A Novel Method for Improving Web Page Search using Raspberry Pi

T.Deepika[1] Mr. Gopalakrishnan[2]
[1]P.G. Scholar [2]Assistnat Professor
[1,2]Department of Electrical and Electronics Engineering
[1]Anna University, Tamil Nadu, India.
[2]Kongunadu College of Engineering &Technology, Tamil Nadu, India

Abstract— Search engine is very helpful to provide information about things. But in the modern world, text based search consumed more time and produce small typing error due to carelessness. In this system provide high accuracy and fast with no typing necessary. Take input as snap a picture by using a camera and compares to its database and provide detail of image. This technology is entirely eradicated the problem of text based search and extracts the information regarding the image. To find the capture image from a complex background using feature extraction method. Raspberry pi is used for comparing the original image and capture images with LAN connection. The Raspberry Pi is a compact size and it has inbuilt all the component like as processor. It's only running on Linux operating system and eliminates on-board non-volatile memory because the entire databases are stored in SD card. The HDMI cable is connected to the monitor for display the detail of the capture image information

Key words: Raspberry pi, Camera, MATLAB, Linux

I. INTRODUCTION

Web search engine is the set of program that is used for providing information about typing text query detail. This project is used very effective search engine used to browse directly in web server instead of the web browser and the main component is raspberry pi. Raspberry Pi is the compact sized single board computer, system on chip. The camera is the best role in the paper because input as an image. The captured image is extracted from the complex background using feature extraction method. The typing detail is comparing the stored keyword in the web browser. If the typing text is incorrect, that is not matched to the original information.

The web engine is provided an index of the query image by comparing the stored keyword. The unrelated information is present in web pages while result set is more. This problem is reduced by using prototype based on re ranking image search. The highest rank image is called trainer data (noisy) and its improve by visual classifier[1]. Performance of search is improved by using, exploiting image contents in web search. The multimedia information contains large detail so searching process is inconvenient, this method has easily solved the problem. The query image information is analyzed by using the density of the visual feature space[2]. Classifier is the important part of the web search engine. The efficient object category recognition method is providing efficient construction and suitable classifier with accuracy. In this system, it associate visional classes pertinent to the semantic meaning [3]. Suppose to finding detail about the physical object in the webpage, Picture based question answering method is used. It is used in online albums, text based QA and mobile application. In this method is depends on the template, information retrieval and human-computation[4]. Re ranking is the best method to reduce unrelated image while result set is more. Reranking is automatically generated for the given query image by using Harvesting image databases from the web. The main process removes unrelated data and re-rank is established. The top ranked image used as training data[5]. The current state of the art approach is unsuitable for real world web search engine because its need training models for each new query. This problem is reduced by the Generic classifier method. In this method depend on new queries without extra training and it improves query-relative feature over the raw search ranking[6]. For difficult analysis, search engine are one of the difficult tool. At the present time, we have more number of pioneering search engine designed for searching complicated detail and leading advantage is to reduce the searching time and also it provide related clear information. Same way indri system is shown how the query language is designed to support a model language technology[7]. The complex loss function is alters the enactment of search engine. It is overcome by using Regression convergence analysis of algorithms. It mainly used for reducing the quadratic upper boundary of the loss function[8].

II. PROPOSED SYSTEM

The main aim of the project is providing information about unknown objects using image. It is faster and more accurate then text based search methods. In this method eliminate typing error and increase processing time. Raspberry pi processor as an implementing platform. Raspberry pi is the compact sized device or such. Such means System on Chip, it has all the required electronics components on system chip and cost reduction. The Camera is the important role of this project and it captures the query image. The camera take a snap of query image from real time like as video. The query image is colour image and it convert to a gray image because all the colour present in the same memory. The captured image is presented in the complex background and extract from the background using background subtraction. Gradient method is used for feature extraction of the query image. Mapping method is used for select the necessary region. The edge detection method is used for finding a query image. The camera is connected to the Raspberry pi kit and it compares to the query image with a database. All the database all stored in SD card. The query image information is matched to the database and display information on the monitor.

