



ADICHUNCHANAGIRI UNIVERSITY
BGS INSTITUTE OF TECHNOLOGY

B G NAGARA, Nagamangala Taluk,
Mandya District – 571448



AN INTERNSHIP REPORT
ON

**“OBJECT DETECTION FOR BLIND PERSONS-BLIND VISION
SYSTEM USING ML”**

Submitted in partial fulfillment for the award of degree

BACHELOR OF ENGINEERING
in
ELECTRONICS AND COMMUNICATION ENGINEERING
for the academic year 2023 – 2024

Submitted by:

DIVYA H S

20ECE028

*Internship Carried out
At*

CONTRIVER



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

BGS INSTITUTE OF TECHNOLOGY

B G NAGARA, Nagamangala Taluk, Mandya District – 571448
2023-2024



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE

This is to certify that the Internship entitled **“OBJECT DETECTION FOR BLIND PERSONS - BLIND VISION SYSTEM USING ML”**, is a bonafidework carried out by **DIVYA H S (20ECE028)** in partial fulfilment for the award of **Bachelor of Engineering in ELECTRONICS and COMMUNICATION ENGINEERING of the ADICHUNCHANAGIRI UNIVERSITY**, B G Nagara, during the academic year 2023-2024. It is certified that all the correction/suggestion indicated for internal assessment have been incorporated in the report deposited in the department library. The Internship report has been approved as it satisfies the academic requirement in respectof Internship work prescribed for the Bachelor of Engineering degree.

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INTERNSHIP CERTIFICATE

This is to certify that **Mr/Miss. DIVYA H S (20ECE028)** of **BGS INSTITUTE OF TECHNOLOGY (BGSIT), Mandya** have worked as an intern in the Department of Programming and Development with Data Science and web development in our Kuvempunagar branch, Mysuru.

In the internship he/she has completed a project on the above-mentioned department dated from **07/03/2024 to 27/04/2024** (working days only).

His/her performance during the internship training period was



Satisfactory



Average



Not Satisfactory

We wish him/her the best of luck for his/her future endeavour.

For Contriver

SANJAY B.
Chief Executive Officer
Contriver
Employee ID:001

Mr. Sanjay B

Date: 29th April 2024

Place: Mysuru



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ACKNOWLEDGEMENT

The completion of any internship involves the effort of many people. I have been lucky to receive a lot of help and support from all the persons during the making of this internship. So with gratitude I take this opportunity to acknowledge all those who guided and encouraged me to emerge successful.

It gives me great pleasure in expressing and humble pranamas to his holiness **BYRAVAIKYA JAGADGURU PADMA BHUSHAN SRI SRI SRI Dr. BALAGANGADHARANATHA MAHASWAMIJI** and my sincere thanks to the present pontiff his holiness **JAGADGURU SRI SRI SRI Dr. NIRMALANANDANATHA MAHASWAMIJI** and seek their blessings.

It gives me an immense pleasure to write an acknowledgement to this Internship, a contribution of all people who helped me realize it. I would like to convey my heart full thanks to **Dr. B N SHOBHA** our beloved Principal, BGSIT, B G Nagara, for giving support for my academic endeavors.

I am gratefully indebt to **Dr. P S PUTTASWAMY**, Professor and Head, Dept. of ECE, BGSIT, for giving the opportunity to embark upon this topic.

I express my deep sense of gratitude to **Ms. AFREEN ALAM**, Supervisor of web development ,Contriver, for her guidance, technical expertise, encouragement and timely help in carrying out my Internship.

I am also thankful to resourceful guidance, timely assistance and graceful of our Coordinators, **Dr. NAVEEN B**, Associate Professor, and **Mr. GOUTHAM V**, Assistant Professor, Dept. of ECE, BGSIT, who helped me in every aspect of my internship work.

I am heartily thankful to **Dr. M B ANANDARAJU**, HR-Director, Dept. of ECE, BGSIT, for his guidance, technical expertise, encouragement and timely help in making this internship a reality.

I am heartily thankful to **Mrs. ARUNA B**, Assistant Professor, Dept. of ECE, BGSIT, for her guidance, technical expertise, encouragement and timely help in making this internship a reality.

I am extremely thankful to my parents who have been cooperative and helpful during the entire course of the internship.

Once again, I convey my acknowledgment to all people associated with me for the completion of my internship. I thank one and all.

