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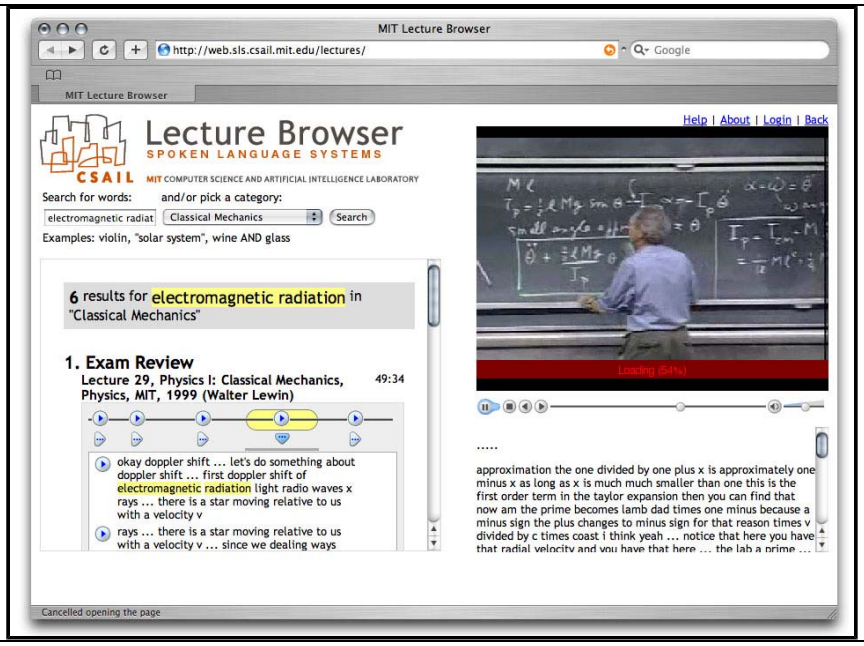
MIT Researchers Advance Lecture Capture with Search Capabilities

by Dave Nagel

Researchers in MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) have developed a new Web-based technology that's designed to take recorded classroom lectures to the next level. The technology, developed by a team led by MIT's Regina Barzilay and James Glass, provides search functionality for classroom video recordings. At present, the prototype only works with MIT's online lectures made available to the public through the university's OpenCourseWare initiative, but it may be made available to other institutions in the future.

The functionality of MIT's new technology shares a little in common with traditional search technology from a user perspective. That is, if you enter in a search term, the system calls up a list of results, along with relevant details, such as the title of the lecture, running time, highlighted search terms within the results, etc. And that's where the similarity ends. From this point, clicking on any word within the results calls up not only the relevant lecture, but takes the user to the precise point in the lecture where that term is used.

The screen shot below shows this, although you'd get a better idea by performing a search yourself.



Along with the running video and audio of the lecture, a transcript of the lecture also appears, which scrolls with the lecture and underlines words in the lecture as they're spoken. The text transcripts are

created using speech recognition software with a little manual help from the researchers themselves.

"Our goal is to develop a speech and language technology that will help educators provide structure to these video recordings, so it's easier for students to access the material," said Glass, who is also head of CSAIL's Spoken Language Systems Group, in a release issued this week by MIT's News Office.

The system isn't without its flaws. In the sample above, the phrase spoken by the lecturer "V cosine theta," for example, shows up textually as "v co signed fatal," but, in large part, the text follows the lecture with a fair degree of accuracy. The researchers plug technical terms into the computer to help improve that accuracy, and, according to MIT, the system is getting about 80 percent of the words right.

Following the creation of the transcript, another program breaks up the lecture into chunks of text about 100 words long each, which are "compared with each other using a mathematical formula that calculates the number of overlapping words between the text blocks," according to MIT. "Each word is weighted so that repetition of key terms has more weight than less important words, and chunks with the most similar words are grouped into sections."

The researchers said they hope to add new functionality to the system in the future, including lecture summarization and collaboration features that would allow users to make corrections to the transcripts and also add lecture notes.

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