III. METHODOLOGY

Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Usually Image

Processing system includes treating images as two dimensional signals while applying already set signal processing methods to them.

It is among rapidly growing technologies today, with its applications in various aspects of a business. Image Processing forms core research area within engineering and computer science disciplines too.

Image processing basically includes the following three steps.

1) Importing the image with optical scanner or by digital photography.
2) Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs.
3) Output is the last stage in which result can be altered image or report that is based on image analysis.

Figure 1 show which methodology used in proposed method as below:

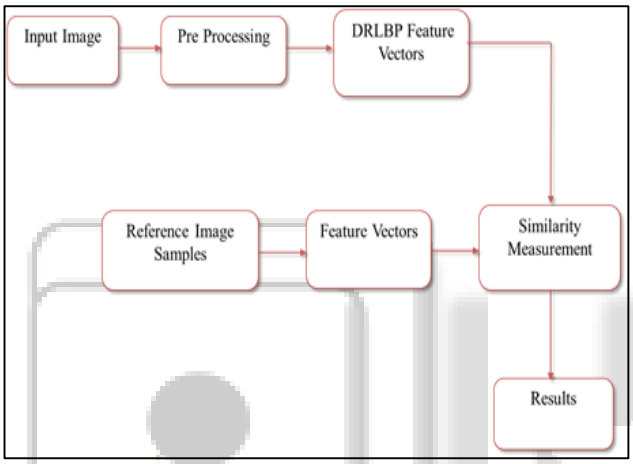

Fig. 1: Block diagram of image processing

The purpose of image processing is divided into 5 groups. They are:

1) Visualization - Observe the objects that are not visible.
2) Image sharpening and restoration - To create a better image.
3) Image retrieval - Seek for the image of interest.
4) Measurement of pattern – Measures various objects in an image.
5) Image Recognition – Distinguish the objects in an image.

The two types of methods used for Image Processing are Analog and Digital Image Processing. Analog or visual techniques of image processing can be used for the hard copies like printouts and photographs. Image analysts use various fundamentals of interpretation while using these visual techniques. The image processing is not just confined to area that has to be studied but on knowledge of analyst. Association is another important tool in image processing through visual techniques. So analysts apply a combination of personal knowledge and collateral data to image processing.Digital Processing techniques help in manipulation of the digital images by using computers. As raw data from imaging sensors from satellite platform contains deficiencies. To get over such flaws and to get originality of information, it has to undergo various phases of processing. The three general phases that all types of data have to undergo while using digital technique are Pre-processing, enhancement and display, information extraction.

A. Image Recognition

Our project is prototype system of assistive image recognition. The system framework consists of three functional components: scene capture, data processing, and monitor.

The data processing component is used for deploying our proposed algorithms, including 1) object-of-interest detection to selectively extract the image of the object held by the user from the cluttered background or other neutral objects in the camera view; and 2) text localization to obtain image regions containing text, and text recognition to transform image-based text information into readable codes. We use raspberry pi as the processing device in our current prototype system. The output component is to inform the user of reorganized image codes. An Ethernet cable with monitor is employed for display the capture image information.This simple hardware configuration ensures the portability of the assistive text reading system. Figure depicts a work flowchart of the prototype system. A frame sequence V is captured by a camera worn by users, containing their objects and cluttered back- ground. To extract text information from the objects, motion- based object detection is first applied to determine the user's object of interest S by shaking the object while recording video

$$S = 1/|V| \sum R(Vi,B)$$

Where Vi denotes the ith frame in the captured sequence, |V |denotes the number of frames, B denotes the estimated back-ground from motion-based object detection, and R represents the calculated foreground object at each frame. The object of interest is localized by the average of foreground masks.

