DOCUMENT SCANNER APPLICATION USING PYTHON

Sachin Parihar[*1], S Ayushman[*2], Rohan Deshpande[*3], Shantanu Pal[*4], Sourabh Yadav[*5], Prof. Akshita Sharma[*6]

[*1,2,3,4,5] Student, Information Technology, Acropolis Institute of Technology and Research Indore, India.

[*6]Associate Professor, Information Technology, Acropolis Institute of Technology and Research, Indore, India.

ABSTRACT

Document Scanner application facilitates easy scanning, storage of photos and important documents online. The application uses python libraries to convert text and images as scanned document. The idea is to select a targeted portion of the document to be scanned and create a clear copy of that in image or pdf format. Hence this application will process the document in various available formats.

Keywords: Scanner, document, conversion, text recognition, image to character.

I.   INTRODUCTION

Doc scanner systems facilitate the initial input, storage, retrieval, and display of digital images. Specialized image processing systems additionally provide for image enhancement, image restoration, image analysis, image compression, and image synthesis. Image enhancement activities include, for example, sharpening edges and adjusting contrast. Restoration activities, like photometric correction, adjust images to compensate for conversion errors. Image analysis may extract features or classify objects within an image, while image compression concerns itself with decreasing the overall size of a digital image file. Finally, image synthesis may incorporate activities like visualization and image mergers. Scanning software may incorporate features of an image processing system for user convenience and effectiveness.

II.   PROBLEM STATEMENT

The main purpose of the Doc Scanner app is to facilitate easy scanning, storage of photos and important documents online. It uses python libraries to convert text and images as a scanned document, selecting a targeted portion of the document to be scanned and creating a clear copy image or pdf format. The application will process the document in various available formats.

III.   PROBLEM DISCUSSION

As the need and demand of all sorts of documents, transportation from one place to another and also the types of formats have kept increasing, so have the overloading and disadvantageous factors that may lead to confusion, innacurracy in conversion and concern. This is why implementing a procedure by means of a document scanner app wherein the quality, backup content, conversion convenience and overall safety of the document and its contents all kept in mind is the intended purpose, by means of Python interface.

IV.   OBJECTIVES

The main objectives of this application are:

1. To develop a scanner application that scans the image and text documents using the web camera and its features.

2. To deliver better scanned images and documents.

3. To minimize additional amounts of storage and focus on the exact content mentioned by the user.

4.   To provide authenticity and reliability.

5.   To create backups and avoid interruption.

V.   SYSTEM ANALYSIS

Suppose, there are 60 students in a classroom as an overall entity for which this app is intended. Knowing all attendants of the classroom can we provide them access to the scanner app interface which can be utilized by them whenever they need it irrespective of wherever they are. The app is equipped with mobility and flexibility in being able to convert to any format as required by the user. Given that the studied scope is kept at a particular entity, this not only provides security but prevents external malware and interruptions from taking place anywhere in between.

VI.   SOLUTION

This project includes a important desktop Application whose name is "Document Scanner." This application is used by the participants of an entity such as a classroom to upload their documents and be able to scan exactly what they need with available formats at a reasonable amount of time.

Scanning contents in this app is easier than a regular public app where ads and unwanted suspicions may occur. The user will benefit immensely by the elimination of geographical constraint and time limitation. There are existing apps with advanced features but the primary goal of this app is to keep a number of useful specifications available without any loss of data or other problems to the user.

VII.   METHODOLOGY

Document scanner scans the image and text documents using the web camera and deliver better scanned images and documents which can be further utilized by as per the need and demand. Document Scanner App is developed using python and its libraries. The working of doc scanner involves following steps and ways:

a). Select Image.

b). Scan the Image

c). Save the Scanned Image

d). Recognize Text

e). Save the Output Text

a). Select Image:

We use a GUI based image selection option. It will direct the user to a dialog box which will show the file explorer of the system from where the image can be selected manually. This option is very handy to use.

b). Scan the Image:

This step involves the scanning of image which further involves three sub steps. They are as follows:

- Edge Detection
- Finding Contours
- Perspective Transform

Edge Detection:

To detect the edge of image the canny edge detector algorithm is used. The canny edge detector algorithm was developed in 1986 by John F. Canny.

