Portable Data Compiler

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Abstract— In Modern century data compilation is very important task in industrial as well as for educational purpose. Data compiler uses digital image processing concept to resolve problem faced in pedagogy and industrial sectors. It uses high quality camera and different methods of image processing for data compilation from an image taken by camera. It also allows user to auto identify of different input source and display quick information related to the source. In this technology, the implementation of a new concept for image capturing, image drawing and hand gesture control using image processing is done.Every day we use our gestures to interact with everyone. Gestures play an important role in our life. This software is helpful in using the digital world through our gestures. It provides a link between the digital world and the real object world. We can use our fingers for movements rather than using mouse and much more like this through this software. It also makes computing very easy and more interactive. In this technology, we are focusing on Image processing concept. By using image processing concept this portable data compiler gives the way to collect the specific data from discrete sources like books, articles, novels, newspaper etc. which provides liberty to the user to have his desired data in various format like image, editable text format which can be stored on desktop or on a portable data devices such as pendrives etc.

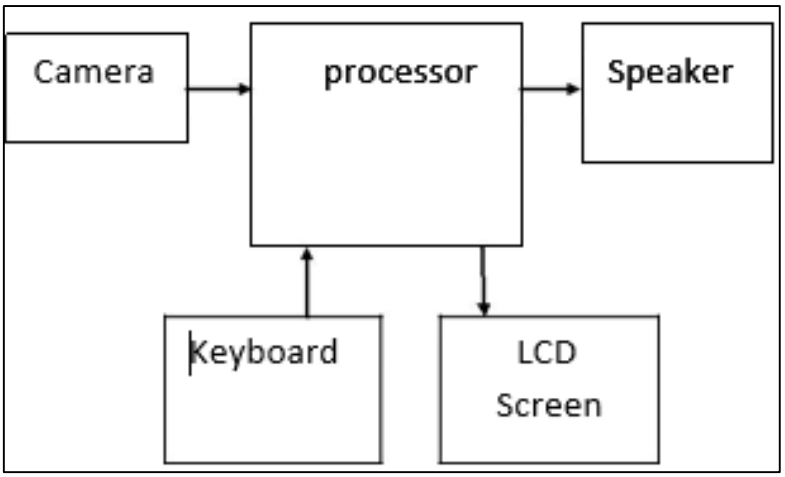
Key words: Data compiler,Gestures

I. INTRODUCTION

This project evolved over millions of years to sense the world around us. The information helps us make decisions and chose the right actions to take. But arguably the most useful information that can help to make the right decision is not naturally perceivable with our five senses, namely the data, information and knowledge thatMankind has accumulated about everything and which is increasingly all available online .After some development or civilization also adopted the digital form of information which is very significant and vital role in our day to day life, but having such a sort of information highly dependent on large or expensive hardware.

To overcome such problems everyone trying to have their own information or needed information with them at anytime and anywhere. To resolve this we come up With an idea that can help both literate and illiterate people. By converting various format of information for literate person and in voice format for blind and illiterate person. Although the miniaturization of computing devices allows us to carry computers in our pockets, keeping people continually connected to the digital world, there is no link between our digital devices and interactions with the physical world. Information is confined traditionally on paper or digitally on a screen. Portable Data Compiler (PDC) bridges this gap, bringing intangible, digital information out into the tangible world, and allowing people to interact with this information via natural hand gestures.

II. SYSTEM DESIGN AT CUSTOMER SIDE



Description: It will show the working of system at customer side. here camera is used to take an image and given processor and speaker and LCD is used for output. Processor will convert the text image into editable word format which is saved in notepad and keyboard is used here to make changes in the document taken by camera.Speaker is read text written in document output as sound.