Next, our novel proposed text localization algorithm is applied to the object of interest to extract text regions. At first, candidate text regions are generated by layout analysis of colour uniformity and horizontal alignment

$$XC = \text{argmaxs } \epsilon SL(s)$$

Where L (•) denotes the suitability responses of text layout and XC denotes the candidate text regions from object of interest S. Then, a text classifier is generated from a Cascade-Adaboost learning model, by using stroke orientations and edge distributions of text characters as features.

$$X=H[XC]=H[\text{argmaxs } \epsilon SL(s)]$$

Where H denotes the Cascade-Adaboost classifier and X denotes the localized image regions. After image region localization, off-the-shelf OCR is employed to perform text recognition in the localized image regions. The recognized information is display in the monitor.

Our main contributions embodied in this prototype system are:

1) A novel motion-based algorithm to solve the aiming problem for users by their simply shaking the object of interest for a brief period
2) A novel algorithm of automatic image localization to extract text regions from complex background and multiple image patterns and
3) A portable camera-based assistive framework to persons reading text from hand-held objects. Algorithms of the proposed system are evaluated over images captured by users using the described techniques.

The pre-processing of the pictures consisted of the following steps:

- Get the image from camera
- Convert the picture to 8 bit gravy scale image
- Apply thresholding to get only black and white picture
- Cut out the letters

B. Image Capturing

First, we get the frames continuously from the camera and send it to the process.

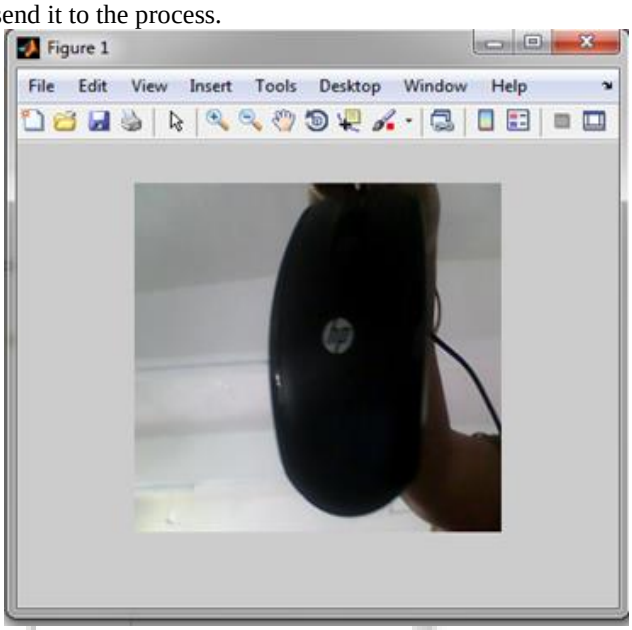

Fig. 2: Original image

Once the object of interest is extracted from the camera image using haar cascade classifier, subsequent process can be done using following steps.

C. Original Image:

Figure 2 shows the camera capture the original image

D. Converting To Gray-Scale

Conversion to Gray-scale can be done in OpenCV with three lines of code and by using thecvCvtColor () function. Figure 3 shows the gray scale image.

Fig. 3: Gray-scale image

The reason we had to convert our image to Gray-scale was because thresholding could be applied to monochrome pictures only.

E. Thresholding:

In an 8 bit image each pixel is represented by one number from 0 to 255 where 0 is black and 255 is white. The simplest way to convert the image to black and white pixels would be to select one value, let's say 128 and consider all pixels that have higher value to be white and the others black. The biggest problem with this approach is that the brightness can vary from picture to picture and as a result some images might become totally black while others are entirely white. The solution to this is something called thresholding. In OpenCV it is implemented in a function cvThreshold. The code that we used to get the result on Figure:

CvThreshold (out, out, 0, 255, CV_THRESH_BINARY);

IV. HARDWARE DESCRIPTION

Figure 4 shows how to hardware woking in the proposed method as below:

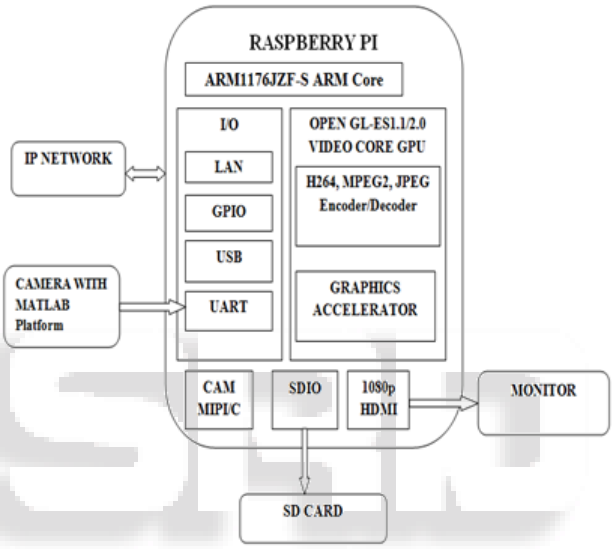

Fig. 4: Block diagram

A. Camera:

The camera is the important role of this project because input as a snap of picture. The camera is connected to the Raspberry pi using UART. It's take a input from video using pause command. The image is arranged in the row and column vice and this project used [256,256] rows and columns. The camera capture is the image is colour image and converts a gray image because it stored the entire colour in small space. The converted gray image is applied to the LBP. LBP is an image operator that is used for find the edge of the image. The edge is defined out layer of an input image. The Histogram method is used for remove the noise present in the query images. This output is given to the Raspberry pi.

B. Raspberry Pi:

The Raspberry pi is small size device and it has inbuilt all the component like as ARM1176JZF-S. It is low cost and reduces system complexity. It is operate in Linux operating system. Raspberry pi is the programmed computer and stores data in SD card. The camera output is compared to the stored database with LAN connection. IP network is connected to the LAN for provide internet for this project. Reference sampled image is stored in the database. Feature extraction method is used to define feature of an input image. The input image is applied to the pre-processing method for identify

process. Both pre-processing and feature extraction method compares and produces results.

C. SD Card:

SD Card is used for storage purpose and reduces non-volatile memory in on-board. In this project is used 32GB memory card and store the all necessary database. An operating system is installing onto SD Card because Raspberry pi used this project.

D. Monitor:

The HDMI cable are used connect the monitor to the Raspberry pi. The monitor is display the output of the query image. The query image detail is compared to the reference sampled image, if both details are same and display the query image using LAN connection.

V. RESULT

MATLAB platform is used to simulate the input image and the result is compared with database image, if it matches, result will display and if it doesn't, there won't be any result.

A. ImageL:

The reference sampled image is stored in database. The input as a snap of image and snap image is converting to a gray image. If the two images matches next process will obtained. Otherwise it results as incorrect image.

B. LBP Code:

LBP method is an image operator that is used for arranged the image in row and column vice. In this method used to find the edge of the input image.

C. Histogram:

Histogram is the graphical representation that is used to remove the noise from input image.

VI. EXPERIMENTAL RESULTS

Figure 5 shows screen shot of the open cv process. The opencv process such as capturing image, processing the image and display the information of the image.

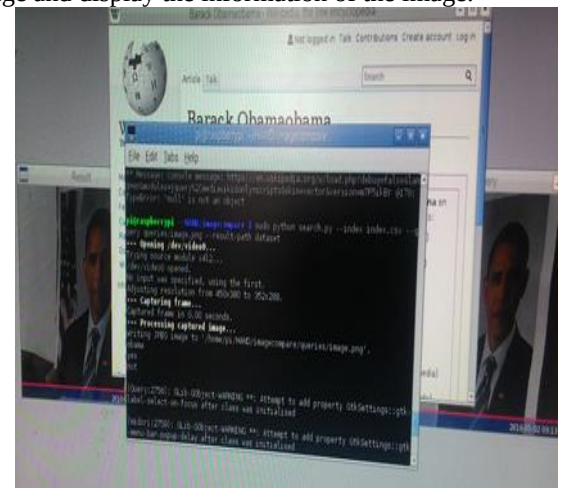

Fig. 5: OpenCV process

Fig. 6: Camera capture the image

Figure 6 shows screen shot of camera capture the image and display the detail of the image in the monitor. Figure 7 shows screen shot of the monitor display the detail of the image. Figure 8 shows screenshot of the raspberry pi.

