

Language Translator Using OCR In LabVIEW

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Abstract

Language translation has become very much vital and is used for several applications. The primary objective of this research article is to ensure proper translation of desired and predefined words of a particular language to English along with audio indication, in order to enhance the quality of communication between people from different parts of the world using OCR in LabVIEW. OCR is most widely used for text based searching, character recognition, pattern matching etc. This deals with images of the objects with regard to their orientation and shape. The system is trained by feeding images of the objects and then it is tested by comparing with the images of the same object taken at real time. The trained objects are recognized by the system. This system is used for creating a language translator by training the system to identify most frequently used words in different languages. Our research work also intends to eliminate the problem faced by blind people by providing with an audio indicator.

Keywords: OCR, Labview, Image Processing and Audio Indication, Language Translator.

I. INTRODUCTION

Image processing plays a major role in many applications nowadays. Reading an unknown language for the user can be provided using this technique. Here we used OCR (Optical Character Recognition) for language translator. Dreams in ancient times for reading a normal character has now been greatly improvised using OCR in LabVIEW. You need to understand more in less time to get things done efficiently. Instead of putting different meaning for unknown words, Language translator is a one which helps you to even understand the word of an unknown language by converting it into a word of your known language. The recognition of the words lies in the method of training each and every character present in the unknown word^[1].

An important means for capturing the picture is by a camera. Pixels which are going to give the resolution should be high, so that there is a finite clarity in every work or training we proceed. The identification is much easier when we undergo finite resolutions.

Various predefined character can be recognized by using the OCR algorithm in LabVIEW. Proper description is given for recognizing the character. Once it is recognized the corresponding output will be produced as an audio signal^[2].

II. HARDWARE AND SOFTWARE TOOLS

A. PC with NI LabVIEW:



Fig. 1: PC With LabVIEW

LabVIEW 2014(stands for **L**aboratory **V**irtual **I**nstrumentation **E**ngineering **W**orkbench 2014) is a platform and development environment for a visual programming language from National Instruments. LabVIEW which uses icons for programming instead of lines of coding full of texts^[5,7]. In contrast to text-based programming language, where instruction determine the order of program execution, LabVIEW approaches dataflow programming, where the flow of data through nodes on the block diagram

determines the execution order of the VI's (Virtual Instruments) and function. Virtual instruments symbolize an ultimate modification from conventional hardware-centred instrumentation arrangements to software-centred systems that use the computing power, efficiency, presentation, and connectivity competencies of widespread desktop computers and workspaces. VI in LabVIEW programs imitates the physical instruments [6].

In NI-labVIEW the major three components of VI are Front Panel, Block Diagram and Connector Panel. Panel is used for Displaying and controlling the functions. The Connector Panel is used for connecting a VI with other VIs and Sub VI's in it. Block Diagram helps to connect the controls, and indicators with the series of functions such as Structures, Clusters, Arrays, Vision Assistant, Data Acquisition and much more [4].

User interfaces can be provided in LabVIEW by using the set of tools and objects in it. The user interface is known as the front panel. Front panel objects are controlled by using codes through graphical representation by the user. This graphical source code is also known as G code or block diagram code. The block diagram in LabVIEW contains this code and it resembles a flowchart. Initially created aimed at the Apple Macintosh in 1986, LabVIEW is universally employed for data acquisition(DAQ) and instrument control on a multiplicity of platforms comprising Microsoft Windows, numerous versions of UNIX, Linux, and Mac OS X. The newest version of LabVIEW is LabVIEW 2014, released in August 2014[3].

B. USB CAMERA:



Fig. 2: Usb Camera

Camera is used as a sensor which captures the word and further process is carried away by OCR. Character recognition will be made through this USB camera.

