

A Review Paper on HELPING BLIND USING FACE RECOGNITION

TANTRAVAHU KALYAN¹, PUSULURI SAI VENKATA AKSHAY², Mrs. R. PREMA³

¹B.E Graduate (IV year), Department of Computer Science and Engineering, SCSVMV, Kanchipuram

²B.E Graduate (IV year), Department of Computer Science and Engineering, SCSVMV, Kanchipuram

³Assistant Professor, Department of Computer Science and Engineering, SCSVMV, Kanchipuram

Abstract – Human face identification and recognition assume significant parts in numerous applications like video observation and face picture data set administration. In our venture, we will chip away at both face recognition and identification procedures. The ascent in the field of picture handling and the advancement of calculations, for example, the face identification calculation, face recognition calculation gives inspiration to foster gadgets that can help the outwardly disabled. The powerlessness to distinguish individuals is a detriment for blind or outwardly disabled individuals. This undertaking presents the Face Recognition framework for Blind People created on Raspberry Pi. At the point when the individual goes into the room, the face will be perceived by utilizing camera. Then, at that point, in like manner voice yield will be created by demonstrating the names of the individual. The gadget is underlying such a way of further developing perception, collaboration and correspondence of outwardly weakened. Here we utilized KNN (K closest Neighbors) calculations to play out the face discovery and recognition in python (OpenCV). It functions admirably under hearty conditions like complex foundation, diverse face positions.

Key Words: Dlib; NumPy; Cmake; K- Nearest Neighbour (KNN); OpenCV; Face_Recognition; espeak.

1. INTRODUCTION

It is assessed that 285 million individuals all around the world are outwardly weakened with 39 million visually impaired and 246 million with low vision. Roughly 90% of these individuals live in non-industrial nations and 82% of visually impaired individuals are matured 50 or more. Outwardly debilitated people adjust to life by utilizing different assistive techniques like the white stick, tactile replacement and electronic gadgets. Exploration has shown that people which are visually impaired since the beginning have improved hearing contrasted with those with late visual impairment and to located people because of early commencement of tangible replacement. While there are a few frameworks for helping the outwardly weakened in route, there are somewhat couple of frameworks which assist them with finding and distinguish explicit objects. Object identification and acknowledgment are among the most troublesome assignments looked by outwardly hindered people. Object recognition is the most common way of finding objects in a given climate. The article acknowledgment process develops object recognition by distinguishing the recognized item.

To achieve this, object recognition frameworks are prepared on a preparation dataset that figures out which articles will be perceived. This exploration proposes a plan and execution of facial acknowledgment framework for outwardly impeded utilizing picture handling for an assistive help gave to the outwardly disabled youngster utilizing K adjoining calculation and AI. The framework utilizes momentary video feed as info and produces yield in sound structure giving a portrayal of the recognized face or article in case it is accessible in the index.

1.1 SCOPE OF THE PROJECT

The scope of the project is to assist the visually impaired people using face recognition technique. It helps the blind to identify the persons or objects which are in front of them. By this we can ensure the safety of the visually impaired persons. So that the blind person can be more secured and can prevent from any accidents. This device is more compact, light and mobile device. This can help visually impaired to people to lead a normal life.

1.2 LITERATURE SURVEY

- In the literature, the authors used different approaches to help the visually impaired people in navigation process because during their movement from one place to any other places they need safety.
- For these reasons the existing systems had proposed many applications.
- The most commonly used techniques are: filtering, deep learning and Convolutional Neural Networks (CNN).
- Methodology for face recognition based on information theory approach of coding and decoding the face image is discussed.
- "Voice Assisted Text Reading system for Visually Impaired Persons Using TTS Method" - This can help the visually impaired persons to read any printed text in vocal form.
- "Approaches on Partial Face Recognition"-Uses Dynamic Feature Matching algorithm for face recognition
- "Hardware Implementation of Smart Reader for Visually Impaired People Using Raspberry PI" - It is used to

digitize and reproduce texts that have been produced with a non-computerized system.

- Smart Third Eye with Optimum and Safe Path Detection Based on Neural Networks for Blind Persons Using Raspberry-Pi - Implemented to improve the mobility of visually impaired people in a specific area.
- "Image Text to Speech Conversion Using OCR Technique in Raspberry Pi" - It presented a robust approach for text extraction and convert it to speech.
- Jeong D., Han S.H. (2020) Diary Methods Used in Research on Visually Impaired People. In: Di Bucchianico G., Shin C., Shim S., Fukuda S., Montagna G., Carvalho C. (eds) Advances in Industrial Design. AHFE 2020. Advances in Intelligent Systems and Computing, vol 1202. Springer, Cham.
- Andrius Budrionis, Darius Plikynas, Povilas Daniušis & Audrius Indrulionis (2020) Smartphone-based computer vision travelling aids for blind and visually impaired individuals: A systematic review, Assistive Technology, DOI: 10.1080/10400435.2020.1743381

2. PROJECT DESCRIPTION

Problem Statement:

- It is assessed that 285 million individuals universally are outwardly disabled with 39 million visually impaired and 246 million with low vision.
- Roughly 90% of these individuals live in agricultural nations and 82% of visually impaired individuals are matured 50 or more. They are dealing with numerous issues to perceive who are before them and what are before them. In this way, our task is to assist blind with conquering these issues. We use face recognition and item recognition advances to illuminate the outwardly disabled residents through sound yield to have a typical existence. We use raspberry pi to make the gadget portable and minimized. This turns into an eye for the outwardly hindered individuals.

