Introduction of Video Journals Archives in the Classroom

Alexander Haubold and John R. Kender
Department of Computer Science
Columbia University, New York
{ahaubold,jrk}@cs.columbia.edu

Overview

- Motivation
- Course Background
- In-class Milestones
  - Overview
  - Objectives
  - Difficulties
  - Our Solution
  - Feedback
- Milestones Outside of Class
  - Overview
  - Objectives
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Motivation

- Video inherently entertaining
- Typically incorporated into classroom as:
  - History/Discovery Channel-like shows
  - Content supplement/replacement
- We explore as interactive medium:
  1. Archiving of in-class milestones
     (equivalent to storing written midterm/final exams)
  2. Journaling of milestones outside the classroom
     (equivalent to completing homework assignments)

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Course Background

- First-year engineering design course (E1102 at SEAS, Columbia University)
  - Emphasis on:
    - Basic engineering design skills
    - Professional development (ABET)

      (team interaction, communication skills within and outside of team, formulate problem, perform research, find solutions, produce drawings and/or prototypes, etc.)
    - Technical instruction on: Matlab (computational tool), Maya (3D design tool)

Course Background

- E1102 (cont.):
  - One-term project-based service-learning course
  - >160 students/semester, 4 course sections
  - Mandatory for first-year engineering students
  - 3 hour class/week (lecture + laboratory)

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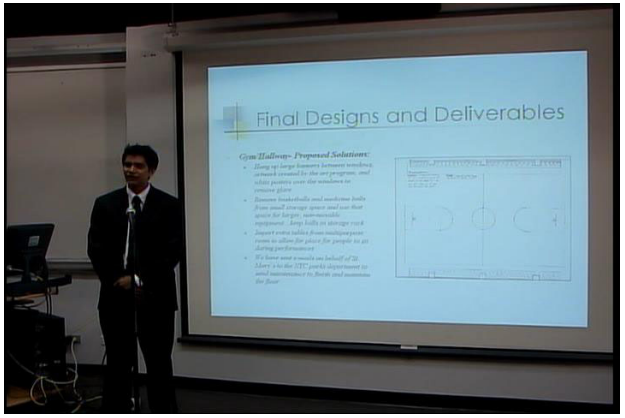
In-Class Milestones
Overview

- Student team presentations held twice a semester (midterm, final)
  - Formal presentation
  - Semi-professionally video-recorded (good equipment, but amateur operators)



In-class presentation with Q&A

In-Class Milestones
Objectives

- Learning resource for students:
  - Self assessment (in particular after midterm; preparation for final presentation)
  - Peer assessment
  - Archive of prior project work (research)
- Archival resource for instructors:
  - Review for grading
  - Interactive material to discuss performance with student(s)
  - Archival

In-Class Milestones
Difficulties

- Dissemination of video difficult
  - Naïve: physical formats; DVD, CD, VHS
    - Burden on staff for duplication of material
    - Workload grows linearly with number of students
    - Physical library-like setup for past material
  - Reasonable: “put it on-line”
    - What does that entail?
    - What are the implications?
    - Web server? YouTube?
    - How to search through growing collection?
    - Without indices, search is linear!

In-Class Milestones
Difficulties

- Videos are not documents
  - There exists no magical Google for video
- Manual indexing hard and burdensome
  - Ideally, human edits and builds indices:
    - Transcript of audio
    - Alignment to electronic presentation material
    - Segmentation by student speaker
    - Annotation with feedback and comments
  - Literature: 1 hr video = >10 hr annotation
  - Too expensive, no justification!

In-Class Milestones
Our Solution

- Automatic indexing possible
  - Borrow approaches from various fields
  - Automatic transcripts (e.g., IBM ViaVoice)
    - Very fast, very cheap, but highly inaccurate
    - Customization (speaker, language) burdensome
    - With filter, surprisingly good overview index
  - Visual segmentation (many approaches)
    - Divides visual material into distinct scenes
    - Thumbnail index
    - Fast browsing of video (super fast forward)

