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Impediments Perception Assistant for Efficacious Assistive Locomotion for Purblind Personage

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Abstract: ***Visually impaired or partially blind people measure usually counts on exterior aid which could be delivered by humans, educated dogs, or completely different electronic appliances as backing techniques for the bigger psychological feature techniques. The most downside with blind individuals is that they navigate their path to where they need to travel. They usually need assistance from others. This project is determined to support the blind person to beat the deficit of visual ability, by victimization different senses like sound and bit. This project is determined to support the visually impaired person to whip the absence of visual-sense modality, by using distinct connotations like touch and sound (Voice). The detector module is aspired to utilize the precept of ultrasonic ripples to see the change in incoming/outgoing object. The structure also comprises a buzzer to receive an alarm tone (prebuild vocal instructions) and a motor to come up with vibration signals. The network uses ultrasonic ripple signals to acquaint the visually impaired person about incoming/outgoing hurdles. As the expanse between the band and hurdle decreases, the force of vibration signals increases. Thus, the structure formulates the navigation strategy for the needy easy. This architecture bids an inexpensive, credible, mobile, low energy consuming, and athletic solution for navigation with noticeable quick interruptions. The architecture also has another module in which it revamps images into a speech layout. This module will assist visually undermined people in browsing various images as they will be able to read them by hearing them. The Optical Character Recognition [OCR] is expended to do these tasks.***

Keywords: Raspberry Pi, Ultrasonic Sensor, Optical Character Recognition, text to speech

I. INTRODUCTION

The power of vision is one of the foremost vital components of human physiology. Our eyes unit is the key to our surroundings. sadly, approx. 285 million individuals are calculable to be visually disabled report revealed by the Health Organization (WHO). Moreover, 90% of total visually impaired individuals belong to developing countries. The earliest reasonably navigation tool for the blind has been among the type of walking sticks. With the advances in technology, it's become potential to vogue and develop technological solutions which can facilitate a visually impaired person to navigate freely in a more efficient manner. To associate in the nursing appliance for the visually undermined people for the impediment detection, the project architecture uses buzzers and micro-vibration motors to impress the vibrations. It tutors the individual by adhering to steering during the navigation. It utilizes a Raspberry Pi processor that contains additional recollection and options at a high operation rate. The additionally mounted camera will be clamped along with the module to read the incoming images. The ultrasonic device unit is for the detection of barriers while the camera functionality helps in reading the text content from the images captured. Distance info is sent to the user through vibrating patterns variable incrementally with ever-changing impediment distance. It's problematic to walk for unseeing individuals as they are doing not recognize their surroundings. They sometimes use a white stick or a working dog for his or their help. However, this method restricts as a result of that is not entirely helping in protecting visually impaired individuals from varied hazards. To cover up the previous odds, the project utilizes the ultrasonic sensor mechanism clamped with the camera functionality using Optical Character Recognition methodology (OCR).

II. LITERATURE SURVEY

A. Obstacle and Fall Detection to Guide the Visually Impaired People with Real Time Monitoring

Mohammad Marufur Rahman et .al [1] designed the hybrid gadget to help the visually challenged person or the person with the low visionary disorder. The proposed module consists of various sensors like ultrasonic sensors and accelerators. The proposed hardware conjugatively works along with the android application. The system works on processing the real-time inputs.

B. Development of an Automated Obstacle Detector for Blind People

Chandan Debnath [2] proposed a system that will help the visually impaired person during walking without external additional aid. The system consists of a single-mounted ultrasonic sensor. The ultrasonic sensor sends the data of the incoming hindrance to the Arduino processor where the distance is categorized as per the predefined ranges and the final outcome i.e., the object is close/far is spelled out as the output voice format. The proposed module focuses on decreasing the overall cost.

C. Development Of an Arduino-based Obstacle Avoidance Robotic System for An Unmanned Vehicle

Kolapo Sulaimon Alli et .al [3] proposed the system of the unmanned vehicle robot. The overall architecture consists of the Ultrasonic Sensor, Infrared Sensor, and actuating motor. As per the incoming object arrival/departure, the system decides to take the angular turn. The system proposed works on the processing of the inputs received from the Ultrasonic Sensor and Infrared Sensor and the final processed output is been displayed by the movement of the actuator motors.

