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Optical Character Recognition for Visual Impaired People Using Smart Grid Technology

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***Abstract* – An OCR (Optical Character Recognition) system which is a branch of computer vision and in turn a sub-class of Artificial Intelligence. Optical character recognition is the translation of optically scanned bitmaps of printed or hand-written text into audio output by using of Raspberry pi. OCRs are developed for many world languages are already under efficient use. This method extracts moving object region by a mixture-of-Gaussians-based background subtraction method. A text localization and recognition are conducted to acquire text information. To automatically localize the text regions from the object, a text localization and Tesseract algorithm by learning gradient features of stroke orientations and distributions of edge pixels in an Ada boost model. Text characters in the localized text regions are then binaries and recognized by off-the-shelf optical character recognition software. The recognized text codes are output to blind users in speech. Performance of the proposed text localization algorithm. As the recognition process is completed, the character codes in the text file are processed using Raspberry pi device on which recognize character using Tesseract algorithm and python programming, the audio output is listed.**

I. INTRODUCTION

To access information in a text, a person needs to have vision. However those who are deprived of vision can gather information using their hearing capability. The proposed method is a camera based assistive text reading to help blind person in reading the text present on the text labels, printed notes and products. The proposed project involves Text Extraction from image and converting the Text to Speech converter, a process which makes blind persons to read the text. There are already a few systems that have some promise for portable use, like portable bar code readers designed to help blind people identify different products in an extensive product database can enable users who are blind to access information about these products through speech and Braille. But a big limitation is that it is very hard for blind users to find the position of the bar code and to correctly point the bar code reader at the bar code. Speech is probably the most efficient medium for communication between humans.

To extract the text from image, Optical Character Recognition technique (OCR) is used. Optical character recognition has become one of the most successful applications of technology in the field of pattern recognition and artificial intelligence. Character recognition or optical character recognition (OCR) is the process of converting images of machine printed or handwritten text (numerals, letters, and symbols) into a computer format text. Speech synthesis is the artificial synthesis of human speech. A Text-To-Speech (TTS) synthesizer is a computer-based system that should be able to read any text aloud, whether it was directly introduced in the computer by an operator or scanned and submitted to an Optical Character Recognition (OCR) system.

II. BLOCK DIAGRAM

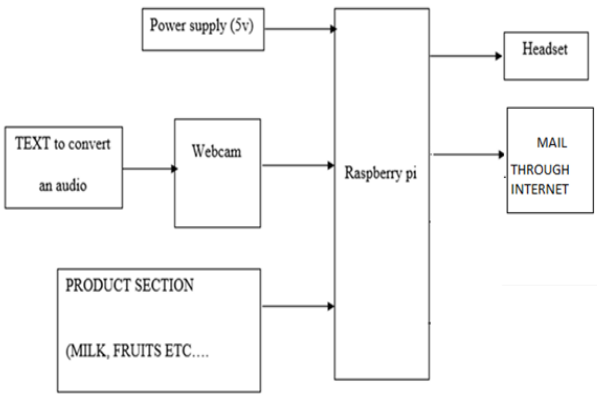

Fig 1. Block diagram of proposed system

A prototype system is described to read printed text on hand-held objects for assisting blind persons. In order to solve the common aiming problem for blind

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users, a motion-based method is proposed to detect the object of interest, while the blind user simply shakes the object for a couple of seconds. The automatic ROI detection and text localization algorithms were independently evaluated as unit tests to ensure effectiveness and robustness of the whole system. We subsequently evaluated this prototype system of assistive text reading using images of hand-held objects captured by ten blind users in person. Two calibrations were applied to prepare for the system test. First, blind users are instructed to place hand-held object within the camera view. Since it is difficult for blind users to aim their held objects, we employed a camera with a reasonably wide angle.

In future systems, finger is added point detection and tracking to adaptively instruct blind users to aim the object. Second, in an applicable blind-assistive system, a text localization algorithm might prefer higher recall by sacrificing some precision.

When our application starts running it first check all the devices and resources which it needs are available or not. After that it checks the connection with the devices and gives control to the user. The GUI for the user has the following options. An optional label is used for displaying the image taken from the camera. A status box is for representing the detected data from the image. The capture button is to detect the data from the image. The detect button is to detect the human from the video streaming in front of the camera. The audio jack port is the output port here. The Raspberry board comes with integrated peripherals like USB, ADC and Serial etc. On this board Linux operating system is installed with necessary drivers for all peripheral devices.

