

# A Hitchcock Assisted Video Edited Night at the Opera

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## ABSTRACT

Hitchcock is a semi-automatic video editing system. This video shows users collaboratively authoring a home video.

## Categories and Subject Descriptors

J.7. [Computer Applications]: Computers in other systems – Consumer products.

H.5.1. [Information Interfaces and Presentation]: Multimedia Information Systems – Video.

## General Terms

Algorithms, Human Factors.

## Keywords

Video editing, user interface, video keyframes.

## 1. INTRODUCTION

Video cameras are becoming increasingly popular for home and office use. However, it is often difficult to use the video after it has been recorded. While people may watch the entire recording once or twice, afterwards they typically put the tape in a drawer. This is because the interesting parts of the video are usually buried in long sections of boring or bad quality video, and only a few close friends and family are willing to sit through it all.

There are several commercial systems that allow you to edit video, ranging from professional systems such as Adobe Premiere[1] to those intended for the naïve user, such as Apple's iMovie[2]. However, most users find it difficult to use even the lowest end applications.

There are research systems that automatically extract summary segments from video, for example [3] and [4]. However, these systems rely on associated text, audio, or prior viewing to generate summaries. The home video abstracting system [5]

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randomly extracts clips to produce a final video of a user-specified length.

We wanted to create a system that makes it easy to edit informal video such as home movies or travel footage. In addition, we wanted to allow users to add music and titles to their video. Finally, we wanted an easy way for people to share their video clips.

The Hitchcock editing system [6,7] is designed with these requirements in mind. Hitchcock automatically breaks video into short clips containing good video, selects a keyframe to represent each clip, and arranges the keyframes into “piles”. The user then searches through piles to find the desired clips. Users can easily override the start and end time of a clip by resizing the associated keyframe. Hitchcock's peer-to-peer buddy network allows groups to share video clips. To create a video, users simply order the desired clips in a timeline, then add titles and music.

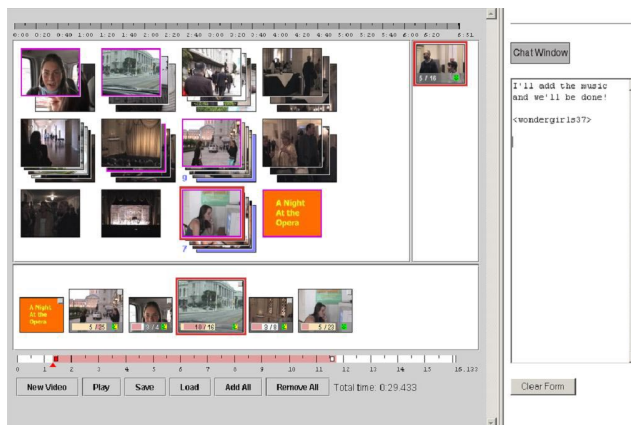


Figure 1. Hitchcock Interface.

## 2. VIDEO SCENARIO

In this video, we demonstrate the Hitchcock system through a usage scenario. The video begins with users shooting video about going to the opera. The girls are going to watch the opera, the boy will sing in the opera chorus.

We then show how the users collaborate in making a music video about their night at the opera. First, they upload video from their cameras to their computers using FireWire DV cable. They each then edit their video, and share clips with each other. Finally, they

show the edited music video to their families by plugging the computer into the TV.

### 3. HITCHCOCK DETAILS

The Hitchcock interface has three windows (see Figure 1). The main window displays piles of keyframes corresponding to video clips. The user can flip through the piles or spread them out to find the desired clips. Clips can also be played. The bottom window represents an ordered timeline where the user can drag clips from the piles and arrange them in the proper order. Clip lengths can be modified in the timeline window as described below, and the assembled video can be played. The near right hand window is the peer-to-peer share space. Clips dragged into this area are shared with the user buddy list. There is also a chat space for peer-to-peer text-based communication.

#### 3.1 Automatic clip selection

Hitchcock simplifies one of the most difficult aspects of editing, namely finding the start and end point of clips, by automatically analyzing the video and finding good boundaries. The system assumes that the user prefers video with little or no camera motion. It also assumes that clips should be about 5 seconds long.

When the user uploads video, Hitchcock algorithms automatically extract good clips. Motion analysis is used to compute a goodness score for the video. Clips are selected from regions with high goodness scores. The clips are then grouped into piles based on recording time or visual similarity, and displayed in the user interface window.

#### 3.2 Video Titles

To add titles to video, the user edits a template similar to a power point slide. Hitchcock then generates a short video clip of the title, and inserts it into a special pile in the Hitchcock interface window.

#### 3.3 Making a Video

To make a video, clips are dragged from the piles in the main window into the timeline window. Clips can be moved around the timeline to change the order of the video. Clips can be grouped for easier manipulation.

#### 3.4 Trimming Clips

Sometimes, the automatic analysis does not give the user the exact video clip he or she wanted. In this case, the user can easily lengthen or shorten the clip in the timeline window by simply resizing the keyframe representation of the clip. For more control over the exact start and end points, the user can use the bar in the timeline to drag either endpoint to the correct location.

#### 3.5 Peer-to-peer Video Sharing

Hitchcock users can share video clips through a peer-to-peer buddy network. To share a clip, the user simply drags the clip into the right window of the Hitchcock interface. The clip then appears in the corresponding window on the buddy interface. A chat window is included, so that users can communicate in a manner similar to instant messaging.

### 3.6 Finding Video Clips

All video clips are arranged in piles in the main interface. A pile corresponds to video clips taken together in time. To find a clip, users can flip through keyframes in the pile or expand the pile. Sometimes it is useful to group video based on visual similarity rather than on time. This creates piles with similar looking keyframes that may or may not be adjacent in time. This type of grouping may make it easier to find a particular clip even if the time information has been forgotten.

### 3.7 Adding Music

The final step to music creation is adding the appropriate music. The user simply drops an audio file into the Hitchcock interface. In the simplest case, the music is played along with the clip sequence. If the user wants to align audio changes to video changes, as in [8], audio analysis is performed and the clips are automatically resized to correspond to music changes.

## 4. SUMMARY

In this video, we show how users collect, edit, and share home video.

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