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ADICHUNCHANAGIRI UNIVERSITY
BGS INSTITUTE OF TECHNOLOGY

B G NAGARA, Nagamangala Taluk,
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DECLARATION

I DIVYA H S, bearing 20ECE028, a student of final year Bachelor of Engineering in Electronics and Communication Engineering from BGS Institute of Technology, Adichunchanagiri University, B G Nagara, hereby declare that the report entitled “**OBJECT DETECTION FOR BLIND PERSONS-BLIND VISION SYSTEM USING ML**” has been independently carried out by me under the supervision of my external guide **Mrs. AFREEN ALAM, Supervisor of web development, Contriver**, and my internal guide **Dr. M B ANANDARAJU, HR-Director**, Dept. of ECE, BGSIT, ACU, BG Nagara, Submitted in partial fulfillment for the award of degree Bachelor Of Engineering in Electronics And Communication Engineering for the academic year 2023 – 2024.

I Further declare that this Internship report has not been submitted by me to any other university or institution either in part or in full for the award of any degree.

DIVYA H S
20ECE028

ABSTRACT

Object detection plays a crucial role in facilitating the independence and mobility of visually impaired individuals. Traditional methods rely heavily on tactile cues or assistance from sighted individuals, limiting the autonomy of the blind. Leveraging advancements in machine learning (ML), particularly deep learning, this paper proposes a novel approach to enhance the visual perception of blind persons through an object detection system tailored to their unique needs. The proposed system utilizes ML algorithms trained on vast datasets of images to recognize and localize objects in real-time. By harnessing convolutional neural networks (CNNs) and other state-of-the-art ML techniques, the system can accurately identify various objects, including common obstacles, landmarks, and everyday items. Integration with wearable devices equipped with cameras and sensors enables seamless interaction and feedback for the user. Key challenges such as real-time processing, robustness to diverse environmental conditions, and user-friendly interface design are addressed to ensure practical usability and reliability. Additionally, considerations for privacy and data security are carefully managed to uphold user trust and compliance with regulatory standards. Evaluation of the proposed system involves user studies to assess its effectiveness in improving mobility and independence for blind individuals. Quantitative metrics such as detection accuracy, processing speed, and false positive rates are measured, alongside qualitative feedback regarding user experience and satisfaction. The results demonstrate the efficacy of the ML-based object detection system in empowering blind persons to navigate their surroundings with greater confidence and efficiency. Future research directions may explore enhancements such as multi-modal feedback integration, semantic scene understanding, and personalized adaptation to individual user preferences, further advancing the accessibility and inclusivity of assistive technologies for the visually impaired.

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CHAPTER 1

ABOUT THE COMPANY

This chapter gives the brief introduction about the company, its vision, mission, values, and inspirer of the company. It also covers the services offered by the company details, product details, and number of people working in company and different department and its function.

1.1 Company Profile

Company Name: Contriver

Address: Building 609, 1st floor, Sinchana clinic,
Panchamantra road, Kuvempu Nagara, Mysore,
Karnataka 570023

Official Website: <https://contriver.co.in/>



Contriver is a company owned by young people who have recognized the intolerance that is possessed to the society in the field of Food, Health, Education, Agriculture, Fitness, Construction, Engineering, Fashion, Record Producing and On Demand Services. The founder of Contriver wanted to create a community for the young people who are the future pillars of the nation. We, Everyone in Contriver work to build a grateful nation by making things come alive every day in our family with great work culture in our enterprises. Our organization's highest priority is to serve the customer and help them to make a better purchase decision everyday with high quality products which meets the 5s and 7s Standards to cater the global requirements. Our core values have been framed around the end-user and to serve global audience.

1.2 Visions and Goals

- We envision in reaching out to each and every individual around the world by providing top-notch consumer products, professional training and technical solutions, within the year 2025.
- To make our nation a minimum polluted country with more green and sustainable energy that can cater the needs of every class of the society.
- To teach the industrial or real-time engineering to cultivate the best organizational behavior.

- To enrich the value of traditional nutritious food of our country and eradicate the health issues caused by preserved food and oils.
- To construct economical, ergonomically, robust buildings to the middle-class society of the nation.
- To provide every class of people with best in class household service.

1.3 Company Information

Contriver is a company owned by young people who have recognized the intolerance that is possessed to the society in the field of Food, Health, Education, Agriculture, Fitness, Construction, Engineering, Fashion, Record Producing and On Demand Services. The founder of Contriver wanted to create a community for the young people who are the future pillars of the nation.

We, Everyone in Contriver work to build a grateful nation by making things come alive every day in our family with great work culture in our enterprises. Our organization's highest priority is to serve the customer and help them to make a better purchase decision everyday with high quality products which meets the 5s and 7s Standards to cater the global requirements. Our core values have been framed around the end-user and to serve global audience.