III. WORKING

Block Diagram:

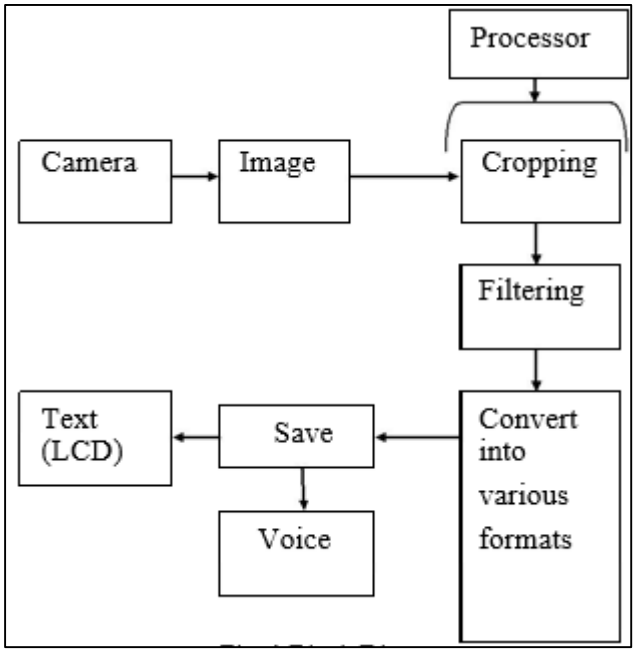


Fig. 1: Block Diagram

Description- Keep image in front of camera, Orientation of the object should be perpendicular to webcam. User has to wear different colour sticker of finger tip so that finger can be recognized in a differential manner by the system. Here we are using two different colour stickers. One is red and another is blue. Take the image with the help of this sticker. Position of sticker should be diagonal. Camera will take the image of the text or document. Then input image is given to matlab for processing. In the processing first the image is crop by the matlab with the help of stickers and finds its centroid and according to it cropping of image will done. After cropping of image cropped image goes for filtering here the median filter is used for filtering purpose and then image goes for edge detection process. All this process is done in the matlab OCR (Optical Character Recognition) tools. Here cropping and filtering is done in OCR tool of matlab Then Matlab will process and gives output in the form of text which will be stored in the notepad. In notepad user can edit the data or text taken by the camera according to their need and store it in memory of processor and can taken into pen drive also. The text written in the notepad can also me read by using speaker. Speaker will produce the output in sound form which is helpful for the illiterate as well as blind person.

IV. COMPONENTS APPLIED

A. Camera:

Fig. 2: Camera

It is used to capture the image which is an input image given to Matlab for sound output and convert into notepad. A webcam captures and recognizes letters in view and tracks the user's hand gestures using co mputer-vision based techniques and crop that part of image only. It sends the data to the computer. The camera, in a sense, acts as a digital eye, seeing what the user sees. It also tracks the movements of the thumbs and index fingers of both of the use hands. The camera recognizes captured letters and sends it to matlab.

B. Color Stickers (R G B):

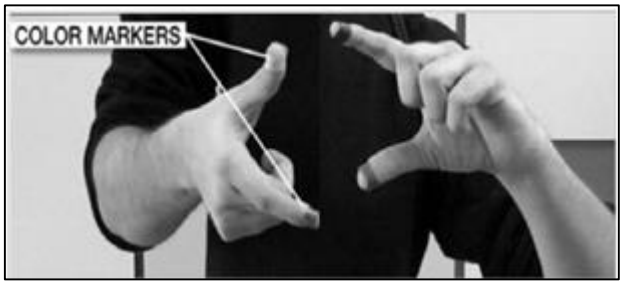


Fig. 3: Colour stickers (R G B)

It is at the tip of the user's fingers. Marking the user's fingers with red, green, and Blue tape helps the webcam recognize gestures. The movements and arrangements of these Markers are interpreted into gestures that act as interaction instructions for the projected application interface.

C. Speaker:

Fig. 4: Speaker

Speaker is an audio device which is used for the output module for this project. As describe in this project the output of this project is in teo form first one is the output in the text format in the notepad which is editable according to the user convenience and second one is in the form of speech. For the speech for we need a high performance speaker module which is able to reduce the noise in the audio format. Speaker is used to give the output in sound form.

