DETECTING OBJECTS USING ANDROID APPLICATION

A Project Report

Submitted in partial fulfillment of requirements for the award of the degree of

BACHELOR OF TECHNOLOGY IN

COMPUTER SCIENCE & ENGINEERING

Submitted by

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(Approved by AICTE-New Delhi Affiliated TO JNTUK-Kakinada)

NAAC Accredited & an ISO 9001-2015 Certified Institution

DECLARATION

We the students of DHANEKULA INSTITUTE OF ENGINEERING & TECHNOLOGY, hereby declare that the project entitled "**DETECTING OBJECTS USING ANDROID APPLICATION**" submitted for the B.Tech. (CSE) degree is my original work and the project has not formed the basis for the award of any other degree, diploma, fellowship, or any other similar titles.

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CERTIFICATE

This is to certify that the project titled **"Detecting Objects Using Android Application"** is the bonafide work carried out by **SUNKAVALLI LAKSHMI DEVI (198T1A05A5), SUREDDY CHATURYA (198T1A05A7), TANURI INDRAJA (198T1A05B0), YERUKONDA KRISHNA VAMSI (208T5A0512)** students of B. Tech (CSE) of Dhanekula Institute of Engineering & Technology, affiliated to JNT University, Kakinada, AP(India) during the academic year 2022-23, in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology (Computer Science & Engineering) and that the project has not formed the basis for the award previously of any other degree, diploma, fellowship or any other similar title

Signature of the Guide
Dr. THATI BALA MURALI KRISHNA
(Professor)

Signature of the HOD
Dr. KONERU SOWMYA
(HOD & Professor)

EXTERNAL EXAMINER

VISION–MISSION–PEOs

Vision/Mission/PEOs

Institute Vision	Pioneering Professional Education through Quality
Institute Mission	Providing Quality Education through state-of-art infrastructure, laboratories, and committed staff. Molding Students as proficient, competent, and socially responsible engineering personnel with ingenious intellect. Involving faculty members and students in researc and Development works for the betterment of society.
Department Vision	To empower students of the Computer Science and Engineering Department to be technologically adept, Innovative, global citizens possessing human values.
Department Mission	To Encourage students to become self-motivated and problem-solving individuals. To prepare students for a professional career with academic excellenc and leadership skills. To Empower the rural youth with computer education.To create a Centre of excellence in Computer Science and Engineering.
Program Educational Objectives (PEOs)	Graduates of Computer Science & Engineering will: PEO1: Excel in Professional career through knowledge in mathematics and engineerir principles. PEO2: Able to pursue higher education and research. PEO3: Communicate effectively, recognize, and incorporate societal needs in their professional endeavors. PEO4: Adapt to technological advancements by continuous learning.

POs/PSOs

POs

1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropria consideration for public health and safety, and the cultural, societal, and environmental considerations
4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data, a synthesis of the information to provide valid conclusions.
5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	**The engineer and society**: Apply to reason informed by the contextual knowledge assess societal, health, safety, legal and cultural issues and the consequent responsibiliti relevant to the professional engineering practice.
7	**Environment and sustainability**: Understand the impact of the professional engineerin solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities a norms of the engineering practice.
9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest

PROGRAM SPECIFIC OUTCOMES

PSO1: Have expertise in algorithms, networking, web applications, and software engineering for efficient design of computer-based systems of varying complexity.

PSO2: Qualify in national international level competitive examinations for successful higher studies and employment.

Project Mappings

Batch No:	06
Project Title	DETECTING OBJECTS USING ANDROID APPLICATION
Project Domain	Machine Learning
Type of the Project	Product/Research/Application/Review/Others
Guide Name	Mr. THATI BALA MURALI KRISHNA
Student Roll No	Student Name
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Project Title	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Detecting objects by using Android Application	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Mapping Level	Mapping Description
1	Low Level Mapping with PO & PSO
2	Moderate Mapping with PO & PSO
3	High Level Mapping with PO & PSO

Mapping Justifications:

PO1: Apply the gained domain knowledge in this project.

PO2: Compare and contrast the several existing solutions for research challenges.

PO3: Demonstrates the performance of the design.

PO4: Assesses solution by formulating proper methodology.

PO5: Apply appropriate techniques and modern engineering hardware and software tools.

PO6: Give reasoning and assess societal, health, legal and cultural issues with competency professional engineering practice.

PO7: Understand the impact of the professional engineering solutions in societal and environmental contexts.

PO8: Apply ethical principles and commit to professional ethics and responsibilities.

PO9: Function effectively as an individual and as a member or leader in project team and reports and presents the findings of the study.

PO10: Makes effective presentations and communicates effectively.

PO11: Formulate and propose a plan for creating a solution for the project identified.

PO12: Demonstrate the understanding of the engineering and management principles in multidisciplinary environments to engage in lifelong learning in the broadest context of technological change.

PSO1: Project mainly includes an effective design of computer-based system, so PSO1 is mapped**.**

PSO2: Project is mainly useful in successful employment. So PSO2 is mapped.

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Signature of the Guide

Dr. THATI BALA MURALI KRISHNA

(Professor)

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Behind every achievement lies an unfathomable sea of gratitude to those who activated it, without whom it would ever have come into existence. To them we lay the words of gratitude imprinted with us.

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ABSTRACT

For a human in order to lead a normal life five senses place a crucial role among them vision takes a most significant place. These days most people are facing problems understanding situations and difficulties around them due to blindness. They are not able to work independently. So, they want guidance from other people such as family members, friends etc. In addition it will give the information of direction of things and distance in the place where they are located. It notifies about the direction of the objects and the distance of the objects. So, our paper makes an effort in enlarging the detection of objects through an application for blind people. To implement this essential component like camera, an audio device and an android application are required using all these components we developed an object detecting android application for detecting and identifying objects for blind people. To overcome this problem, we have proposed an android application to detect the object and provide an audio message. The main outcome of the paper is to detecting objects by using Android applications and to help vision challenging people in highly sophisticated and effective manner. This paper consists of different modules such as object detection and object localization along with distance calculation which is developed using Open CV. This paper narrated using Convolution Neural Network Algorithm and it has given a tremendous result. So, our paper makes effort in enlarging the detection of objects through an application for blind people. To implement this essential component like camera, an audio device and an android application are required using all these components we developed an object detecting android application for detecting and identifying objects for blind people. To overcome this problem, we have proposed an android application to detect the object and provide an audio message. The main outcome of the paper is to detect objects by using Android applications and to help vision-challenging people in a highly sophisticated and effective manner. This paper consists of different modules such as object detection and object localization along with distance calculation which is developed using OpenCV. This paper narrated the data file contains more than 1100 brackets, a point - based denary approach using the supported features of service analysis is performed, The denary analysis represents the overall points of the systems in an surprising manner. It is observed that the system which is proposed has performed better than the existing systems that have a total score of 9.6/10, where it is 8.5% more than the second-best.

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CHAPTER-1

INTRODUCTION

1. INTRODUCTION

1.1 Origin of the problem

A few years ago, the creation of the software and hardware image processing systems was mainly limited to the development of the user interface, which most of the programmers of each firm were engaged in. The situation has been significantly changed with the advent of the Windows operating system when the majority of the developers switched to solving the problems of image processing itself. However, this has not yet led to the cardinal progress in solving typical tasks of recognizing faces, car numbers, road signs, analyzing remote and medical images, etc. Each of these "eternal" problems is solved by trial and error by the efforts of numerous groups of engineers and scientists. As modern technical solutions turn out to be excessively expensive, the task of automating the creation of the software tools for solving intellectual problems is formulated and intensively solved abroad. In the field of image processing, the required tool kit should support the analysis and recognition of images of previously unknown content and ensure the effective development of applications by ordinary programmers. Just as the Windows toolkit supports the creation of interfaces for solving various applied problems.

Object recognition is to describe a collection of related computer vision tasks that involve activities like identifying objects in digital photographs. Image classification involves activities such as predicting the class of one object in an image. Object localization refers to identifying the location of one or more objects in an image and drawing a bounding box around their extent. Object detection does the work of combining these two tasks and localizes and classifies one or more objects in an image. When a user or practitioner refers to the term “object recognition“, they often mean “object detection“. It may be challenging for beginners to distinguish between different related computer vision tasks.

So, we can distinguish between these three computer vision tasks with this example: Image Classification: This is done by Predicting the type or class of an object in an image.
Input: An image which consists of a single object, such as a photograph.
Output: A class label (e.g. one or more integers that are mapped to class labels).

Object Localization: This is done through, Locate the presence of objects in an image and indicate their location with a bounding box.
Input: An image which consists of one or more objects, such as a photograph. Output: One or more bounding boxes (e.g. defined by a point, width, and height).
Object Detection: This is done through, Locate the presence of objects with a bounding box and types or classes of the located objects in an image.

Input: An image which consists of one or more objects, such as a photograph.

Output: One or more bounding boxes (e.g. defined by a point, width, and height), and a class label for each bounding box.

1.2 Basic definitions and Background

One of the further extensions to this breakdown of computer vision tasks is object segmentation, also called "object instance segmentation" or "semantic segmentation," where instances of recognized objects are indicated by highlighting the specific pixels of the object instead of a coarse bounding box. From this breakdown, we can understand that object recognition refers to a suite of challenging computer vision tasks
For example, image classification is simply straightforward, but the differences between object localization and object detection can be confusing, especially when all three tasks may be just as equally referred to as object recognition.

Humans can detect and identify objects present in an image. The human visual system is fast and accurate and can also perform complex tasks like identifying multiple objects and detect obstacles with little conscious thought. The availability of large sets of data, faster GPUs, and better algorithms, we can now easily train computers to detect and classify multiple objects within an image with high accuracy. We need to understand terms such as object detection, object localization, loss function for object detection and localization, and finally explore an object detection algorithm known as "You only look once" (YOLO).
Image classification also involves assigning a class label to an image, whereas object localization involves drawing a bounding box around one or more objects in an image. Object detection is always more challenging and combines these two tasks and draws a bounding box around each object of interest in the image and assigns them a class label. Together, all these problems are referred to as object recognition.

Object recognition refers to a collection of related tasks for identifying objects in digital photographs. Region-based Convolutional Neural Networks, or R-CNNs, is a family of techniques for addressing object localization and recognition tasks, designed for model performance. You Only Look Once, or YOLO is known as the second family of techniques for object recognition designed for speed and real-time use.

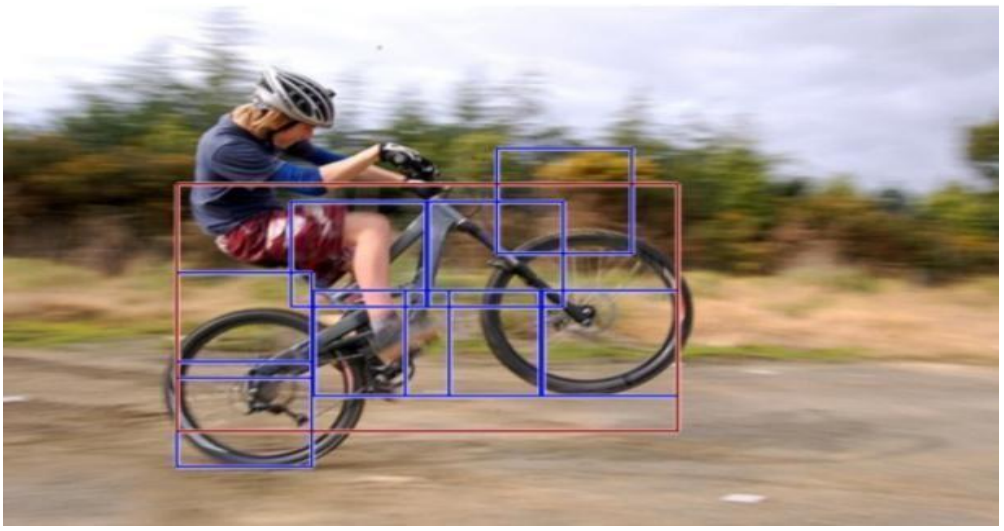


Fig.1.1 Background Image

The aim of object detection is to detect all instances of objects from a known class, such as people, cars or faces in an image. Generally, only a small number of instances of the object are present in the image, but there is a very large number of possible locations and scales at which they can occur and that need to somehow be explored. Each detection of the image is reported with some form of pose information. This is as simple as the location of the object, a location and scale, or the extent of the object defined in terms of a bounding box. In some other situations, the pose information is more detailed and contains the parameters of a linear or non-linear transformation For example for face detection in a face detector may compute the locations of the eyes, nose and mouth, in addition to the bounding box of the face. An example of a bicycle detection in an image that specifies the locations of certain parts is shown in Figure The pose can also be defined by a three-dimensional transformation specifying the location of the object relative to the camera. Object detection systems always construct a model for an object class from a set of training examples. In the case of a fixed rigid object in an image, only one example may be needed, but more generally multiple training examples are necessary to capture certain aspects of class variability.