The journey of Contriver started from the educational sector on 07-Oct-2017 at Vidyavardhaka College of engineering(VVCE), Mysore. By conducting a 12 days' Workshop on "Professional Designing" for 5th and 7th Semester students.

When one of the founder Mr. Sanjay clearly understood the real-time complication that the consumers are facing in these fields, he immediately wanted to find a solution for these problems.

But, starting a firm which could cater all this needs would be very tedious process, As an initial investment for complete one year (2017-2018) the founders shared their knowledge for a reasonable price by organizing workshop in major Engineering colleges in the city of Mysuru, Karnataka.

After getting a sustainable capital to start a firm they rented a place and bought machines with an aid of some venture capitalists (family, friends) and started the manufacturing plant near Nanjangud, Mysuru.

1.4 Value Proposition

The value proposition of Contriver lies in its commitment to delivering cutting-edge aftermarket solutions tailored to address the dynamic challenges of the market. Contriver specializes in providing innovative products and services exclusively designed for the aftermarket industry, ensuring a precise fit for the unique needs of its clients. One of the standout features of Contriver's solutions is their unparalleled adaptability. Recognizing the ever-evolving nature of the aftermarket sector, Contriver crafts highly scalable, customizable, and flexible solutions, empowering clients to swiftly respond to market fluctuations. Moreover, Contriver's offerings are equipped with a suite of advanced features aimed at optimizing operations, reducing expenses, and enhancing overall efficiency for its clientele. Flexibility is a cornerstone of Contriver's value proposition. Whether clients prefer on-premise or cloud-based deployment, mobile accessibility, or integration with existing legacy systems, Contriver provides seamless solutions tailored to meet their specific requirements. Clients enjoy the freedom to select the deployment option that best aligns with their operational needs, without any restrictive commitments. Furthermore, Contriver ensures that its solutions remain future-proof by enabling clients to easily augment and update features in response to evolving market trends and technological advancements.

In summary, Contriver stands out in the aftermarket industry by offering specialized solutions that are adaptable, innovative, and tailored to meet the evolving needs of its clients. With a strong focus on customer satisfaction and continuous improvement, Contriver is dedicated to empowering its clients to achieve sustainable success in the aftermarket sector.

Specialized solutions: Contriver specializes in delivering innovative aftermarket solutions tailored to the unique challenges of the industry.

Scalable and customizable: Contriver's solutions are highly adaptable, scalable, and customizable to meet the evolving needs of clients.

- **Advanced features:** Contriver's offerings are equipped with advanced features designed to optimize operations and enhance efficiency.
- **Flexible deployment options:** Clients can choose between on-premise or cloud deployment, mobile accessibility, and seamless integration with existing systems.
- **Future-proof solutions:** Contriver enables clients to easily update and augment features in response to market changes and technological advancements, ensuring long-term relevance.

1.5 What they do?

At Contriver, we're a passionate team of young visionaries who have identified and are addressing the pressing issues of intolerance across various sectors including Food, Health, Education, Agriculture, Fitness, Construction, Engineering, Fashion, Record Producing, and On- Demand Services.

- **Global Impact:** We are owned and operated by young individuals who understand the pulse of society. Our innovative solutions are crafted to tackle intolerance head-on, catering to the needs of both local communities and the global market.
- **Commitment to Excellence:** At Contriver, we prioritize excellence in everything we do. From our meticulous work culture to the products and services we offer, our unwavering commitment to quality ensures that every interaction with us is meaningful and rewarding.
- **Customer-Centric Approach:** Serving our customers is our top priority. We strive to empower our clients to make informed decisions every day by providing them with high- quality products that meet the stringent 5s and 7s standards, ensuring they meet global requirements.

1.6 Awards and Recognition

- In June the Ministry of Micro, Small, and Medium Enterprise a body of Central government of India recognized Contriver.
- During the month, August Contriver was also recognized by the Department of Industrial Policy and Promotion with Ministry of Commerce and Industry a central government of India organization and was certified under start-up India.
- In September, our company got eligibility to certify compliance nine certifications authorized by the central government.

In respect to the following labor Laws:

- Other Constructions Workers Act, 1996
- The Inter-State Migrant Workmen Act, 1979
- The Payment of Gratuity Act, 1972
- The Contract Labor Act, 1970
- The Employees' Provident Funds and Miscellaneous Provisions Act, 1952
- The Employees' State Insurance Act, 1948
- Contriver was certified by start-up Karnataka, an initiative by Government of Karnataka in the month of September-2019.

