Acquisition and Data Flow

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Acquisition

- Seamless integration professional and user generated content
- Professional
  - 4K and HD cameras
  - Omnidirectional camera
- UGC
  - Smartphones, tablets (IOS, Android)
  - Semi Pro: DSLR
  - GoPro
- Sensor Data
  - GPS, acceleration, …
- Spot microphones
- Microphone arrays
  - 3D Sound (Pro / UGC)
UGC Challenges

- Multimedia streaming from mobile devices
  - Varying bandwidth conditions of mobile networks
  - Close to Real-time

- Energy efficiency for mobile devices
  - Short battery lifetime while streaming
    - Video encoding

- Approach
  - Latest Network standards, e.g. LTE
  - Improvements in codecs and adaptive streaming methods
  - Efficient and standard-compliant integration of metadata
  - Quality analysis of UGC live streams
    - On the device before transmission
UGC Video Content Selection/Filtering

- Automatic video quality analysis (on mobile devices)
  - Simple QA (mobile devices site)
    - Luminance level, over/under exposure, severe blur, noise at low light (may also be an indication for blocking), severe instability
  - Complex QA (server site)
    - Blocking, blur, motion blur, transmission problems (freeze frame, drop frame), light/moderate instability
  - Investigate reliability of sensor data
    - Support/replace visual analysis
  - Prioritising streams
    - Based on quality, complementarity

- Development of tailored mobile apps
  - Sensor data recording (Android and iOS)
  - Video quality analysis (Android 4.3 needed)
UGC Audio Content Selection/Filtering

- Automatic audio quality analysis
  - Simple QA (mobile devices site)
    - Dynamic, distortion, frequency response, severe instability
  - Complex QA (server site)
    - Audio coding artifacts, transmission problems (freeze frame, drop frame affects audio), source movement

- Sensor fusion
  - Microphone array for 3D audio generation

- Development of tailored mobile apps
  - Similar to video content selection/filtering
ICoSOLE System

Event Controller → (UG) Content → Event Creator → (Pro) Content → Editor

Signal processing
Software Development Tactics

- System
  - Use cases
  - System Analysis
  - Requirements
  - System Design
  - (POC) SW development
  - POC

- Processing
  - Use of established frameworks & standards
    - Gstreamer (Open Source) or similar
    - IPStudio (BBC)
    - MPEG-DASH (ISO/IEC Std)
    - MPEG-H (ISO/IEC Std)
    - ...

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