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A Review of Camera Scanning Apps for You and Your Patrons

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**By John
DeLooper**

This article discusses mobile phone apps that can be used to scan photos and documents via the digital cameras built into smartphones. It talks about the history of these apps and what their best utility is in library settings. It also examines one specific project to digitize materials for a local history website.

What Is a Camera Scanner?

Have you ever wanted to digitize a document but didn't have access to a flatbed scanner? Working as an academic librarian, I became aware of how common this issue can be approximately 10 years ago. At that time, I received a lot of questions from students who were interested in using scanners at a library that did not have any. Based on

this patron feedback, I lobbied the library's administration to add scanners and even surveyed peer institutions in our state to see if they had this kind of equipment in place. From these calls, I learned that scanners were a popular tool at libraries, with their main appeal being that they could make documents electronic for sending, printing, etc. Additionally, for these devices, scanning was typically free, in contrast to photocopiers for which a charge of 10 cents a page to copy material was the norm. Based on this feedback, we bought several scanners, which proved popular almost instantaneously.

But scanners are not without problems. For instance, the low-budget scanners we purchased were slow to scan and save materials. The scanners' default settings did not



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always provide the best options for the scans our students typically made. There were also durability issues. With dozens of students using a scanner each day, pieces such as the top cover would break, the computers connected to the scanner would break, and sometimes scanners would be accidentally knocked off a table and broken. There were also issues with the long lines of students who wanted to use them. They wanted to get scans, especially of chapters or homework sets from required textbooks quickly, but even with limits (such as 15 minutes per scan session), the wait was often too long for most students who could only access the library in between class periods.

Interestingly, the long line issue began to solve itself. In recent years, library staffers started to see students taking

pictures of book pages, chapters, or problem sets using their cellphones. Several students even started approaching library staffers to share their recommended tools to aid in the scanning process. While many used their phone's built-in camera app, others started mentioning tools such as Scannable, CamScanner, and Microsoft Lens. These tools had the convenience of being integrated into the student's personal cellphone and included additional features to make better scans (such as edge detection and correcting distortion caused by a book's binding).

Phone camera scanning tools began to emerge about a decade ago. One of the earliest tools for this, CamScanner, appeared in 2010 as an iPhone app. It turns photos taken in the app into PDF documents (see Graeme McGilliard, "Snap

to It and Win a Top Prize,” *Manchester Evening News*, Oct. 23, 2010, sec. FEATURES; pg. 9, Nexis Uni). The market soon expanded, and in recent years, it has seen entrants from corporations such as Adobe, Microsoft, Google, ABBY, and Evernote, as well as many smaller companies that produce their own scanning programs. In the years since CamScanner debuted, software manufacturers have also added features that aid in digitizing other materials such as documents, whiteboards, and business cards.

What Makes for a Good Scanner Program?

While many variables factor into what makes a camera scanning tool useful, there are some features that may prove key when choosing a camera scanning app for your users. First, cost can be a primary factor. Patrons looking for the most economical option might consider using a camera scanning app simply due to its low cost. Most camera scanning apps are free with ads and have paid subscription options. These options typically involve charging subscription fees for features such as no ads, cloud storage, OCR, or export/conversion to formats such as Microsoft Word.

Next, scanning speed and ease of use for these tools are important. Many typical library uses—such as digitizing a book chapter or scanning a government form—are often completed under time pressure. Patrons want a quick experience that doesn’t involve hours spent learning a new

app. Features such as image clarity matter as well. Libraries often have overhead fluorescent lights. Those lights, combined with glossy or reflective paper, can make taking clear images difficult. Fortunately, most camera scanning applications now have tools to compensate for these environmental factors.

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Finally, for many users, file compatibility can be critical. Luckily, most scanning software now allows items to be digitized in PDF, which is widely compatible across many computers and mobile devices. PDFs also allow multiple images to be combined into one document, and that can be especially useful when digitizing reports or documents.

Secondary Considerations

Beyond this, there are several other features that are helpful to many users. These include OCR, which converts images into searchable text and can thus allow patrons to find relevant information more easily. Features such as binding or curl correction and de-skewing can help patrons who want images to be more easily readable or printable.

Cloud storage (another common feature) can be a tremendous asset to many patrons, as running out of space is a constant problem for many mobile users. It can also provide easy access to digitized materials across many devices. That said, privacy is important to consider. Ad-supported products are funded by selling an end user’s behavior and personal information. While many users may be willing to use ad-supported software due to its low cost, others may be uncomfortable with these business models. As librarians, we need to keep this in mind and let patrons weigh the considerations of ad-supported or subscription-supported software.

