IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

Voice Based Navigation System for Blind People Using Raspberry Pi

Prof. Sujay Pawar[1], Bhavana Pawar[2], Amruta Jadhav[3], Ajay Throat [4], Rushikesh Zinjurke[5]
Assistant Professor, Department of Information Technology[1]
Students, Department of Information Technology [2,3,4,5]
Dr. D. Y. Patil Institute of Technology, Pune, Maharashtra, India

Abstract: *Blind people are often excluded from society because they feel that people and society are racist and may not be accepted for a long time. In order to improve the quality of life of the visually impaired or blind, in this work we focus on the development of other public facilities. The project therefore aims to play a special role in the field of providing as much information as possible to the visually impaired or blind, allowing them to travel comfortably. In order to create an example focused on users and their interests, this project aims to build a program to help people with disabilities. The program aims to assist them in providing information. In this program we will see the barrier using an ultrasonic sensor.*

Keywords: Machine Learning, Object Detection, Raspberry PI, IR and Sonar Senor, Tenser Flow API.

I. INTRODUCTION

What is blind navigation system (NAVI) refers to programs that can help or guide people with visual impairments, from partially sighted to completely blind, through audio commands. The main idea of the proposed awareness system and the roadblock. "(Raspberry Pi) for blind pedestrians and to deal with problems with existing systems successfully. The system designed will detect an object or obstacle using ultrasonic sensors and an IR sensor and provide audio instructions for orientation. It also provides information about people who look at them or raise their hands using face recognition. People who are blind and partially sighted are often dependent on others for help. The eyes are an important part of visual perception; Walking in such an outdoor setting is challenging because a blind person cannot rely on his own eyes. Traditional walking aids include white crutches and guide dogs, white crutches are the most widely used, cheap, versatile guide tools used by blind people but, they can only see nearby obstacles and cannot detect head height barriers [2]. Guided dogs had the ability to inform head height barriers, and could detect pedestrians, potential dangers, choosing the right paths and much more, a guide dog. they are expensive, require a lot of training and cannot be used for more than 5 years [3]. A few of the most important methods used were laser, GPS, computer vision infrared and SONAR. In this project we are trying to overcome all obstacles using the latest technology such as tenser flow api, sonar and IR sensor with raspberry pi.

II. DESCRIPTION OF THE PROBLEM

2.1 Motivation

In order to improve the quality of life of the visually impaired, in this work we focus on developing new technologies to help these people reach out to the outside world especially such as banks, hospitals, post office, and other public facilities. The project therefore aims to play a special role in the sector by providing as much information as possible for the visually impaired or blind, allowing them to travel comfortably. In order to create an example focused on users and their interests, this project aims to build a program to help people with disabilities. The program aims to assist them in providing information. In this program we will see the barrier using an ultrasonic sensor and an IR sensor on camera.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

2.2 Problem Statement

Outdoor mobility becomes a daunting task for blind and partially sighted people in an increasingly urbanized world. Advances in technology cause the blind to fall behind, at times even risking their lives. Available blind navigation technology is not affordable enough some devices rely heavily on infrastructure requirements.

III. METHODOLOGY

We are using a program in the popular IoT-based hardware module known as the RASPBERRY-PI with IR Sensor and Infrared Sensor. It will then test and the output class will be determined by precise metrics. If that Blind Person is too close to the private or far from a safe place, it will produce output based on voice and distance units. TensorFlow APIs.

APIs give us ease so they can save time. TensorFlow Object Acquisition API is actually a structure for building an in-depth learning network that solves acquisition object issues. There are trained models in their framework and they call it the Model Zoo. This includes a COCO database collection, a KITTI data set, and an open image data set. Here, we are focusing on COCO DATASETS.

3.1 What is the Tensorflow Object Detection API (TFOD)

To train our custom Object Detector we will be using the TensorFlow API (TFOD API). The Tensorflow Object Detection API is a framework built on TensorFlow that makes it easy for you to train your custom models.