D. Automatic Number Plate Detection and Unmanned Chalan Generation for odd/even rules in Delhi

Sakshi Singhal et .al [4] proposed a system that works on the principles of the Optical Character Recognition (OCR) methodology. The proposed system is used to identify the vehicle number plate data and further classify it under the category of the Odd/Even Regional Transport Office (RTO) rules. The system captures the picture of the number plate and further extracts the keywords/numbers from that image and further sends the extracted data for effective categorization.

E. Robo kart for Visually Impaired People

Murugaveni Sudamani [5] proposes a module that can be mounted on top of the shopping cart that is used to guide visually disabled people. This proposed system uses the methodology of character recognition software. The mounted camera is controlled by the Raspberry Pi processor.

F. Implementation of text Recognition and text Recognition on Formatted Bills

M. Geetha et .al [6] proposes the system to recognize the textual content of the formatted bills. The proposed system uses the method of Deep Learning algorithms. The system uses an Efficient and Accurate Scene Text Detector (EAST) algorithm to extract and process the data on bills in a real-time environment.

III. SYSTEM INFORMATION

This In the implemented system, the module consists of two major sections. The first module i.e., the hardware module helps the system to detect the incoming and outgoing hindrances with the help of the ultrasonic sensors while the second software module helps in the image text to audio conversion mechanism. As shown in Fig.1, the module consists of the Ultrasonic sensors to detect the obstacles throughout the directions while Fig.2 represents the flowchart of the software module to scan the image and converting it to the audio output. Module 2 uses the web camera to capture the images and the wired speakers to deliver the output of the extracted text from the incoming images.

