

Mobile Page Scanner

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I. MOTIVATION

Why wait to get a dedicated scanner when a mobile application can make you scan your document quickly? Specialized scanners are large effective means of converting hard official documents into useable soft formats but there are cases where there is an urgent need to scan documents and a scanner is inaccessible. On the flip side, the camera capabilities of the ubiquitous hand-held devices have increased tremendously in recent years with improving ability to take high quality pictures. Is there a way of leveraging on this optical capability of the mobile phone to readily scan and generate good quality documents?

II. GOALS

Through this project, our team hopes to develop a mobile application which will help the user scan pages of documents. The target is to make the output of the application as good, in quality, as that of a specialized scanner. Relevant image processing techniques would be used to sequentially and simultaneously process the captured portions of a page of the document and the portions are combined to form a whole document with decent resolution and clarity. Some expected concerns to be handled include perspective correction, uneven lighting conditions, text alignment etc. In addition, this app would create a ready mobile platform for adapting the various document processing algorithms to scanned documents.

III. OBJECTIVES (Page Scanning Android Application)

The android platform would be used to implement this project and the resulting application would do the following while guiding the user to scan a document page:

- Image scanning. Select the right sampling frequency/zoom level to sample images.
- Apply transformation techniques (rotation/ translation/ perspective correction) to align the image. This accounts for the movement (rotation/ tilt) of the phone while taking the images.
- Put the processed images together to form a seamless single image of the whole page.
- Apply OCR and other techniques to the final image. This is one possible extension to the project which is to carry out OCR on a scanned page to convert hand-written documents into typed documents.

Procedure

1. Point the camera at the top edge of the page of the document.
2. Take sequence of pictures for different portions of the page (with continuous S-shaped/zig-zag motion capture of the image). Figure 1 shows a close snapshot of a portion of a document. This close capture is repeated for the entire page and each shot is pieced together to construct the full page.
3. Can the phone intelligently guide the user in taking the complete page? Edge detection of boundaries of the page could help achieve this. In addition, accelerometer can be employed to detect and prevent two swift movements.
4. Account for the tilt in camera during capture of frames (using image processing algorithm for Plane Rectification in Real Time).
5. Piece the image portions together to form a complete page. Figure 2 illustrates the typical expected output which could be a pdf document.

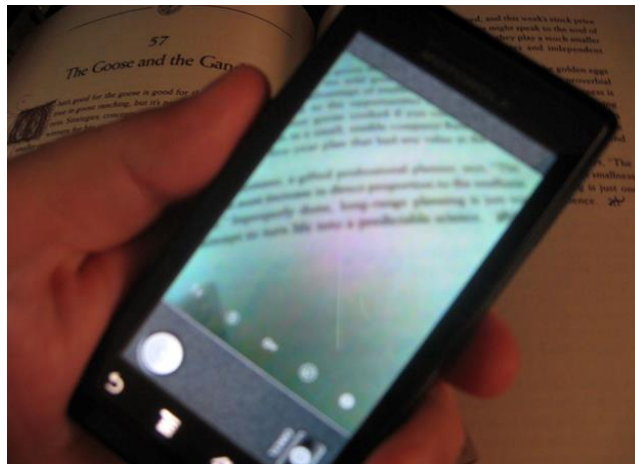


Figure 1: Close snapshot of a portion of a document



Figure 2: Display of a full page of pdf document on a mobile phone.