

AUTOMATIC BOOK SCANNING

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Abstract— In recent years, there has been an increasing demand to digitize a huge number of books. A new approach for meeting this demand, called Book drive Scanning, This is a new technique of scanning. In which all pages of a book are automatically turned and scan. In our project we are making a device in which book pages will turn automatically one by one then scanner will scan the pages and converted it into digital form. Scanning is a process by which a document (primarily paper, although any medium can be used) is converted from a human-readable format to a computer-readable digital image. These images can be stored on variety of media in various form. This machine has a mechanism by which page turning will take place. In that sliders and roller is used to turn pages just as pages a turned over by human fingers. Those results clarified the relationship between the failures and sensor outputs. Based on experimental results, we examine how to improve the machine by investigating the problems we found in controlling the page turning mechanism and sensing the page turning timing, in addition to the roller shape and the machine structure.

Index Terms— Book scanning, page turning mechanism, digital image, camera, image captured.

I Introduction

In the past few years, several projects were initiated to digitize large amounts of books and documents. To simulate the look and feel of a physical book in its electronic correspondent, the British Library has recently developed a system called "Turning the Pages"[2]. Such devices can satisfy demands for a machine to turn pages of books and magazines automatically, for reduce in human efforts of turning page and then scanning. Repeating page turning for book scanning experiments using our prototype machine with such an attached roller

and mechanical mechanism. One of the major technical challenges in designing a mechanism for turning the pages. There are several constraints on a good mechanism. First, the page turning should be computable in real time, allowing the user to examine different pages of the book interactively. Second, the mechanism should be scalable to handle books with large numbers of pages. Finally, the page turning must resemble a physical page turning.

By using camera we will capture the image of book during turning the page, means we will scanning the image by camera instead of book flipping scanner.

Scanning machine on which we have to scan the every single page for printing or in digital form in that time things were difficult for manually operation are required for scanning [4]. That's why we designing the scanning a device in which book pages will turn automatically one by one, scanner will scan the pages and converted it into digital form.

Scanning, or digital imaging, is an increasingly popular strategy for dealing with records. Scanning can be a useful tool for managing your records and enhancing workflow, but is not always a good idea.

Scanning, the book images, is a process whereby a document is converted from print to a computer-readable format. You can think of the digitized version as a photocopy that can be viewed on your computer. Digital images produced by scanning are equivalent to the photographs one produces with digital cameras: they can be transmitted, displayed, and printed, but as images they are not text searchable. In order to make searchable electronic text, one must either transcribe records by typing or perform optical character recognition (OCR) processes upon digital images following scanning. After scanning the image we applied to the printer for zerox copies or computer for viewing the digital image [5].

The goal of book drive scanning is to convert paper documents into usable electronic images. Ideally the process will minimize time, labour, and optimizing image quality, throughput, and cost effectiveness[6]. To achieve all these type of objective..

II. Book Scanning Manipulation Technology And Requirements For Our Page Turner Machine And Scanning.

A. Related technology

Conventionally, different types of manipulation mechanisms for handling paper.

On the other hand, there are various number of automatic

book-page turner machines designed for book scanning.

The mechanism we are using for our project in that machine

performs a similar action to that by which human fingers move for page turning: a page turning module of the machine consists of two axes with a roller attached on each axis, both of which are expected to perform the role of a Human finger.[1]

The page turning module is moved to a position where the initially page turning process takes place. After lifting the page one shaft will fix the page between the gap of the shaft and shaft will turn the page .after the page turn it will be at initial position for next page turning.[2]

The scanning process starts after turning the page, camera will capture the image for digitalize the image by using matlab .

The purpose of these types of systems is to support reading by a user on computer as digital image, or for zerox shop to reduce the human efforts for scanning .

For better performing efficient and high-speed digitization in one shot. Therefore, this configuration is suitable for book scanning. [4][6].

Necessity

Scanning's great strength is as a means of providing access to records. When records need to be accessed frequently, or from remote locations, or simultaneously by multiple users, scanning can be a cost effective means of distributing digital records. However, if full-text searching is required, the cost will go up considerably, due both to the OCR process itself and increased quality-checking[5].

Scanning records to save on storage costs is not likely to be cost-effective. Always do a full cost analysis before attempting this. This means that the technology used to scanned records is advancing at a great rate, and the user needed to read records may be in the digital images will also need to be reformatted as the software used to create and read the digital images becomes simpler. Additionally, for records with permanent storage of records periods, the original paper documents may need to be maintained as well as the digital images.[1][3]

Technical considerations

Decide on file formats and other technical requirements for scanning, storage, and retrieval.

Quality control:

Images must be inspected to ensure that they are of good enough quality for the purpose for which they are being scanned. In some cases, every image must be reviewed, in others only a sampling.