IV. BLOCK DIAGRAM

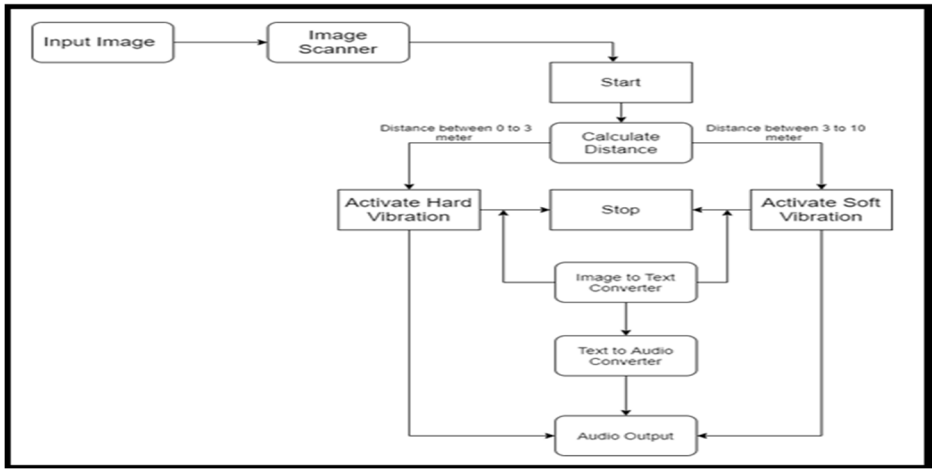

Fig 1: Flowchart of Hardware Module

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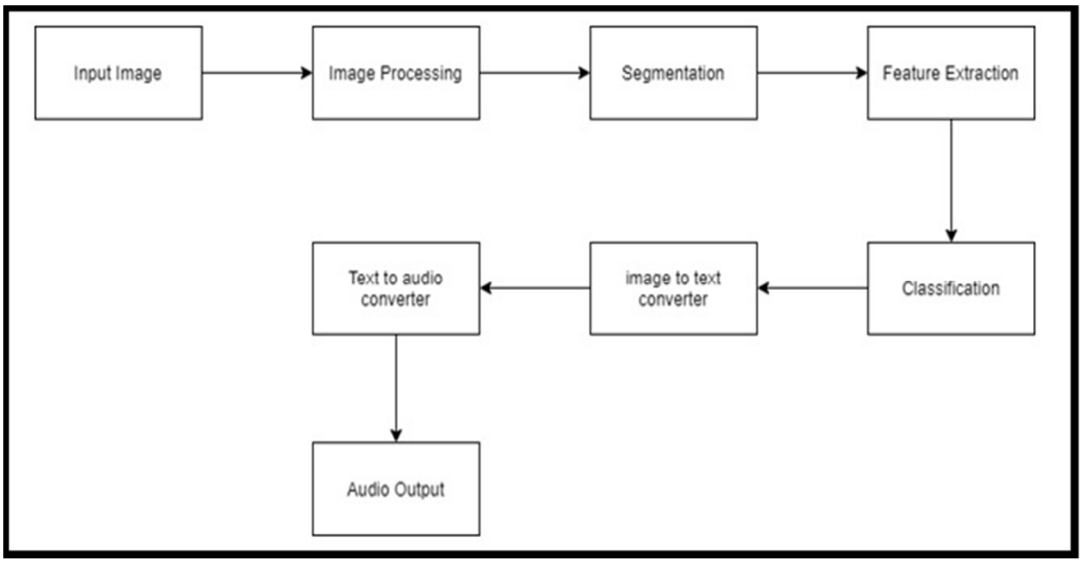


Fig 2: Image Text Extraction Module

V. SYSTEM MODULE

A. The Objection Detection Hardware Module

The obstacle detection module works on the principle of Ultrasonic Sensing technology. In the architectural connectivity, there is a total of 8 Ultrasonic sensors which are placed across the all the 360-degree perimeter i.e., front, back, right and left direction. The ultrasonic sensors send the detected inputs to the processor. The processor analyzes the inputs and categorizes the input on the basis of which direction it might be. The direction is being identified and the audio output is generated. If the incoming obstacle is coming from the left side, then the system will give audio output as the message “the obstacle from left detected”, likewise for all the subsequent directions. The Fig. 3 represents Obstacle Detection Module.

