

LectureScribe: A Simple Tool for Creating Animated Whiteboard Lectures

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In my graduate algorithms course, I recently taught my students an efficient algorithm for finding the farthest pair of points among n points in the plane. Since this concept is both highly geometric and dynamic in nature, it is much harder to articulate clearly in printed text than in a classroom setting where I can gesture, speak, and draw dynamic pictures on a whiteboard. This phenomenon isn't specific to algorithms or computer science, of course – many areas of study involve concepts that are easy to explain in a person-to-person setting, but much harder to communicate, especially at an intuitive level, in printed text. Why then, does most of the educational material in use today consist only of static, printed text, when today's technology allows us to create and deliver far more effective rich multimedia educational content? One reason is that today's technology still doesn't make the *creation* and *delivery* of multimedia content as effortless as it could be.

Java applets and Macromedia Flash animations are easy to deliver by embedding them on a webpage, but very time-consuming to create. Full-motion video of an instructor in front of a whiteboard is rather bandwidth-intensive to download, and also somewhat complicated to create, especially if you want a highly-polished result, since it can be difficult to combine several "takes" in a seamless fashion. Slide shows with accompanying audio are fairly easy to create using software like Macromedia Breeze, but this format often isn't dynamic enough to fully articulate many concepts. One of the more promising formats is dynamic screen/whiteboard capture with accompanying audio, since it compresses well for delivery over the web. However, it still takes a good deal of effort to produce highly-polished content in this format using today's popular software packages (e.g., Mimio Boardcast or Macromedia Captivate). Some of these products (e.g., Mimio Boardcast) require that you have a special server set up to broadcast the resulting animations, and with most products it is very cumbersome to back up and "reset" a recording after misspeaking (which, at least in my case, is an extremely common occurrence).

About five years ago, since there were no packages available for producing animated whiteboard lectures, I wrote my own, called LectureScribe, for the purpose of developing more effective content for the algorithms classes I was teaching at M.I.T. Due to its relative simplicity, LectureScribe remains an attractive alternative to the software packages mentioned above. Recording a lecture is as simple as clicking "record" and then writing (on a tablet PC, an electronic whiteboard, or Wacom tablet) and speaking. You can back up and reset the recording after misspeaking in a matter of seconds using a few keystrokes, there are facilities for importing images, drawing simple primitive objects like lines, circles, grids, etc., and also "gesturing" at previously-drawn content by moving a pointer around the screen. Finished lectures can be exported to a highly-compressed Macromedia Flash file, which you can easily post on a webpage or email to a student or colleague. Over the past few years, I have used LectureScribe for a variety of purposes: sending multimedia notes to students and colleagues in response to questions over email, posting supplemental material in my courses, making research notes for myself to view in the future, and finally in the development of a multimedia textbook where difficult material is explained using short animated mini-lectures.

Since LectureScribe has reached a point where it is fairly stable, I would like to open it up for use by the Clemson community, so I can obtain feedback that will enable me to continue to improve its capabilities and ease of use. I plan to release it to the rest of the world (as free software) in the near future. You can obtain LectureScribe as well as instructions and examples at: <http://www.cs.clemson.edu/~bcdean/lscribe/>.