project will investigate new methods and formats for authoring and production of live sports events in a professional broadcast environment. To achieve these new interactive TV formats the processing of different types of audio-visual (A/V) material must be enhanced to allow for a more sophisticated selection and advanced authoring of sports content. This live staging process will generate several output streams which are interlinked with each other. The consumers have the benefit that they can select and receive video material in a more personalized manner.

Index Terms— multimedia analysis, interactive TV format, personalization

I. INTRODUCTION

ADVANCED technologies in the area of content analysis and production lead to new possibilities to create new interactive TV formats. Although several standards (e.g. MHP) and applications (e.g. tele shopping) in the media industry are introduced to enable interactive TV formats the acceptance by TV consumers as well as the market penetration is still low. On the other hand the increased availability of different TV channels (more than 100 TV channels can already be received in a typical German household) and different types of TV distribution networks (cable, internet, IPTV, etc.) lead to a competitive market situation in the broadcast world. Hence, the broadcasters pay high fees for important sports events, like the Olympic Games, and offer this important content to the TV consumers. Optimizing the exploitation of this expensive content is in the central interest of the broadcasters. The TV consumer should be able to receive the content in a personal and interactive way to stay as

long as possible at the channel of the selected broadcaster. Further the consumer should be enabled to influence the authoring of live content.

To achieve this goal the IST project Live investigates new methods to process the live sports content and invent novel formats to produce several TV streams in parallel. In a first step interdisciplinary teams of TV broadcasters, artists and researchers have to mutually combine methods and strategies and set up experiments to develop new concepts and content formats. Creating a non-linear multi-stream video show in real-time which is influenced by the consumers using feedback mechanism is in the central scope of the project.

A. Role of the Partners

In the project 9 partners from the academic and industrial area are involved. The co-ordination is performed by the Fraunhofer Institute Intelligent Analysis and Information Systems (**FhG IAIS**). The **ORF** in Vienna participates with several units and provides the main infrastructure to produce the content. Since the sports department is involved, the project benefits from the experience of sports commentators and directors. The **KHM** and the **University of Applied Sciences** in Cologne carry out research on new methods for live staging. The **University of Ljubljana** develops tools for personalization, user profiling and feedback mechanism. **ATOS Origin** investigates the market for interactive broadcast solutions. FhG IAIS and the **University of Bradford** investigate media analysis approaches to generate the metadata online and offline. The research work on semantic analysis for content filtering is performed by **Salzburg research**. Finally, **Sony NetServices** develops content visualization tools for the authoring environment.

B. Budget and Milestones

Live is an integrated project (IP) and has a duration of 45 months. It started on the 1st of January 2006 and the first phase has a duration of 18 month. The milestone of the first phase is to provide a first integrated prototype which is able to generate 2 streams in parallel. In the second phase of the project a demonstrator for the Olympic Games 2008 will be developed to show the new interactive format to a defined group of TV consumers in Austria. The overall budget is 11.3 Mio. € and the amount of funding is 7.0 Mio. €.

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II. REQUIREMENTS FOR LIVE STAGING

As one of the first project results the requirement analysis for the live staging process was defined. The objective was to evaluate the actual way of content production of live sports events at the ORF and to analyze available tools and infrastructures for live conduction. Therefore several live staging sessions were observed and analyzed at the ORF in Austria as for example the 2006 Women's FIS Ski World Cup in Bad Kleinkirchheim. For the first actual live staging experiments and the investigation of new live staging approaches we decided to use recorded live material from the 2006 UCI World Championship in Salzburg to produce two parallel streams with the available ORF infrastructure. The experiments will be carried out with content stored on digital storage systems, the live situation will be simulated.

Future directors and production teams – *Live Video Conductors* – will have the difficult task to produce several output streams from incoming video feeds and additional information sources in real-time which means a need for sophisticated concepts and tools to process, prepare and select the incoming A/V content. Yet in encouraging the consumer to switch to a parallel stream we are deliberately endangering the 'guidance of interpretation' which we are used to in 'single stream TV productions' by the application of well-established and sophisticated editing methods. The Live project aims at the development of a system that deals with the classification of *meaning* of A/V objects on different semantic levels and methods to support producers in utilizing this meaning.

This will be done by creating an intelligent media framework in which semantic information is extracted from and assigned to A/V material. Rather than creating an agent system which autonomously decides on the selection of certain content the project's focus is to create a system which makes multiple recommendations to both Live Video Conductors during TV production as well as to consumers.

III. REQUIREMENTS FOR THE GENERAL OVERALL SYSTEM ARCHITECTURE

As a second result of the first 6 months of the project an overall system architecture was designed. A basic overview is given in figure 1.

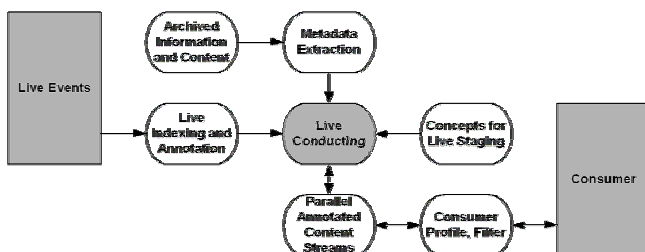


Figure 1. Basic system architecture of the Live project

In the center of the whole system the live conducting tools are situated. Incoming live content from sports events is

indexed and annotated in real-time to provide the required metadata for content filtering and selection. Further, additional material from the archive will be made available directly for the conduction process. This means that all relevant broadcast material should be made available for the conducting process within a very short time span. Therefore it is necessary to connect the broadcaster's archive directly to the conducting environment. Multiple streams/feeds of the live staging will be distributed in parallel and will be interlinked with each other.

Then the signal will be distributed over a TV network to the consumer. For transmission the available interactive broadcasting technologies, like MHP or IPTV, can be used. One important aspect of the project is the possibility of personalization of the content by the TV content consumer who can select a special feed of the live sports event. Beyond mere channel selection it is possible to give feedback to the broadcast station and to influence the live conduction process.

Whether this approach will be accepted and means an added value for the broadcasting world is one of the exciting questions in the project. Consumer feedback and influence during production leads to a situation where the consumer gets in to the role of the director. For the feedback mechanism approaches like explicit and implicit user feedback will be investigated and techniques like collaborative filtering and the development of a recommender system are foreseen. All components and their relation to each other are modeled in UML. In the further process of the project the modules and the missing components must be implemented and adapted.

IV. CONCLUSION AND OUTLOOK

After the finalization of the requirement phase the design and implementation of the first prototype for a live staging environment is on its way. The intensive interaction between experts from the content research field, users in broadcast domain and researchers on system and algorithm design will lead to new chances to enable advanced interactive TV applications. The mayor goal is to provide an integrated Live system for the 2008 Olympic Games.

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