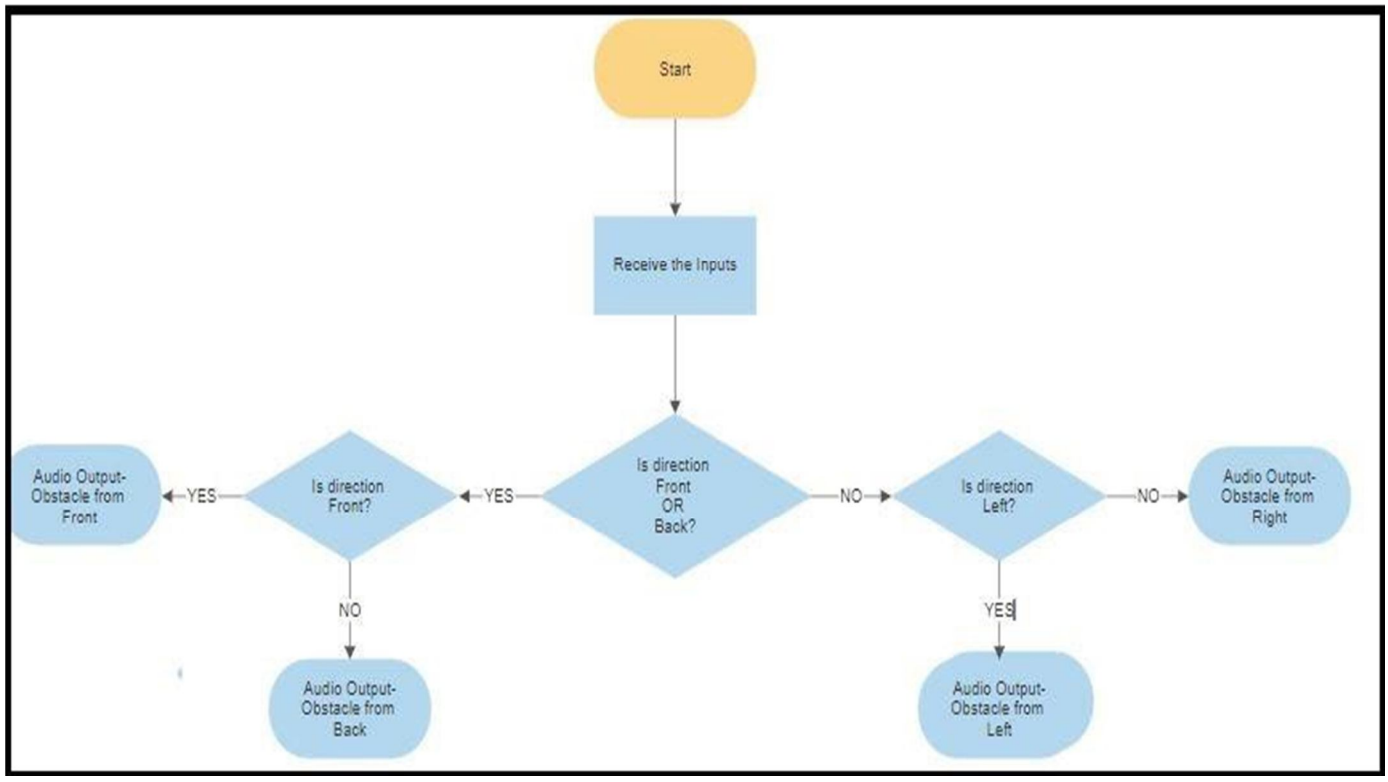


Fig 3: Obstacle Detection (Hardware Module)

B. Text extraction Software Module

The module consists of a web camera. The image is captured and it is sent for further image cleaning in the Optical Character Recognition (OCR) algorithm methodology. The image is first converted to the grayscale image lining all the text contents in one line for the better identification of the textual characters. Finally, the text is extracted and the extracted textual notes are later converted to the audio as the final modular output. The extracted text from the image is being converted to the audio format so that the visually impaired person can understand the text printed on the image. The Fig. 4 represents Image to Audio module.

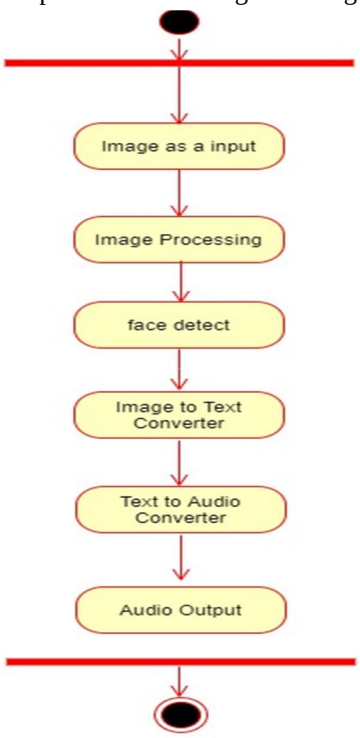


Fig 4: Image Text to Audio (Software Module)

VI. SYSTEM ARCHITECTURE

Fig. 5 and Fig. 6 represent the overall architecture of the proposed system. In Fig. 5, the inputs are received from the varying ultrasonic sensors which are placed in the set of two for every right-angle direction. Fig. 6 is the architecture where the system received the inputs in the form of the textual images. The text present in the picture is being extracted and the finally extracted text is converted to the final audio format.