My Personal Experience With Scanner Tools

I maintain a local history website (sunsetparkhistory.org) about the neighborhood I live in. It includes a variety of

COMPARISON OF CAMERA SCANNING TOOLS				
NAME OF TOOL	PLATFORMS	BEST FOR	INTEGRATIONS	COST
Adobe Scan	iOS, Android	Whiteboards, documents, business cards, and forms	Adobe Creative Cloud	Free with 2GB cloud storage \$9.99 a month for additional editing, exporting, and OCR capabilities
Google’s PhotoScan	iOS, Android	Photos	Google Photos	Free Google account required for integration with Google Photos
Microsoft Lens	iOS, Android	Documents, whiteboards, photographs, and business cards	Microsoft 365/OneDrive	Free for images and PDFs Free Microsoft account required for 5GB cloud storage, OneDrive, PowerPoint, and Word integration Additional storage with paid Microsoft 365 or OneDrive account
Scannable	iOS	Documents, photos, whiteboards, and business cards*	Integration with Evernote, business card integration with iOS Address Book, and Microsoft Outlook*	Free *Evernote account required for OCR, business card features, and social media sharing

materials, such as reports, photographs, postcards, and 3"x5" images. As part of the collection development for this site, I had received and was struggling to figure out the best way to digitize several 3"x5" pictures that were glued to poster board (see Figure 1 in the sidebar). Because of the way they were mounted, the images were difficult to scan on a flatbed scanner. The photos were also too fragile to risk removing them from the poster board, and I did not have access to a DSLR camera to try to get a high-quality picture of each photo, as is the method commonly used in museums and archives. In search of a solution that would allow me to scan these images in a non-destructive way, I turned to camera scanning apps.

For this project, I chose Google's PhotoScan, which is preinstalled on certain Android smartphones. It is also available via the Google Play app store for Android phones and tablets, as well as the Apple App Store for the iPhone and iPad. PhotoScan's product description in the Google Play app store highlights features such as the ability to remove glare, to automatically detect the edges of a picture, and to correct the perspective so images will display in their original shape and without distortion.

Scans were quick, taking an average of about 30 seconds. This was much faster than using the auto settings on a typical low-cost scanner such as Canon's CanoScan LiDE120 Color Image Scanner, which takes approximately a minute per scan. PhotoScan also includes cloud integration with Google Photos, which might be useful to patrons who are interested in sharing digitized photos in that tool. It was also easy to export images to email, text messages, and social media. That was particularly useful, as I periodically share images uploaded to sunsetparkhistory.org with a local Facebook group.

That said, while PhotoScan is convenient, it's not a perfect product. The app advertises smart rotation, which is supposed to make sure each picture is always oriented correctly. However, in practice, output pictures were sometimes rendered upside down. Next, the scans do appear to be straightened/de-skewed as compared to taking a regular image of a photo, but the straightening process is not always perfect, and distortion sometimes remains. Automatic cropping happens via edge detection, which works well, but must sometimes be manually overridden if the edge detection overcorrects and cuts off a piece of a photo or under-corrects and leaves in the image additional materials from the surface that was used to scan. In addition, the claims

Scanning 3"x5" Photos From a Poster With Google's PhotoScan

For my local history project, I needed to scan several 3"x5" images that were attached to poster board (see Figure 1).

Using the program was simple. After opening the PhotoScan app, the picture needed to be centered in the camera's photo frame (see Figure 2).

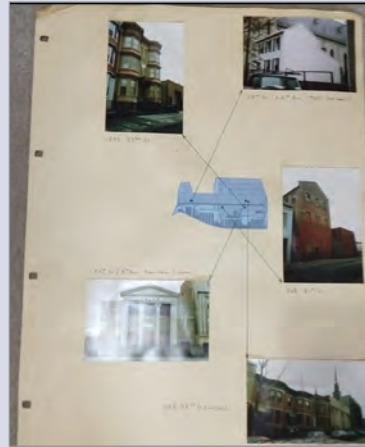


Figure 1



Figure 2: Positioning a photo in the camera frame

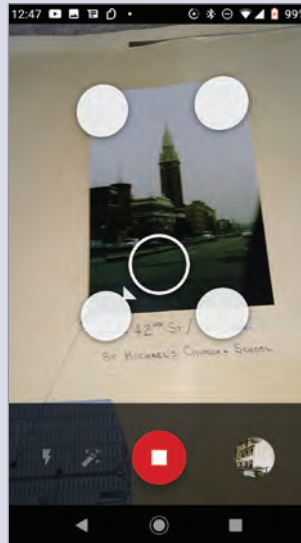


Figure 3: Moving from dot to dot to composite the image



Figure 4: Viewing the final image

Then, a center Capture button must be pressed. At this point, four dots appear.

Users then follow the arrows from dot to dot and pause briefly while the program takes images and analyzes them (see Figure 3). At the end, these separate images are composited together as a final image in the app. The program will then attempt edge detection and produce a final photo (see Figure 4).

of glare-free and shadow-free scans do not hold up as advertised and seem to be closely tied to lighting conditions (see Figure 5). Taken together, this means that these features are very hit or miss and that my photos sometimes needed to be scanned by the app two or three times for an optimal image.

In addition, the quality of any individual phone's camera has a significant effect on how the final scanned image is lit and its details captured. For comparison's sake, I scanned one image with a Moto X4 and another with a Galaxy S7 (see Figure 6), both midrange phones as of the time this article was written. The image taken by the Moto X4 (see Figure 7) was significantly brighter than the image taken with the Galaxy S7, possibly due to differences in the phone's sensor and its software for processing images.