III. OPTICAL CHARACTER RECOGNITION

Optical character recognition (OCR) is the mechanical or electronic conversion of images of typewritten or printed text into machine-encoded text. IMAQ Vision OCR is designed for high-speed and reliable reading performance .The characters which are to be identified should be given training through OCR, so that the output translator has good knowledge about the word. This training creates an interface between the OCR session file and the characters which are being read. OCR "pre-processes" the images to improve the chances of successful recognition. Optical Character Recognition belongs to the family of techniques performing automatic identification. OCR is needed when the information should be readable to both human and to a machine. In comparison with the other techniques for automatic identification, optical character recognition is distinctive in a way that it does not require control of the process that produces the information.

IV. SYSTEM DIAGRAM

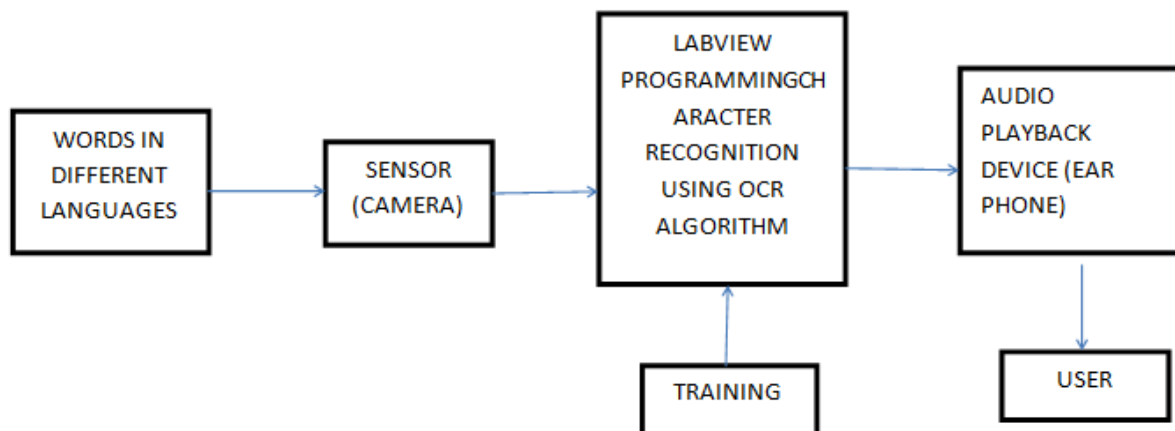


Fig. 3: System Diagram

A. WORKING:

The camera which acts as a sensor will capture the word when it is placed in front of the camera. By using the optical character recognition (OCR) algorithm the characters in the word are recognized. If the condition is satisfied after processing, the corresponding output will be given to the user through audio playback device. For OCR to function properly and to give appropriate outputs, it is trained well by feeding with images of words to be translated into English. A set of words in a particular language is trained so as to satisfy the basic needs to communicate in that particular language. This is similar to the concept of putting up information in the database of a dictionary or any other translator. A proposal for text to speech processing bifurcates the objective of this work, shaping it as a language translator, as well as, a reader for visually impaired people. The explanation holds good for the above given block diagram.