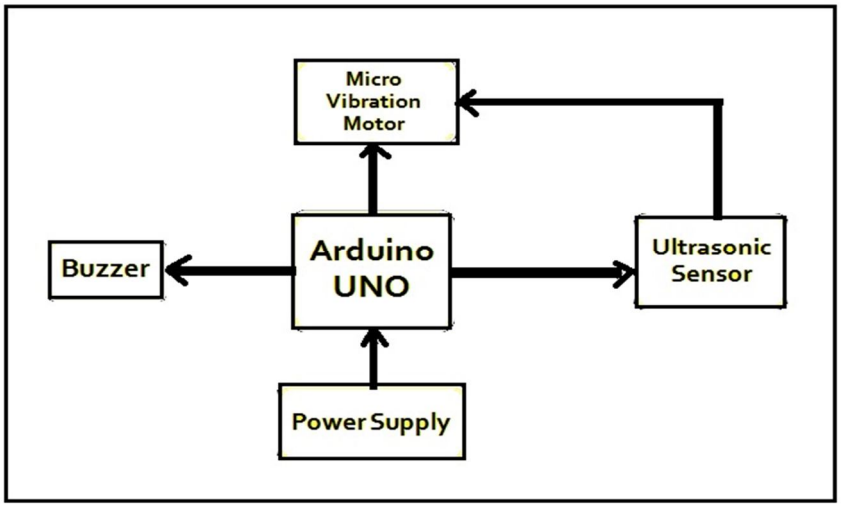


Fig 5: Ultrasonic Module (Hardware Module)

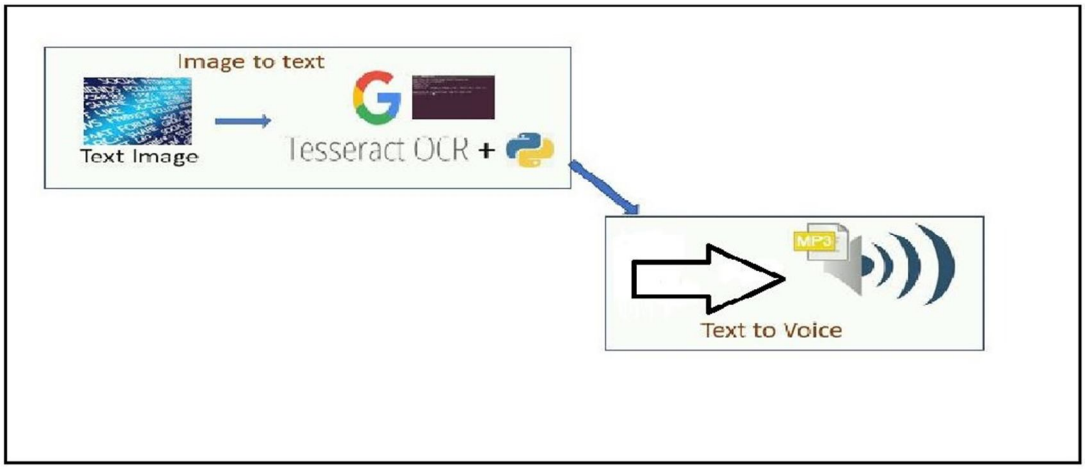


Fig 6: Image Text Extraction Module (Software Module)

VII. TECHNOLOGY USED

A. Raspberry Pi Processor

Raspberry Pi is a tiny single-board computer developed in the United. Broadcom and Raspberry Pi foundation developed this processor.

B. PyCharm IDE

PyCharm IDE is used in the programming work. It is mainly used for Python programming projects. The IDE is developed by JetBrains.

C. Hardware Sensors

1) Ultrasonic Sensors
2) Camera Module
3) Speaker / Buzzer

VIII. COMPLETED DESIGN

A. The Fig. 7 is the screenshot of the software module which successfully illustrates the Optical Character Recognition (OCR) module of the project. The image has been captured successfully with the help of the web camera and the captured image will be processed.

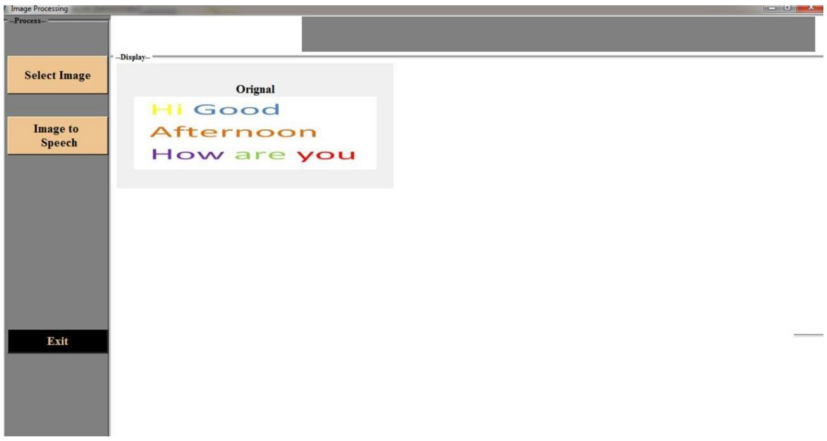


Fig 7: Capturing of the Incoming Text Image (Initial Stage)