V. SOFTWARE DESCRIPTION

A. Image Processing With MATLAB:

Images are everywhere, from everyday devices like cameras and smart phones to specialized devices for medical imaging, automotive safety, industrial automation, and more. Each of these uses for image processing has unique challenges. MATLAB and Image Processing Toolbox provide a flexible environment to explore design ideas and create unique solutions for imaging systems.Matlab toolbox used in our project is as follows:
Image acquisition Toolbox. Image processing toolbox GUI builder.

1) Image Acquisition Toolbox:

The Image Acquisition Toolbox is a collection of functions that extend the capability of the MATLAB® numeric computing environment. The toolbox supports a wide range of image acquisition operations, including. Acquiring images through many types of image acquisition devices, from professional grade frame grabbers to USB-based Webcam. Viewing a preview of the live video stream. Triggering acquisitions (includes external hardware triggers). Configuring callback functions that execute when certain events occur. Bringing the image data into the MATLAB workspace.

2) Image Processing Toolbox:

Image Processing Toolbox™ provides a comprehensive set of reference-standard algorithms, functions, and apps for image processing, analysis, visualization, and algorithm development. You can perform image enhancement, image deblurring, feature detection, noise reduction, image segmentation, geometric transformations, and image registration. Many toolbox functions are multithreaded to take advantage of multicore and multiprocessor computers.

Image Processing Toolbox supports a diverse set of image types, including high dynamic range, giga pixel resolution, embedded ICC profile, and tomographic. Visualization functions let you explore an image, examine a region of pixels, adjust the contrast, create contours or histograms, and manipulate regions of interest (ROIs). With toolbox algorithms you can restore degraded images, detect and measure features, analyze shapes and textures, and adjust color balance.

3) Gui Builder:

A graphical user interface (GUI) is a graphical display in one or more windows containing controls, called components that enable a user to perform interactive tasks. The user of the GUI does not have to create a script or type commands at the command line to accomplish the tasks. Unlike coding programs to accomplish tasks, the user of a GUI need not understand the details of how the tasks are performed.

GUI components can include menus, toolbars, push buttons, radio buttons, list boxes, and sliders —just to name a few. GUIs created using MATLAB® tools can also perform any type of computation, read and write data files, communicate with other GUIs, and display data as tables or as plots.

B. OCR Technique In Matlab:

It is used to convert characters in image form to characters in text form. Characters on image can have variations in font types and font sizes.

1) Basics Of OCR:

OCR technology provides reproductive systems by scanning and imaging systems the ability to convert images of characters in a font of machine character can be understood or recognized by a computer. Thus, images of characters in a font of machine are drawn from a bitmap of the image reproduced by the scanner. Thus, images of characters in a font of machine are drawn from a bitmap of the image reproduced by the scanner

The OCR process involves several aspects such as segmentation, feature extraction and classification. Image Processing Toolbox for MATLAB provides a feature set that extends the product's capabilities to develop new algorithms and applications in the field of process and image analysis.

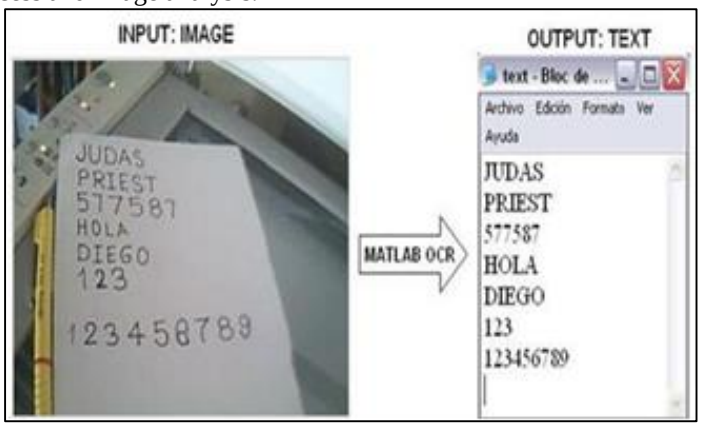


Fig. 5: Input and Output

The environment and create mathematical MATLAB is ideal for image processing, because these images are, after all, dies. This toolbox includes functions for:

- Filter design.
- Improving and retouched images.
- Image Analysis and Statistics.