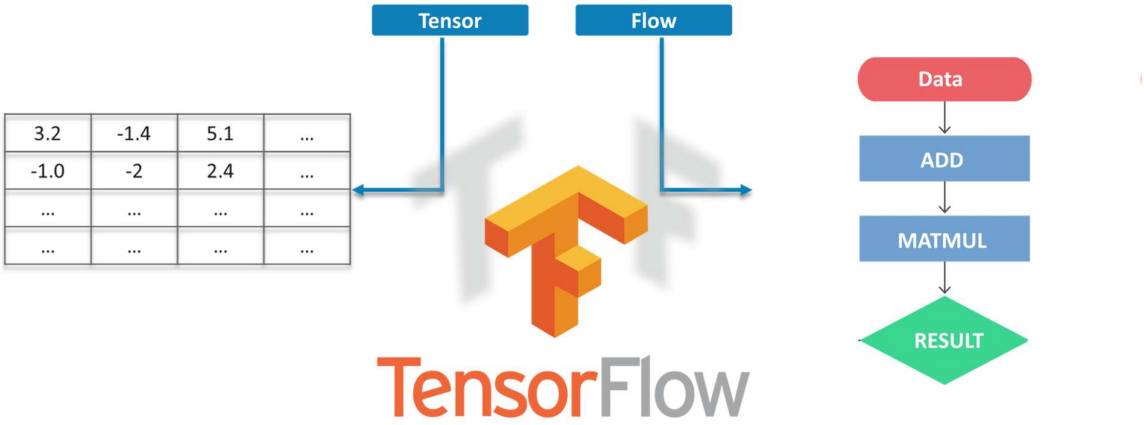
- TensorFlow integrates machine learning and in-depth learning models with algorithms.
- It uses Python as a good ending and runs it well in a well-designed C ++.
- TensorFlow allows developers to create a mathematical graph.

3.2 What does Tensor mean in TensorFlow?

A tensor is a combination of vectors and matrices to a higher intensity. Internally, TensorFlow represents tensors as n-dimensional arrays of base datatypes. When writing a TensorFlow program, the main thing you trick and pass is Tensor.

3.3 What is the TensorFlow Data Flow Graph?

The data flow graph is a calculation diagram where the nodes represent the calculation units, and the edges represent the used data.



IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

IV. LITERATURE REVIEW

SR. NO	Name Of Paper	Author	Publication	Year of Publication	Description
1	Low Cost Smart Navigation System for the Blind	BarathiKanna S, Ganesh Kumar T R, Niranjan C, Prashanth S, Rolant Gini J, M.E.Harikumar	IEEE	03 June 2021	The proposed solution works on the Internet of Things realm wherein the blind can "communicate" with the environment. This prototype is equipped with an ESP8266, a power source for the development board and coin motors along with a smartphone application, thereby making it accessible for even the working class visually impaired.
2	IoT Based Navigation System for Visually Impaired People	Shabnam Chodhary,VaishaliBhatia,K.R Ramkumar	IEEE	15 September 2020	This paper presents an RFID based electronic model, which will help a blind person to use public transport very quickly and safely in his daily life without any external help
3	V-Eye: A VisionBased Navigation System for the Visually Impaired	Ping-jungduh,YuCheng Sung, Liang-Yu Fan Chiang	IEEE	10 June 2020	This paper proposes V-Eye, which fulfills these needs by utilizing a novel global localization method (VB-GPS) and image-segmentation techniques to achieve better scene understanding with a single camera
4	An AIBased Visual Aid With Integrated Reading Assistant for the Completely Blind	Muiz Ahmed Khan ,Pias Paul , Mahmudur Rashid	IEEE	20 October 2020	In this work, we propose a novel visual aid system for the completely blind. Because of its low cost, compact size, and easeof-integration, Raspberry Pi 3 Model B+ has been used to demonstrate the functionality of the proposed prototype

V. SYSTEM DESIGN AND FLOW

5.1 Raspberry Pi

It is a small device capable of enabling people of all ages to scan a computer, and learn to edit in languages like Scratch and Python. The Raspberry Pi 3 equipment has been developed using a few forms that highlight the memory limit types and limited gadget support. Raspberry pi square capacity v01.This square frame shows Model B and B +; Models An, A +, and Pi Zero are comparable, yet they do not have Ethernet and USB center point components. The Ethernet connector is connected to an additional USB port.