B. Fig. 8 is the screenshot of the software module which represents the conversion of the colored image to the Gray Scale Image. The Optical Character Recognition (OCR) methodology converts the color extract to the gray scale for further efficient text extraction.

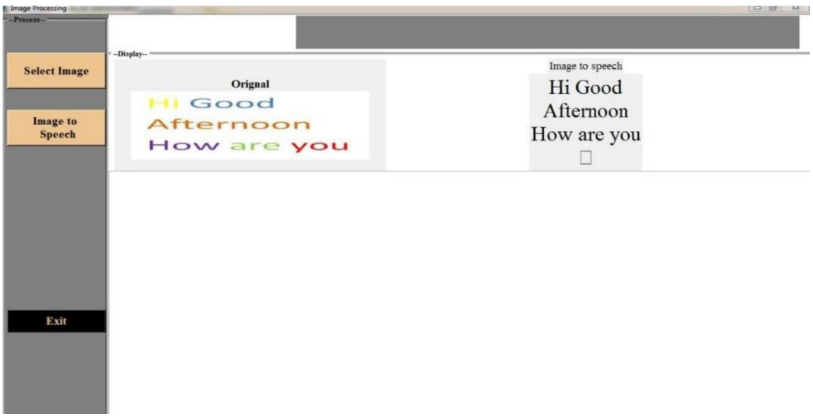


Fig 8: Conversion of The Colored Image to The Gray Scale Image (Intermediate Stage)

C. Fig. 9 is the screenshot of the final processed software module. In this final staging of the module, the grayscale image text has been extracted successfully and converted into the final Audio format. The person with visual disabilities will get assisted due to the conversion of the image text to the final Audio formatting. The media player shown in Fig. Z gives the output in the audio format.

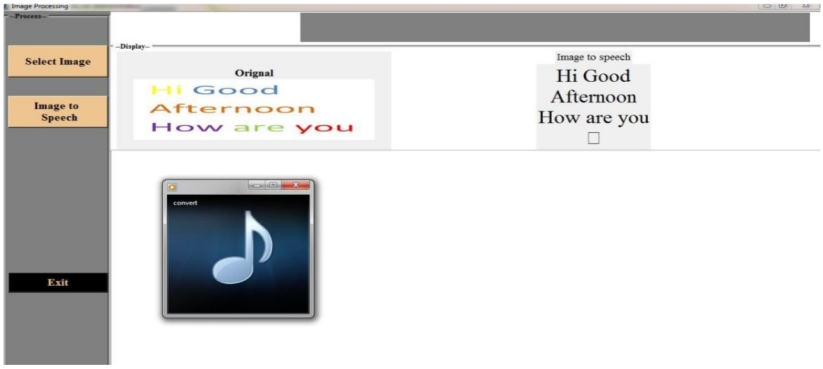


Fig 9: Conversion of The Extracted Text to Audio Format (Final Stage)

D. Fig. 10 is the picture of the hardware module to detect the incoming obstacles. The hardware module consists of the Ultrasonic sensors for receiving the incoming signals while the buzzer/speaker is used to result in the output in the Audio format. There is a total of 8 Ultrasonic sensors used where every couple of sensor pair is assigned for the respective locomotive direction which is separated by right angles i.e. Right, Left, Front, back. The black speaker shown in the picture is the source to get the final output audio such as “the incoming object detected from the front side” likewise.