CHAPTER- 2
REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

In various fields, there is a necessity to detect the target object and also track them effectively while handling occlusions and other included complexities. Many researchers (Almeida and Guting 2004, Hsiao-Ping Tsai 2011, Nicolas Papadakis and Aure lie Bugeau 2010) attempted for various approaches in object tracking. The nature of the techniques largely depends on the application domain. Some of the research works which made the evolution to proposed work .

2.1 OBJECT DETECTION

Object detection is an important, yet challenging vision task. It is a critical part of many applications such as image search, image auto-annotation and scene understanding, object tracking. Moving object tracking of video image sequences was one of the most important subjects in computer vision. It had already been applied in many computer vision fields, such as smart video surveillance (Arun Hampapur 2005), artificial intelligence, military guidance, safety detection and robot navigation, medical and biological application. In recent years, a number of successful single-object tracking system appeared, but in the presence of several objects, object detection becomes difficult and when objects are fully or partially occluded, they are obtruded from the human vision which further increases the problem of detection. Decreasing illumination and acquisition angle. The proposed MLP based object tracking system is made robust by an optimum selection of unique features and also by implementing the Adaboost strong classification method.

2.1.1 BACKGROUND SUBTRACTION

The background subtraction method by Horprasert et al (1999), was able to cope with local illumination changes, such as shadows and highlights, even globe illumination changes. In this method, the background model was statistically modelled on each pixel. Computational colour mode, include the brightness distortion and the chromaticity distortion which was used to distinguish shading background from the ordinary background or moving foreground objects. The background and foreground subtraction method used the following approach. A pixel was modelled by a 4-tuple [Ei, si, ai, bi], where Ei- a vector with expected colour value, si - a vector with the standard deviation of colour value, ai - the variation of the brightness distortion and bi was the variation of the chromaticity distortion of the ith pixel.

In the next step, the difference between the background image and the current image was evaluated. Each pixel was a background, shaded background or shadow, highlighted background and moving foreground object. Liyuan Li et al (2003), contributed a method for detecting foreground objects in non-stationary complex environments containing moving background objects. A Bayes decision rule was used for classification of background and foreground changes based on inter-frame colour co-occurrence statistics. An approach to store and fast retrieve colour co occurrence statistics was also established. In this method, foreground objects were detected in two steps. First, both the foreground and the background changes are extracted using background subtraction and temporal differencing. The frequent background changes were then recognized using the Bayes decision rule based on the learned colour co-occurrence statistics. Both short-term and long term strategies to learn the frequent background changes were used.

An algorithm focused on obtaining the stationary foreground regions as said by Álvaro Bayona et al (2010), which was useful for applications like the detection of abandoned/stolen objects and parked vehicles. This algorithm mainly used two steps. Firstly, a sub-sampling scheme based on background subtraction techniques was implemented to obtain stationary foreground regions.

This detects foreground changes at different time instants in the same pixel locations. This was done by using a Gaussian distribution function. Secondly, some modifications were introduced on this base algorithm such as thresh holding the previously computed subtraction. The main purpose of this algorithm was reducing the amount of stationary foreground detected.

2.1.2 TEMPLATE MATCHING

Template Matching is the technique of finding small parts of an image which match a template image. It slides the template from the top left to the bottom right of the image and compares for the best match with the template. The template dimension should be equal to the reference image or smaller than the reference image.

It recognizes the segment with the highest correlation as the target. Given an image S and an image T, where the dimension of S was both larger than T, output whether S contains a subset image I where I and T are suitably similar in pattern and if such I exists, output the location of I in S as in Hager and Bellhumear (1998).

- Schweitzer et al (2011), derived an algorithm which used both upper and lower bound to detect ‘k’ best matches. Euclidean distance and Walsh transform kernels are used to calculate match measure.
- The positive things included the usage of priority queue improved quality of decision as to which bound-improved and when good matches exist inherent cost was dominant and it improved performance.
- But there were constraints like the absence of good matches that lead to queue cost and the arithmetic operation cost was higher. The proposed methods dint use queue thereby avoiding the queue cost rather used template matching.
- Visual tracking methods can be roughly categorized in two ways namely, the feature-based and region-based method as proposed by Ken Ito and Shigeyuki Sakane (2001).
- The feature-based approach estimates the 3D pose of a target object to fit the image features the edges, given a 3D geometrical model of an object.
- This method requires much computational cost. Region-based can be classified into two categories namely, parametric method and view-based method.
- The parametric method assumes a parametric model of the images in the target image and calculates optimal fitting of the model to pixel data in a region.
- The view-based method was used to find the best match of a region in a search area given the reference template.
- This has the advantage that it does not require much computational complexity as in the feature-based approach

For Blind People the Detection of Objects is possible Using Deep Neural Network in Real-Time

- This paper detection for helping blind people in detecting real time objects is done using an audio device integrated in the application.
- The CNN algorithm uses convolutional filters and map extraction for identifying small objects.
- This model is mainly used for detecting objects present in the image, videos or data collected using web cams.

Android Based Object Detection System for the visually Impaired Ajinkya Badave, Rizina Kaovasia, Department of IT Department, Savitribai Phule Pune University.

- This paper attempted to develop a system for detecting objects to help people with diminished sight. The model need a few elements like an application, a camera and an audio device. The proposed model consists of an Android application that was designed and implemented .
- This application also provides information regarding the direction and the distance to the user. The model consists of different modules such as object detection and object localization along with distance calculation which is developed using OpenCV.

Smart Assistive System for Blind People Obstruction Avoidance Through Object Detection and Classification

- The main plan behind this article is to develop an effective system that guide blind people through Obstacle Detection and Scene Classification
- The proposed system utilizes a Arduino, Camera, Raspberry-Pi 4B, Ultrasonic Sensor.
- Data which is taken must be saved firstly and then it is processed. This does not require any internet access. Because IoT has been heavily depends on data science and analytics.
- This model has a battery which is rechargeable and can store so the user will be able to recharge after every 24 hours. Whereas applications and systems are developed to help blind people to move around. RFID systems are one among them.
- In our model RFID tags are attached to all objects in the house when user is present for identification and tracking purpose The users device will use these tags to send tags to for nearby computers. The system now identifies the ID of tags and the data which is present in the database.
- The Database will also have each tag-ID which is associated with audio clip that also consists name of object. In this project, the authors also proposed another idea using smart cap. This smart cap has a mounted camera and this cao informs users about the detected object with the help of the camera.
- The computer searches for ID of tags present in a database that is managed. This Database will also consist of tag ID of audio clip and also the object name.
- Even the system can also be used, but cannot be feasible for navigating objects that are present outside. More over the tag used in this is expensive.

CHAPTER- 3

PROPOSED METHOD

3. PROPOSED METHOD

This chapter describes the project flow, methodology, algorithm, components, and complete implementation procedure of the project.

3.1 REQUIREMENTS SPECIFICATION

A software requirement specification (SRS) is a detailed description of a software system to be developed with its functional and non-functional requirements. The SRS is developed based on the agreement between the customers and contractors. It may include the use cases of how a user is going to interact with the software system. The software requirement specification document consists of all requirements required for project development. To develop the software system, we should have a clear understanding of the software system. To achieve this, we need continuous communication with customers to gather all requirements.

A good SRS defines how a software system will interact with all internal modules, hardware, communication with other programs, and human user interactions with a wide range of real-life scenarios. Using the software requirements specification (SRS) document on the QA lead, managers create a test plan.

Types

There are two types of requirements specification. They are:

- Functional requirements specification
- Non-functional requirements specification

Functional Requirements Specification

A Functional Requirement (FR) is a description of the service that the software must offer. It describes a software system or its components. A function is nothing but inputs to the software system, its behavior, and outputs. It can be a calculation, data manipulation, business process, user interaction, or any other specific functionality which defines what function a system is likely to perform. Functional Requirements are also called Functional Specification.

In software engineering and systems engineering, a Functional Requirement can range from the high-level abstract statement of the sender's necessity to detailed mathematical functional requirement specifications. Functional software requirements help you to capture the intended behavior of the system.

The present application has been divided into the following modules.

- Image Preprocessing
- Feature Extraction
- Classification

Non-Functional Requirement Specifications

Non-functional requirement (NFR) specifies the quality attribute of a software system. They judge the software system based on Responsiveness, Usability, Security, Portability, and other non-functional standards that are critical to the success of the software system. An example of a non-functional requirement, "how fast does the website load?" Failing to meet non-functional requirements can result in systems that fail to satisfy user needs. The non-functional requirement allows you to impose constraints or restrictions on the design of the system across the various agile backlogs. For example, the site should load in 3 seconds when the number of simultaneous users is > 10000. Description of non-functional requirements is just as critical as a functional requirement.

Important to User	Important to Team	Important to business
Performance	Maintainability	Time to market
Security	Portability	Cost
Usability	Reusability	Flexibility
Compatibility	Testability	Speed
Accessibility	Naming Convention	
Flexibility	Tech Stack	
Disaster Recovery	Monitoring	

Table 3.1 Non-functional requirements

1. Performance

The system must be interactive, and the delays involved must be fewer. So, in every action-response of the system, there are no immediate delays. In the case of opening windows forms, popping error messages, and saving the settings or sessions there is a delay much below 2 seconds. In the case of opening databases, sorting questions, and evaluation there are no delays, and the operation is performed in less than 2 seconds for opening, sorting, computing, posting > 95% of the files. Also, when connecting to the server the delay is based on the distance of the 2 systems and the Configuration between them so there is a high probability that there will be or not a successful connection in less than 20 seconds for the sake of good communication.

2. Reliability

As the system provides the right tools for discussion, problem-solving it must be made sure that the system is reliable in its operations and for securing the sensitive details.

3. Safety

Information transmission should be securely transmitted to the server without any information changes.

4. Security

The main security concern is for the user's account hence proper login mechanism should be used to avoid hacking. The tablet id registration is a way to spam check for increasing security. Hence, security is provided from the unwanted use of recognition software.

5. Availability

If the internet service gets disrupted while sending information to the server, the information can be sent again for verification.

6. Usability

As the system is easy to handle and navigates most expectedly with no delays. In that case, the system program reacts accordingly and transverses quickly between its states.

7. Portability

It is the usability of the same software in different environments. The pre- requirement for portability is the generalized abstraction between the application logic and system interfaces. When software with the same functionality is produced for several computing platforms, portability is the key issue for development cost reduction.

8. Testability

Software testability is the degree to which a software artifact (i.e. a software system, software module, requirements- or design document) supports testing in a given test context. If the testability of the software artifact is high, then finding faults in the system (if it has any) through testing.