The Canny edge detection algorithm is composed of 5 steps:

1). Noise reduction;

2). Gradient calculation;

3) .Non-maximum suppression;

4). Double threshold;

5). Edge Tracking by Hysteresis.

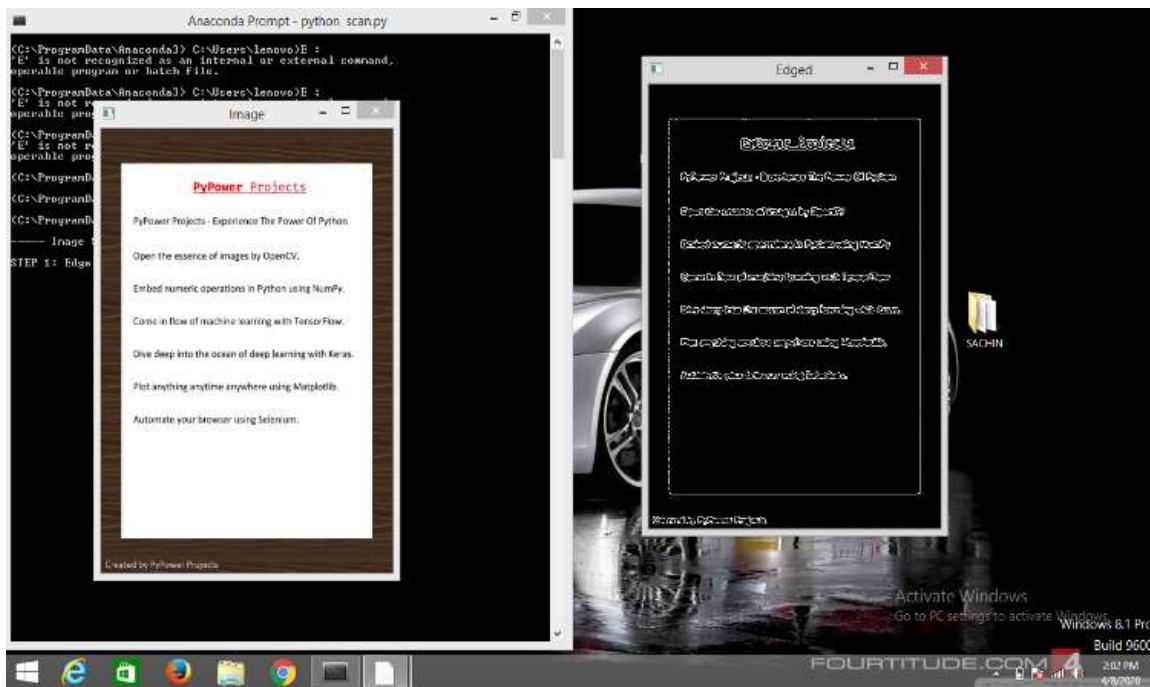After applying these steps, you will be able to get the following -

Fig-1: Edge detection of image**.**

Finding Contours:-

A contour is a closed curve joining all the continuous points having some color or intensity, they represent the shapes of objects found in an image. Contour detection is a useful technique for shape analysis and object detection and recognition.

For a better accuracy, here is the whole pipeline that we gonna follow to successfully detect contours in an image:

- Convert the image to a binary image, it is a common practice for the input image to be a binary image (which should be a result of a thresholded image or edge detection).

- Finding the contours using find Contours() OpenCV function.

- Draw these contours and show the image.