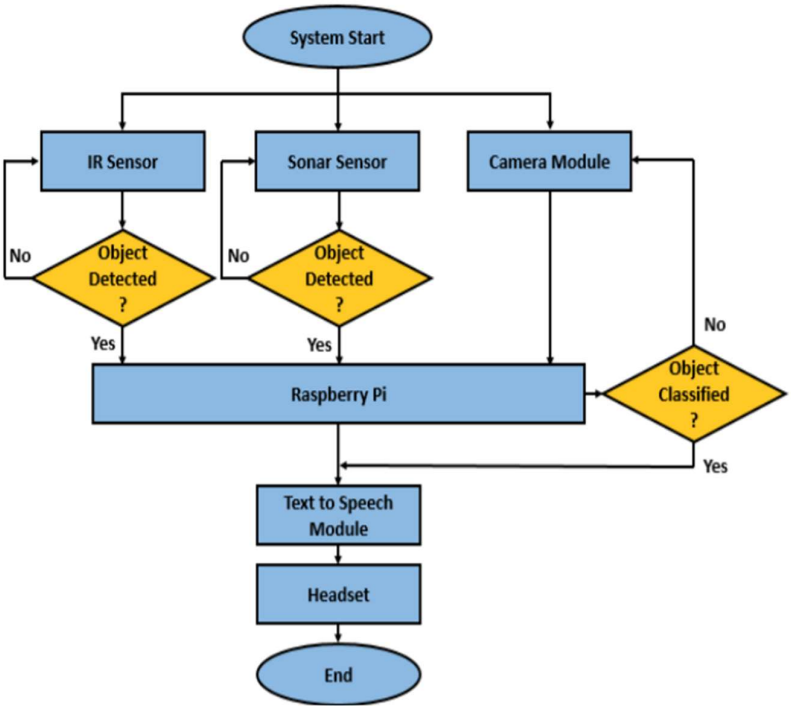
IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

5.2 IR Sensor

Sensor image effect The infrared sensor (IR sensor) is an optoelectronic component of spectral sensitive radiation at an infrared wavelength 780 nm. . . 50µm. IR sensors are now widely used in motion detectors, which are used in construction programs to turn on lights or alarms to detect unwelcome visitors. Infrared Raspberry PiConnect VCC and GND pin IR Sensor on + 5V and GND Raspberry Pi pins. Then connect the IR Sensor Data PIN to GPIO23 i.e. Physical Pin 16 for Raspberry Pi. To signal the alarm, I used a simple 5V Buzzer.

5.3 Sonar Sensor

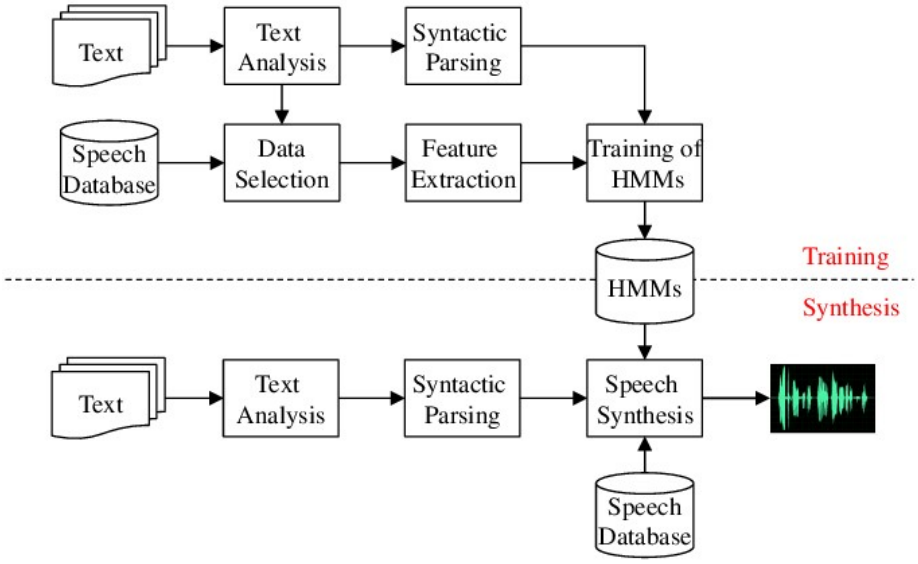
Ultrasonic sensors operate by sending sound waves at a frequency greater than the human hearing range. The sensor transducer acts as a microphone to receive and transmit ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to transmit heart rate and echo. The Sonar is a popular sensor in robots that uses acoustic pulses and their echoes to measure the width of an object. As the sound speed is generally known, the object width is equal to the time of the echo movement.



5.4 Text to Speech

It can be used on software or hardware products. The text-to-speech system (TTS) converts ordinary language text into speech; some programs offer figurative language presentations such as phonetic transcripts into speech. Designed in partnership with Grand Idea Studio, the Emic 2 Text-to-Speech Module is a multilingual voice synthesizer that converts digital text series into natural sound speech. Its simple command-based interface makes it easy to integrate into any embedded system. pyttsx3 module is used to convert text into speech.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731



VI. ADVANTAGES

- Low production cost .
- Low design time
- This system is applicable for both the indoor and outdoor environment .
- Setting the destination is very easy.
- This system be capable of using in public Places .
- It is a dynamic system .
- Less space .
- Low power consumption.