3.3 System Architecture Diagram

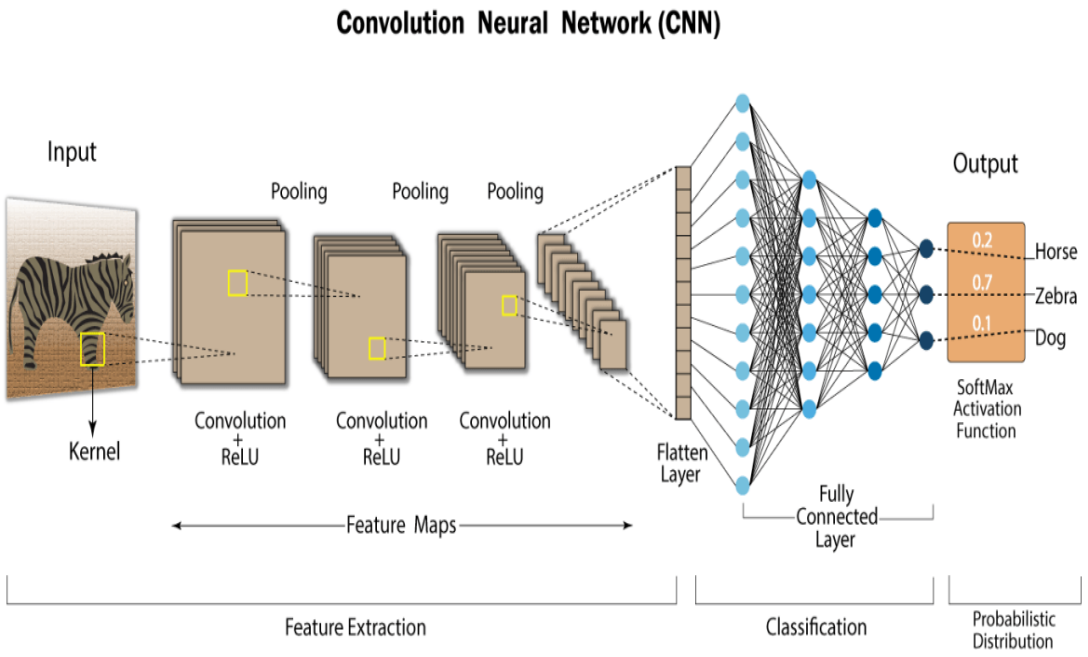


Fig 3.2 System Architecture of Detecting Objects Using Android Application

One of the techniques like PCA is used for extracting the features from the dataset. To classification, a model is developed to classify the different classes present in the dataset. Here convolution neural network is used in which it consists of different layers present in it like convolution, max pooling, flatten and some hidden layers. From this model a classification map will be obtained which can be compared with the ground truth and obtain accuracies.

3.3 SYSTEM DESIGN

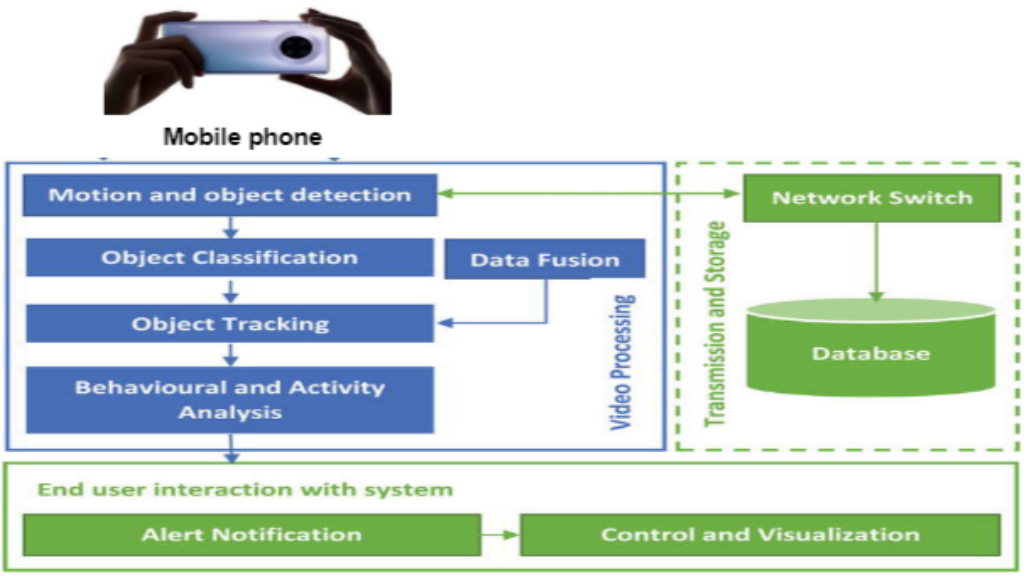


Fig.3.3 System Design

3.4 Description of Algorithms

In this we are using (CNN) Convolution Neural Network Algorithm. It is a forward neural network where its main purpose is to analyze visual images through data processing using grid-like topology. CNN is also called ConvNet.CNN. This can be used to classify and detect objects.

Steps:

1. First, we take an image as input.
2. Then we divide the image into various regions.
3. We will then consider each region as a separate image.
4. Pass all these regions (images) to the CNN and classify them into various classes.
5. Once we have divided each region into its corresponding class, we can combine all these regions to get the original image with the detected objects.

Python:

- Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991 (Kuhlman, 2011).
- IDLE (Integrated Development and Learning Environment) is an integrated development environment (IDE) for Python. The Python installer for Windows contains the IDLE module by default.
- IDLE is not available by default in Python distributions for Linux. It needs to be installed using the respective package managers.
- IDLE can be used to execute a single statement just like Python Shell and to create, modify, and execute Python scripts. IDLE provides a fully- featured text editor to create Python script that includes features like syntax highlighting, autocompletion, and smart indent. It also has a debugger with stepping and breakpoints features.
- PyCharm is a dedicated Python Integrated Development Environment (IDE) providing a wide range of essential tools for Python developers, tightly integrated to create a convenient environment for productive Python, web, and data science development.
- Its language constructs and object-oriented approach aims to help programmers write clear, logical code for small and large- scale projects. In this web application, python is used as a backend language to code database parts and all functionalities that the website can perform.

Install Python on your computer system

1. Install ImageAI and its dependencies like tensorflow, Numpy,OpenCV, etc.
2. Download the Object Detection model file(Retinanet).

1. **Steps to be followed :-**

1. Download and install Python version 3 from official Python Language website *https://python.org*

2.Install the following dependencies via pip

i. Tensorflow:

Tensorflow is an open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning.

ii. Numpy:

NumPy is library of Python programming language, adding support for large, multidimensional array and matrix, along with large collection of high-level mathematical function to operate over these arrays. The ancestor of NumPy, Numeric, was originally created by Jim Hugunin with contributions from several developers. In 2005 Travis Olphant created NumPy by incorporating features of computing Numarray into Numeric, with extension modifications. NumPy is open-source software and has many contributors.

pip install numpy -command

iii. SciPy:

SciPy contain modules for many optimizations, linear algebra, integration, interpolation, special fumction, FFT, signal and image processing, ODE solvers and other tasks common in engineering. SciPy abstracts majorly on NumPy array object,and is the part of the NumPy stack which include tools like Matplotlib, pandas and SymPy,etc., and an expanding set of scientific computing libraries. This NumPy stack has similar uses to other applications such as MATLAB, Octave, and Scilab.

pip install scipy -command

iv. OpenCV:

OpenCV is an library of programming functions mainly aimed on real time computer vision. originally developed by Intel, it is later supported by Willow Garage then Itseez.

pip install opencv-python -command

v. Pillow:

Python Imaging Library is a free Python programming language library that provides support to open, edit and save several different formats of image files. Windows, Mac OS X and Linux are available for this.

pip install pillow –command

vi. Matplotlib:

Matplotlib is a Python programming language plotting library and its NumPy numerical math extension. It provides an object-oriented API to use general-purpose GUI toolkits such as Tkinter, wxPython, Qt, or GTK+ to embed plots into applications.

pip install matplotlib - command

vii. H5py:

pip install h5py

viii. Keras

Keras is an open-source neural-network library written in Python. It is capable of running on top of TensorFlow, Microsoft Cognitive Toolkit, Theano, or PlaidML. Designed to enable fast experimentation with deep neural networks, it focuses on being user-friendly, modular, and extensible.

pip install keras .

3.5 UML DIAGRAMS

Introduction

The Unified Modeling Language allows the software engineer to express an analysis model using the modeling notation that is governed by a set of syntactic-semantic and pragmatic rules.

A UML system is represented using five different views that describe the system from a distinctly different perspective. Each view is defined by a set of diagrams, which is as follows:

- **User Model View**

1. This view represents the system from the user's perspective.
2. The analysis representation describes a usage scenario from the end user's perspective.

- **Structural model View**

1. In this model, the data and functionality arrive from inside the system.
2. This model view models the static structures.

- **Behavioral Model View**

It represents the dynamic of behavior as parts of the system, depicting the interactions of Collection between various structural elements described in the user model and structural model view.

- **Implementation Model View**

In these the structural and behavioral parts of the system are represented as they are to be built

- **Environmental Model View**

In these the structural and behavioral aspects of the environment in which the systems to be implemented are represented. As UML describes the real-time systems, it is very important to make a conceptual model and then proceed gradually. To use UML has three basic building blocks that need to be learned first before we start drawing the UML diagrams.

Those building blocks of UML are

1.Things
2.Relationships
3.Diagrams

THINGS:

Things are the most important building blocks of UML. Things can be:

Types

1.Structural
2.Behavioral
3.Grouping
4.Annotational

It makes the use of elements and forms associations between them to form diagrams. Diagrams in UML can be broadly classified as:

1. Structural Diagrams
2. Behavioral Diagrams

STRUCTURAL DIAGRAMS

They capture the static aspects or structure of a system. Structural diagrams include:

1. Class Diagram
2. Object Diagram
3. Component Diagram
4. Deployment Diagram

CLASS DIAGRAM

A class diagram is a static diagram. It represents the static view of an application. The class diagram is not only used for visualizing, describing, and documenting different aspects of a system but also for constructing executable code of the software application. The class diagram shows a collection of classes, interfaces, associations, collaborations, and constraints. It is also known as a structural diagram.

Purpose of Class Diagrams

The purpose of a class diagram is to model the static view of an application. Class diagrams are the only diagrams that can be directly mapped with object-oriented languages and thus widely used at the time of construction. The purpose of the class diagram can be summarized

- Analysis and design of the static view of an application
- Describe the responsibilities of a system
- The base for component and deployment diagrams
- Forward and reverse engineering.