Proposed method:

- The proposed system is designed to overcome the problems faced by the visually impaired persons.
- The proposed face recognition system is designed to take advantage of the portability of mobile devices and provide a simple user interface that makes use of the system easy for the visually impaired.
- Compared to other systems, our systems provide a mobile and compact design using raspberry pi.

- It will detect the objects in front of the person using Ultra Sonic sensor.
- The following packages are used in our project: (Modules)
 - OpenCV
 - CMake
 - Dlib
 - NumPy
- OS
- Here, we will use
 - haarcascade_frontalface_default.xml (classifier) dataset that is well accessible online.
 - We use espeak module to make the text to speech.
 - Finally, the user can identify the object or person in front of them with the audio produced.
 - We use KNN and CNN algorithms to obtain the nearest match of the person

Process:

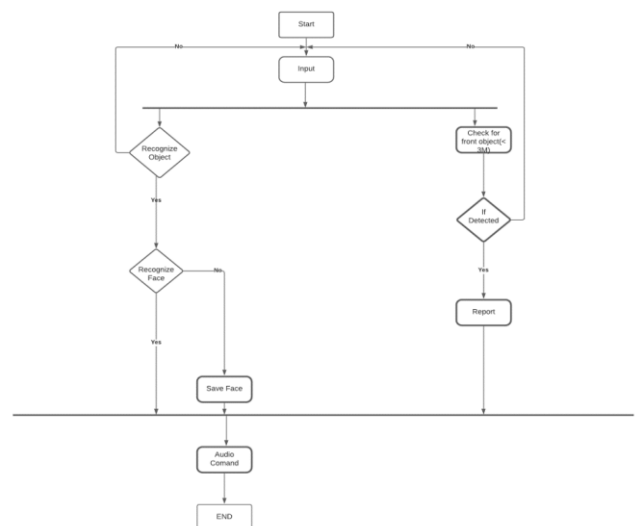


Fig.1. Flow Chart

Architecture:

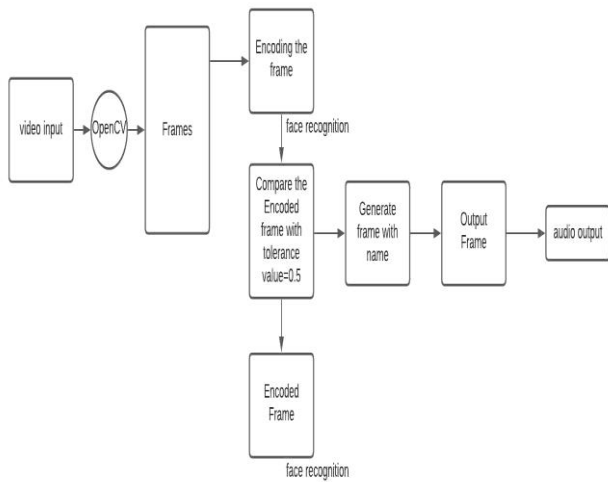


Fig.2. Architecture

Algorithm:

- 1) Start
- 2) capture input image/ object using camera.
- 3) If the object (any obstacle) is less than 3meters in the path of the user, then the object is detected and alerts the user with audio.
- 4) If it detects a face, the user gets notified with the name of the person in front by checking with the saved images of the dataset.
- 5) If the face detected not matched with the saved dataset, then it gives the audio command to the user that he is not known
- 6) Stop.

Steps for implementation:

- First, the video input will be collected from face cam and will run that in the OpenCV software
- Then the output will get converted into frames and the frames will bet encoded using face recognition.
- The encoded frames (which are already encoded) will be compared with the recently encoded frame from the input with tolerance value =0.5
- If the frame is matched, then the name of the frame will be generated and finally gives the output frame
- In our project as the user is visually impaired, the output will be given via audio signal to the user.