1.7 Industries and Services

Product:

Contriver is a multi-disciplinary company, we are working on many projects, products and service. Here are the streams that we are working on.

1. Mechanical:

- **Savonius wind turbine:** The savonius turbine has been approved for manufacturing 10,000 units in Make in India initiative and is one the main core project of Contriver in the MSME registration. The setup will be mounted on the top of the highway lights and harness the wind from the vehicles.
- **Water turbine used in river:** The water turbine used to harness energy in low velocity flow of water 5,000 units in Make in India initiative and is one of the main core projects of Contriver in the MSME registration. It is used in the river where flow of the water is less than 10 KM/HR.

2. Computer Science and Electronics:

- **Biodigester:** The Biodigester stirrer is powered by the highway wind turbines, slurry components will be added each day automatically by calculating the respective traffic density and the power generated by the wind turbines.
- **E-commerce:** Contriver is developing an E-commerce application for phones, a residential on-demand service which will be launched in the month of January 2024, which uses the applications and algorithms of the domains, Machine learning, Data mining and Cascading Style Sheets. The user data is stored and fetched by the server in cloud by the application or the website. The application is developed using angular and android app development and will be available on iOS and android soon in the month of March of 2024.

3. Electrical:

- **Traffic speed monitoring:** A sensor grid is placed at the highways to monitor the traffic density and report them to the highway authority. Contriver is developing two application which are defined in the service section.
- **IoT Development:** We manage the data that have been fetch by the turbine sensor and to monitor the traffic density of the highway vehicles and report it to the highway authority. The sensors and the hardware are been out sourced but the interface with programming is being managed and maintained an IoT team in Contriver.

4. Civil:

- **CAD Design:** Contriver Out sources design, 2D planning, 3D planning for some startup companies and some local clients in and around Mysuru district. We have also supervise residential and commercial constructions.
- **Structural Design:** Contriver Out sources Interior designing and Structural designing for some startup companies and some local clients in and around Mysuru district.

Services:

Contriver is a multi-disciplinary company, we are working on many projects, products and service. Here are the steams that we are working on.

E-commerce

The application for phones, a residential On Demand Service which will be launched in the month of January, 2022, which uses the applications and algorithms of the domains, Machine learning, Data mining and Cascading Style Sheets. The user data is stored and fetched by the server in cloud by the application or the website.

Delivagoo

The delivery wagon delivering freshly prepared home made food for school children and office employees. A delivery food truck will be carrying the lunch boxes from their respective homes to the schools and offices of the individuals. The rider can be tracked via a application installed in the consumers mobile phones.

CHAPTER 2

ABOUT DOMAIN

INTRODUCTION TO PYTHON

Python is a high-level scripting language which can be used for a wide variety of text processing, system administration and internet-related tasks. Unlike many similar languages, its core language is very small and easy to master, while allowing the addition of modules to perform a virtually limitless variety of tasks. Python is a true object-oriented language, and is available on a wide variety of platforms. There's even a python interpreter written entirely in Java further enhancing python's position as an excellent solution for internet-based problems. Python was developed in the early 1990's by Guido van Rossum, then at CWT in Amsterdam, and currently at CNRI in Virginia. In some ways, python grew out of a project to design a computer language which would be easy for beginners to learn, yet would be powerful enough for even advanced users. This heritage is reflected in python's small, clean syntax and the thoroughness of the implementation of ideas like object-oriented programming, without eliminating the ability to program in a more traditional style. So python is an excellent choice as a first programming language without sacrificing the power and advanced capabilities that users will eventually need.

PYTHON VARIABLES

Variables are containers for storing data values. Python has no command for declaring a variable. A variable is created the moment you first assign a value to it.

PYTHON DATA TYPES

Built-in Data Types in programming, data type is an important concept. Variables can store data of different types, and different types can do different things. Python has the following data types built-in by default, in these Categories:

Text Type: str

Numeric Types: int, float, complex

Sequence Types: list, tuple, range

Mapping Type: dict

Set Types: set, frozenset

Boolean Type: bool

PYTHON LIST

Lists are used to store multiple items in a single variable List items are ordered, changeable, and allow duplicate values.

