PROBLEM STATEMENT

Despite the tremendous increase in home-made videos, high-level video manipulation is still uncommon among home-users due to lack of easy to use and powerful platforms. Can we improve the usability of video authoring interfaces?

MOTIVATION

Basic video editing platforms for home users provide limited functionality such as synchronizing media objects, adding captions, split and merge videos etc. Professional video editing platforms provide rich functionality but demand certain level of training and expertise for use.

Motivation of our work is to improve usability of video authoring interfaces for naïve users, using computer vision and image processing techniques.

We propose an object trajectories based interface which allows users to navigate and manipulate video objects in an intuitive ‘click and drag’ fashion.

BASIC CONCEPT

Most video editing platforms model and represent videos as a collection of frames against a timeline which makes object-centric manipulation and browsing an unnatural and laborious experience.

Basic concept in our approach is to use object-time model instead of a frame-time model for video representation.

Model the video as a collection of spatiotemporal object volumes and a static background. Represent object trajectories in a 3D space-time grid to perform object-centric operations.

This representation enables a user to perform a number of object-centric manipulation tasks by interactively manipulating the object trajectories in a simple “click and drag” fashion.

Users can interactively modify the trajectories in interaction grid to effectively modify the spatiotemporal object volume in output video and simultaneously visualize the resulting spatial occupancy and object overlap in visualization grid.

This representation replaces complex input elements like parameter specification dialogs and tools by interactive curve manipulation operations like translate, erase, cut, copy, paste. Most home-office users are already familiar with such operations.

RELEATED WORK

- Rav-Acha et al. (CVPR '06) - Making a long video short: Dynamic Video Synopsis
- Goldman et al. (UIST '08): Particle video based editing interface
- Karrer et al. (CHI '08)
- Dragicevic et al. (CHI '08): SIFT feature-flow based playback interface
- Basic concept in our approach is to use object-time model instead of a frame-time model for video representation.

FUTURE WORK

We are trying to extend our approach to support simple camera motion using mosaic based representation.

Another useful extension of this work is to estimate the complexity of object motion and represent it visually to aid a user focus on probably more important video segments.

CONCLUSION

We believe that augmenting video context and motion cues with user interface can significantly improve the usability of video manipulation tools. Proposed interface is one such step to achieve that overall goal. We believe that the fidelity and popularity of such interfaces will increase with the progress in computer vision and video processing techniques.