# Tools Identification System with Audio Indication using OCR in LabVIEW

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*Abstract*— There is a great difficulty faced by the blind people who can work with tools like screws, due to similarity in their texture and appearance. Blind people are unable to differentiate tools and thereby they are notable to identify also. Our research article takes up this problem faced by the blind people as primary concern and deals with possible solution for this using OCR in LabVIEW with the help of a USB camera. Different tools are trained by properly describing them. Training helps the system to identify different tools. A blind person will be able to identify tools by himself with the help of a camera.

***Key words:*** OCR, Labview

## I. INTRODUCTION

The recent technology that has been used numerously is image processing. Images can be recognized in many ways by using this technique. One of its forms is OCR. For industrial and commercial applications OCR is employed for identifying the tools type and structure. Optical character recognition processes the image captured by a camera which is an optical source. The object present is identified depending on the light intensity. The implementation of this concept with OCR is accomplished by software called LabVIEW.

"Controlling of electronic equipment using gesture recognition" (2013). It is a technology which aims at interpreting the human gestures and which controls the electronic equipment. These gestures are used to open any forms of application in TV or laptop [1]. "Camera based currency reader for the visually challenged" (2008) – This paper focuses on recognizing U.S currency notes based on pictured obtained. The technique used in this eliminates the background color and environment and focuses on four vital points two in the front and two in the back, centering on the numbers denoted in the currency, and so a voice output indicating the currency's value will be obtained [2].

Our main motive is to identify the type of tools and to specify their names, which helps the visually impaired people by using OCR in LabVIEW.

## II. BLOCK DIAGRAM

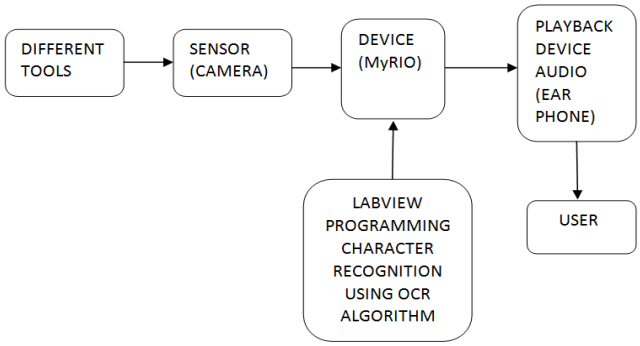


Fig. 1: System Diagram

## III. LABVIEW PLATFORM

Lab View's recent version has been used for our project [LABVIEW 2014]. LabVIEW a Laboratory Virtual Instrumentation Engineering Workbench is a platform and environment for developing visual programming language from National instruments. Dataflow and Graphical are the two ways of programming in LabVIEW. The graphical language is named "G". Originally released for the Apple Macintosh in 1986, LabVIEW is commonly used for data acquisition(DAQ), instrument control, and industrial automation on a variety of stages including Microsoft Windows, various, flavors of Linux, and Mac OS X. LabVIEW is a graphical programming language that uses icons instead of lines of text to create applications. LabVIEW uses dataflow programming, where the flow of data through nodes on the block diagram determines the execution order of the Vis and function. To know the flow of data, highlighting tool present in the block diagram can be used.

Visual Basic, C++, JAVA and any other computer programming are text based, whereas on the other hand LabVIEW is a source for virtual programming.

### *A. Optical Character Recognition:*

The mechanical or electronic conversion of images is converted into machine-encoded text by using OCR. High speed and reliable reading performances are obtained from IMAQ vision in which it is programmed to. The performance of OCR depends on how the captured images are trained. An interface between the OCR session file and the data are created by this training method. In-order to improve the chances of successful recognition OCR provides pre-processing. OCR which is an automatic identification technique is distinctive when compared to all other automatic identification methods. The co-ordinate system will be set previously in the process of shape extraction and it is used to draw the region of interest. The shape will be bounded within the rectangular box once the ROI is set. The obtained information will be compared with the pre-defined character set. OCR will recognize both the hand written and printed text

## IV. MY-RIO

RIO which is a reconfigurable input and output can be used to load bigger programs and can be made into a stand-alone device. One of the recent applications of National instruments is My-RIO. Since it has WIFI capability, once the program is loaded it can run on its own without any human intervention. RIO has a flexible architecture and has many digital/analog input/output lines. By using the PCI bus processor and FPGA can be interfaced.