VII. LIMITATIONS

- It is bulky to carry.
- Device being very sensitive it may send faulty message during accidental cases.
- Requirement of power source.

VIII. CONCLUSION

A navigation system for visually impaired people has been designed, implemented, and assessed in both indoor and outdoor environments This research would help future developers in giving an extended helping hand. The work presented would help blind people to easily and safely navigate using public transport. The proposed solution also provides strong justification for using hybrid technologies, because of the inability of all sensors to work under all environmental conditions (sunlight, rain, etc.)

ACKNOWLEDGEMENTS

The completion of our project brings with it a sense of satisfaction, but it is never complete without those people who made it possible and whose constant support has crowned our efforts with success. One cannot even imagine our completion of the project without guidance and neither can we succeed without acknowledging it. It is a great pleasure that we acknowledge the enormous assistance and excellent co-operation to us by the respected personalities.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

REFERENCES

[1]. eKINZA SHAFIQUE 1 , BILAL A. KHAWAJA 2,3, (Senior Member, IEEE), FARAH SABIR4 , SAMEER QAZI 4 , (Member, IEEE), AND MUHAMMAD MUSTAQIM 3 "Internet of Things (IoT) for Next-Generation Smart Systems: A Review of Current Challenges, Future Trends and Prospects for Emerging 5G-IoT Scenarios" Received December 30, 2019, accepted January 17, 2020, date of publication January 28, 2020, date of current version February 6, 2020. Digital Object Identifier 10.1109/ACCESS.2020.2970118

[2]. CATHERINE NAYER TADROS 1, MOHAMED R. M. RIZK 1, (Life Senior Member, IEEE), AND BASSEM MAHMOUD MOKHTAR 1,2, (Senior Member, IEEE) "Software Defined Network-Based Management for Enhanced 5G Network Services" Received February 20, 2020, accepted March 6, 2020, date of publication March 12, 2020, date of current version March 26, 2020 Digital Object Identifier 10.1109/ACCESS.2020.2980392

[3]. S. Li, L. Da Xu, and S. Zhao, "5G Internet of Things: A survey," J. Ind. Inf. Integer., vol. 10, pp. 1–9, Jun. 2018.

[4]. A Survey on IOT and 5G Network JM Khurpade , D Rao. International conference on . . . , 2018 - ieeexplore.ieee.org

[5]. A comprehensive survey on Internet of Things (IoT) toward 5G wireless systems L Chettri, R Bera - IEEE Internet of Things Journal, 2019 - ieeexplore.ieee.org

[6]. Intelligence in IoT-based 5G networks: Opportunities and challenges N Javaid, A Sher, H Nasir. . . - IEEE Communications, 2019.

[7]. Low Cost Smart Navigation System for the Blind BarathiKanna S, Ganesh Kumar T R, Niranjan C, Prashanth S, Rolant Gini J, M.E.Harikumar Department of Electronics and Communication Engineering Amrita School of Engineering, Coimbatore Amrita Vishwa Vidyapeetham, India barathisaminathan@gmail.com, ganeshkumartr13@gmail.com, niranjansboa@gmail.com, prashanth.saravanan10@gmail.com, j _rolantgini@cb. amrita. edu, me_harikumar@cb. amrita. Edu(2021)

[8]. IoT Based Navigation System for Visually Impaired People Shabnam Choudhary Chitkara University Institute of Engineering and Technology, Chitkara University Punjab India Vaishali Bhatia Chitkara University Institute of Engineering and Technology, Chitkara University Punjab India vaishali.bhatia@chitkara.edu.in K.R Ramkumar Chitkara University Institute of Engineering and Technology, Chitkara University Punjab India(2020)

[9]. S. R. Flaxman et al., "Global causes of blindness and distance vision impairment 1990-2020: A systematic review and meta-analysis", Lancet Global Health, vol. 5, no. 12, pp. e1221-e1234, 2017.

[10]. Blindness and vision impairment", Available:https://www.who.int/health-topics/blindnessand-vision-loss#tab=tab

[11]. HC-SR04 Ultrasonic Range Sensor on the Raspberry Pi" Available: https://www.modmypi.com/blog/hc-sr04-ultrasonic-range-sensor-on-the-raspberry-pi.