Storage:

Digital files and digital media are inherently fragile. Regardless of storage media used, it is always prudent to make multiple copies and, ideally, to store the copies in separate locations-even during the production phase of a scanning project.[5]

Diagram: Design of the Page Turning Machine

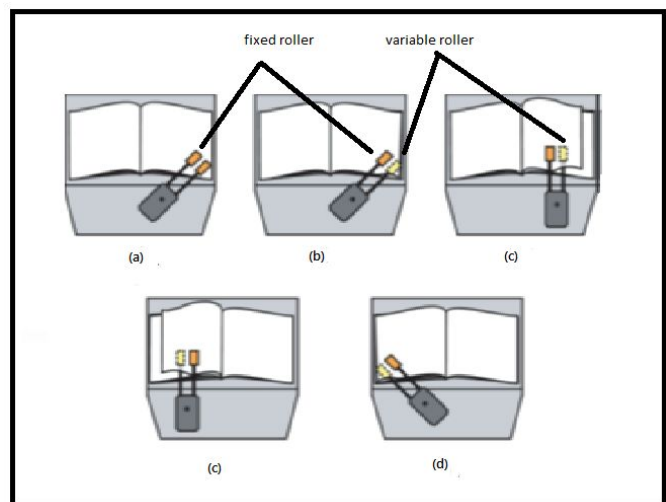


Fig 1

The turning mechanism has rotated 45, 90, 135, and 180 degrees, respectively.

After the page turned the camera will capture the image and converted into several forms.

Technical survey

After assessing the skills our project will require we evaluated the technical skills our team needs to successfully complete this project. For the static structure and moving parts we will need knowledge of physics, statics, dynamics, and mechanics of materials. For the page turning mechanism we will need knowledge of servo motors, gears, machines, and basic mathematics. For the electrical system and controls we will need knowledge of basic electric circuits, bread-boarding, and Programmable knowledge. For the scanning/imaging systems we will need knowledge of digital imaging and image processing. The software and computer programming will require knowledge of various computer programming languages as well as a deep understanding of developing sound algorithms.

Constraints

Limited Time

We have roughly six months to complete this project, which is a very limited time given skills we currently possess. The target completion date for our project is within the first week of April.

Knowledge

All the team members have taken the same classes and we are all doing a project of this scale for the first time. We do have the basic knowledge required for the design, drawing, stability, dynamics, electrical components, and programming. Not all of use know how to use the tools in the shop or how to do welding of metal, so it will be a challenge for us to learn.

Resources

We have limited resources and tools. If the tools and resources we need are not available, we wil have to search for alternatives.