 

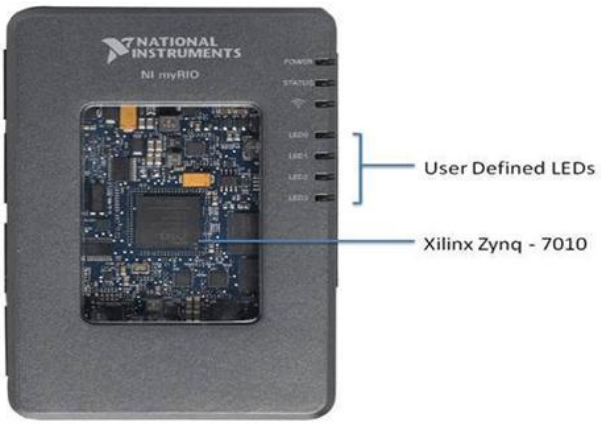


Fig. 2: myRIO

## V. INTERFACING

When the program is been downloaded into RIO, then it can be used without the aid of personal computers. Vision acquisition is used to acquire images readily through the camera which then will be compared with the template image. The NI Vision Acquisition Software is the basic software you need if you need to create Vision Applications for LabVIEW or the .NET platform. The desired will be captured as an image and training will be given for each and every character using OCR. Train single character method will be used here. The respective file can be saved as .abc. Whenever the trained image comes in front of the camera it will be recognized and detected using OCR. Likewise, the same procedure will be repeated for all the trained images. After the recognition, the name of the corresponding image will be displayed in the front panel. Whenever a new image is added, a new case will be added respectively in the case structure. Therefore the number of images that are to be detected will be directly proportional to the number of cases in the case structure. Corresponding audio signal will be generated.

Fig. 3: Headphone

## VI. RESULT

Various tools are detected and recognized along with its size in this section. A test is initialized and started by importing or capturing the first object and sent to computer through interfacing. If the first tool is detected the respective case structure will get the TRUE value and the string "small screw" will be displayed. The matching string will have an index value. And it has its corresponding audio signal which will be generated as shown in following figure.

If the second object is detected the corresponding string "big screw" will be displayed and the respective audio signal is produced.