Example my list = ["apple", "banana", "cherry"]

PYTHON TUPLES

Tuples are used to store multiple items in a single variable. A tuple is a collection which is ordered .

my list ("apple", "banana", "cherry")

PYTHON SETS

My list = ("apple", "banana", "cherry")

PYTHON DICTIONARIES

Dictionaries are used to store data values in key value pairs. A dictionary is a collection which is ordered", changeable and does not allow duplicates

Example: this dict ("brand": "Ford", "model": "Mustang", "year": 1964)

PYTHON CONDITION

Python supports the usual logical conditions from mathematics

- Equals: a==b
- Not Equals: a!= b
- Less than: a < b
- Less than or equal to: a <= b
- Greater than: a>b
- Greater than or equal to: a>=

CHAPTER 3

TASK PERFORMED

Object detection plays a crucial role in facilitating the independence and mobility of visually impaired individuals. Traditional methods rely heavily on tactile cues or assistance from sighted individuals, limiting the autonomy of the blind. Leveraging advancements in machine learning (ML), particularly deep learning, this paper proposes a novel approach to enhance the visual perception of blind persons through an object detection system tailored to their unique needs. The proposed system utilizes ML algorithms trained on vast datasets of images to recognize and localize objects in real-time. By harnessing convolutional neural networks (CNNs) and other state-of-the-art ML techniques, the system can accurately identify various objects, including common obstacles, landmarks, and everyday items. Integration with wearable devices equipped with cameras and sensors enables seamless interaction and feedback for the user. Key challenges such as real-time processing, robustness to diverse environmental conditions, and user-friendly interface design are addressed to ensure practical usability and reliability. Additionally, considerations for privacy and data security are carefully managed to uphold user trust and compliance with regulatory standards.

OBJECT DETECTION FOR BLIND PERSONS -BLIND VISION SYSTEM USING ML

Visual perception is fundamental to how we navigate and interact with the world around us. For individuals with visual impairments, navigating everyday environments can be challenging, often relying on tactile cues, auditory information, or assistance from others. Object detection technology powered by machine learning (ML) presents a groundbreaking solution to enhance the autonomy and mobility of blind persons, revolutionizing their ability to perceive and interact with their surroundings. Traditionally, the independence of blind individuals has been limited by the lack of real-time visual feedback about their environment. Tasks as simple as crossing a street or navigating through a crowded space can pose significant challenges. While canes and guide dogs offer invaluable assistance, they may not always provide sufficient information about obstacles or objects in the immediate vicinity. In recent years, advancements in ML, particularly deep learning techniques, have enabled the development of highly accurate and efficient object detection systems. These systems leverage neural networks trained on vast datasets of images to recognize and localize objects within a scene in real-time.

3.1 Existing System

Existing systems for object detection tailored for blind individuals leverage machine learning (ML) techniques to provide real-time environmental perception. These systems typically employ wearable devices equipped with cameras and sensors, which capture live video feeds of the user's surroundings. The captured images are then processed by ML algorithms, trained on extensive datasets, to detect and localize objects within the scene. One notable example is the Seeing AI mobile application developed by Microsoft, which utilizes ML models to describe objects in the user's surroundings through auditory feedback. Another system, Horizon, developed by the University of Southern California, consists of smart glasses equipped with a camera and computing unit that uses ML algorithms to detect obstacles and landmarks, providing auditory feedback to aid navigation. Similarly, the Smart Cane developed by researchers at the Indian Institute of Technology Delhi integrates ML-based object detection capabilities using ultrasonic sensors and a camera module to provide haptic feedback about obstacles.

Limitations of existing system:

- **Accuracy and Reliability:** Many existing systems may struggle with accurately detecting objects in various environments and lighting conditions. False positives and false negatives can occur, which can be confusing or even dangerous for blind users.
- **Limited Object Recognition:** Some systems may only recognize a limited set of objects or may struggle with recognizing objects that are not within their predefined database. This limitation can restrict the usability of the system in real-world scenarios where users encounter diverse objects.
- **Real-Time Processing:** Processing speed is crucial for providing timely feedback to users. Some existing systems may have delays in object detection and recognition, which can hinder the user experience, especially in fast-paced environments.
- **Portability and Cost:** Many existing systems may require expensive hardware or specialized equipment, making them less accessible to a wide range of users. Additionally, the size and weight of the devices may limit their portability, reducing their practicality for everyday use.
- **User Interface and Interaction:** The interface design and interaction methods of existing systems may not be intuitive or user-friendly for blind users. Complex navigation or cumbersome controls can impede the adoption and usability of the system.