V. FRONT PANEL

A. FRONT PANEL: GERMAN TO ENGLISH

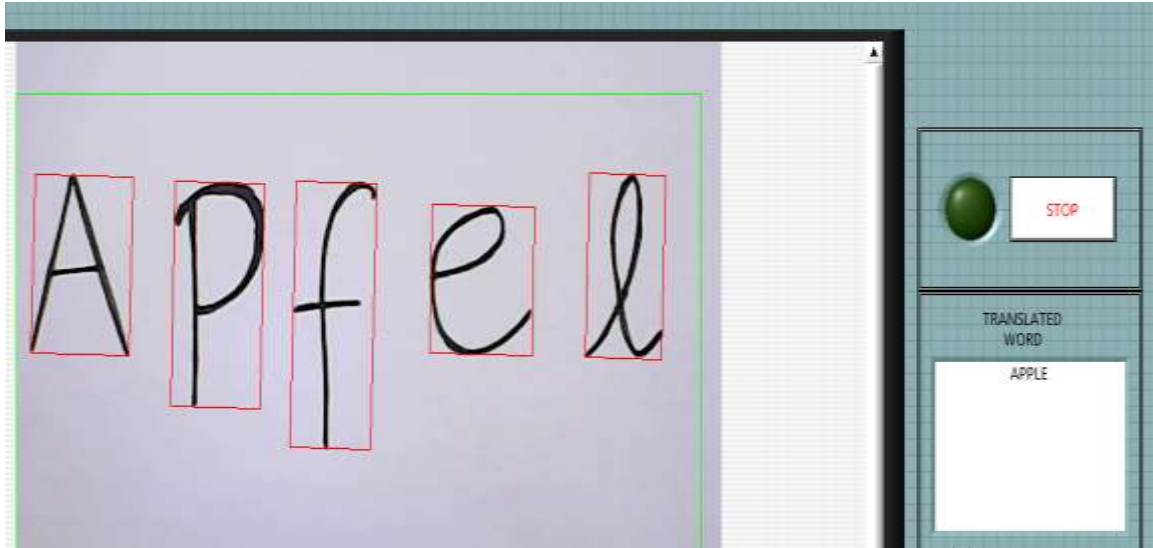


Fig. 4: Front Panel (1)

The English word “APPLE” is termed as “APFEL” in German language. By using “train single character” training method the word “Apfel” is trained to its corresponding word as “APPLE”.

In the same way, the Tamil word “தமிழ்நாடு” is also trained to its corresponding word in English. For both the trained words the appropriate case will be selected and audio will be generated.

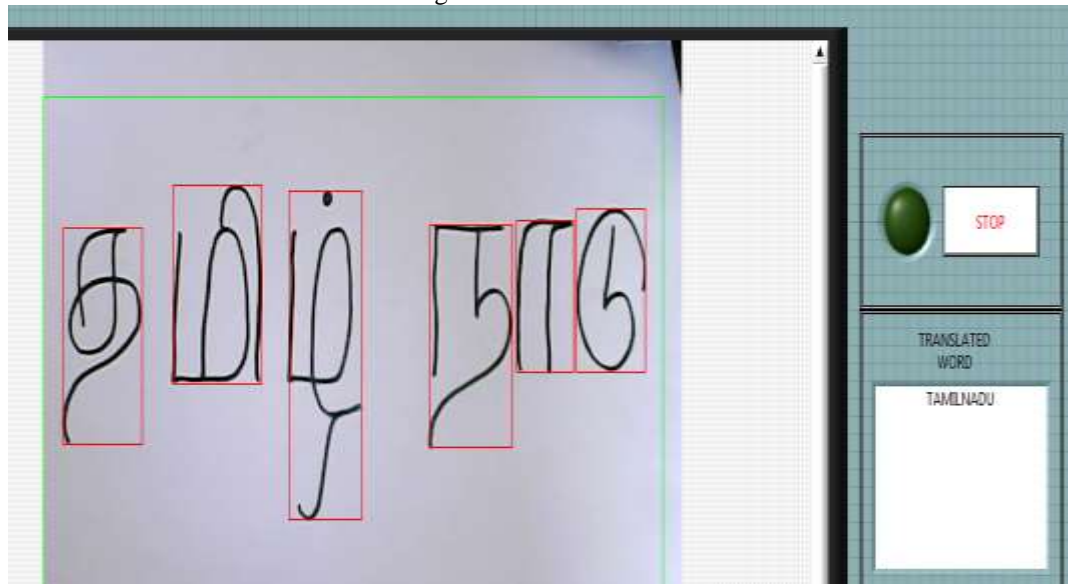


Fig. 5: Front Panel (2)

VI. RESULT AND CONCLUSION

The language translation was successfully accomplished by appropriate training and results were evaluated. German and Tamil were taken up for experimental purpose and they have shown good results. Based on the outcomes obtained we conclude that OCR algorithm is a suitable method for language translation. Also audio indication was given appropriately for corresponding words. This work can be enhanced in future in multiple dimensions. TEXT TO SPEECH processing functionality could be added to this language translator.

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