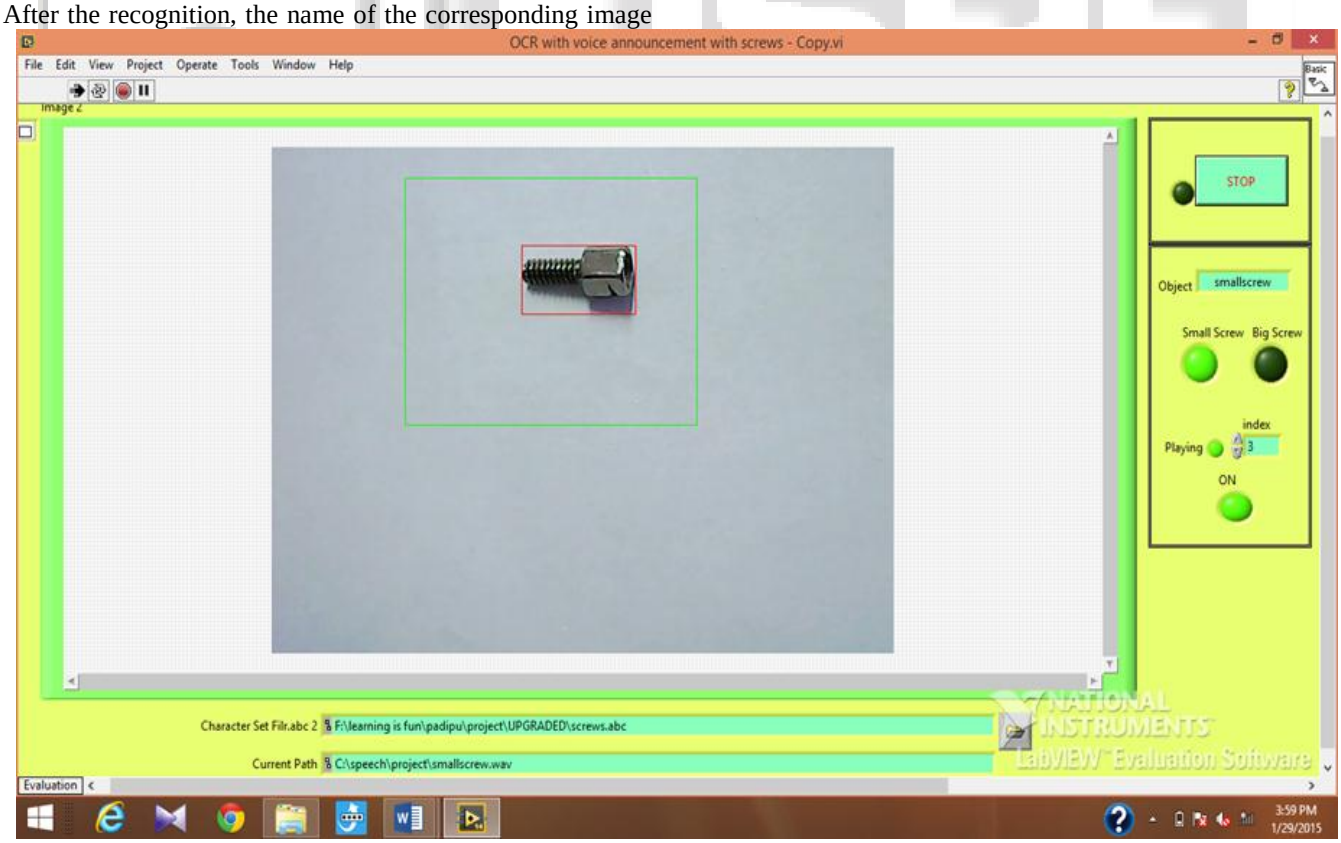


Fig. 4: Front panel for small screw recognition

 

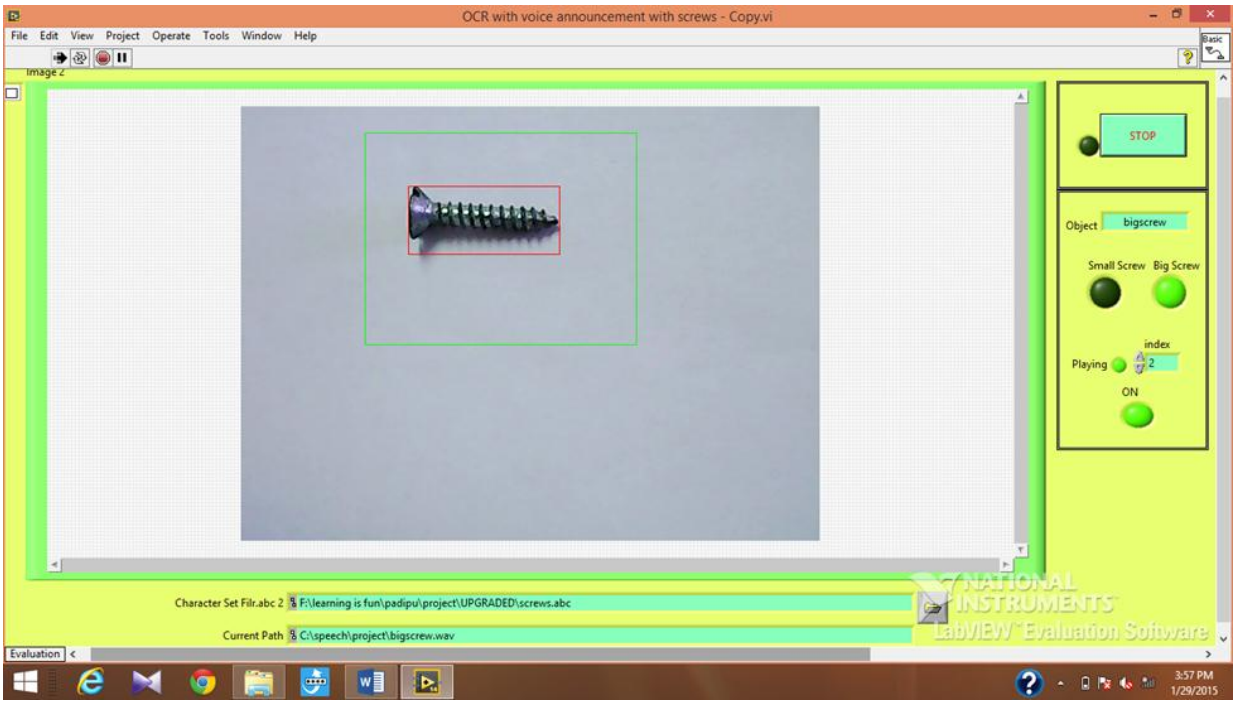


Fig. 5: Front panel for big screw recognition

## VII. CONCLUSION

The recognition of the images has been completed successfully and their names were also displayed in the front panel. The audio signal was trained for a particular image and it will be generated once it gets detected. Likewise, 'n' number of images can be detected using OCR technique in LabVIEW.

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