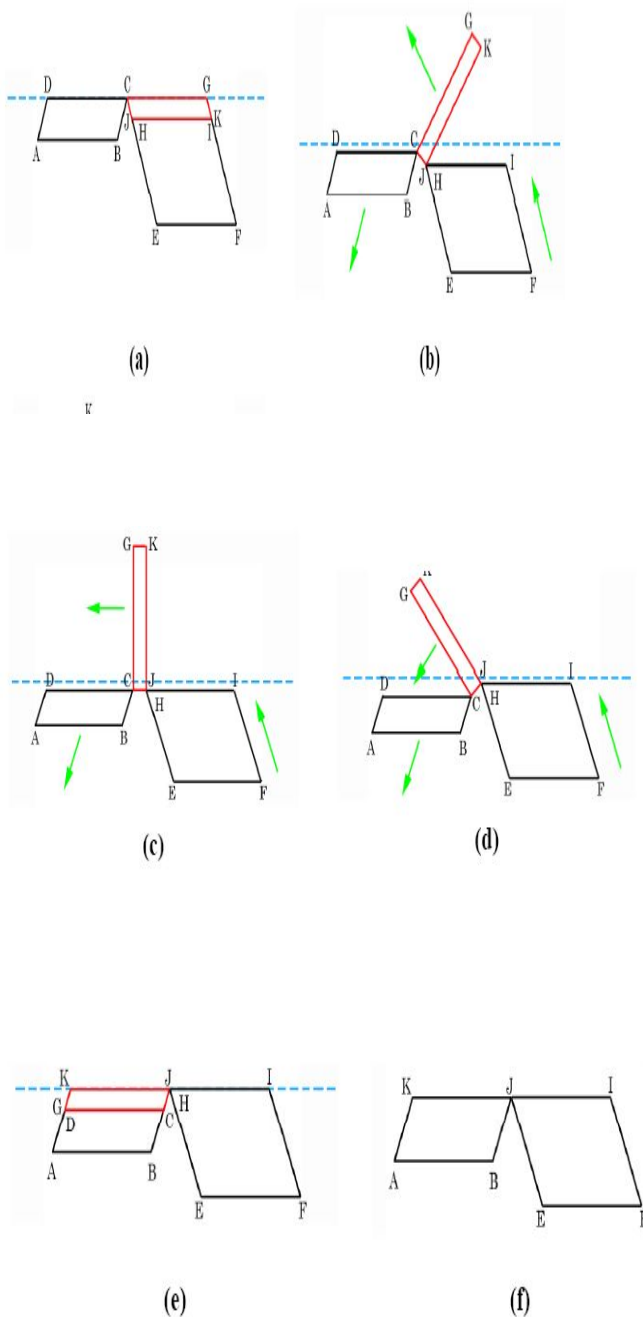


Fig 2

RESULT ANALYSIS

Expected Result

The automatic page turning system should have low power consumption, low project cost and high accuracy. At the same time it should be able to lift a single page for saving the operational time.

The important expectation from such system is the system should be fully automated i.e. system should be capable in precisely flipping the page without any misbehave.

Results :

It shows the results for the books scanning. The average speed and the average success rate for the thin-paper book was good and 100 %. For the other books, the flipping speed and desired result of attempt rate were over normal and over 98 %, respectively. These results show that book scanning machine worked effectively with books having different paper basis weights.

The reason why a 100 % success rate could not be achieved for the books other than the thin-paper book can be considered as follows. the flipping was performed stably, the problem where multiple pages were flipped at the same time happened when the number of remaining pages was small. We consider that, at the last page, the edge face and the sheet on the deformable surface were not properly connected, so that the manipulator might have been moved in an undesired direction when the cylindrical holder first reached the sheet. Compared with the thin-paper book, this condition tends to happen more with the thick-paper book because it was difficult, and not required, to strongly curve this book. Possible solutions include modifying the structure of the deformable sheet under the book, introducing a higher-pressure manipulator for keeping the book curved, and placing additional sheets of paper, which will not be digitized, between the last page[1][2][3][6]

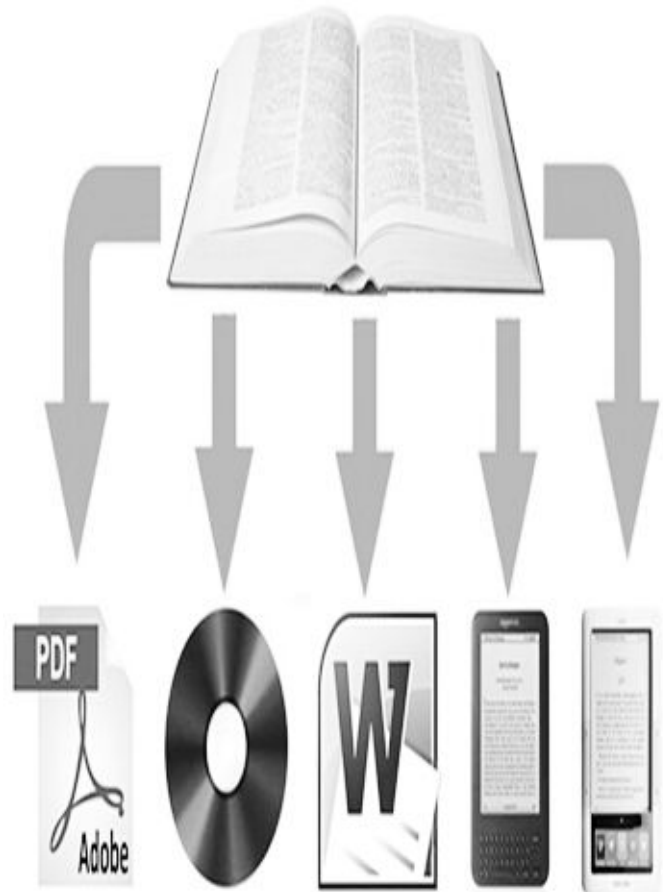


Fig 3

Various formats of image scan

Application

- In photocopy machines.
- Digital book readers.
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Advantages

- Ability to use very high-density storage media.
- Shorter retrieval time than hard copy when the images are well indexed.
- Multiple users and access levels are possible.
- Ease of information dissemination.
- Ease of use of imaged copies of records in vital records and disaster recovery plans.
- Ease of making copies of the imaged records.
- Digital images don't lose quality from generation to generation. Well made copies and derivatives can be as good as the original images.

CONCLUSIONS

For Books drive scanning, interactive page turning is particularly important. In this paper we have presented a page turning mechanism and scanning processes of digital image developed for the books scanning. Our design provides a good framework to page turning under various circumstances. Actually it supports books of almost any size, including large books or even containing several volumes or mazines.[2]

After scanning it shows in different forms of scan like PDF, CD, Word format, PC, laptops, and Zerox of scanned copies. Also it is important to consider an automatic book scanning mechanism in order to simplify and standardize tasks performed by a machine. [3]

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