3.2 Proposed System

The proposed system for object detection for blind persons using machine learning (ML) combines advanced techniques and user-centered design principles to overcome existing limitations and provide a comprehensive solution. It focuses on achieving highly accurate object recognition through the utilization of state-of-the-art ML models, ensuring minimal false positives and missed detections. To enhance real-time responsiveness and reduce reliance on internet connectivity, the system leverages edge computing and on-device processing. Additionally, it offers a personalized user experience by allowing users to customize auditory, haptic, or visual feedback based on their preferences. Adaptive navigational assistance is provided to help users navigate complex environments safely, with real-time feedback about the distance and direction of detected objects, as well as route optimization based on user preferences. Integration of multi-modal sensory cues, such as auditory, haptic, and visual feedback, enhances the comprehensiveness of feedback and ensures a more immersive experience. Robust privacy and security measures are implemented to protect user data, including encryption, anonymization techniques, and transparent data handling practices. Continuous learning and improvement mechanisms allow ML models to adapt and evolve over time based on user feedback and real-world usage data, ensuring the system remains responsive to changing user needs and environmental conditions.

3.3 System Design

Designing a blind vision system using machine learning (ML) for object detection involves several components and considerations. Here's a basic system design:

1.Sensor Input:

- Cameras: Utilize one or more cameras to capture the surroundings. These cameras can be mounted on wearable devices like glasses or can be handheld.
- Additional Sensors: Incorporate other sensors such as depth sensors or LiDAR to provide depth information, which can enhance object detection accuracy.

2.Data Preprocessing:

- Image Processing: Preprocess the captured images to enhance quality, remove noise, and adjust for lighting conditions. Techniques like image normalization, contrast enhancement, and noise reduction can be applied.

3.Machine Learning Model:

- Object Detection Model: Train or use pre-trained ML models for object detection. Popular models like YOLO (You Only Look Once), SSD (Single Shot MultiBox Detector), or Faster R-CNN (Region- based Convolutional Neural Network) can be employed.

4.Object Recognition and Classification:

- Classify Detected Objects: After detecting objects, classify them into predefined categories (e.g., pedestrian, vehicle, obstacle) using classification algorithms or techniques.
- Text-to-Speech (TTS) Output: Convert the classification results into spoken feedback using TTS technology to convey object information to the user.

5.User Interface:

- Audio Feedback: Provide auditory feedback to the user through earphones or speakers. Clearly and concisely communicate detected objects and their locations relative to the user.
- Haptic Feedback (Optional): Incorporate haptic feedback mechanisms such as vibration patterns or tactile cues to supplement auditory feedback, enhancing the user experience.

6.User Interaction:

- Voice Commands: Allow users to interact with the system through voice commands for tasks like initiating object detection, adjusting settings, or requesting specific information.
- Gesture Control (Optional): Implement gesture recognition for hands-free interaction, enabling users to control the system through intuitive gestures.

7.Accessibility Features:

- Customizable Settings: Provide options for users to customize the system settings based on their preferences and needs, such as adjusting detection sensitivity or choosing preferred feedback modes.
- Multilingual Support: Incorporate support for multiple languages to cater to a diverse user base.

8.Hardware Implementation:

- Wearable Device: Design a compact and lightweight wearable device housing the necessary sensors, processing units, and battery to ensure portability and ease of use.
- Connectivity: Include wireless connectivity options (e.g., Bluetooth, Wi-Fi) for data transmission and integration with other devices or services.

9. Testing and Validation:

- Real-World Testing: Conduct thorough testing of the system in diverse environments and scenarios to evaluate performance, accuracy, and reliability.
- User Feedback: Gather feedback from blind users through usability testing and incorporate their input to refine and improve the system.

10. Privacy and Security:

- Data Privacy: Implement measures to ensure the privacy and security of user data, especially if the system involves transmitting or storing personal information.
- Secure Communication: Use encryption and secure protocols for data transmission to protect against unauthorized access or interception.

