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SMART HELPER FOR VISUALLY IMPAIRED PERSONS

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ABSTRACT:-
The objective of this study is to create a portable system that uses a camera to assist visually impaired individuals in reading text labels and product packaging on handheld objects in their daily lives. The proposed system consists of three primary components: scene capture, data processing, and speech output. Scene capture involves using a small camera to capture the text image and transmit it to the data processing platform. The data processing component filters out the text from the surroundings and uses optical character recognition (OCR) software to recognize it. Speech output generates an audio output by transmitting the filtered text. In addition, the project employs template matching as a separate method for recognizing specific objects like currency notes. To ensure portability and ease of use, the system is designed based on Raspberry Pi.
KEYWORDS:-Portable system, camera, optical character recognition (OCR), template matching, data processing, speech output, Raspberry Pi.

INTRODUCTION :-Recent technological advancements in computer vision, digital cameras, and portable computers have opened up new possibilities for aiding the visually impaired. Despite significant progress in developed countries like the United States, where a National Health Interview Survey in 2008 found that over 85% of American adults lack vision to some extent, billions of people worldwide continue to struggle with vision impairment. To address this challenge, camera-based products have been developed that incorporate computer vision technology with existing tools like optical character recognition (OCR), helping individuals with visual impairments to better navigate and interact with the world around them.

RELATED WORK:-
(i) Optical Character Recognition (OCR):-Optical character recognition (OCR) is a computer process that involves recognizing printed or handwritten text characters. The process involves scanning the text character-by-character, analyzing the scanned image, and then translating the character image into character codes like ASCII, which can be processed by a computer.However, the computer cannot understand the text in the image as it is just a meaningless pattern of pixels. OCR allows the computer to interpret the image and convert it into text that can be processed, such as a TXT or DOC file. While OCR presents a significant challenge to computers due to their lack of eyes, it enables them to perform tasks like extracting information from old book pages or handwritten documents, which would otherwise be challenging or impossible.

(ii) Raspberry Pi:-The Raspberry Pi is a tiny, inexpensive computer that is roughly the size of a credit card. It can be connected to a TV or computer monitor, and standard keyboard and mouse can be used with it. Although it is not as powerful as modern laptops or desktops, it is a complete Linux computer and can perform most of the expected functions with low power consumption.The Raspberry Pi is powered by the Broadcom BCM2835 SoC, which includes a 32-bit ARM1176JZFS processor running at 700MHz, and a Videocore IV GPU. It also has 256MB of RAM in a POP package above the SoC. The device is powered by a 5V micro USB AC charger and features HDMI and composite video outputs, two USB 2.0 ports, a 10/100 Ethernet port, an SD card slot, a GPIO connector, and an analog audio output (3.5mm headphone jack).

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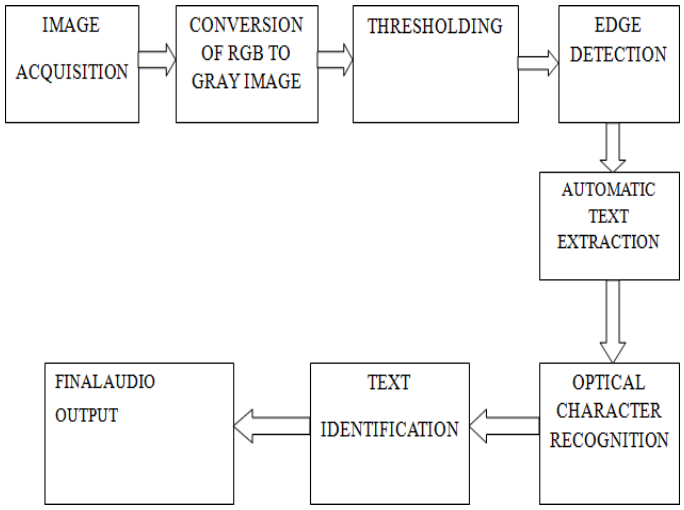
DESIGN :-



RESULTS:-

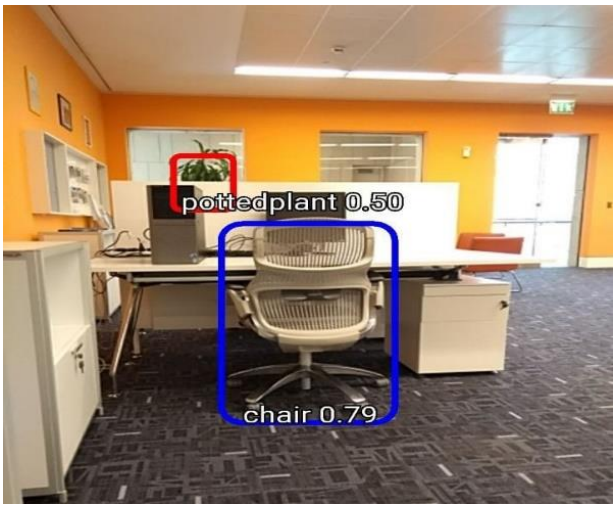


Figure 1

shows the names of the objects that captured through camera such as chair ,potted plant .

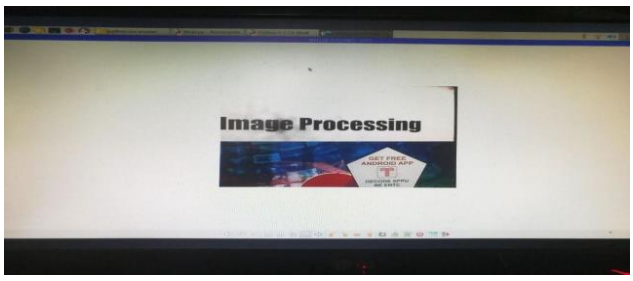


Figure 2

Figure 2 shows the test image of the OCR method. This is the image captured by the camera.
Figure 3 shows the final text recognised output which is highlighted on the screen.

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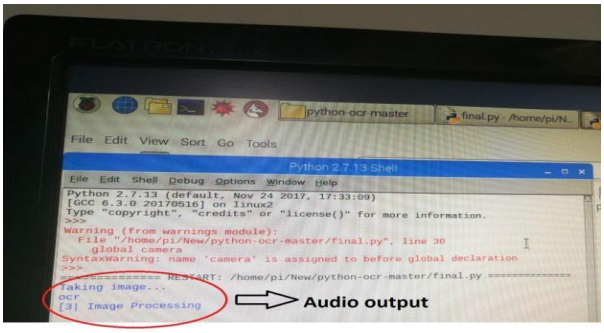

Figure 3

Figure 4

Here captured test image of the product is compared withtemplate images in the database and at the end we get the output as the product name as shown highlighted on the screen.

Figure 5

Hereafter the processing of text is done and the output isconverted into audio output which can be heard through earphones.

CONCLUSION:-This research paper presents a framework that utilizes a camera to aid visually impaired individuals in reading text labels and product packaging on handheld objects. The framework employs optical character recognition (OCR) techniques and template matching to accurately identify text. While the OCR method works well for text with a font size of approximately 1 inch or larger on simple backgrounds, template matching is especially effective for recognizing currency notes that require 100% accuracy and are commonly used by all. To improve the system's capability of recognizing small text and text with complex backgrounds, more advanced algorithms will be implemented in the future.

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