Fig. 7: Output of the monitor

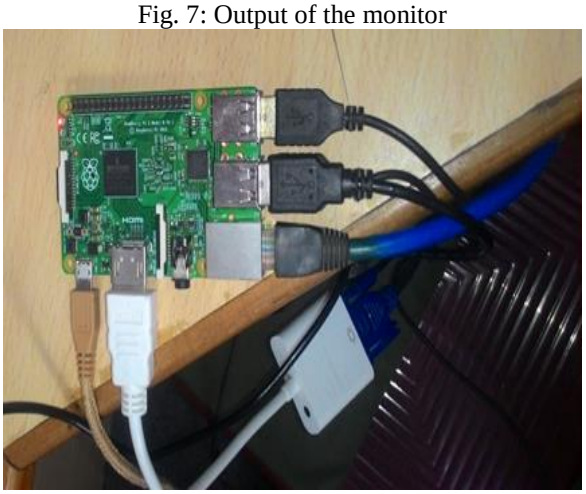

Fig. 8: Connection of raspberry pi

VII. CONCLUSION AND FUTURE WORK

This system will take input as a snap of images from the camera. The input image is compared with the database image, if it matched, then display the information in the web browser by connecting the raspberry pi with LAN connection. It is an advanced search engine than now available search engines. It is also useful for real time applications such as hospital, industrial, military, etc. In future, it can be done in python language in open CV platform by giving input as the video also.

ACKNOWLEDGMENT

This work was supported by our well-wisher. We would like to thank them for vital encouragement, support and lab facilities provided for our work. They kindly read our paper and offered invaluable detailed advices on grammar, organization, and the theme of the paper

REFERENCES

[1] Prof. C. M. Jadhav, Ms. Swati R. Murumkar" Improving Web Image Search using Reranking" Volume 4, Issue 11, November 2014.
[2] Z.-H. Zhou and H.-B. Dai, "Exploiting image contents in web search." in Proc. Int. J. Conf. Artif. Intell., 2007, pp. 2922–2927.
[3] L. Torresani, M. Szummer, and A. W. Fitzgibbon, "Efficient object category recognition using classemes," in Proc. Eur. Conf. Comput. Vis., 2010, pp. 776–789.
[4] T. Yeh, J. J. Lee, and T. Darrell, "Photo-based question answering," in Proc. 16th ACM Int. Conf. Multimedia, ser. MM '08, New York, NY, USA: ACM, 2008, pp. 389–398.
[5] F. Schroff, A. Criminisi, and A. Zisserman, "Harvesting image databases from the web," IEEE Trans. Pattern Anal. Mach. Intell.,vol. 33, no. 4, pp. 754–766, Apr. 2011.
[6] J. Krapac, M. Allan, J. J. Verbeek, and F. Jurie, "Improving web image search results using query-relative classifiers," in Proc.IEEE Conf. Comput. Vis. Pattern Recognit., 2010, pp. 1094–1101.
[7] T. Strohman, D. Metzler, H. Turtle, and W. B. Croft, "Indri: A language-model based search engine for complex queries," in Proc. Int. Conf. Intell. Anal., vol. 2, no. 6, 2005, pp. 2–7.
[8] Z. Zheng, H. Zha, T. Zhang, O. Chapelle, K. Chen, and G. Sun, "A general boosting method and its application to learning ranking functions for web search," in Proc. Neural Inf. Process. Syst., 2007, pp. 1697–1704.