Image processing is an absolutely crucial area of work for those groups and industries that are working in areas such as medical diagnostics, astronomy, geophysics, science environmental science, data analysis in laboratories, industrial inspection, etc.

C. Median Filter:

In image processing, it is often desirable to be able to perform some kind of noise reduction on an image or signal. The median filter is a nonlinear digital filtering technique, often used to remove noise. Such noise reduction is a typical pre-processing step to improve the results of later processing (for example, edge detection on an image). Median filtering is very widely used in digital image processing because, under certain conditions, it preserves edges while removing noise images quite often contain artifacts known as noise. Noise means, of course, un-wanted sounds occurring in an audition context but the term quickly expanded to other domains, designating the presence of un-wanted randomly disseminated artifacts within any given context. In imaging domain, for instance, one of the frequently occurring noise-types is called salt and pepper noise. Quite an intuitive name, as images affected by this type of noise look like as if salt and pepper particles was poured over the clear image (bright pixels on darker areas and dark pixels on brighter areas of the image).

The usual causes for this issue are hardware related (analoge-to-digital conversion, bit errors in transmissions, etc.).Which brings us to the median filtering, one of the most effective method to remove such noise from images is to apply the median filter

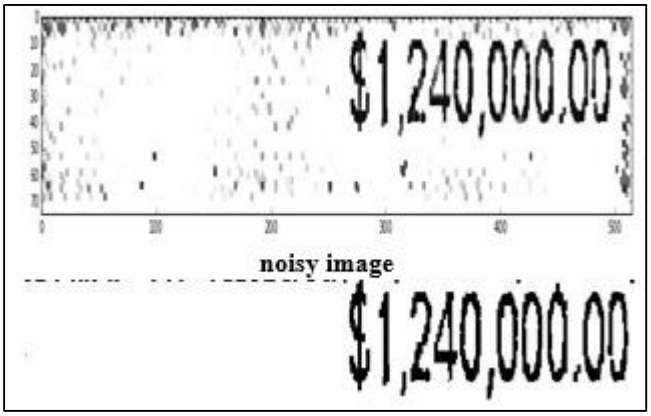


Fig. 6: Median filter

D. Sobel Edge Detection:

Edges characterize boundaries and are therefore a problem of fundamental importance in image processing. Edges in images are areas with strong intensity contrasts – a jump in intensity from one pixel to the next. Edge detecting an image significantly reduces the amount of data and filters out useless information, while preserving the important structural properties in an image. There are many ways to perform edge detection. However, the majority of different methods may be grouped into two categories, gradient and Laplacian. The gradient method detects the edges by looking for the maximum and minimum in the first derivative of the image. The Laplacian method searches for zero crossings in the second derivative of the image to find edges. An edge has the one-dimensional shape of a ramp and calculating the derivative of the image can highlight its location. Suppose we have the following signal, with an edge shown by the jump in intensity below:

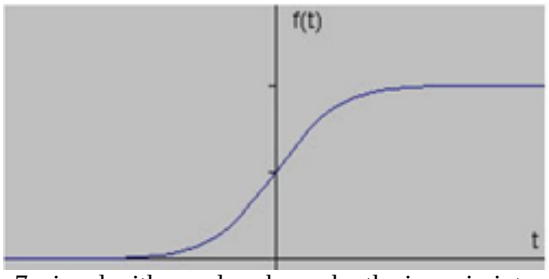


Fig. 7: signal with an edge shown by the jump in intensity

If we take the gradient of this signal (which, in one dimension, is just the first derivative with respect to t) we get the following