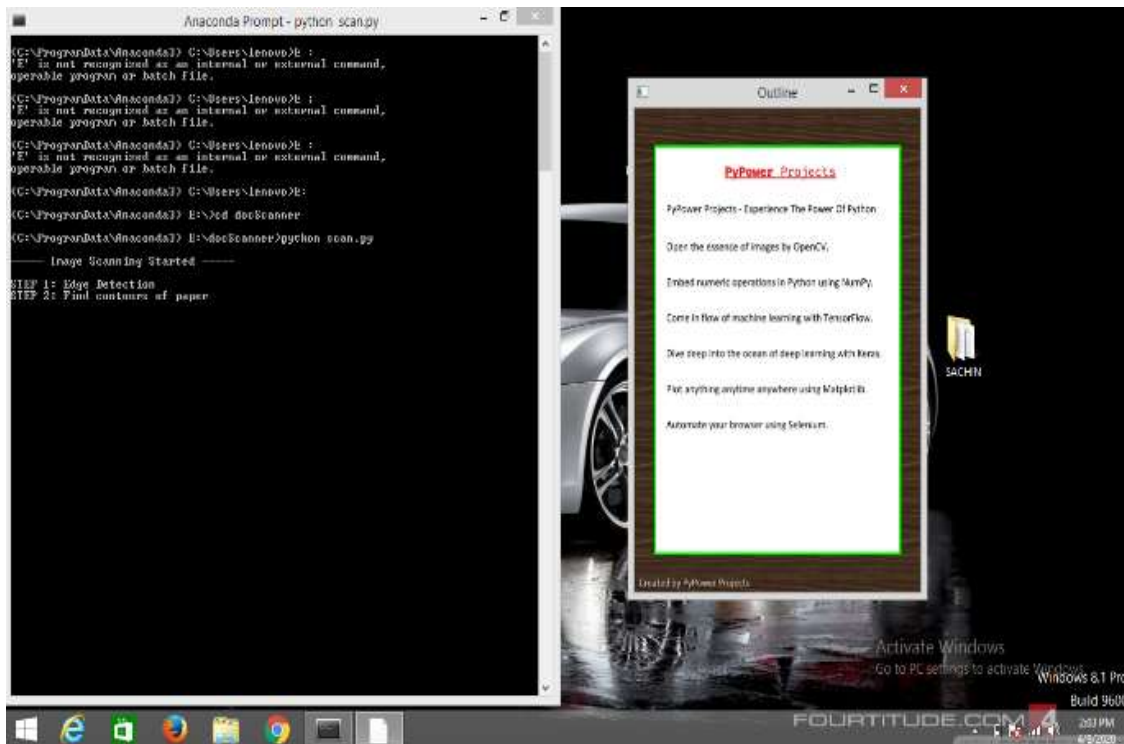After applying these steps, you will be able to get the following

Fig-2: Contours of image.

Perspective Transform :

The Perspective Transformation is that operation that we use when we want to change the perspective of an object.

How to do perspective transformation?

- First we need to load the image we want to transform

- We then need to select 4 points, in order: top-left, top-right, bottom-left, bottom-right.

- Then drawing a circle to show the exact points we are taking.

- create a list with this 4 points, and we'll use this list later to apply the transformation

- create a new set of 4 points. This 4 points are the size of the new window where we want to display the image transformed.

- Then we apply the perspective transform to create the matrix and finally we can warp the image into using the original frame and the matrix just created.

- Then we can show it on the screen.

