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How we built a DIY book scanner with speeds of 150 pages per minute

A kit, online forums, and an Ikea-like manual made DIY scanning easier than expected.

by Jennifer Baek and Jake Brown-Steiner Feb 14, 2013 11:00am ART

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Chapter two: Conflict

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Confused, we consulted the forum. DIYers informed us that the instructions didn't include this part because of difficulties in rendering the images. Great. And the forums were filled with only vague instructions and unanswered questions on assembling the "camera trigger mechanism." With little knowledge of how to put together a bicycle brake, we again consulted the Internet, but we came up empty-handed. We were in trouble.

Late that night, we decided to call our lifeline, a friend who had experience in "building." After tinkering with the parts and looking at the moving pieces, he came up with a plan for assembling the mechanism.

Putting together the moving parts was relatively easy: you simply piece the wooden bits together, insert the brake cable into a groove, and secure the parts with a nut, washer, and bolt. The problem was connecting the wooden parts to the brake cable with enough tension so that pulling on the brake lever would cause the wooden trigger to move. Initially, we achieved the right amount of tension, but after several uses, cable tension would go too slack. We remedied this by wedging the brake cable between two washers, a screw, and a nut. Although this kept the cable taut, it sometimes became *too* taut. We ultimately counteracted the tension by placing rubber bands on the other end of the hinge.

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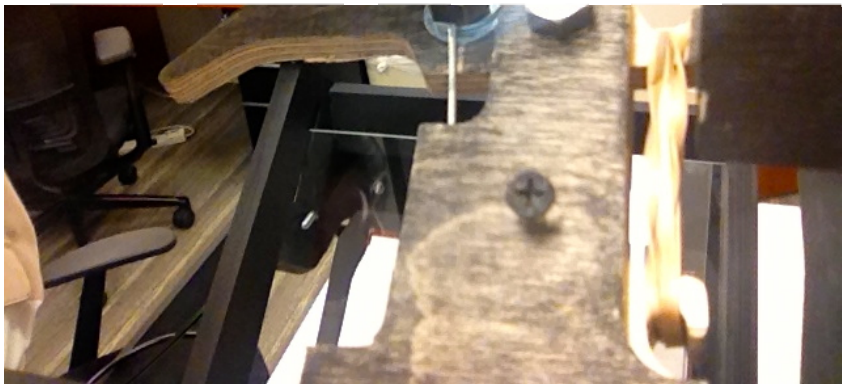

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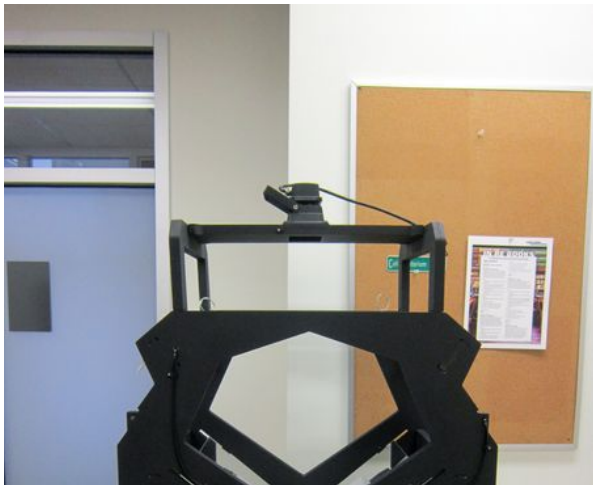
The next day, after another trip to the hardware store and a few more hours of assembling, the three of us managed to put together the camera trigger mechanism. We did it—finished building the DIY Book Scanner. Up next, the webcast.



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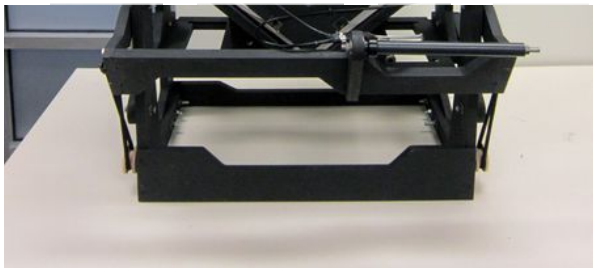

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A few weeks later, on October 26 and 27, we showcased our masterpiece at the *In re* Books Conference, talking about our law school's DIY moment and piquing the interest of intellectual property law professors, lawyers, librarians, and authors. Getting the DIY Book Scanner built and functional by the time the conference rolled around had been our original goal, mainly because the entire gathering was about the future of books.

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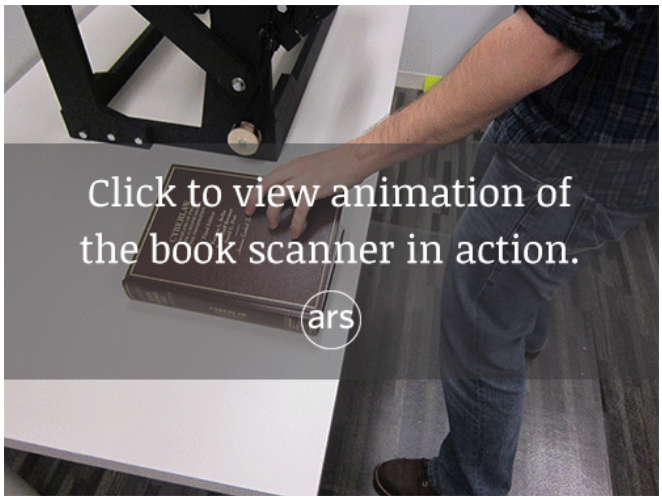
Chapter three: How it works