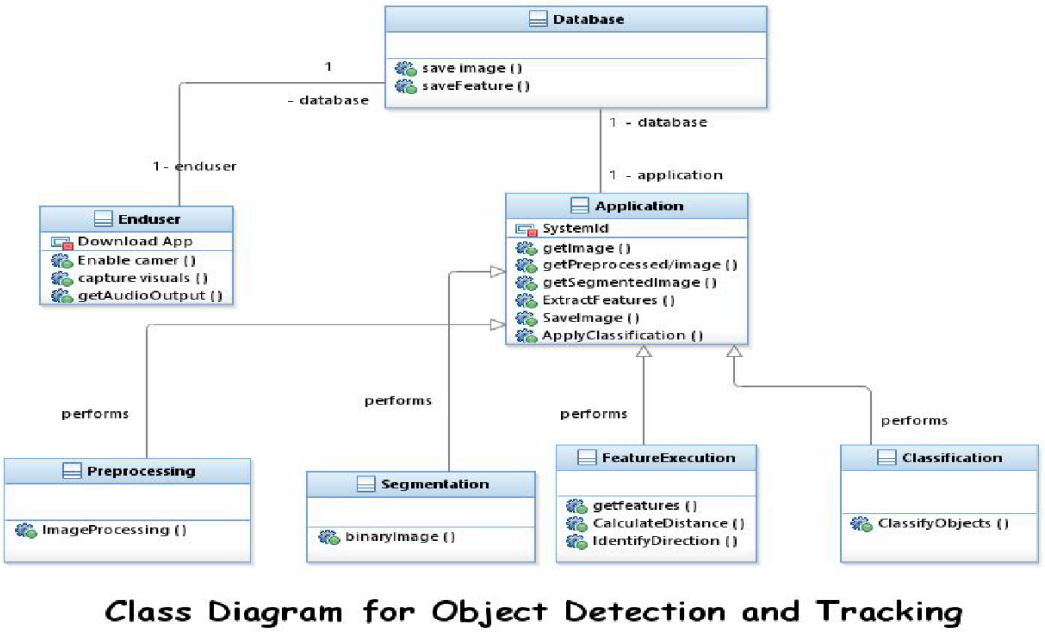


Fig.3.4 Class Diagram

COMPONENT DIAGRAM

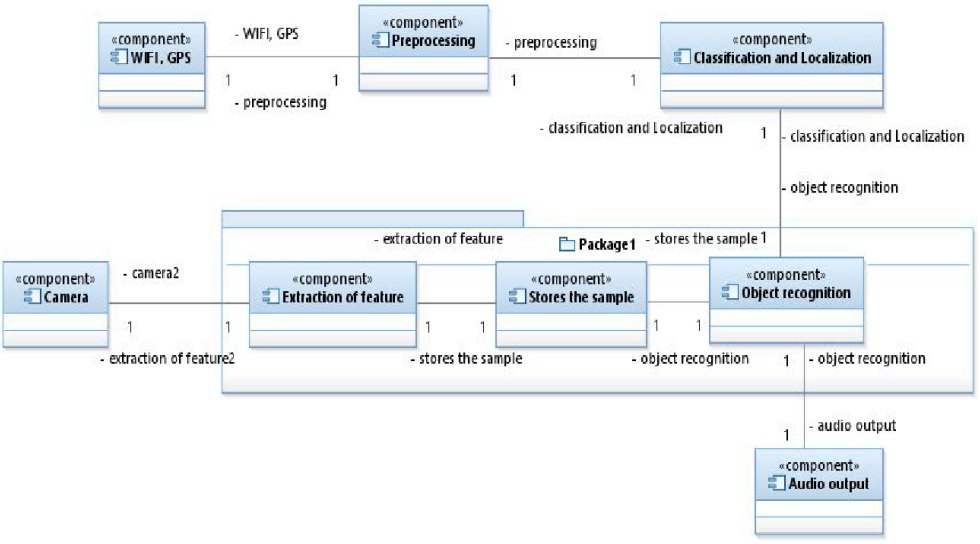
Component diagrams are different in terms of nature and behavior. Component diagrams are used to model the physical aspects of a system. Now the question is, what are these physical aspects? Physical aspects are the elements such as executables, libraries, files, documents, etc. which reside in a node. Component diagrams are used to visualize the organization and relationships among components in a system. These diagrams are also used to make executable systems.

Purpose of Component Diagrams

A single component diagram cannot represent the entire system, but a collection of diagrams is used to represent the whole.

The purpose of the component diagram can be summarized as

- Visualize the components of a system.
- Construct executables by using forward and reverse engineering.
- Describe the organization and relationships of the components.



Component diagram for Object Detection and Tracking

Fig.3.5 Component Diagram

DEPLOYMENT DIAGRAM

Deployment diagrams are used to visualize the topology of the physical components of a system, where the software components are deployed. the software components are deployed. Deployment diagrams are used to describe the static deployment view of a system. Deployment diagrams consist of nodes and their relationships.

Purpose of Deployment Diagrams

The term Deployment itself describes the purpose of the diagram. Deployment diagrams are used for describing the hardware components, where software components are deployed. Most of the UML diagrams are used to handle logical components but deployment diagrams are made to focus on the hardware topology of a system. Deployment diagrams are used by the system engineers.

The purpose of deployment diagrams can be described as –

- Visualize the hardware topology of a system.
- Describe the hardware components used to deploy software components.
- Describe the runtime processing nodes.

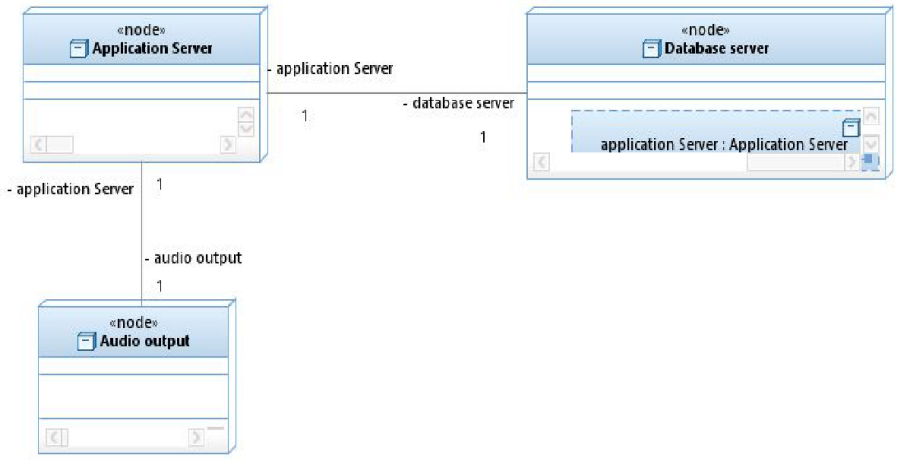


Fig.3.6 Deployment Diagram

BEHAVIORAL DIAGRAMS

They capture dynamic aspects or behavior of a system. Structural diagrams include Use case diagram, State chart diagram, Activity diagram, and Interaction diagram.

USE CASE DIAGRAM

- To model a system, the most important aspect is to capture the dynamic behavior. Dynamic behavior means the behavior of the system when it is running/operating.
- Only static behavior is not sufficient to model a system rather dynamic behavior is more important than static behavior.
- These internal and external agents are known as actors. Use case diagrams consist of actors, use cases, and their relationships.
- The diagram is used to model the system/subsystem of an application. A single and their relationships.
- The diagram is used to model the system/subsystem of an application. A single-use case diagram captures a particular functionality of a system.

Purpose of Use Case Diagrams

The purpose of the use case diagram is to capture the dynamic aspect of a system. However, this definition is too generic to describe the purpose, as the other four diagrams (activity, sequence, collaboration, and State chart) also have the same purpose. We will look into some specific purpose, which will distinguish it from the other four diagrams. When the initial task is complete, use case diagrams are modeled to present the outside view.

In brief, the purposes of use case diagrams can be said to be as follows –

- Used to get an outside view of a system.
- Used to gather the requirements of a system.
- Identify the external and internal factors influencing the system.
- Show the interaction among the requirements is an actor.

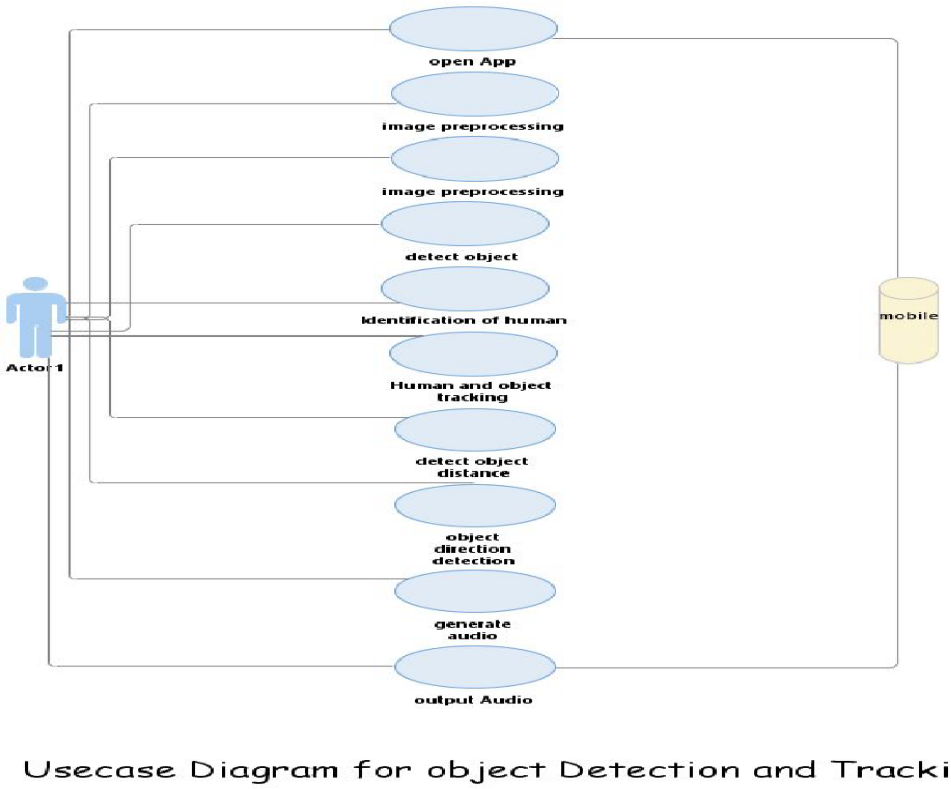


Fig.3.7 Use case Diagram

STATECHART DIAGRAM

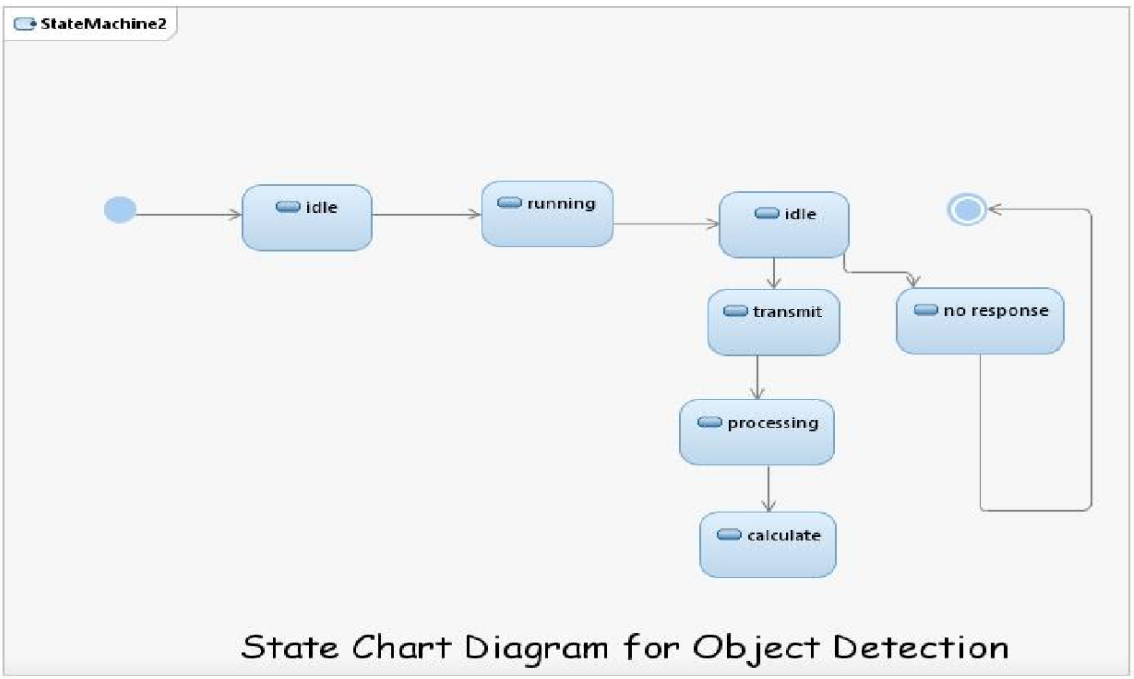
The name of the diagram itself clarifies the purpose of the diagram and other details. It describes the different states of a component in a system. The states are specific to a component/object of a system. A State chart diagram describes a state machine. A state machine can be defined as a machine that defines different states of an object and these states are controlled by external or internal event.

