User Interfaces and Crowdsourcing Workflows for Enhancing the Video Learning Experience

ToolScape: Interactive browsing and watching

Storyboard summarization: actions and work-in-progress
- Two view modes: All reveals the Storyboard, while Simple opens only before and after images.
- Top tools show most frequently used tools in videos covering the currently searched effect. Faceted navigation presents only workflows that include selected tools.
- Storyboard lists each step in the workflow (image) and a means to reach a step from the previous one (command).
- The number of steps is calculated from the workflow and displayed to hint at the difficulty level of the video.

Interactive timeline: stepwise repeat / skip / jump
- Each step in the workflow is marked on an interactive timeline to allow per-step navigation.
- Parts of video with no visual progress are grayed out to allow skipping to the main content.
- Images in progress allow visual comparisons between intermediate steps in the workflow.

User study: Photo manipulation tasks in Photoshop
- Learners with ToolScape:
  - Gained more self-efficacy in their skills
  - Rated their own work higher
  - Frequently used interactive navigation (9 times per task)
  - Produced better designs by external rating

Crowdsourcing Workflow for Annotating How-to Videos

Stage 1: Capture time marks with labels
- Procedure that generates annotations

Stage 2: Vote or improve labels

Stage 3: Capture before / after images of a step

Future Work
- Other educational videos: MOOC-style lecture videos, TED-style talk videos, and 1-to-1 tutoring videos
- Techniques for mediating diverse, noisy learner input
- Video analytics to add social navigation and interaction

Learnersourcing: Channeling learner activities into useful input

Subgoal labeling* supports learning new knowledge by clustering a group of steps into a high-level conceptual unit.

* Catrambone, R. The subgoal learning model: Creating better examples so that students can solve novel problems. Journal of Experimental Psychology: General, 127, 394p, 355-376.

Stage 2:
- Voting or improve labels

Stage 3:
- Capture before / after images of a step

Inject quizzes before / during / after watching a video

Subgoal labeling
- Increase contrast
- Add vignetting
- Record as reusable action

Rationale / Intention
- What is the reason for applying this tool? e.g., Why S-curve in RGB? To maximize contrast.

Clustering Steps
- Which tools go together to accomplish a goal? e.g., Desaturate should be applied before invert

Self-Explanation
- Natural language description of a step. e.g., Make the person look as if he’s rapidly moving.

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