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Image Boundary Detection for Smart Identification of Books

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Abstract: In this paper a novel approach for automatic book finder on vertical boundary detection in image is discussed. Our application uses an image processing algorithm that will search for the correct book in a rack, by giving the name of the book we need. After implementing this application using MATLAB, we have found that the application has 85% of success rate in choosing the correct book in a Rack. This application runs locally on a mobile phone and thus has improvements in terms of speed over applications that require computational power from a remote server. Since our algorithm uses both the RGB MAP detector and template matching, it works not only for books with text but also for the books which do not contain text along the spine, thereby expanding the program's applicability.

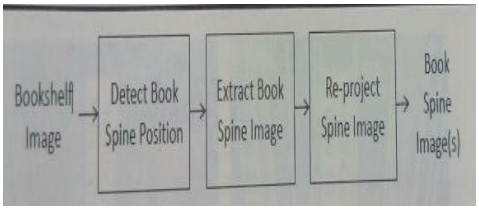
Keywords: Book spine, RGB MAP detector, Template matcher, edge detection.

I. INTRODUCTION:

Local image features for large-scale object distinguishment, are unsuccessful in identifying book spines in bookshelves, this is because some book spines contain only text components that do not yield distinguishing image features. To overcome this issue, another methodology that combines a text-based spine recognition pipeline with an image feature-based spine recognition pipeline was implemented.

The content on the book spine image is recognized and used as keywords to search the book spine content in the database and thus the corresponding book of choice is detected.

Deploying camera based book recognition solutions is more cost-effective because there is no need to attach physical tags to individual books. These camera-based systems use image features for robust recognition [1].



BLOCK DIAFRAM FOR SPINE EXTRACTION

The book spine recognition can be done with text or otherwise with image feature. On the camera-phone, a lightweight application guides the user to take a picture of the bookshelf. The query image of the bookshelf and location data is sent to a server. On the server, book spines are first extracted from the image of the bookshelf. Then, each book spine image is identified using a recognition system which consists of a text-based recognition pipeline and an image feature-based recognition pipeline. The recognized results are sent back to the user and also passed to a book management system that creates a location aware inventory which keeps track of each book's location.

II. PROPOSED METHOD

At the point when our application begins up, the user will be incited to give the name of the book, after pressing "Pursuit", the portable application handle the data feature picture from the cam and attempt and match presaved book information from its database that was pre- segmented in Matlab to what the cam is survey at this time. Represented calculations were utilized as a part of the Android application next. In our versatile

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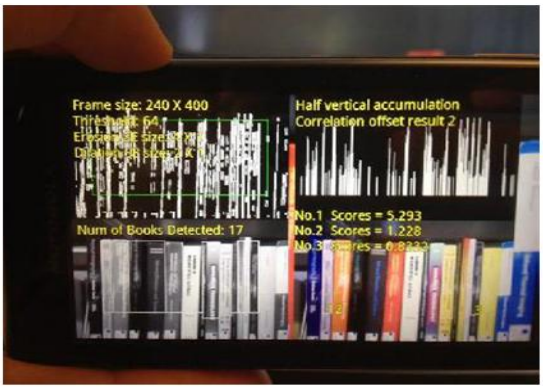
application, the book spine division and distinguishment calculation comprises the accompanying steps:

1. Book Spine Vertical Segmentation
2. Book Spine Horizontal Segmentation
3. MAP Detection in RGB Space
4. Format Matching in Grayscale

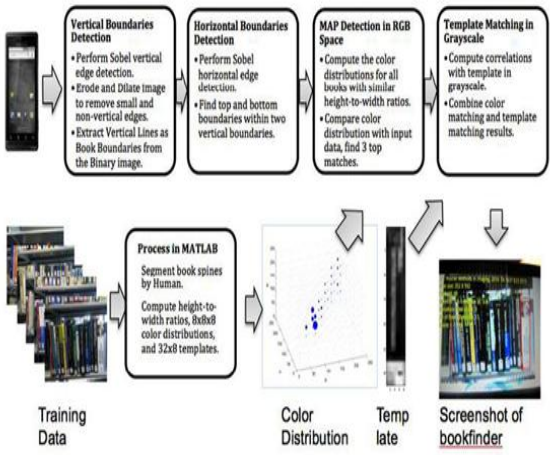
The book division incorporates two steps. The main step is vertical division and the second step is level division. For the vertical limits identification, first perform Sobel vertical edge discovery was performed. At that point the disintegration and enlargement to uproot little and non-vertical edges were done. After that, we separate the vertical lines as book limits from the parallel picture. And for level division, we utilize a comparable calculation.