In-Class Milestones
Our Solution

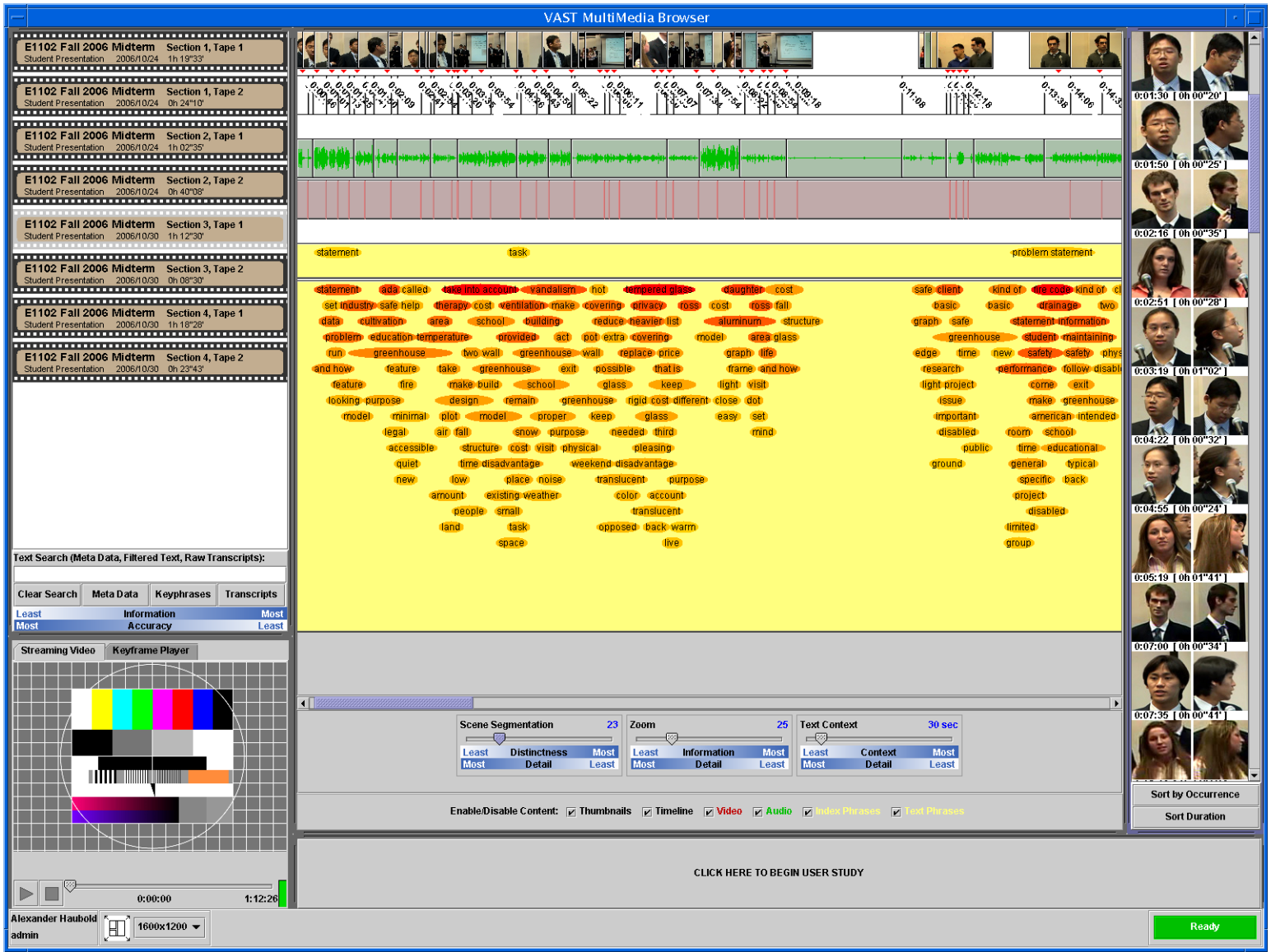
- Automatic indexing possible (cont.)
  - Speaker segmentation
    - Divides audio material into speakers
    - Distinguish between students
    - Build visual speaker index
  - Not yet fully explored:
    - Optical character recognition: text index
    - Gesticulation detection
    - Intonation detection
    - Speech disfluency detection (e.g., interjections)

In-Class Milestones
Our Solution

- Large scale dissemination possible
- Our solution entails:
  - Alternative to web page “list of videos”
  - Leverage indices, provide search
  - Marginal cost for additional material
  - No cost for additional users
  - Platform independence with Java
    (Windows, MacOS, Linux, Solaris)

In-Class Milestones

Our Solution



In-Class Milestones
Feedback

- Tool in use for 2 ½ years
- User studies after every semester
  - Targeted tasks to measure effectiveness
  - Surveys to collect feedback
- Considerations made for changes in tool
  - Improve speed at which material is found
  - Adjust interface to meet student and instructor needs
  - Architecture for off-campus connectivity

In-Class Milestones
Feedback

- Generally well-received
  - Students, instructors appreciate availability
  - Desire for more material
    (e.g., lab lectures)
- Improvements always desirable
  - Annotations by instructors (interactive feedback)
  - Magic!? (Face recognition)

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Milestones outside of Class
Overview

- Student teams journal their activity
  - Include various material:
    - Client interviews
    - Meetings
    - Team interaction
    - …
  - Required to produce edited version
  - Granted full artistic rights

Team video: shot of project site

Milestones outside of Class
Objectives

- Learning resource for students:
  - Self assessment (external view of team interaction)
  - Archival of events for later review
- Short project promotion
  - Audio-visual guide through project

    (Problem statement, client interview and interaction, team interaction, solution)
  - Archival of student project material

Milestones outside of Class
Difficulties

- Shortcomings due to several factors
  - Varying video editing know-how
    (range from pre-amateur to professional)
  - Varying artistic approaches
    (creative Rap video vs. 10 minute shot of meeting)
  - Most productions miss objective regardless of creativity
    (artistic freedom was inappropriate choice)

Team video, set up as a Rap Video

Milestones outside of Class
Recommendations

- Still believe team videos are good venue
- Somewhat strict structure required

  (guidelines on good vs. bad elements)
- Artistic freedom within reason

Thank you!

Questions / Answers?