3.3.1 System Architecture

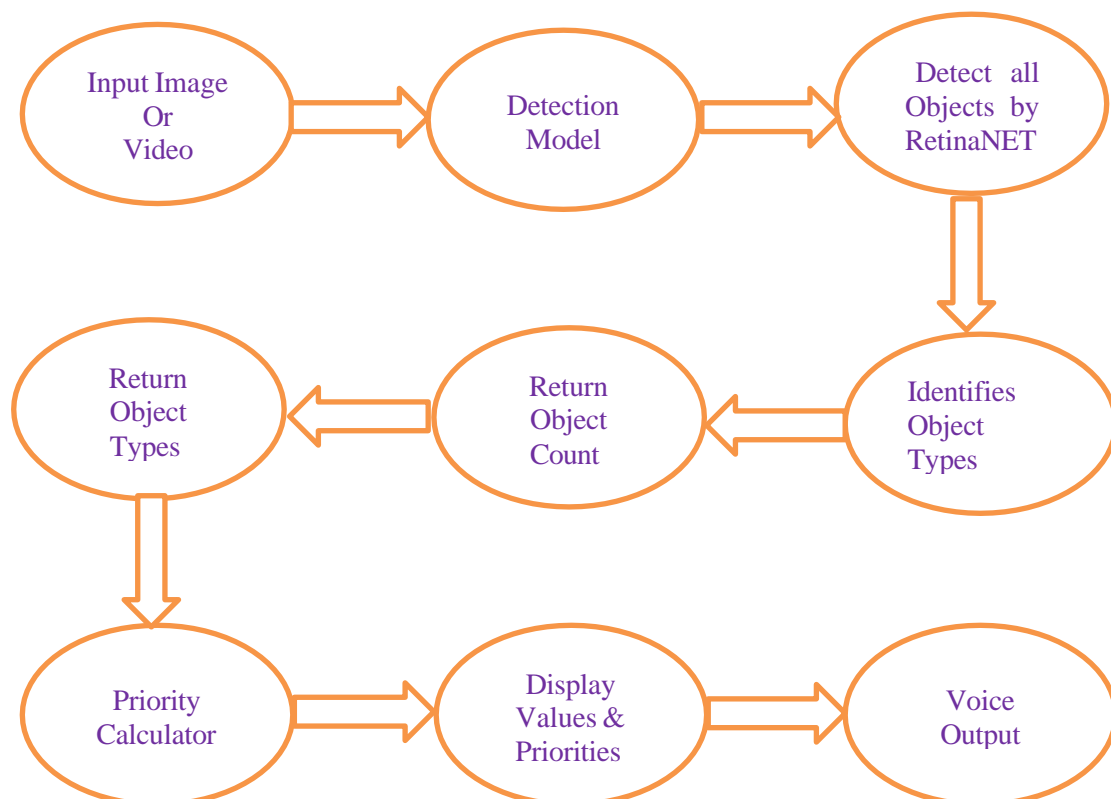


Fig 3.3.1: Architecture to detect the objects.

- **Introduction:** Start with an overview of the project's goal: to assist blind individuals by detecting objects in their surroundings using machine learning.
- **Image Input:** Explain how the system takes input from a camera or a pre-captured image.
- **Detection Model:** Introduce the RetinaNet model, explaining its role in detecting objects within the input images. Highlight its efficiency and accuracy in object detection tasks.
- **Object Detection:** Describe how the RetinaNet model is used to detect all objects present in the input image.
- **Return Object Types:** Explain how the system identifies and categorizes the detected objects into different types (e.g., person, car, chair) using the RetinaNet output.
- **Return Object Count:** Discuss how the system calculates the count of each detected object type, providing users with valuable information about their surroundings.
- **Identify Object Types by RCNN:** Introduce the Region-based Convolutional Neural Network (RCNN) model, which further refines the object identification process by analyzing regions of interest within the detected objects.
- **Priority Calculator:** Explain the purpose of the priority calculator module, which assigns priorities to detected objects based on factors such as proximity, size, and user preferences.
- **Display Values and Priorities:** Describe how the system displays the detected object types, counts, and their corresponding priorities in a user-friendly format, such as a text-based or graphical interface.
- **Voice Output:** Highlight the importance of voice output in delivering real-time information to blind users. Explain how the system converts the displayed values and priorities into spoken audio using text-to-speech technology.

CHAPTER 4

REFLECTION

This chapter gives the brief introduction about the work experience and assessment in the company during the period of internship. It also gives the details about the technical outcomes after working in the company, the after working in the company such as improvement in verbal and written communication, personality development, time management, resource utilization skills and what are the contributions to the company during the period of internship.

4.1 Work Experience/Assessment

Work experience encompasses the knowledge and skills acquired while engaged in a specific field or occupation. Often, it involves volunteer work tailored for young individuals, such as students, to acquaint them with a professional working environment. It also encompasses technical and non-technical outcomes gained from working within a company, such as enhanced communication, personality development, and time management skills.

During my tenure at Contriver, I gained valuable experience, including:

- Exposure to a positive and supportive working environment.
- Strengthening my research skills through effective utilization of online resources like Google for work-related tasks.
- Seamless access to internet facilities facilitated easy retrieval of necessary documents crucial for project requirements.
- Utilizing internet resources for a comprehensive understanding of project modules via instructional videos.
- Acquired knowledge of the Project Development Life Cycle.
- Understanding the process of project initiation, assignment, module division, and team formation within a company.
- Gained proficiency in creating databases using Python.
- Acquired basic coding skills in Java for application development.
- Significantly improved verbal and written communication abilities.
- Benefited from the internship experience as it provided valuable insights into the company's organizational culture and work environment.