The picture is initially shifted by a Sobel flat edge identifier, at that point we will get the top and lowest part limits inside two vertical limits of the book. After division, a RGB MAP finder and layout matching to discover the coveted book spine were utilized.

In MAP indicator, we process the shade disseminations for all sectioned book spines with comparative stature to width degrees. At that point we contrast the shade conveyance and the coveted book spine color appropriation and the application will diagram on the phone the initial three books on the rack with the best match to the book that was searching for.



Application segments the books on the shelf and measures their correlation with the book we are searching for



System Flow Chart

In system flow chart the preparing stage utilizes the best one out of five casings to perform division and distinguishment. Along these lines, we can accomplish a constant picture preparing. With this calculation, we have the capacity lessen the unpredictability and dormancy of our picture transforming, accordingly wiping out the requirement for server power. In rundown, the preparation information book spine pictures are precollected and stored in the database of the phone. Here Matlab is utilized to gather the fancied book spine picture. Since this is not done on the phone, we can utilize the Canny edge channel to section the reference bookshelf photograph, which is taken by the smart phone camera. At this point the tallness to width degree, the color appropriation of the sectioned book spine in RGB space was identified.

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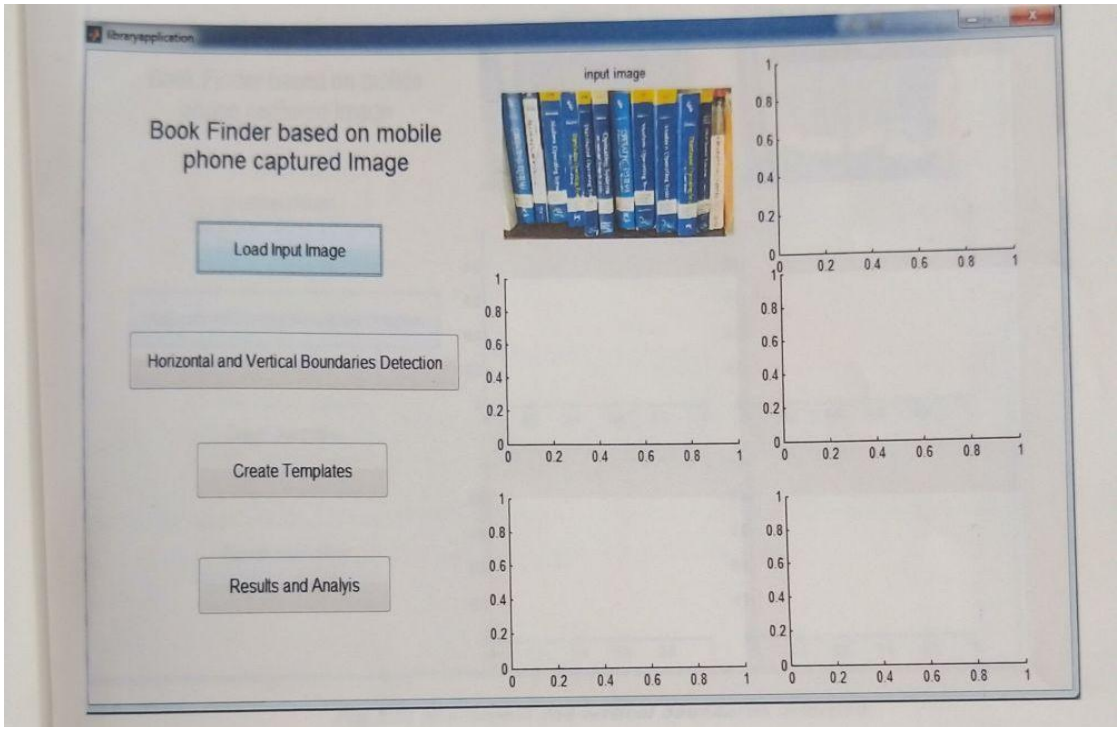
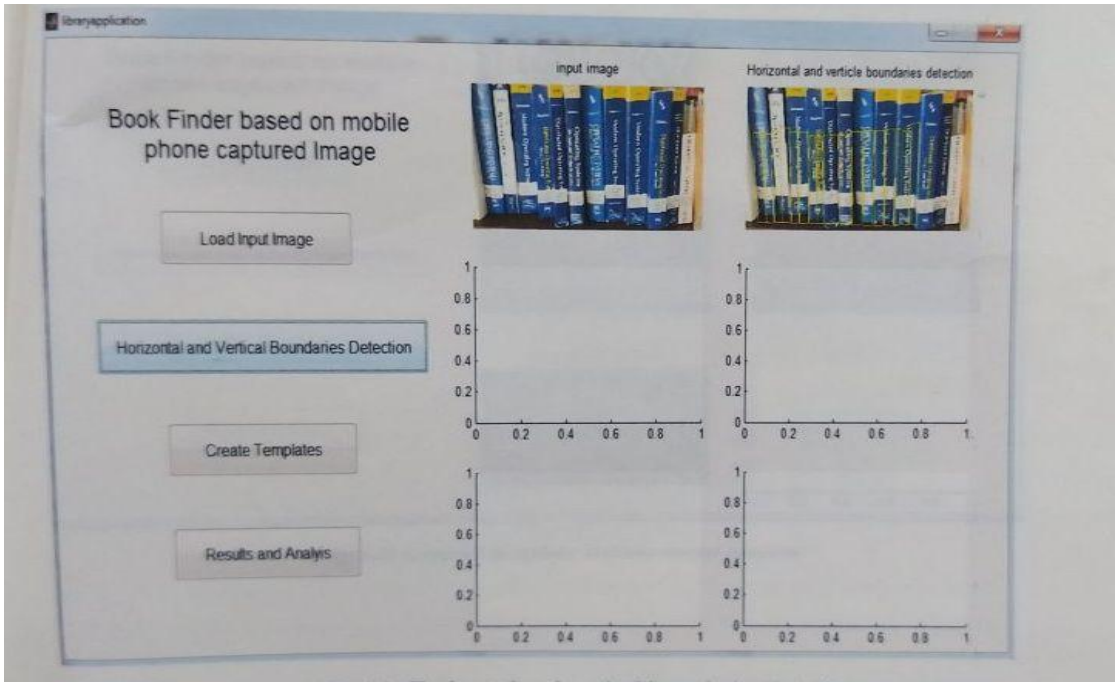
III. RESULTS AND ANALYSIS:



FRONT WINDOW



HORIZONTAL AND VERTICAL BOUNDARY DETECTION

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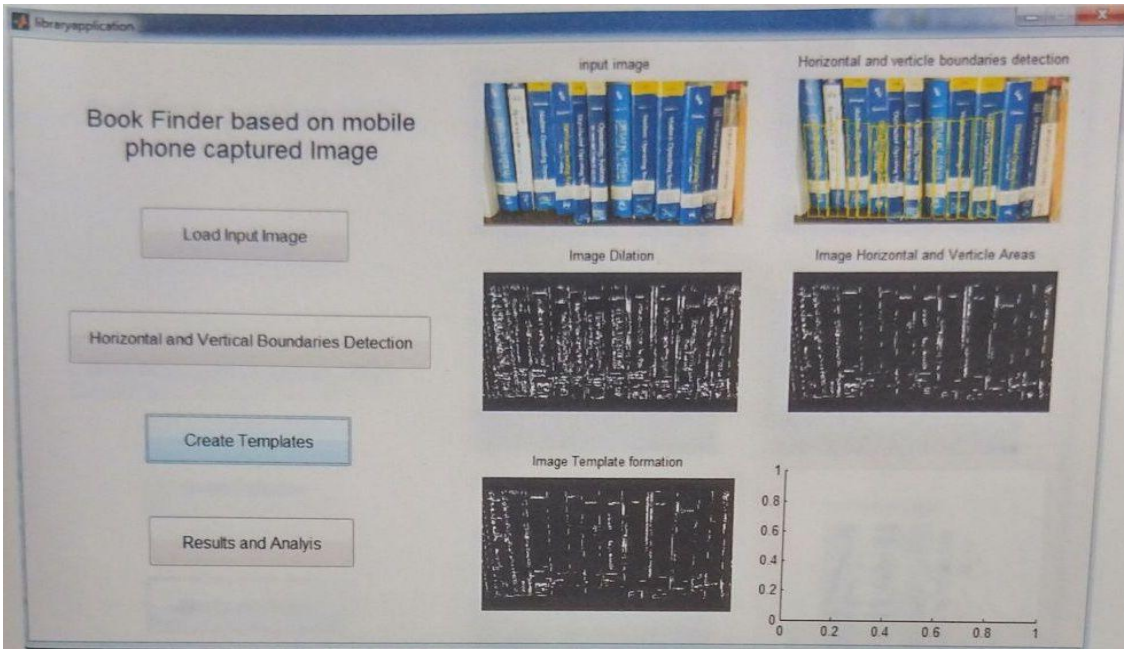
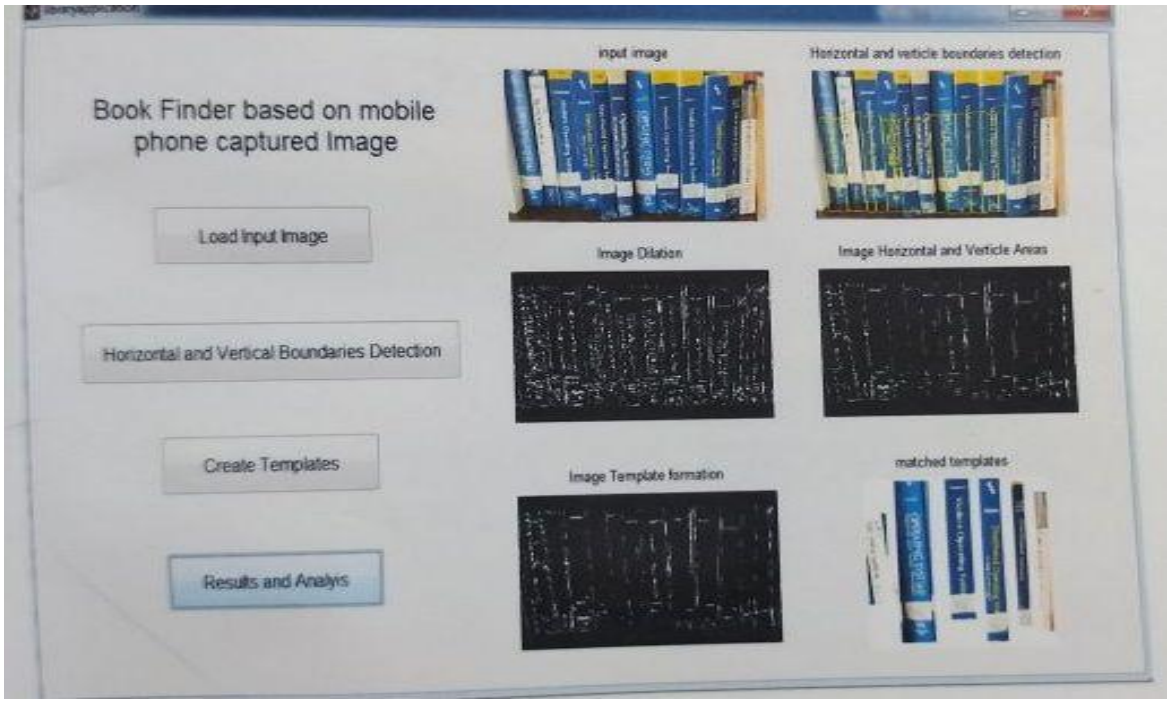


CREATED TEMPLETE ENHANCEMENT PROCESS



DATA SET CONTAINING OF SEVERAL BOOKS FOR OUR APPLICATION
TO SEARCH FOR CORRECT BOOK

IV. CONCLUSION AND FUTURE SCOPE:

We have implemented an application on an Android phone that will help to point out the correct book in the rack of books through reading the spine of that particular book. This Android application is fast, since the algorithm runs locally on a mobile phone, and it is comparatively accurate with an 85% of success rate in pointing out the correct book in the rack of books. Since our algorithm relies on the identification of the book spine and its shape, this Android application is developed in a manner that it can detect both book spines i.e., both the books with text and which lack text on spine and its shape. Further this algorithm can be developed to improve the success of detection by using the color of spine.

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