III. SYSTEM ARCHITECTURE

A rectifier converts available AC supply to a DC supply with the use of diodes. Rectification helps in producing pulsed DC. Capacitors are used for smoothening purpose since the rectifier output is pulsed DC so for constant DC it must be filtered out, so does this. Transformer is used to convert electricity from one voltage to another voltage with a minimal loss of power. It consists of two windings that are linked by an iron core. The main function of the transformer is to step-up (increase) and step-down (decrease) the voltage. Text-to-speech (TTS) is a type of speech synthesis application that is used to create a spoken sound version of the text in a computer document, such as a help file or a Web page.

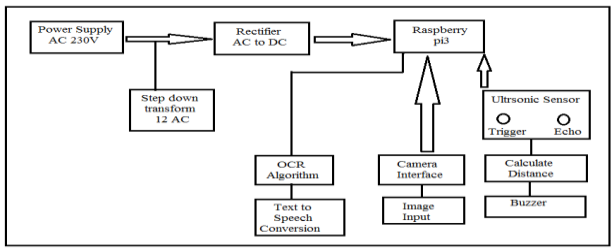

Fig. 2 System Architecture

IV. SOFTWARE PLATFORM

Python IDE

IDE stands for Integrated Development Environment. It's a coding tool which allows you to write, test and debug your code in an easier way, as they typically offer code completion or code insight by highlighting, resource management, debugging tools, and even though the IDE is a strictly defined concept, it's starting to be redefined as other tools such as notebooks start gaining more and more features that traditionally belong to IDEs. For example, debugging your code is also possible in Jupyter Notebook. You can probably most clearly see this evolution in the results of the Stack Overflow Developer Survey below, which also includes these new tools, next to the traditional IDEs that you might already know; they all fall under the section "development environment".

Because of all the features that IDEs have to offer, they are extremely useful for development: they make your coding more comfortable and this is no different for data science. However, given the fact that there aren't only the traditional IDEs to consider, but also new tools, such as notebooks, you might be wondering which development environment to use when you're just starting out with data science.

Raspberry OS

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics it does not include peripherals (such as keyboards, mice and cases). However, some accessories have been included in several official and unofficial bundles. According to the Raspberry Pi Foundation, over 5 million Raspberry Pi were sold by February 2015, making it the best-selling British computer. By November 2016 they had sold 11 million units, and 12.5m by March

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2017, making it the third best-selling "general purpose computer "In July 2017, sales reached nearly 15 million.

Processor

The Raspberry Pi 2 uses a 32-bit 900 MHz quad-core ARM Cortex-A7 processor. The Broadcom BCM2835 so used in the first generation Raspberry Pi is somewhat equivalent to the chip used in first modern generation smart phones (its CPU is an older ARMv6 architecture),which includes a 700 MHz ARM1176JZF-S processor, Video Core IV graphics processing unit(GPU), and RAM. It has a level 1 (L1) cache of 16 KB and a level 2 (L2) cache of 128 KB. The level 2 cache is used primarily by the GPU. The Soc is stacked underneath the RAM chip, so only its edge is visible. The earlier V1.1 model of the Raspberry Pi 2 used a Broadcom BCM2836 SoC with a 900 MHz 32-bit quad-core ARM Cortex-A7 processor, with 256 KB shared L2 cache. The Raspberry Pi 2 V1.2 was upgraded to a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-core ARM Cortex-A53 processor, the same SoC which is used on the Raspberry Pi 3, but under clocked (by default) to the same 900 MHz CPU clock speed as the V1.1. The BCM2836 SoC is no longer in production (as of late 2016).The Raspberry Pi 3 uses a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-core ARM Cortex-A53 processor, with 512 KB shared L2 cache.

Operating System

Various operating systems for the Raspberry Pi can be installed on a Micro-SD, Mini-SD or SD card, depending on the board and available adapters; seen here is the Micro-SD slot located on the bottom of a Raspberry Pi 2 board. The Raspberry Pi Foundation recommends the use of Raspbian, a Debian-based Linux operating system. Other third party operating systems available via the official website include Ubuntu MATE, Windows 10 IoT Core, RISC OS and specialised distributions for the Kodi media center and classroom management. Many other operating systems can also run on the Raspberry Pi.