Purpose of State chart Diagrams

State chart diagram is one of the five UML diagrams used to model the dynamic nature of a system. They define different states of an object during its lifetime and these states are changed by events. State chart diagrams are useful to model reactive systems. Reactive systems can be defined as a system that responds to external or internal events. State chart diagrams are also used for forward and reverse engineering of a system. However, the main purpose is to model the reactive system.

Following are the main purposes of using State chart diagrams –

- To model the lifetime of a reactive system.
- To describe different states of an object during its lifetime.
- Define a state machine to model the states of an object.



State Chart Diagram for Object Detection

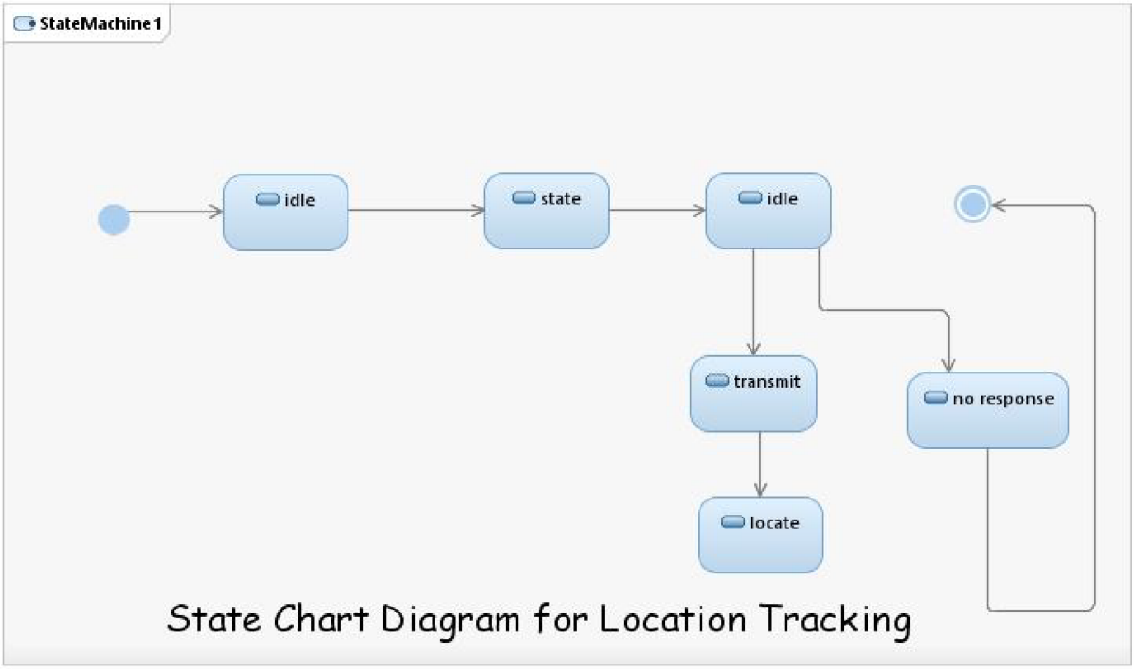


Fig.3.8 State chart Diagram

ACTIVITY DIAGRAM

The activity diagram is another important diagram in UML to describe the dynamic aspects of the system. An activity diagram is a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system.

Purpose of Activity Diagrams

The basic purposes of activity diagrams are like the other four diagrams.

It captures the dynamic behavior of the system. The other four diagrams are used to show the message flow from one object to another, but the activity diagram is used to show message flow from one activity to another.

The purpose of an activity diagram can be described as –

- Draw the activity flow of a system.
- Describe the sequence from one activity to another.
- Describe the parallel, branched, and concurrent flow of the system.

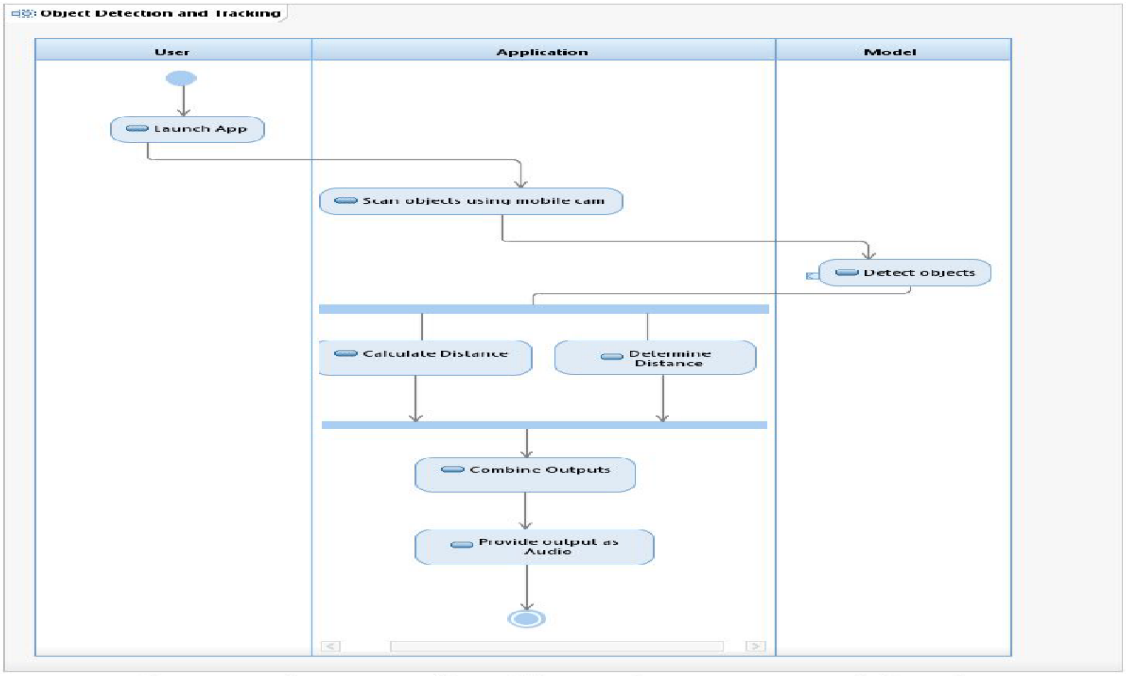


Fig.3.9 Activity Diagram

INTERACTION DIAGRAMS

From the term Interaction, the diagram is used to describe some type of interactions among the different elements in the model. This interaction is a part of the dynamic behavior of the system. This interactive behavior is represented in UML by two diagrams known as the Sequence diagram and Collaboration diagram. The basic purpose of both diagrams is similar.

Purpose of Interaction Diagrams

The purpose of interaction diagrams is to visualize the interactive behavior of the system. Visualizing the interaction is a difficult task. Hence, the solution is to use different types of models to capture the different aspects of the interaction. Sequence and collaboration diagrams are used to capture the dynamic nature but from a different angle.

The purpose of the interaction diagram is –

- To capture the dynamic behavior of a system.
- To describe the message flow in the system.
- To describe the structural organization of the objects

SEQUENCE DIAGRAM

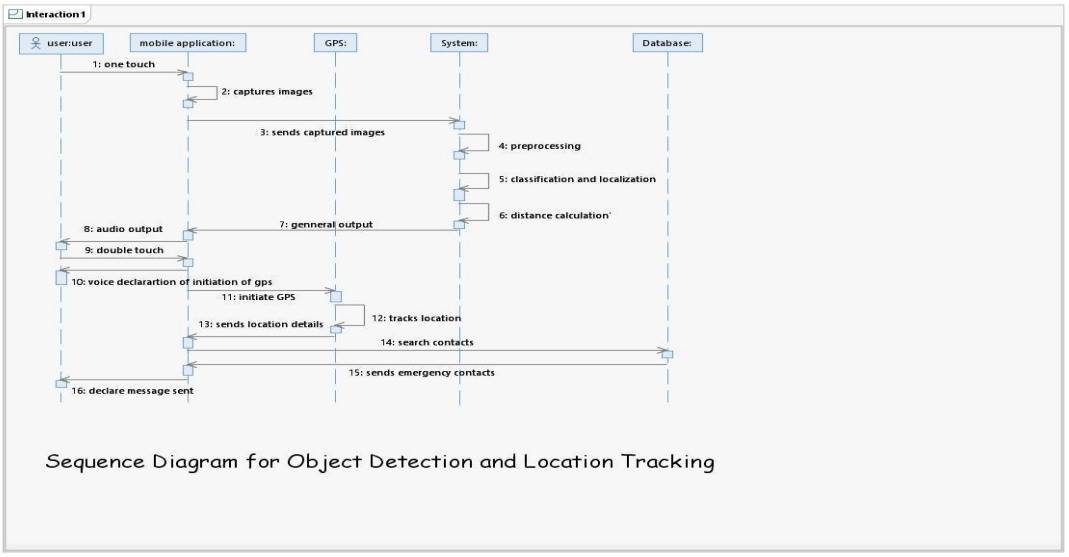


Fig.3.10 Sequence Diagram

COLLABORATION DIAGRAM

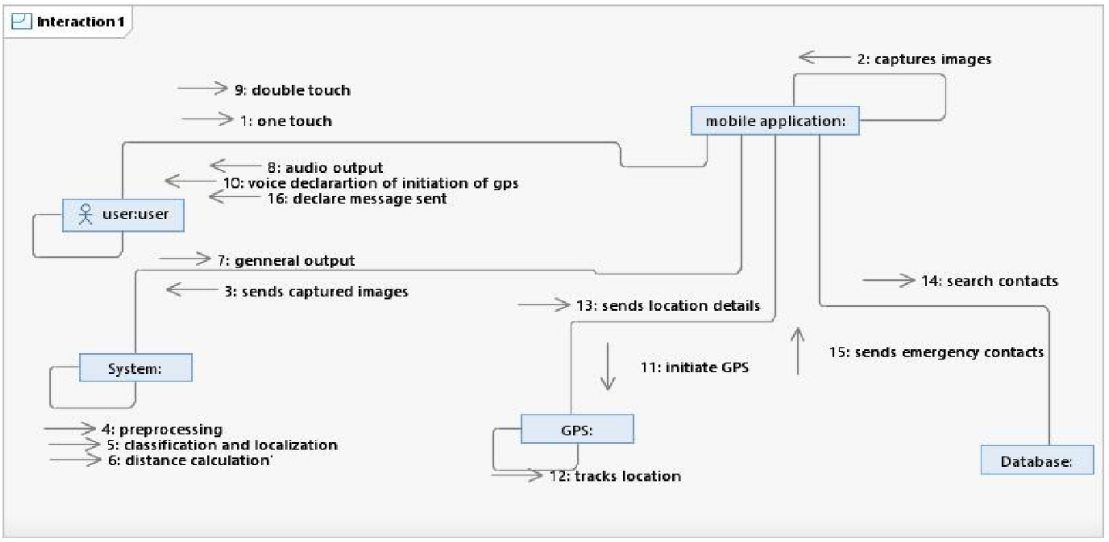


Fig.3.11 Collaboration Diagram

SOFTWARE ENVIRONMENT

Software environment emerged in the middle of the midrange era as a means of improving software quality and productivity through automation. A software environment may be described as an ‘operating system environment and a collection of tools or subroutines. A slightly better definition of a software environment is a ‘coordinated collection of software tools organized to support some approach to software development or conform to some software process model’, where software tools are defined as computer programs that assist engineers with the design and development of computer-based systems. Structured programming environments were created as a means of improving software reliability and productivity using guidelines, code libraries, structured coding, top-down development, chief programmer teams, standards, procedures, documentation, education, and metrics. Software factories were soon created to introduce discipline and repeatability, software visualization tools, the capture of customer needs or requirements, automated software testing, and software reuse.