4.2 Problems/Challenges

It sounds like you're reflecting on your internship experience and highlighting some of the challenges you faced during that time. Adjusting to a new environment and schedule can indeed be tricky, especially when transitioning from academic studies to practical work settings. Understanding and adapting to the tasks assigned can take some time, especially when they involve new concepts like abstract classes and interfaces in Python programming.

It's common for interns to encounter difficulties in practical applications, such as identifying errors when programming without integrated development environments (IDEs) like Anaconda. However, these challenges often provide valuable learning opportunities and help build problem-solving skills. Your mention of learning about Wordpress for certificate security is interesting. Did you encounter any specific challenges or insights while working on that aspect? It seems like an area where practical application would be essential for understanding the nuances of implementation and ensuring security.

4.3 Benefits of Doing Internship

Gain Valuable Work Experience

An internship provides the opportunity to gain hands on work experience that is not possible to get in the classroom and companies train interns and help in gaining the experience required for our career.

Transition into a Job

Employers see interns as prospective employees, so by performing well one can finish internships and continue working with the company full time. Internships are the number one way for employers to find new staffs and employees to find a new job with experience.

Networking Opportunities

Internships are a great way to meet people in specific field of our interest. An internship allows meeting people who might help in getting a job later on and give the contacts of the industry to which we are interested and break into it. Plus, references from people in the industry will really add weight to the application.

Apply Classroom Knowledge

An internship can be seen as the pinnacle of the education and give a chance to use the skill.

Gain Confidence

Getting experience is a great way to build the confidence. Having an impressive resume will help in boosting the confidence level and it increases the chances of securing a job.

4.4 Contribution to the Organization

This session delves into elucidating our impact as interns on the organization. It encompasses elucidating the value we bring to the company through our efforts, how our work aligns with the company's objectives, and the tangible benefits our contributions offer. Emphasizing our diligence and efficacy in task completion, I am committed to leveraging my organizational prowess and collaborative aptitude to enhance team productivity. Moreover, my adeptness lends itself to fostering the swift advancement of the business, thereby bolstering its trajectory towards success.

CHAPTER 5

CONCLUSION

The Implementing object detection for blind individuals using machine learning (ML) holds great promise for enhancing accessibility and independence. By leveraging advanced ML models like YOLOv3, RetinaNet, or TinyYOLOv3 alongside text-to-speech technology, individuals with visual impairments can receive real-time auditory descriptions of their surroundings, fostering a deeper understanding and interaction with their environment. This innovative solution offers several compelling advantages. Firstly, it enhances accessibility by providing auditory cues about objects nearby, enabling users to better comprehend their surroundings. Additionally, ML-based object detection algorithms enable instantaneous identification of objects, providing users with immediate feedback as they navigate through different environments. This leads to improved safety and independence, as blind individuals can detect obstacles and hazards in their path, reducing the risk of accidents. Moreover, these systems can be tailored to meet individual preferences, allowing for personalized auditory descriptions and user interfaces. Lastly, continuous feedback and refinement ensure that these systems evolve over time, remaining effective and relevant. In conclusion, object detection for blind persons using ML represents a transformative tool for promoting accessibility, independence, and inclusion, empowering individuals with visual impairments to navigate the world with confidence and dignity.

FUTURE SCOPES

Looking to the future, the scope for advancing object detection for blind individuals using machine learning (ML) is rich with potential for further development and innovation. Key areas for future exploration include enhancing the accuracy and reliability of detection algorithms through ongoing research and the application of advanced ML techniques. Moreover, the integration of adaptive and context-aware systems can tailor auditory descriptions based on user context and preferences, elevating the relevance and utility of the information provided. Multi-modal integration presents another avenue, where the incorporation of audio, haptic feedback, and augmented reality can offer a more immersive navigation experience. Additionally, leveraging advancements in natural language processing (NLP) can lead to more informative and contextually relevant descriptions of detected objects, enhancing the overall usability of the system. Collaborative and crowd-sourced approaches hold promise for harnessing user feedback to continuously improve system performance and coverage. Furthermore, prioritizing ethical considerations and inclusive design practices ensures that these technologies are accessible, secure, and equitable for all users. Integrating object detection systems with smart environments and assistive technologies can create interconnected navigation solutions, while efforts to increase global accessibility and affordability can drive widespread adoption and impact. In summary, the future of object detection for blind individuals using ML is characterized by ongoing innovation, collaboration, and a commitment to creating inclusive technologies that empower individuals with visual impairments to navigate the world with confidence and independence.

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