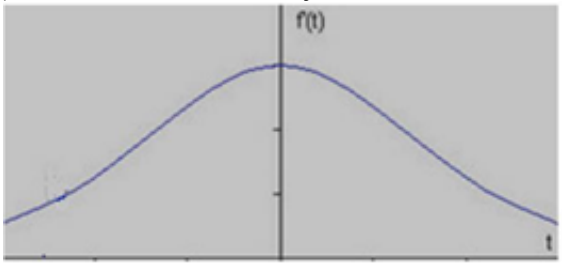


Fig. 8: gradient of the above signal

Clearly, the derivative shows a maximum located at the center of the edge in the original signal. This method of locating an edge is characteristic of the ―gradient filter‖ family of edge detection filters and includes the Sobel method.. A pixel location is declared an edge location if the value of the gradient exceeds some threshold. Edges have higher pixel intensity values than those intensity values surrounding it. So once a threshold is set, we can compare the gradient value to the threshold value and detect an edge whenever the threshold is exceeded. Furthermore, when the first derivative is at a maximum, the second derivative is zero. As a result, another alternative to finding the location of an edge is to locate the zeros in the second derivative. This method is known as the Laplacian and the second derivative of the signal is shown below:

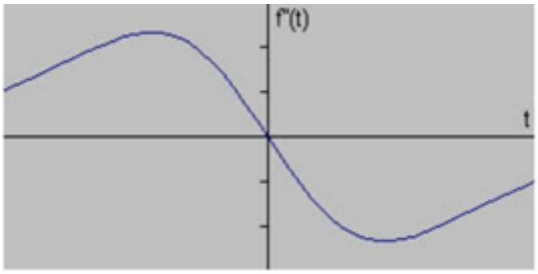


Fig. 9: second derivative of the signal

The Sobel operator performs a 2-D spatial gradient measurement on an image and emphasizes regions of high spatial gradient that correspond to edges. Typically it is used to find the approximate absolute gradient magnitude at each point in an input greyscale image.

Compared to other edge operator, Sobel has two main advantages:

1) Since the introduction of the average factor, it has some smoothing effect to the random noise of the image.
2) Because it is the differential of two rows or two columns, so the elements of the edge on both sides have been enhanced, so that the edge seems thick and bright.

VI. CONCLUSION

This Portable Data Compiler (PDC) comprises the Compact, portable, easily accessible system which allows the user to compile his data from various sources. And data can be converted in to various formats like Images, docs which is editable And we can store the compiled data with or without computer. In Modern century data compilation is very important task in industrial as well as for educational purpose. Data compiler uses digital image processing concept to resolve problem faced in pedagogy and industrial sectors. By using image processing concept this portable data compiler gives the way to collect the specific data from discrete sources like books, articles, novels, newspaper etc. which Provides liberty to the user to have his desired data in various format like image, editable text format which can be stored on desktop or on a portable data devices Such as pen drive and hard disk which can be further used according to person need.

REFERENCES

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[2] Game P. M., Mahajan A.R,‖ A gestural user interface to Interact with computer system‖, International Journal on Science and Technology (IJSAT) Volume II, Issue I, (Jan.-Mar.) 2011, pp.018-027
[3] 1928/9: Gustav Tauschek of Vienna, Austria patents a basic OCR "reading machine." Paul Handel of General Electric files a patent for a similar system in the United States in April 1931. Both are based on the idea of using light-detecting photocells to recognize patterns on paper or card.
[4] 1949: L.E. Flory and W.S. Pike of RCA Laboratories develop a photocell-based machine that can read text to blind people at a rate of 60 words per minute. (Read all about it in the February 1949 issue of Popular Science.)
[5] 1950: David H. Shepard develops machines that can turn printed information into machine-readable form for the US military and later founds a pioneering OCR company called Intelligent Machines Research (IMR). Shepherd also develops a machine-readable font called Farrington B (also called OCR-7B and 7B-OCR), now widely used to print the embossed numbers on credit cards.
[6] 1960: Lawrence (Larry) Roberts,a computer graphics researcher working at MIT, develops early text recognition using specially simplified fonts such as OCR-A. He later becomes one of the founding fathers of the Internet
[7] http://www.ijarcsse.com/docs/papers/Special_Issue/e acm2012/7.pdf