Computer- assisted software engineering or CASE was also created to enhance software productivity and reliability by automating document production, diagram design, code compilation, software testing, configuration management, management reporting, and sharing of data by multiple developers.

IMAGE PROCESSING

Image processing is the technique to convert an image into digital format and perform operations on it to get an enhanced image or extract some useful information from it. Changes that take place in images are usually performed automatically and rely on carefully designed algorithms. Image processing is a multidisciplinary field, with contributions from different branches of science including mathematics, physics, optical and electrical engineering. Moreover, it overlaps with other areas such as pattern recognition, machine learning, artificial intelligence, and human vision research. Different steps involved in image processing include importing the image with an optical scanner or from a digital camera, analyzing and manipulating the image (data compression, image enhancement, and filtering), and generating the desired output image.

3.6 CODE

Coding is the process of designing, writing, testing, debugging, and maintaining the source code of computer programs. This source code is written in one or more programming languages. The purpose of programming is to create a set of instructions that computers use to perform specific operations or to exhibit desired behaviors. The process of writing source code often requires expertise in many different subjects, including knowledge of the application domain, specialized algorithms, and formal logic.

PROGRAM:

```
    /*** A general-purpose data class to store detection result for visualization ***/

data class BoxWithText(val box: Rect, val text: String)

<!DOCTYPE html>

<html lang="en">

<head>

   <title>The Recognizer</title>

   <meta charset="utf-8">

   <meta name="viewport" content="width=device-width, initial-scale=1">

   <link href="styles.css" rel="stylesheet">

</head>

<body>

<h1>Object Detection</h1>

<section id="demos">

   <div id="liveView" >

   <button id="webcamButton" class="invisible">Loading...</button>
```

```
        <video id="webcam" class="background" playsinline
crossorigin="anonymous"></video>

    </div>

</section>

<!-- Import TensorFlow.js library →

<!-- <script src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs/dist/tf.min.js"></script-->

<script src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@2.6.0/dist/tf.min.js"></script>

<script src="script.js"></script>

</body>

</html>
```

3.7 TESTING

Testing can also be stated as the process of verifying and validating that software or application is bug-free, meets the technical requirements as guided by its design and development, and meets the user requirements effectively and efficiently with handling all the exceptional and boundary cases.

Principles of Testing:

(i) All the tests should meet the customer requirements.

(ii) To make our software, testing should be performed by a third party.

(iii) Exhaustive testing is not possible. As we need the optimal amount of testing

(iv) All the tests to be conducted should be planned before implementing them.

(v) It follows the Pareto rule (80/20 rule) which states that 80% of errors

(vi) Start testing with small parts and extend it to large parts.

Testing Objectives:

The following are the testing objectives...

- Testing is the process of executing a program with the intent of finding an error.
- A good test case has a high probability of finding an as- yet- undiscovered error.
- A successful test is one that uncovers a yet undiscovered error.

Steps:

Testing can be divided into two steps. They are –

- **Verification**

It refers to the set of tasks that ensure that software correctly implements a specific function.

- **Validation**

It refers to a different set of tasks that ensure that the software that has been built is traceable to customer requirements.

Verification: "Are we building the product, right?"

Validation: "Are we building the right product?"

TYPES OF TESTING

1) White Box Testing:

White box testing is a test case design method that uses the control structure of the procedural design to derive test cases. After performing white box testing it was identified that

- The E-health care system guarantees that all independent paths within the module
- It has exercised all logical decisions on their true and false sides.

2) Black Box Testing:

Black box tests are designed to uncover errors in functional requirements without regard to the internal workings of a program. Black box testing techniques focus on the information domain of the software.

Black box testing attempts to find errors in the following categories.

- Incorrect or missing functions
- Interface errors
- Errors in the data structures or external database access
- Performance errors

3.8 TEST CASES

Id	Function Name	Description	Step	Expected	Actual	Status	Priority
1	Start app	Run the app and it is started execution available	If doesn't start	App won't run	App is alive	pass	high
2	Camera input	Open the camera and focus on objects	If it is not scanned	It cannot show results	App is success	pass	high
3	Data output	View output results in views	If it is not showing results	App is working	App running success	pass	high

Fig 3.12 : Sample test cases

Validation Checking

Validation checks are performed on the following fields.

Text Field

The text field can contain only the number of characters lesser than or equal to its size. The text fields are alphanumeric in some tables and alphabetic in other tables. Incorrect entries always flash and error messages.

Numeric Field

The numeric field can contain only numbers from 0 to 9. An entry of any character flashes an error message. The individual modules are checked for accuracy and what it has to perform. Each module is subjected to a test run along with sample data. The individually tested modules are integrated into a single system. Testing involves executing the real data information used in the program the existence of any program defect is inferred from the output. The testing should be planned so that all the requirements are individually tested. A successful test is one that gives out the defects for the inappropriate data and produces an output revealing the errors in the system.

Preparation of Test Data

Taking various kinds of test data does the above testing. Preparation of test data plays a vital role in the system testing. After preparing the test data the system under study is tested using that test data. While testing the system by using test data errors are again uncovered and corrected by using above testing steps and corrections are also noted for future use.

User Training

Whenever a new system is developed, user training is required to educate them about the working of the system so that it can be put to efficient use by those for whom the system has been primarily designed. For this purpose the normal working of the project was demonstrated to the prospective users. Its working is easily understandable and since the expected users are people who have good knowledge of computers, the use of this system is very easy.

Maintenance

This covers a wide range of activities including correcting code and design errors. To reduce the need for maintenance in the long run, we have more accurately defined the user's requirements during the process of system development. Depending on the requirements, this system has been developed to satisfy the needs to the largest possible extent. The coding and designing is simple and easy to understand which will make

CHAPTER- 4

RESULTS

4. RESULTS

After the implementation of the project, the results and observations obtained are mentioned and discussed in this chapter.

4.1 Stepwise Descriptions of Results

Result:

All the libraries required are imported for the project.

- The Dataset are loaded successfully, As the function wget is used for getting the required data from a particular URL hosting the files.
- Application of PCA for reducing the dimensions has been finished successfully. Also, different components values for reduction are verified and the data is split into training and testing data.
- Now the creation of a CNN model with multiple filters is performed and data is applied to this model which consists of different convolution layers and dense layers with activation function as ReLu.
- Lastly, we compile the model and train the model with training data, then plot the graphs which contains accuracy and loss with respect to epochs.
- Later for testing the model, we use Adam optimizer for accuracy, then represented the class with the confusion matrix.
- Finally predicted output is compared with the ground truth and accuracy is derived.

Here there is a high rate for usage of face or object detection systems. The system consists of accelerating results from the deep CNN based object detectors and CNN architectures which are utilized in a change of applications.

This methodology is based on the categorized is either as a singular two-stage object detection model. By using CNN we can get accurate results when compared with historical models as shown in the Table 1. With the exception, it tells the different characteristics of available datasets and the investigative result of historical models are

compare through graphical representation.

4.2 Test Case Results

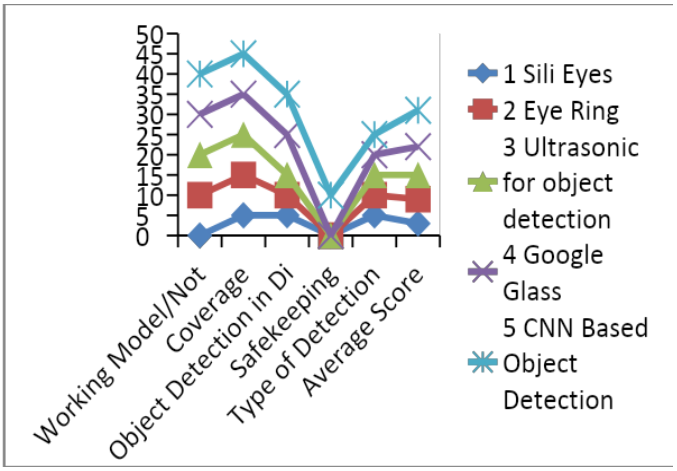


Fig. 4.1 The Comparative results of different models with CNNODT in various perspectives.

Sl.No	Technique	Working Model/Not	Coverage	Object Detection in Distance	Safekeeping	Type of Detection	Average Score
The Score Weightage take max value is 10.00							
1	Sili Eyes (57)	Not (0.00)	5	5	Not At All (0.00)	5	3
2	Eye Ring (59)	10	10	5	Not At All (0.00)	5	6
3	Ultrasonic for object detection (63)	10	10	5	Not At All (0.00)	5	6
4	Google Glass (65)	10	10	10	Not At All (0.00)	5	7
5	CNN Based Object Detection (Present Model)	10	10	10	10	5	9

Fig. 4.2 Summary about Convolution Layers

Fig. 4.3 Before Detection

This is a sample image we feed to the algorithm and expect our algorithm to detect and identify objects in the image and label them according to the class assigned to it.

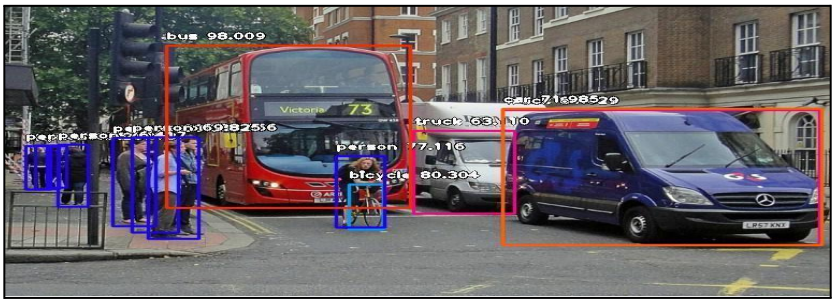


Fig. 4.6 After Detection

As expected our algorithm identifies the objects by its classes ans assigns each object by its tag and has dimensions on detected image.

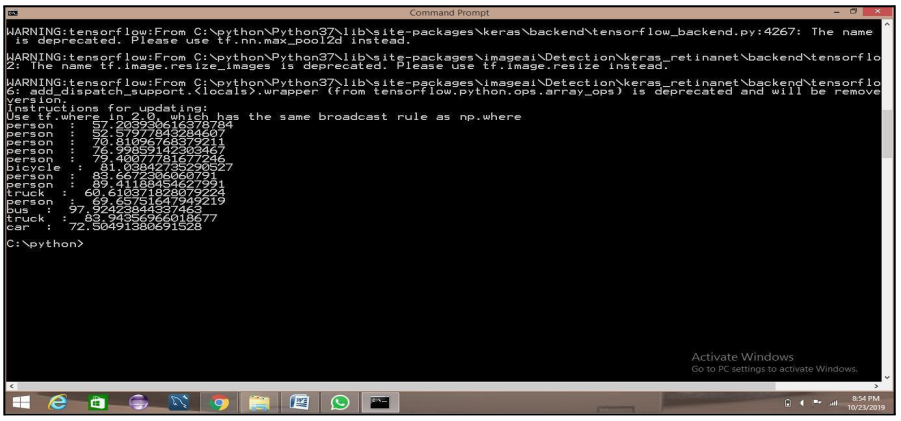


Fig. 4.7 *Console result for above image*

CHAPTER-5

CONCLUSION AND FUTURE STUDY

5. CONCLUSION AND FUTURE STUDY

5.1 Conclusion

Many solutions have been introduced for the sake of solving problems like navigating, identifying & detecting objects that are around visually impaired people. But the maximum number of solutions are not feasible in everyday life by the blind people as they are developed using expensive infrastructure, so to overcome this drawback we are proposing this model which is very feasible when compared to the previous works. There is less accuracy particularly for small objects in complex environments. Here we use the mobile phone which is meant to be mandatory nowadays. So our application is user friendly. Developing an android application that is used for both location tracking and object detection is the primary motive. The camera present in the mobile is used for object detection By using this thesis and based on experimental results we are able to detect object more precisely and identify the objects individually with exact location of an object in the picture in x, y axis. This paper also provides experimental results on different methods for object detection and identification and compares each method for their efficiencies.