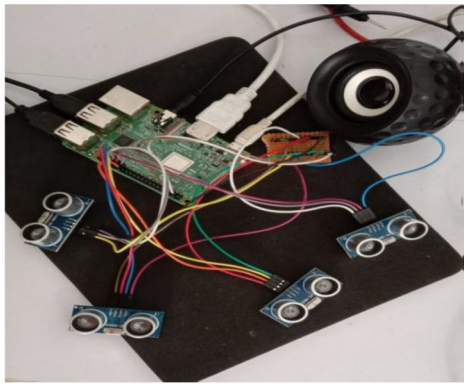


Fig 10: Hardware Module for Obstacle Detection

IX. CONCLUSION

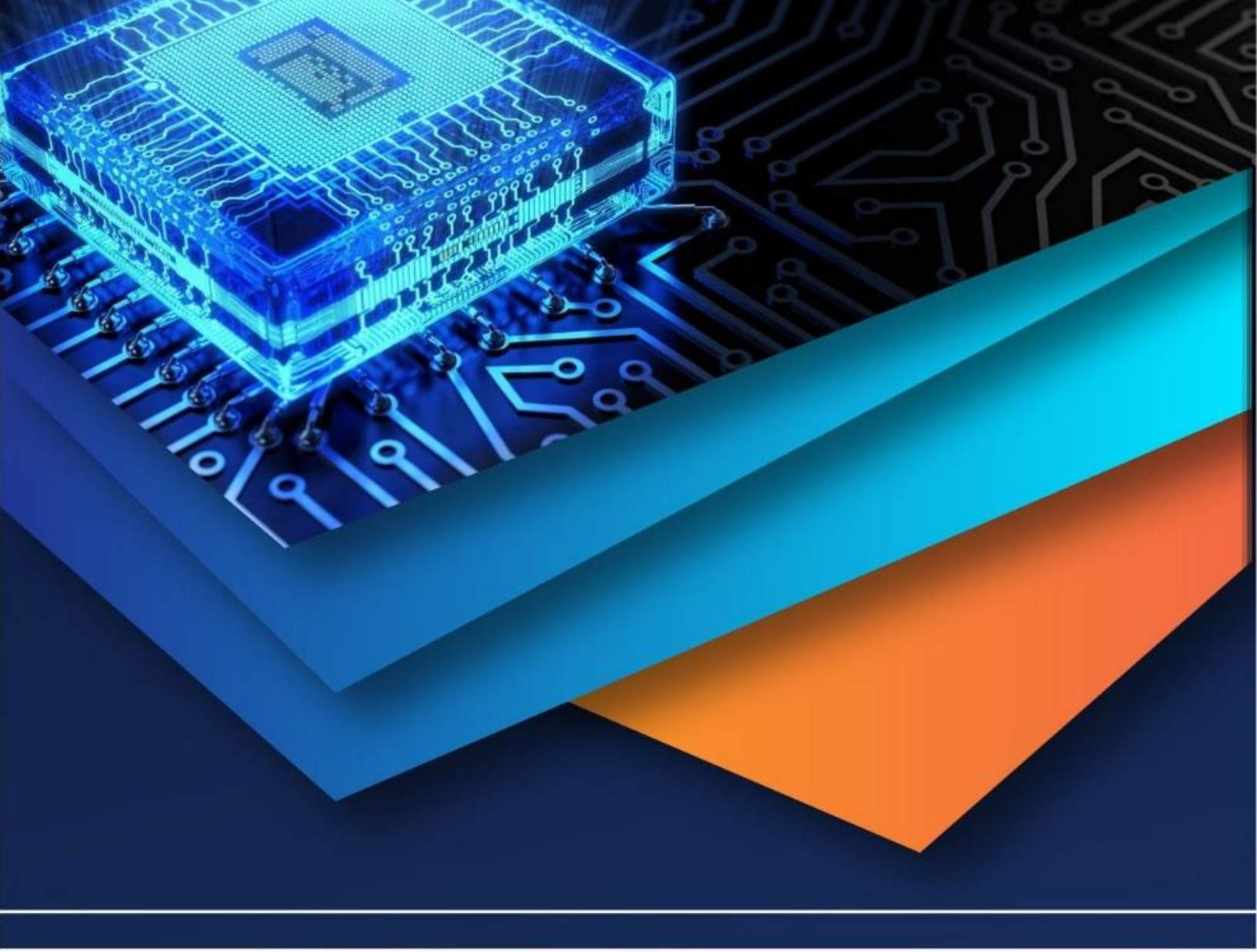
The project successfully confers the understandings of the forthcoming object or person. Infusions from the 360- degree encircling are achieved from the numerous positioning of Ultrasonic sensors. Vibrational fluctuation will assist in the calibration as per the extant gap between the person and the object/another person. Also, the supplementary Camera Module of the project surveys the images and wrench the text from them efficiently. The extracted text is eventually renovated to the Audio output form so that the visually impaired person will comprehend the same. The overall expense has been slashed down to make the manufacturing cheaper. The greatly trending technology renders this device more mobile, adaptable, and helpful. The apparatus proposed in this paper can be a vital aid in unfolding an infrequent of the countless challenges endeavored by visually impaired people or people with less sight. To a further extent, in the upcoming actual model development process, the appliance can be rendered extra lightweight and competent to be worn to make it more user-friendly.