PROJECT DESCRIPTION:

- Research has shown that people which are visually impaired since the beginning have improved hearing contrasted with those with late visual impairment and to located people because of early inception of tangible replacement.
- While there are a few frameworks for helping the outwardly hindered in route, there are generally couple of frameworks which assist them with finding and recognize explicit items.
- Object detection and recognition are among the most difficult tasks faced by visually impaired persons.
- Object detection is the process of locating objects in a given environment.
- This exploration proposes a plan and execution of facial recognition framework for outwardly disabled utilizing picture handling for an assistive help gave to the outwardly hindered kid utilizing K adjoining calculation and AI.
- In our project, we will build a system where it detects and recognizes the objects in frame using OpenCV
- We will ensure the object is recognized accurately with help of encoded images we provide.
- Raspberry pi is used in order to make the device portable and to connect variable sensors (Ultra sonic sensors...)
- First, we need to create a database (folder) which consists of faces which the user knows and a camera is used to capture the image of the person in front of the user.
- Some of the libraries we use are OpenCV, NumPy, dlib etc....
- The framework utilizes momentary video feed as info and produces yield in sound structure giving a portrayal of the recognized face or article in case it is accessible in the catalog.

Components Used:

- Ultra-Sonic sensor
- Type-C power supply (5V)
- Micro HDMI connector for display
- Connecting Wires

- Raspberry pi 4
- Pi Camera
- Audio output is through earpiece connected to raspberry pi.

Working model and Implementation:

- First install all the required modules and libraries.
- In RPI SSH terminal, install OpenCV, espeak, NumPy, dlib, face_recognition libraries.
- Insert the Pi camera ribbon to the camera port in raspberry pi. Connect the pins of ultrasonic sensors to raspberry pi using connecting wires as shown
- Now power the Raspberry Pi using battery or power bank.
- Then open the Pi desktop window in remote desktop or VNC.
- Run the codes.
- When any known or unknown person come in front of the user (visually challenged person), it will detect the face and talk about them.
- If the user comes closer to any obstacles like wall or any other object, the device will alert about it to avoid accident by audio with espeak module.

Raspberry pi	Ultra-Sonic Sensor
5V PIN	VCC
GND	GND
BCM PIN-27	TRIG
BCM PIN-22	ECHO

Table.no.1. Ultrasonic & raspberry pi connection

3. CONCLUSION

By and large, we have had a go at carrying out bringing the vision level of the visually impaired extremely near the ordinary ones. The venture proposes a gadget which improves investment of the outwardly debilitated by empowering them to be more powerful in friendly connections.

Facial acknowledgment framework presumes that the framework will help the outwardly tested in a few purposes. It utilizes Raspberry Pi pack to execute this interaction. The Raspberry Pi pack is a little board which can be utilized with any working framework like Linux FreeBSD, NetBSD, RISC OS. It will work on the cognizance of the outwardly debilitated. This proposed framework doesn't utilize any earlier information about the situation of individuals. The exploratory assessment is performed on an enormous dataset. The framework will take input from the camera and gets the edges of the pictures. The exactness of the face discovery and acknowledgment of the framework has 92% which is nearly wonderful then the past recognition procedures.

REFERENCES

- H. Gao, "Innovative study on online ideological education in the era of new media, face recognition and blockchain," 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), Coimbatore, India, 2021, pp. 440-443, doi: 10.1109/ICAIS50930.2021.9395904.
- Qurat-ul-ain, N. Nida, A. Irtaza and N. Ilyas, "Forged Face Detection using ELA and Deep Learning Techniques," 2021 International Bhurban Conference on Applied Sciences and Technologies (IBCAST), Islamabad, Pakistan, 2021, pp. 271-275, doi: 10.1109/IBCAST51254.2021.9393234.
- H. Badave and M. Kuber, "Head Pose Estimation Based Robust Multicamera Face Recognition," 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), Coimbatore, India, 2021, pp.492495, doi:10.1109/ICAIS50930.2021.9395954.
- Jeong D., Han S.H. (2020) Diary Methods Used in Research on Visually Impaired People. In: Di Bucchianico G., Shin C., Shim S., Fukuda S., Montagna G., Carvalho C. (eds) Advances in Industrial Design. AHFE 2020. Advances in Intelligent Systems and Computing, vol 1202. Springer, Cham.
- Andrius Budrionis, Darius Plikynas, Povilas Daniušis & Audrius Indrulionis (2020) Smartphone-based computer vision travelling aids for blind and visually impaired individuals: A systematic review, Assistive Technology, DOI: 10.1080/10400435.2020.1743381

BIOGRAPHIES:

1. Mr. Tantravahi Kalyan, 11189A237, Student, B.E. Computer Science and Engineering, Sri Chandrasekharendra SaraswathiViswa Mahavidyalaya deemed to be university, Enathur, Kanchipuram, India.
2. Mr. Pusuluri Sai Venkata Akshay, 11189A193, Student, B.E. Computer Science and Engineering, Sri Chandrasekharendra SaraswathiViswa Mahavidyalaya deemed to be university, Enathur, Kanchipuram, India.
3. Mrs. R Prema is an Assistant Professor in Computer Science and Engineering at Sri Chandrasekharendra SaraswathiViswa Mahavidyalaya deemed to be university, Enathur, Kanchipuram, India.