
Film Ties: Collaborative Cinematography in the Social Web

William Bares

College of Charleston
Charleston, SC 29424, USA
bareswh@cofc.edu

Donald Schwartz

Marist College
Poughkeepsie, NY 12601, USA
Donald.Schwartz@marist.edu

Abstract

UPDATED—February 7, 2016. Learning the craft of cinematography involves understanding when to use particular camera shots to communicate a given narrative. Our Web-based, social interface for practicing camera work enables users to collaborate on editing a virtual movie while learning from shared examples of camera compositions and posted comments or critiques. A posted comment may consist of a text message that explains why a composition works and/or suggests an alternative camera shot. It also introduces a new form of social communication in which a first artist creates a virtual camera composition whose visual composition properties are stored into a database allowing other artists to adopt that composition for use in their own different virtual scenes. On adopting a composition, the system computes a comparable composition of subjects situated in a second virtual environment. A pilot evaluation of the prototype demonstrates participants improved their knowledge of film practice.

Author Keywords

cinematography; education; crowdsourcing

ACM Classification Keywords

H.5.3 [Group and Organization Interfaces]: Computer-supported cooperative work

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ACM 978-1-4503-3950-6/16/02. <http://dx.doi.org/10.1145/2818052.2869088>

Cinematography Guidelines

Rule of Thirds: suggests framing subjects so they appear on imaginary horizontal and vertical lines that divide the frame into thirds.

180-degree rule: suggests keeping the camera on a consistent side of an imaginary line between two characters so that each consistently appears in the same side of the frame.

Introduction

Cinematographers begin learning their craft by mastering commonly-accepted guidelines for picture composition and editing (see sidebar). In film schools students learn to collaborate as they take turns in roles of director, camera operator, and editor as they complete team film projects. They also screen each others films and offer helpful critiques. These learning activities occur in film school television sets, screening rooms, and editing suites, which require expensive investments in equipment and lab fees. Additionally, the amount of hands-on practice is limited since students must take turns using the equipment and sets. We propose that a collaborative, Web-based platform coupled with low-cost tablet devices and emerging motion sensors can enable film students to benefit from additional practice outside of the physical constraints of the film class and labs. We further propose that human-to-human collaboration and shared critiques be augmented with the option for human-machine collaboration. For example, students could choose to call upon an intelligent machine assistant to suggest camera compositions computed from sample compositions shared by other skilled human filmmakers.

Collaborative Cinematography

We propose that cinematography instruction be provided via a Web-based social environment that encourages sharing of examples and critiques as suggested by prior works [2, 4].

Users record shots by operating a virtual movie camera to film an animated 3D movie and browse shots created by other users and post and view commentaries to shots via a client-server Web database framework.

The Film Ties system introduces a new mode of communication in which the essence of a first composition is shared,

enabling others to instantly obtain, within their own distinct scenes, new virtual camera compositions which incorporate the composition features of the selected shared image. This workflow enables film classes to create databases of camera compositions, which can be re-used in other productions. In re-using compositions, the system invokes a smart camera solver which computes a comparable shot in the virtual 3D scene of the new production. The Film Ties workflow also includes a social mode in which artists can choose to browse compositions of selected favorite artists. Artists can post text comments on one another's compositions. Comments posted on a first composition may include a second composition that serves as a suggested improvement or alternate shot [1].

User Interface

The interface presents the virtual camera view, left- and right-sided standard controls for recording and playback, and tabbed galleries along the bottom. The user adjusts the camera via mouse and keyboard or touch-screen gestures to orbit, pan, or dolly closer or farther. The system also supports motion-sensing control of the virtual camera position and aim direction as a user would move and turn a tablet equipped with motion sensors. Playback controls play, pause, or skip forward or backward through a list of narrative events. Each narrative event defines its start time in seconds and the name(s) of the participating character(s). Tabs switch between browsing the following galleries:

- Lenses - palette of lenses by varying focal length.
- My Shots - snapshots created by the logged-in user which serves as a palette of my favorite compositions.
- Friend Shots - snapshots created by one or more specified other users ("followed users") from which the current user can browse for inspiration.