5.2 Future study

The object recognition system can be applied in the area of surveillance systems, face recognition, fault detection, character recognition etc. The objective of this thesis is to develop an object recognition system to recognize the 2D and 3D objects in the image. The performance of the object recognition system depends on the features used and the classifier employed for recognition. This research work attempts to propose a novel feature extraction method for extracting global features and obtaining local features from the region of interest. Also the research work attempts to hybrid the traditional classifiers to recognize the object. The object recognition system developed in this research was tested with the benchmark datasets like COIL100, Caltech 101, ETH80 and MNIST. The object recognition system is implemented in MATLAB .It is important to mention the difficulties observed during the experimentation of the object recognition system due to several features present in the image.

The research work suggests that the image is to be preprocessed and reduced to a size of 128 x 128. The proposed feature extraction method helps to select the important feature. To improve the efficiency of the classifier, the number of features should be less in number. Specifically, the contributions towards this research work are as follows.

- An object recognition system is developed that recognizes the two-dimensional and three dimensional objects.
- The feature extracted is sufficient for recognizing the object and marking the location of the object. x The proposed classifier is able to recognize the object in less computational cost.
- The proposed global feature extraction requires less time, compared to the traditional feature extraction method.
- The performance of the SVM-kNN is greater and promising when compared with the BPN and SVM. The performance of the One-against-One classifier is efficient. As a scope for future enhancement, Features either the local or global used for recognition can be increased

Although the visual tracking algorithm proposed here is robust in many of the conditions, it can be made more robust by eliminating some of the limitations as listed below

- In the Single Visual tracking, the size of the template remains fixed for tracking. If the size of the object reduces with the time, the background becomes more dominant than the object being tracked. In this case the object may not be tracked.
- Fully occluded object cannot be tracked and considered as a new object in the next frame.
- Foreground object extraction depends on the binary segmentation which is carried out by applying threshold techniques. So blob extraction and tracking depends on the threshold value. Splitting and merging cannot be handled very well in all conditions using the single camera due to the loss of information of a 3D object projection in 2D images.
- For Night time visual tracking, night vision mode should be available as an inbuilt feature in the CCTV camera.
- To make the system fully automatic and also to overcome the above limitations, in future, multi- view tracking can be implemented using multiple cameras. Multi view tracking has the obvious advantage over single view tracking because of wide coverage range with different viewing angles for the objects to be tracked.

6. REFERENCES

Here are some of the references for the project from various sites, journals, papers, etc…

1. Sirisha, U., & Chandana, B. S. (2023). Privacy preserving image encryption with optimal deep transfer learning-based accident severity classification model. *Sensors*, *23*(1), 519.
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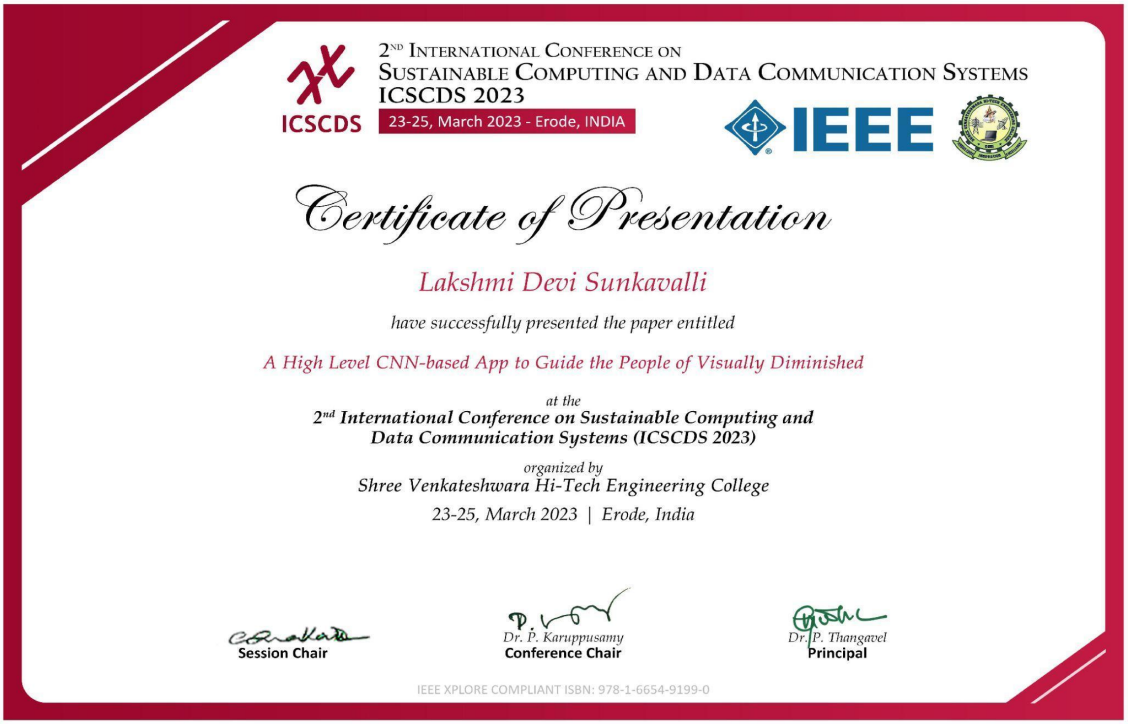
7. CERTIFICATES



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***Abstract*— For a human in order to lead a normal life five senses place a crucial role among them vision takes a most significant place. These days most people are facing problems to understand situations and difficulties around them due to blindness. They are not able to work independently. So, they want guidance from other people such as family members, friends etc. In addition it is will give the information of direction of things and distance in the place where they are located. It notifies about the direction of the objects and the distance of the objects. So, our paper makes effort in enlarging the detection of objects through a application for blind people. To implement this essential component like camera, an audio device and an android application are required using all these components we developed an object detecting android application for detecting and identifying objects for blind people. To overcome this problem, we have proposed an android application to detect the object and provide an audio message. The main outcome of the paper is to detecting objects by using Android applications and to help vision challenging people in highly sophisticated and effective manner. This paper consists of different modules such as object detection and object localization along with distance calculation which is developed using OpenCV. This paper narrated using Convolution Neural Network Algorithm and it have given a tremendous result. The techniques that we adopted and implemented has given an accurateness of 86.7%, whereas the data file contains more than 1100 brackets, a point - based denary approach using the supported features of service analysis is performed , The denary analysis represents the overall points of the systems in an surprising manner. It is observed that the system which is proposed has performed more better than the existing systems that having total score of 9.6/10, where it is 8.5% more than the second-best.**

***Index Terms*— Vision, Crucial, Visual disabilities, Camera, Object detection, Audio device, Android application, Impaired user, Audio message.**

I. INTRODUCTION

According to the recent survey conducted by WHO has reported globally more than 2.2 billion population is suffering from vision related diseases. The diseases that causing people blind are diabetic retinopathy, Refractive error, Opacities, Glaucoma, Trachoma and unaddressed presbyopia. Blind people embrace a large portion among our entire population and they exist worldwide. Nowadays technology has developed in such a way every domain is dependent on it and it is helping humans to complete their task easily, efficiently within less time. So using technology which consists of intelligent and smart application is developed in order to make blind people work by themselves without depending on a second person. By using mobile cameras for surveilling the surroundings always. Using our application every moment can be captured and used to observe the actions and activities which are happening around them according to their surroundings. It includes a few steps like object classification tracking[9], environment modeling, motion segmentation. The main basic step is to identify the moving objects in the camera lens. Here the technology used is object detection for recognizing the symbolism part of the object that is present in the video. Contemplating the significance of detection of objects in the super vision, our paper offers different methods which are accessible for detecting the objects. Deep-learning[14] is used in various aspects like object-detection[8], image-captioning [6], sentiment analysis[4,5], privacy preserving[2,7] etc. Detection of objects is the main objective of

our application. Detection of objects consists of major two parts, Object detection and localization. Detection of objects also belongs to image processing & computer vision [3]. In our model we are using (CNN) convolutional neural networks [16].

for detection of objects The CNN algorithm has image classification and object localization as the principal parts which are used for object recognition. The prediction of class of any

object is done using image classification whereas object locating the position of objects is done using localization of objects. The basic phenomenon of CNN is represented in the Figure 1. These days most people are facing problems in understanding the situations because of blindness and eye related disabilities. They are not able to work independently. So, they want guidance from other people such as family members, friends etc. In addition it is able to inform the direction of the objects and distance in the place where they are located. It notifies about the direction & distance of the objects. The action of recognizing and identifying objects present infront of blind people without touching them with hand or by using any tool is typical .Our paper deals with
recognizing live objects to help blind. In a few cases contact between the person and objects may cause harm to the person. Many systems in order to help blind people. RFID[11] (Radio-

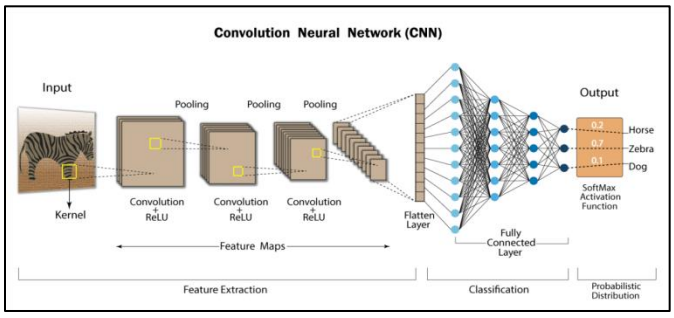

Figure 1. A Taxonomy of Convolution Neural Network

frequency identification) based systems are one among them. RFID system consists of tags which are known as RFID tags that are tagged to all objects so the RFID system will be able to identify and detect objects that are tagged with RFID tags[12].
The objects are identified which are present near to the system and the user provides the information regarding the detected objects that are tagged. As every tagged object has a unique tag ID, this tag ID will sent to the computer depend on the audio clip data present in the database backup provides output as audio. Authors [13,17,18]came up with the other approach using smart stick .These smart stick helps in identifying people and it also calculates the distance using ultrasonic sensors that works based on sonar technology .The main drawback with this application is, it will be enable to detect the nearby objects this makes users to feel tough in identifying objects around .
As the system uses sonar technology which is expensive. Smart cap [15,16] is another engrossing approach which was developed for the visually impaired. In this approach camera is attached at the top of the phone as a cap that informs visually impaired user about the detected objects Raspberry Pi is the primary hardware used for object detection .The captured information is provided through earphones .The drawback of this approach is that Raspberry Pi requires a lot of power which in turn the user need to handle a power bank always whenever he/she using the system. Our paper tries to help them easily detect objects that convert visual form to the audio form.

II. Related Work

For Blind People the Detection of Objects is possible Using Deep Neural Network in Real-Time

- This paper detection for helping blind people in detecting real time objects is done using an audio device integrated in the application.
- The CNN algorithm uses convolutional filters and map extraction for identifying small objects.
- This model is mainly used for detecting objects present in the image, videos or data collected using web cams.

