

Immersive Coverage of Spatially Outspread Live Events

Motivation



JOANNEUM RESEARCH Forschungsgesellschaft mbH

> DIGITAL Users can watch edited live TV stream, content on Institute for Information and second screen web Communication Technologies Festival, e.g. Dranouter, Glastonbury – many stages, Entire coverage of the festival is available for later replay Steyrergasse 17 many parallel performances 8010 Graz, Austria Tel. +43 316 876-1240 Fax +43 316 876-1191 Semantic UGC Content Live scene compositing Booking playout UI Georg Thallinger creation System UI georg.thallinger@joanneum.at digital@joanneum.at www.joanneum.at/digital (((@))) User Generated 3G / 4G Directed Linear technicolor Conten WLan client playout Capture Integrated content Content Content and analysis preselection scene representation Professional A Interactive Interactive Content ארנא RESEARCH & INNOVATION playout client Capture

- Enable a more comprehensive and immersive experience of live events
- Provide better coverage for events spread over large areas
- **Scenario**

- Omnidirectional cameras and microphones capture action on stage and audience
- Users sign up for delivering UGC in return for incentives
- Automatic analysis and filtering of incoming streams

BITMOVIN **Quality analysis**





Technical quality assurance

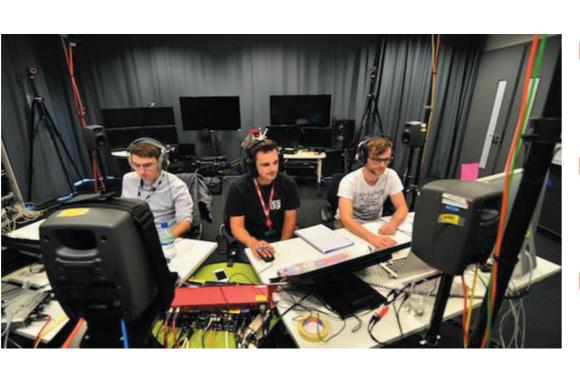


GStreamer-based mixing engine running on Linux server





3D audio rendering



Recordings mixed to achieve professional 3D audio

for UGC

Blur

Noise Level

Luminance

- Render object-based audio in real-time using Web Audio API
- Rendering to loudspeakers and headphones

Playout (server)

- Cocoa GUI running on OSX client
- Communication via zeroMQ + JSON

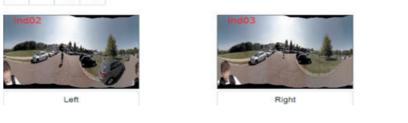
Object-based binaural rendering

Upload BWF files with objectbased audio metadata

- Using different main microphones and mixing techniques
- Head tracking for binaural mode

Content pre-caching





- Mitigate latency issues when zapping in DVB setups
- Optimize time-to-first-picture
- Will be integrated in playout client for live playback on TV

bitdash – HD streaming



- Platform agnostic MPEG-DASH clients
- Smooth content consumption
- Live/catch-up and on-demand streaming



The research leading to the presented

results has received funding from the

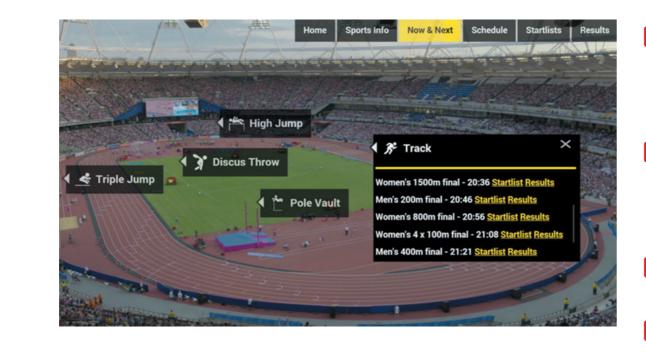
European Union's Seventh Framework

Programme (FP7/2007-2013) under

grant agreement n° 610370.



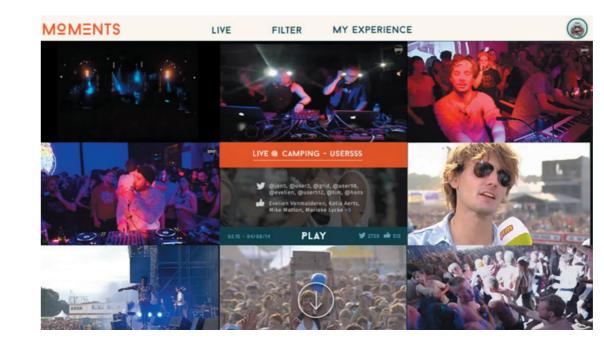
Festival Explorer



Web-based client for interactive scene navigation

- DASH adaptive streaming of video tiles from 4k overview
- Pan & zoom control
- Dynamic audio mix

The Wall of Moments



- Short video fragments captured by users attending the festival Deliver unique festival experi-
- ence for remote users
- Selection based on popularity, friends, music preference etc.