Scanning Reports in Microsoft Lens and Adobe Scan

To further test these tools, I scanned historic reports using Microsoft Lens and Adobe Scan with a Moto X4.

Microsoft Lens

For the first report, I used Microsoft Lens. Scanning an 11-page section took 6 minutes and 25 seconds. The scans initially looked washed out, but after they were complete, Microsoft Lens suggested a "Document filter" option. That helped adjust for shadows and made the document more legible. As with PhotoScan, Microsoft Lens' scan quality was inconsistent. Edge detection and de-skewing worked sometimes, but not always (see Figure 8 on page 27). In con-



Figure 5: Glare removal seems to depend on lighting conditions and does not always work.

trast to PhotoScan, which displayed an image on screen after it was digitized, with Microsoft Lens, it was hard to tell if the original picture was legible and clear until export. That said, Microsoft Lens excelled in its variety of options for saving files, including to OneNote, OneDrive, Microsoft Word, and even PowerPoint.

Adobe Scan

I scanned a second report using Adobe Scan, another popular tool suggested by our library's patrons. This program's scan speed was slightly quicker, taking 6 minutes and four seconds to scan 15 pages. This product excelled in its usability, as the app provided on-screen guides to line up scans and then automatically took pictures of the document when aligned. It also supported image rotation (see Figure 9 on page 27). As with Microsoft Lens, it included options for sharing the files easily as PDFs and as JPGs. Notably, Adobe offers an option for printing, which is useful if no photocopier is available. Document processing at



Figure 6: A 3"x5" image scanned with Samsung Galaxy S7



Figure 7: The same 3"x5" photo, under the same lighting conditions, scanned with a Moto X4 smartphone appears brighter.



Figure 8: Many scanning apps include tools such as edge detection and de-skewing to improve image quality.

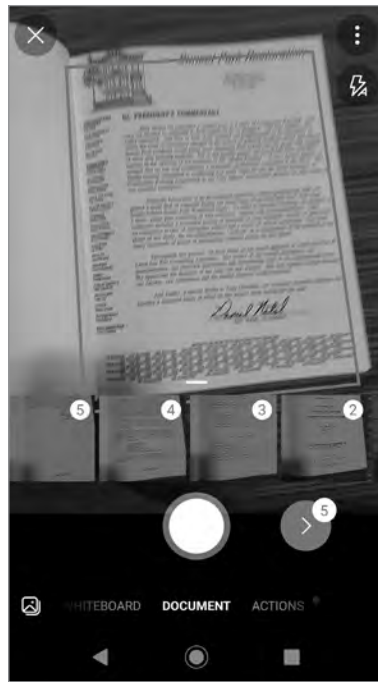


Figure 9: Rotating and editing a scan in Adobe Scan

the end was also faster, since Adobe Scan tried to recognize text during the scanning process.

The Two in Comparison

Both Microsoft Lens and Adobe Scan yielded decent results. The scans were fast and effective at removing shadows, but both had issues with evenly de-skewing and correcting for the binding on bound reports. They both made it easy to save and send files as well. That is useful in a collaborative environment such as a library where patrons or staffers may need to scan and send forms, photos, and other documents. Interestingly, the feature that surprised me most was the effectiveness of the OCR. Even on pages that were hard to read, I could use Microsoft Edge's PDF reader to easily find specific words or phrases of interest. Seeing this, for future projects, I may want to test the OCR accuracy in more detail and also see if the OCR can recognize handwriting when scanning a whiteboard. Unfortunately, our library's physical closure for much of 2020 and 2021 due to the COVID-19 pandemic meant that I have not had access to whiteboards.

Additional Considerations and Conclusions

Exploring these tools helped me come to a few conclusions. To start, camera scanning is not as good as using a traditional flatbed scanner or document scanner for digitizing materials. However, for many users, these issues may be outweighed by the ease of scanning and sharing. For this reason, camera scanning apps could be quite helpful for patrons who are scanning their own documents and for library staffers who might want to digitize and share interesting assets (such as historic photos to social media

platforms or library newsletters). These tools might be especially useful in certain types of libraries. For instance, archives and special collections often allow cellphone cameras, and camera scanning apps—especially the ones that can OCR documents, such as Microsoft Lens and Adobe Scan—could be helpful for facilitating this kind of research.

Camera scanners can be useful to libraries for many projects, especially if they have images that they want to quickly digitize and share with their patron communities. For libraries without flatbed scanners or those that provide only limited access to scanners, they may be a great tool to recommend to patrons for creating a digitized version of an image or document that can easily be shared via email or cloud storage.

But any recommendation to use these products should be tempered with a warning. While they help make materials accessible, the uneven scan quality demonstrates that they are not tools for preservation or creating high-quality digital surrogates. They may help you and your patrons, but do not toss your original images, documents, or reports after scanning them. ■

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