Performance

The Raspberry Pi 3, with a quad-core ARM Cortex-A53 processor, is described as 10 times the performance of a Raspberry Pi 1.This was suggested to be highly dependent upon task threading and instruction set use. Benchmarks showed the Raspberry Pi 3 to be approximately 80% faster than the Raspberry Pi 2 in parallelized tasks. Raspberry Pi 2 V1.1 included a quad-core Cortex-A7 CPU running at 900 MHz and 1 GB RAM. It was described as 4–6 times more powerful than its predecessor. The GPU was identical to the original. In parallelized benchmarks, the Raspberry Pi 2 V1.1 could be up to 14 times faster than a Raspberry Pi 1 Model B+. While operating at 700 MHz by default, the first generation Raspberry Pi provided a real-world performance roughly equivalent to 0.041 GFLOPS On the CPU level the performance is similar to a 300 MHz Pentium IIof 1997–99. The GPU provides 1 Gpixel/s or 1.5 Gtexel/s of graphics processing or 24 GFLOPS of general purpose computing performance. The graphical capabilities of the Raspberry Pi are roughly equivalent to the performance of the Xbox of 2001.

V. LOAD THE CODE TO RASPBERRY PI

First open the TIGHT VNC software. This asks for the IP address of the hardware. Enter the IP address of the device in your PC. This will lead to a page where you have to provide in with your user name and password which you have set in the device. This will lead to another menu where you actually have to connect the devices. After which you install the python files. Then you can press the TIGHT VNC viewer software on your screen. This will lead to your software editor where you can enter and execute your python code. Executing the code is done by clicking the run module. Press and release the button in your hardware and witness the movement of the vehicle and press escape (‘\0’) key to get the audio output and details mailed to the user.

Fig. 3 Raspberry Pi 3 Model- B

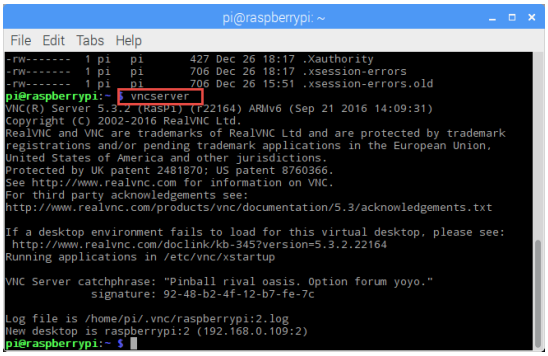

Fig. 4 code loading into Tight VNC

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VI. CHALLENGES AND FUTURE SCOPE

The injuries during and throughout the rescue operation also leads to the death of child. The lack of oxygen inside the deep hole makes it impossible for the child to survive for long time.
This Project can be expanded with additional components based upon the scenario such that Real-Time Rescue of Human Beings can be done. The additional enhancements to the Project may include end-end video transmission and reception to avoid mishandling of Human Beings due to dangerous materials inside the Manhole or Deep wells.

VII. CONCLUSION

The proposed system helps a visually impaired to purchase goods in a particular departmental store effectively without any external human assistance. This device can be designed to any number of product sections. The number of inputs can be scaled. This also helps in significantly nullifying the blinded disability and increases accessibility for impaired people.

REFERENCES

[1] E . Cardillo, V. Di Mattia, G. Manfredi, P. Russo, A. De Leo, A. Caddemi, G. Cerri "An Electromagnetic Sensor Prototype to Assist Visually Impaired and Blind People in Autonomous Walking", IEEE Journal 2017.
[2] Mrs . Shilpa Reddy K, Mounika S . K, Pooja K, Sahana N, "Text to speech for the Visually impaired", IRJCS Journal 2017.
[3] Mallapa D Gurav, Shruti S Salimath, Shruti B Hatti, Vijayalaxmi I Byakod, Shivaleela Kanade "A Reading aid for the Blind People using OCR and Open CV", IJSRET Journal 2017.
[4] AMD Alliance International, "The global economic cost of visual impairment.", 2010. Internet document http://www.icoph.org/resources/146/The-Global-Economic-Cost- of-Visual-Impairment.html Last access Aug 22, 2015.
[5] L. Braille, "Nouveau procede pour representer des points la forme meme des letters, les cartes de geographie, les figures de geometrie, les caracteres de musiques, etc., a l'usage des aveugles," Institution royale des jeunes aveugles, 1839.