Android Based Object Detection System for the visually Impaired

- Ajinkya Badave, Rizina Kaovasia, Department of IT Department, Savitribai Phule Pune University.
- This paper attempted to develop a system for detecting objects to help people with diminished sight. The model need a few elements like an application, a camera and an audio device. The proposed model consists of an Android application that was designed and implemented [19].
- This application also provides information regarding the direction and the distance to the user. The model consists of different modules such as object detection and object localization along with distance calculation which is developed using OpenCV.

Smart Assistive System for Blind People Obstruction Avoidance Through Object Detection and Classification

- The main plan behind this article is to develop an effective system that guide blind people through Obstacle Detection and Scene Classification
- The proposed system utilizes a Arduino, Camera, Raspberry-Pi 4B, Ultrasonic Sensor.
- Data which is taken must be saved firstly and then it is processed. This does not require any internet access. Because IoT has been heavily depends on data science and analytics.
- This model has a battery which is rechargeable and can store so the user will be able to recharge after every 24 hours.
- Whereas applications and systems are developed to help blind people to move around. RFID systems are one among them.
- In our model RFID tags are attached to all objects in the house when user is present for

identification and tracking purpose The users device will use these tags to send tags to for nearby computers. The system now identifies the ID of tags and the data which is present in the database.

- The Database will also have each tag-ID which is associated with audio clip that also consists name of object. In this project, the authors also proposed another idea using smart cap. This smart cap has a mounted camera and this cao informs users about the detected object with the help of the camera.
- The computer searches for ID of tags present in a database that is managed. This Database will also consist of tag ID of audio clip and also the object name.
- Even the system can also be used , but cannot be feasible for navigating objects that are present outside. More over the tag used in this is expensive.

The CNN base object detection technique is explained using sequence diagram as shown in the Figure 2.

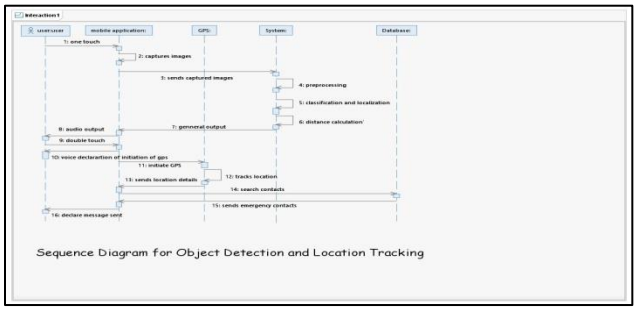

Figure 2. A Sequence Diagram to represent the CNN Based Object Detection Technique.

III. METHODOLOGY

ALGORITHM

CONVOLUTION NEURAL NETWORK

In this paper , we are using (CNN) Convolution Neural Network Algorithm. It is a forward neural network where its main purpose is to analyse visual images through data processing using grid like topology. CNN is also called ConvNet.CNN. This can be used to classify and detect objects.

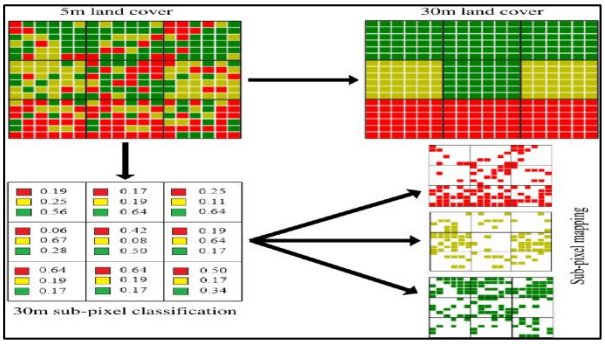

Figure 3. Conversion of pictures (image) into an array of pixel values

Convolution Neural Network converts picture (image) into an array of pixel values as shown in the Figure 3.

The layers of CNN :
Convolution Neural Network comprises numerous hidden layers in detecting and extracting characteristics of image. Mainly CNN consists of layers which are :

- Convolution layer
- ReLU layer
- Pooling layer
- Fully connected layer

Convolution Layer:

In Convolution Layer it will first extract the valuable features of the image. The other layers apply several filters to perform convolution operations. Here every image is converted as pixel values in the form of matrix.
ReLU Layer :
Rectified Linear Unit performs component wise functioning and assigning 0's is done by rectified linear unit for all negative pixels. This provides a more rectified feature map of the image.
Pooling Layer:
Pooling layer involves other filters which can identify the clear features and different parts of the image. Pooling Layer follows down sampling operation which lowers dimensionalities. Here a pooled feature map is generated. After pooling the image flattening is used to get the single long continuous linear vector from two dimensional arrays of pooled feature maps.
Fully Connected Layer:
Flattened matrices are converted to detect the image and fully connected layer to identify.

BLOCK DIAGRAM

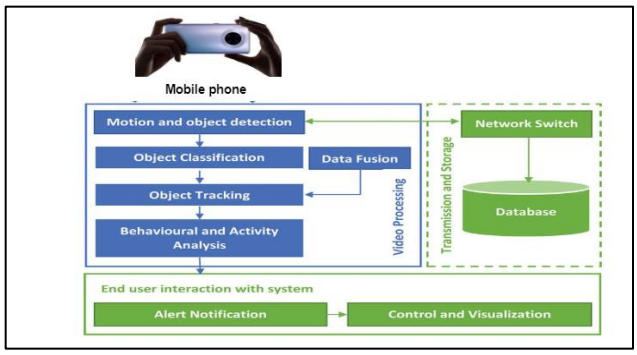

Figure 4. The Block Diagram of CNN Based Objection Detection Technique.

GSM AND GPS MODULE

Raspberry Pi Beta uses 4G network and in this proposed system. This provides battery support, mobile with 4G data and GPS positioning data this model is a simple ready mixed module. Internet connectivity for ultra-raped 4G. This is useful for downloads and video streaming. It also furnish uncomplicated access to data location exposure and GPS onboard. The main purpose of these modules is to provide location of the user and to provide connectivity.

APPLICATION BASED ON WEB

The safety of VIP's is the main motivation behind the development of web interfaces. Using the interface helps the family members to trace the movement from any place. This system also allows visualization of the surroundings and provides safety for the user. The server of the web will be running on DSP. The user will periodically receive labelled snapshot and persons position from the system. The location provided by the web interface will be mapped by using google map API. This system also provides received labelled images and also stores the received images in the gallery. Gallery will be useful for reviewing the visited locality. We developed a web based application using Django framework. In order to use this application the user needs to login the web page using the given ID to monitor the blind person. Once the user gets signed in to the dashboard. Here all the recent snapshots will be present. All the surroundings are captured using a mobile camera and the user will be guided accordingly to the captured snapshots. The basic structure of the CNN base object detection technique is represented clearly in the Figure 4.

TECHNICAL EVALUATION

Here the scenario is evaluated to prototype which is evaluated to test the developed prototype. The main idea is to identify the objects by blind person that are present in nearby locality. Here the prototype detects objects and the type and it can also provide output in the form of voice. Mobile net is used for object recognition and detection, so it is the fastest and uses less processing power. It is trained based on the image net dataset that is segmentation, a captioning dataset and object detection and which consists of nearly 2.1 million images of various groups. Ubuntu 16.04 is used to train the mobile net with Xeon E3-1231 v3, 4 cores @3.40GHz, and accuracy of 90% is achieved. Mobile net architecture is compared with our model with regard to accuracy, error rate, number of model parameters and complexity in the form of (MFPO) per Second. This is recognized as the hyper parameters in the mobile net archives are 32 times smaller and computational intensive is 27 times lower than VGG. However, the exactness network is less than that of shufflenet. Maybe in future shufflenet will be implemented instead of mobile net.

The two successive frames are used to measure the similarity of the SSIM index in this system. This is the expression (1) measures index among the A & B frames of dimension PXQ

$$SSIM_{I,J} = \frac{(2\mu_I\mu_J+S_1)(2\sigma_{I,J}+S_2)}{(\mu_I^2+\mu_J^2+S_1)(\sigma_I^2+S_2)} \text{---------} \quad (1)$$

Where,

- μ_I and μ_J represent the mean of the frame I and J, respectively.
- σ_I^2 and σ_J^2 indicate the variance of the frame I and J ,respectively.
- $\sigma_{I,J}$ is the covariance of the frame I and J.
- $S_1 = (C_1L)^2$ and $S_2 = (C_2L)^2$ stabilize the division with a denominator L indicates the dynamic range of pixel values which is 255, C_1 = 0.01 and C_2 = 0.03.

There are various simulations like video streaming and SSIM index threshold T is set to 0.7. If SSIM >T, it will avoid the frame or else it will process the frame.
Four users have been used to test the proposed system (1 with closed eyes,1 blind, 2 normal persons) which range in age from 20-25. The end users are made to walk and numerous trajectories one after the other & connected devices of voice and object detection. Here several objects are placed in trajectories. The objects like bottles, tables, and dustbins. The corrected outcomes shown that the application has showed correctly that are present nearly by the end users. End users will be able to hear the name of the objects . In order to detect obstacles It is used so, the results established here provides the accurate distance and detected object and also the system provides the faster response & also permits the person to detect moving objects.

IV. Result Analysis

Here there is a high rate for usage of face or object detection systems. The system consists of accelerating results from the deep CNN based object detectors and CNN architectures which are utilized in a change of applications. This methodology is based on the categorized is either as a singular two-stage object detection model. By using CNN we can get accurate results when compared with historical models as shown in the Table 1. With the exception, it tells the different characteristics of available datasets and the investigative result of historical models are compare through graphical representation in the Figure 5.

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Sl.No	Technique	Working Model/Not	Coverage	Object Detection in Distance	Safekeeping	Type of Detection	Average Score
The Score Weightage take max value is 10.00							
1	Sili Eyes (57)	Not(0.00)	5	5	Not At All (0.00)	5	3
2	Eye Ring (59)	10	10	5	Not At All (0.00)	5	6
3	Ultrasonic for object detection (63)	10	10	5	Not At All (0.00)	5	6
4	Google Glass(65)	10	10	10	Not At All (0.00)	5	7
5	CNN Based Object Detection (Present Model)	10	10	10	10	5	9

Table 1. An Investigative result of historical models with CNN Based Object Detection.

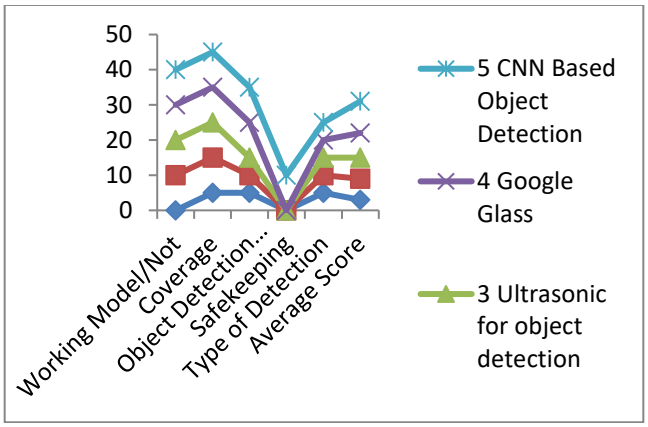

Figure 5. The Comparative results of different models with CNNODT in various perspectives.

V. CONCLUSION

Many solutions have been introduced for the sake of solving problems like navigating, identifying & detecting objects that are around visually impaired people. But the maximum number of solutions are not feasible in everyday life by the blind people as they are developed using expensive infrastructure, so to overcome this drawback we are proposing this model which is very feasible when compared to the previous works. There is less accuracy particularly for small objects in complex environments. Here we use the mobile phone which is meant to be mandatory nowadays. So our application is user friendly. Developing an android application that is used for both location tracking and object detection is the primary motive. The camera present in the mobile is used for object detection.

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