Videotater: An Approach for Pen-Based Digital Video Segmentation and Tagging

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CAP 5937 – Pen-Based Interfaces

Videotater – Editing Interface

- Display video
  - "Polyfocal"
- Segmentation
- Tagging
- Improvements for novices and experts
  - "Video repurposing"

Traditional Video Editing

- Adobe Premiere

Source: [2]

Advances

- Precise location and execution of segments
  - "Magnetic lasso"
- Refining/trimming rough segments
- Different modalities for pen-based interaction
  - Space
  - Time
  - Pressure

Videotater GUI

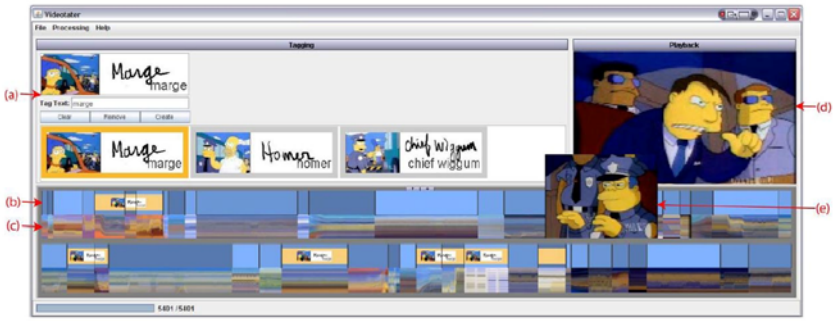


Figure 1. GUI showing (a) tag creation, (b) timeline segments, (c) timeline stripe image, (d) playback window, (e) popup frame from timeline stripe image hover. The timeline representations wrap onto the next line to avoid scrolling.

Source: [1]

Tangible Interaction Modality

- Low pressure: indicates selection
- High pressure: indicates tagging
- Pen tip applies tags, pen eraser removes them

Spatial Interaction Modality

- Gestures on timeline:
  - Vertical line: split segment
    - Mean x-value of line or nearest likely boundary
  - Line between segments: merge

Tagging

- On segment: applies tag to entire segment
- On stripe image: applies tag only to frames touched
- Allows for shot- or frame-level tagging
- Can be removed by dragging eraser over timeline

Polyfocal Visualization

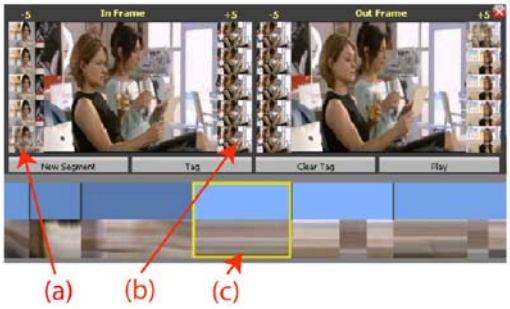
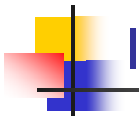


Figure 2. Polyfocal Visualization. (a) 5 frames before in point (b) 5 frames after in point (c) selected segment on timeline

Source: [1]

Interaction with Polyfocal Visualization

- Modeless during mouse or pen hovering
- Visualization tracks the cursor
- Clicking or dragging engages a mode
  - Dismissed by clicking again
- Context images:
  - Hover: Displays at larger size
  - Click: New in- or out-point for segment



Implementation

- Java Swing
- Video is pre-processed
  - ~20% of real-time on 2.1 GHz Pentium M
  - Generate/compress thumbnails

User Feedback Setup

- Three experienced video editors
- Segment and tag two minute video while thinking aloud
- Given demonstration
- Allowed to explore interface before think-aloud

User Feedback Pros

- Timeline interface “compelling”
- Hovering/stripe enhanced ease of segmenting and tagging
- “Informal timings of segmentation efficiency indicates it takes roughly 2x real-time while maintaining high precision.”
- Pressure-modality intuitive, quick

User Feedback Cons

- Split gesture “felt sloppy”
- Subsequent trimming redundant
- Switching to eraser “natural”, but slow
- Polyfocal interface difficult to parse
- Vertical frame listing confusing

References

[1] N. Diakopoulos and I. Essa, " Videotater: An Approach for Pen-Based Digital Video Segmentation and Tagging," Proceedings of the 19th annual ACM symposium on User interface software and technology, pp. 221 - 224, 2006.

[2] http://img1.grafika.cz/grafika/images3/ADOBE_obr.4_pp2_standard_main_screen%20small.jpg

Questions?