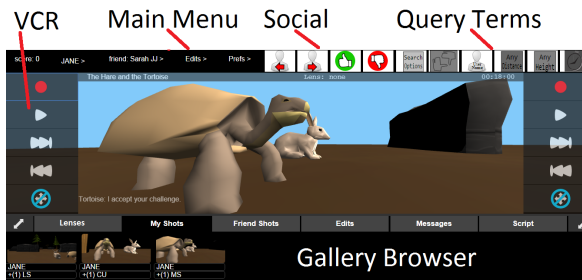


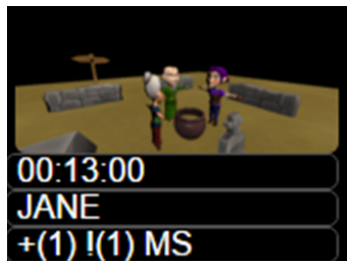
Figure 1: Web-based social interface

- Edit - recorded movie frames in ascending order by time. A user may choose to open his or her own edit or an edit created by a specified user.
- Messages - commentaries posted to the most recently selected snapshot or movie frame.
- Script - movie script text.

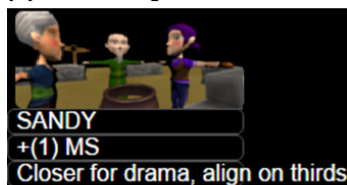
Users may elect to enable one or more Query Options to further refine the set of results displayed in the gallery. For example, a user may elect to retrieve all medium shot compositions made by a specified other user. Social options switch the current followed user and increment or decrement the vote score of a selected snapshot, movie frame, or commentary (Figure 1).

Authoring Commentaries

To author a commentary on a snapshot, a user first selects a snapshot from My Shots gallery or Friend Shots gallery, which makes that snapshot the current camera view, and then clicks the Messages tab to access commentaries for that snapshot. To post a commentary which suggests an alternate view, the user adjusts the camera then clicks the record button and may also enter a text explanation.



(a) Jane's original shot



(b) Sandy's comment to Jane

Figure 2: Comment suggests alternate shot

To post a commentary to a movie frame, a user selects a movie frame from the Edit gallery, clicks the Messages tab, then proceeds in a similar manner.

For example, suppose Sandy views Jane's movie frame, then posts a commentary consisting of a suggested movie frame and text explanation. When Jane browses her Edit gallery she will see an exclamation point followed by a number indicating how many commentaries apply to her movie frame (see Figure 2a). By selecting her movie frame and then opening the Messages Tab, Jane sees Sandy's suggested movie frame and explanation (see Figure 2b). The plus sign indicates the number of votes in favor of a shot. The code "00:13:00" indicates the time of a movie frame in minutes:seconds:frames.

Shared Compositions

When a user wishes to receive guidance in composing camera shots, a user browses the Friends Shots gallery to see compositions shared by other users. To adopt a suggested composition, a user clicks its thumbnail image in the Friends Shots gallery, which invokes the smart camera solver to analyze the layout of the user's current 3D scene and the visual composition properties of the selected shared composition to compute a suitably similar composition in the user's current 3D scene. The Smart Camera solver implements the Toric Manifold solution proposed by Lino and Christie, which computes camera parameters that will result in compositions having one or two specified target objects appearing at the desired on-screen locations [3].

Social Motivation

The system encourages participation by computing a score for each user by adding one point for each created snapshot, movie frame, commentary, or vote made. A quality score averages the vote scores of all snapshots, movie

frames, and commentaries created by a given user.

System Overview

The Film Ties system is a client-server architecture with a WebGL client managing the GUI and scene rendering and sends and receives messages via a socket connection with the server. The server processes client messages, accesses the SQL database, computes virtual camera viewpoints, and transmits result messages to clients.

Exchanging Shots and Messages

When a user saves a snapshot, the client encodes a comprehensive representation of the composition of that snapshot in Javascript Object Notation to the server. The composition encodes, for each user-designated subject, a description of how that subject appears in the frame in terms of its location, height, and relative angle to the camera. When a user posts a comment consisting of an alternate shot, the user may opt to also provide a text message explaining why the alternative shot should be used for that given moment in the movie.

Discussion

We conducted a pilot study with ten Computer Science students at the College of Charleston. Participants were asked to record movie frames to film act 1, scene 1 of *Macbeth* then review their commentaries. Seven out of ten improved accuracy between a pre- and post-test to identify Rule of Thirds images. We are configuring a publicly-accessible Web server for larger evaluations in film classes.

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