AUTONOMOUS PRODUCTION OF SPORT VIDEO SEQUENCES IN APIDIS FRAMEWORK

Fan Chen, Damien Delannay, and Christophe De Vleeschouwer
TELE, UCL
II. Our Implementation of Autonomous Production of Sport Videos

Multi-sensored Data

Detect Objects

Input User Preferences

Final Contents

Scene Rendering Strategy

Which Camera to Show?
  ➔ Camera Selection

Which Part of the Scene to Show?
  ➔ Viewpoint Selection

Determine Optimal Strategy of Scene Rendering

Our Solution

Camera-wise Viewpoint Selection

Frame-wise Camera Selection

Smoothing of Viewpoint/camera Sequence
II. Our Implementation of Autonomous Production of Sport Videos – Hierarchical Processing

Figure 1: Hierarchical working flow in our personalized production.

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<th>Video of Basketball Game</th>
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Figure 2: Hierarchical structure of basketball videos.
III. Camera-wise Determination of Optimal Viewpoints

- Select cropping parameters of each camera view to optimize (in terms of user preferences) the trade-off between completeness and closeness.

Viewpoint is determined by maximizing the interests over all salient objects,

\[(\text{Size}^{VP}, \text{Pos}^{VP}) = \arg \max_{(\text{Pos}^{VP}, \text{Size}^{VP})} \sum_{m} w(x_m | \text{Pos}^{VP}, \text{Size}^{VP}, \text{Size}^{DEV})I_m\]
IV. Camera Selection

- Rate each camera view according to the quality of its completeness/ closeness trade-off, and to its degree of occlusions.
V. Removal of Visual Artifacts - Idea

Camera-wise Viewpoint Smoothing:
Remove flickering!

Camera Sequence Smoothing:
Remove flickering and sudden-scene switching in story-telling!
V. Removal of Visual Artifacts - Implementation

- Compute an optimal virtual camera that pans and switches across views to preserve high ratings of selected camera views while minimizing the amount of virtual camera movements.

- Graph model formalism, and solution based on Viterbi algorithm.
VI. Initial Results of Autonomous Production of Sport Videos in APIDIS Project

Demo Videos:

Relative Tools for The Whole Working Flow of Production Process:

Video Management

Meta-data Process

Personalized Production

Expert Evaluation

Subjective Test