The scanner makes digitizing books nearly effortless. OK, it's not actually *effortless* but it's certainly a lot faster than using a photocopier. The book sits in the bed of the scanner, a wedge-shaped platform near the center of the device. The weight of the book is counterbalanced by built-in bungee-cord pulleys which make moving the book up and down easy. The bed is adjustable so it can fit books with

panels that are positioned at 90 degree angles, flattening the pages and lining them up with the cameras mounted on the two sides of the scanner. Pulling the lever up makes the bed and book move down, giving you space to turn to the next page.

Once you have built the scanner, all you really need to do is lower the book, turn the page, raise the book, snap the pictures (by pressing down on the brake handle), and repeat. We were able to scan roughly 150 pages per minute—making quick work of even a 400-page book.



Can I interest you in a book-making gif?

Jennifer

After scanning comes the less glamorous task of converting the images to your desired e-book format. There is no standard way to go about this, but the forums for the DIY Book Scanner offer a number of great open source programs to use. We started the conversion process by collating the photos into page number order (we weren't able to find software that could automatically do this, although someone should be able to write it easily). We used a program called Scan Tailor which allowed us to de-skew, color correct, and touch up the photos in batches, then turn the photos into a great-looking e-book on par with anything you might buy commercially. We were even able to convert the photos into readable text using free and open source OCR software.

The main drawback of using the DIY Book Scanner was the lack of a comprehensive, go-to program with which we could collate and convert the photographs into PDFs or e-books. There's definitely room for growth in this respect, but we didn't mind using the currently available options; indeed, we thoroughly enjoyed using the scanner and doing the "post-production" afterward, especially given how cheap and efficient it was compared to the alternatives.

Chapter four: Copyright

In many ways, the DIY Book Scanner has become the physical embodiment of our academic work, making many of the copyright issues we spend so much time reading about more pressing. The scanner, like CD burners, can be perceived as a disruptive technology, bringing with it a slew of potential copyright issues. Understandably, most publishers have a vested interest in not letting you digitize your books yourself—they'd rather you purchase their e-books.

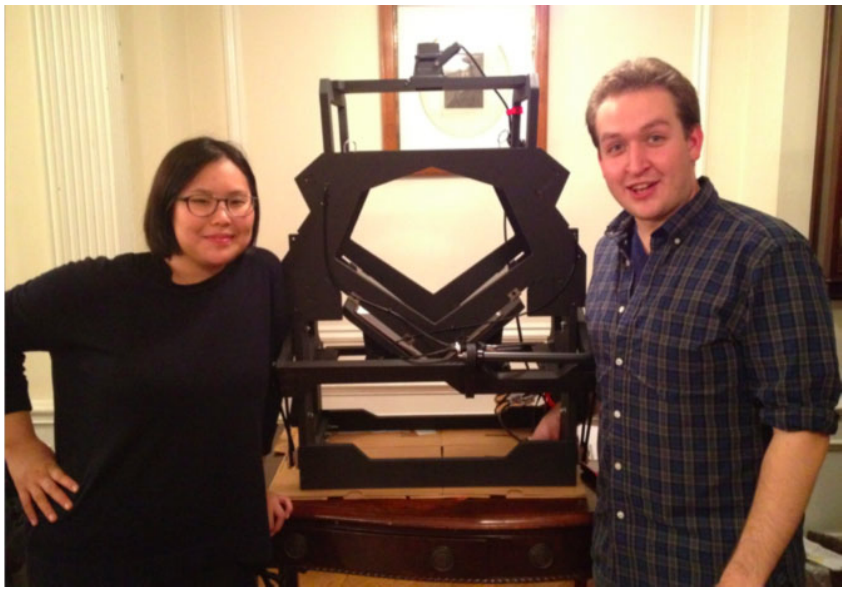
Format shifting, as this is known (in this case, the transformation of a physical book to digital e-book), is not a new issue. Some of us may remember that during the days of ripping CDs into MP3s, there was some contention as to whether or not users should be allowed to make this transformation for backup purposes or otherwise. The war against CD ripping is long behind us, and it seems intuitive that, as with CDs, people should be able to do what they please with the books they purchase, inherit, or find. This includes scanning and archiving books for backup purposes or for the convenience of reading them on digital devices.

However, because of the growing problem of book piracy, a war against "book ripping" may be on the horizon. We're hopeful that book publishers will learn lessons from the music industry and avoid a frontal assault on both their consumers and an emerging, intuitive, and inevitable technology that will only get better with time.

Epilogue: The journey isn't over

lawyers to good use, researching issues in copyright and authoring an article on the legality of book scanning. All of this should help us lay the foundation for a collaborative project between the DIY Book Scanner and another awesome project called PlanetMath.

If you're in New York this spring and are interested in this project or the issues surrounding it, we're organizing the 2013 Students for Free Culture Conference (taking place at New York Law School on April 20 and 21). There, we will discuss the issues regarding digitizing content, open access, and "freeing" information. We've even invited Daniel Reetz to speak about his maker journey. We had a great time on this adventure and want to spread the word, so come help us formulate ideas.



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