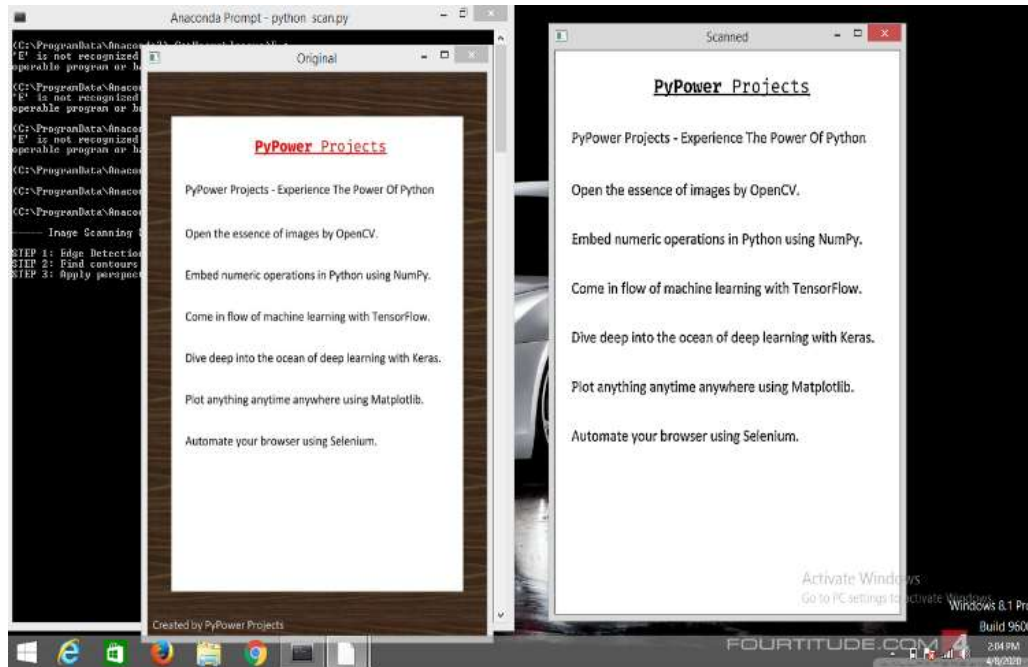After applying these steps, you will be able to get the following:

Fig-3: image after transformation.

c). Save the Scanned Image:

This step is concerned with the saving of the scanned image which can be used ahead for the further task. The image is stored in a particular format such as png or jpg.

d). Recognize Text:

This step is responsible for extracting the text portion from the image that is being scanned. This also allows us to select a targeted portion of the document to be scanned and create a clear copy. It returns the scanned copy of text in grey scale as an output.

e). Save the Output Text:

This step is concerned with the saving of the output text. This copy can be used for further tasks such as uploading or sharing of documents

VIII. CONCLUSION

The Doc Scanner App implemented using python fully meets the objectives for which it has been developed. It operates at a high level of accuracy and the user associated with the system understands its advantage. It was intended to solve the problem as per requirement specification and does this successfully by saving a lot of time, manual effort and extra expenses. Moreover, it makes the task of sharing and uploading documents easier and faster.

IX. REFERENCES

[1] G. T. Shrivakshan and Dr. C. Chandrasekar, "A Comparison of various Edge Detection Techniques used in Image Processing", International Journal of Computer Science Issues, Vol. 9, Issue 5, No 1, September 2012.

[2] WenshuoGao, et.al. ; "An improved Sobel edge detection", Computer Science and Information Technology (ICCSIT), 2010 3rd IEEE International Conference, China, Volume: 5,pp. 67 – 71, 9-11 July 2010.

[3] Bao, P., Zhang, L., Wu, X.: Canny Edge Detection Enhancement by Scale Multiplication. IEEE Trans. on PAMI 27(9), 1485–1490 (2005).

[4] Muthukrishman, R. and M. Radha., "Edge Detection Techniques for Image Segmentation," International Journal of Computer Science & Information Technology (IJCSIT), Vol. 3, No. 6, Dec. 2011.

[5] D. B. Dhar and B. Chanda, "Extraction and recognition of geographical features from paper maps," International Journal on Document Analysis and Recognition, vol. 8, no. 4, pp. 232– 245, 2006.

[6] R. Pradhan, S. Kumar, R. Agarwal, M. P. Pradhan, and M. K. Ghose, "Contour line tracing algorithm for digital topographic maps," International Journal of Image Processing, vol. 4, no. 2, pp. 156–163, 2010.

[7] Zhang J. Research on the geometric distortion auto-correction algorithm for image scanned. Applied Mechanics and Materials, 2014, 3468(644): 30–44

[8] Namboodiri, A., Jain, A.K. (2007)"Document Structure and Layout Analysis", Digital Doc Proc: Major Dir. and Recent Adv.