X. FUTURE WORK

Future work of this project will focus on the development of the actual proposed model which will be able to launch on the real-time scale market. The future model will be more compressed to the lesser units than proposed along with taking into consideration the feasibility of wearing/using the device in real life.

REFERENCES

[1] Mohammad Marufur Rahman, Md. Milon Islam, Saeed Anwar Khan ,2020, “Obstacle and Fall Detection to Guide the Visually Impaired People with Real Time Monitoring”, Madhav Institute of Technology, MP
[2] Chandan Dehanth, 2019, “Development of an Automated Obstacle Detector for Blind People”, Department of Computer Science and Engineering, Daffodil Institute of IT, Dhaka, Bangladesh
[3] Kolapo Sulaimon Alli, Moses Oluwafemi Onibonoje, 2019, “Development of An Arduino-based Obstacle Avoidance Robotic System For An Unmanned Vehicle", Babalola University, Ado Ekiti, Nigeria
[4] Ashima Arora, 2017, “Automatic number plate detection and unmanned chalan generation for odd/even rules in Delhi", IIT, Ropar
[5] Priyalakshmi S, Umamashewari ,2021, “Robo kart for Visually impaired people", SRM Institute, India
[6] M Geetha, R. C. Pooja ,2020, “Implementation of text recognition and text recognition on Formatted Bills", International Journal of Test and Automation
[7] Chen LB, Su JP, Chen MC, Chang WJ, 2019."Implementation of an Intelligent Assistance System for Visually Impaired/Blind People", USA
[8] Islam MM, Rahaman A, Islam M, 2020,"Development of smart healthcare monitoring system in IoT environment".
[9] Rahaman A, Islam MM, Islam MR, Sadi MS, Nooruddin S, 2019, "Developing IoT based smart health monitoring System”, Intelligence Artificially, Lavoisier
[10] Khanom M, Sadi MS, Islam MM, 2019, "A Comparative Study of Walking Assistance Tools Developed for the Visually Impaired People" Engineering and Robotics Technology (ICASERT), Dhaka, Bangladesh
[11] Rahman MM, Islam MM, Ahmmed S, 2019, "Blind Shoe: an electronic guidance system for the visually impaired people", J Telecommunication Electronic Computer Engineering (JTEC)
[12] Nooruddin S, Islam MM, Sharna FA,2020,"An IoT based device-type invariant fall detection system", Dhaka.
[13] Sharma S, Gupta M, Kumar A, Tripathi M, Gaur MS, 2017, "Multiple distance sensors based smart stick for visually impaired people", Las Vegas, NV
[14] Shaha A, Rewari S, Gunasekharan S, 2018, "Smart walking stick for the visually impaired people using low latency communication", Mumbai, India
[15] Sahoo N, Lin H-W, Chang Y, 2019, "Design and implementation of a walking stick aid for visually challenged people", Taiwan.



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