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# A Review on Java Based Object Recognition Application for Visually Impaired

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***ABSTRACT***

Of all the senses that humans possess, vision is one of the most important and plays a vital role in helping us comprehend our surroundings. It is challenging for those with visual impairments to move around outside in the absence of supervision. Thus, this essay is an endeavor to create a human object detecting system with less vision. To accomplish this, a few things are needed parts like an audio player, an application, and a camera gadget. Our team has created and executed an Android app that will utilize the camera on the phone to identify the items surrounding the person with vision impairment. Additionally, the application will notify the user of the object's direction as well as their distance from it. The application will notify the person who is blind about the object's name, direction, and distance utilizing an audio gadget like the phone's speaker or headphones. This arrangement will enlighten and support those who are blind or visually impaired about the different things surrounding them and assist them in navigating and moving about on their own. Therefore, our objective is to present a visual substitution technique that will benefit the visually people's daily lives by providing them with information about the different things surrounding.

## INTRODUCTION

Millions of people worldwide struggle with visual impairments that make it difficult for them to comprehend their surroundings. Getting around is among the most important obstacles that people with visual impairments must overcome. It is challenging for they should go on their own since they are unable to evaluate the placement of the items and those in their immediate vicinity. To navigate outside, those with visual impairments require a guide to help them along the way. The white container is one of the most widely used devices for the blind individuals. Despite being useful for navigation, it does not notify the user of the different challenges till they are extremely near to them. As a result of these traditional solutions' inadequacies, extensive research is being done to create more sophisticated and better tools to help the visually impaired individuals. An Android application will be created for this system for object detection, which takes advantage of the camera on the phone. The program will use Tensor Flow's object identification API to identify the objects and will play an audio message with the name and the object's position to the user. Included in the location is the object's orientation and its separation from the consumer. The auditory communication will be given to the visual a disabled person using an audio gadget like the speaker on the phone or headphones. The arrangement doesn't not require an additional camera because it will be utilizing the phone's camera to perform the duties identify the items in front of us. This research aims to demonstrate how object detection, a computer vision technology, can assist individuals who are visually impaired in supporting autonomous travel by providing a summary of object detection applications for individuals with visual impairments, its methods, and their features.

## LITERATURE SURVEY

Several researchers have given a variety of methods, ranging from background subtraction to CNN. Among the techniques used for human tracking have been given in this area. For pedestrians, human tracking consists of three fundamental processes tracking: tracking, human detection based on frame sequence and tracking analysis for a specific objective. Three essential components make up pedestrian tracking. It can be compared to object tracking 1) Identification of the pedestrian in the frame of the video, 2) The detection's tracking, and 3) Track analysis for the designated objective. The segmentation, classification, background subtraction, and object feature point detection techniques of earlier studies have all been covered in this literature review. For attributes that described the object are what allow tracking to be flawless. Most significant, hence object detection is essential. You can do this by applying either deterministic or probabilistic both appearance-based models and motion models. To accomplish the Improved accuracy versions of the model have been showcased with time. The feature points in the were updated and trained within the tracking procedure. The object's only tracking difficulty is that it needs a lot of features that aren't always available feasible. CNN has been utilized recently to classify and recognize images to significantly increase performance. Millions of photos representing various classes are used to train CNN. CNN are the instructional strategies that take advantage of spatial information of a photograph and automatically identify the intricate details. CNN encroaches on the diversity of an input. The characteristics in this algorithm were acquired through an online procedure. Instead, two images are used to analyze the spatial and temporal aspects of

only one picture. Tong and colleagues introduced the method in which the cascade is the final layer of the CNN module that has been per-trained. utilizing the web SVM to acquire discriminative appearance models. The Bayesian network is used to carry out the tracking. saliency map specified with target. Pte-trained CNN model was utilized by Wang et al for online following. Following parameter tuning, the CNN is utilized to modify the object's appearance in the scene and the likelihood map are made to, as opposed to labeling.

## PROPOSED SYSTEM

**1. Architecture.**

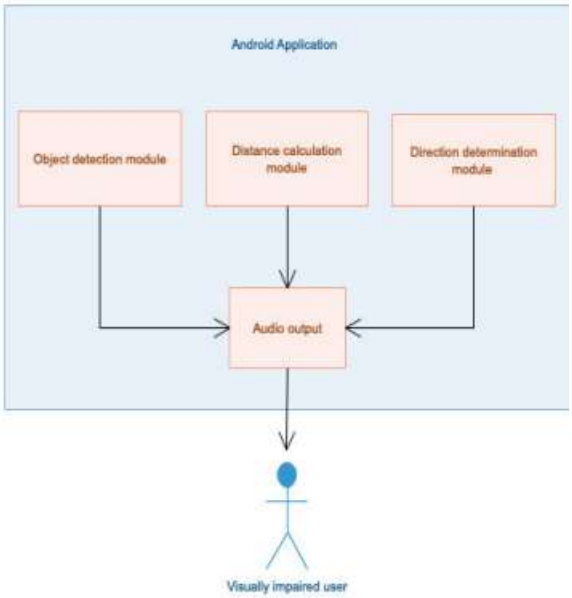


Fig- System's Architecture.

**2. Activity Diagram.**

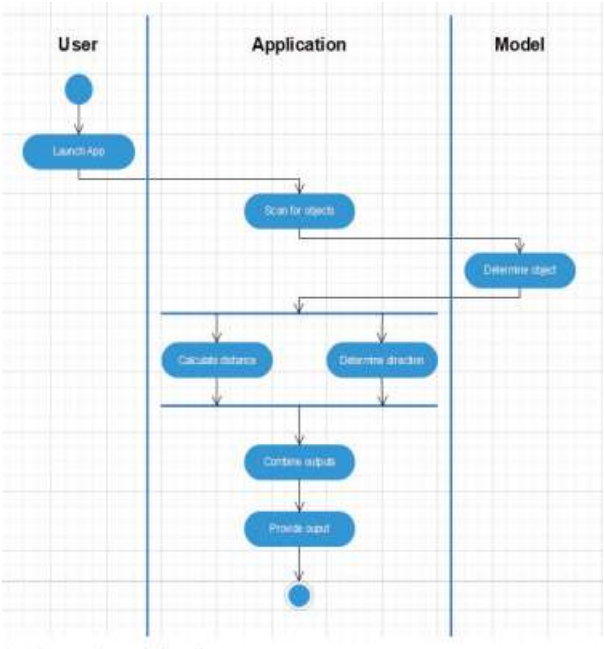


Fig- Activity Diagram.

## OBJECT DETECTION-

The main goal of this system is object detection. Both object location and object classification are included. Object classification is the process of object discovery into many previously specified classifications. In different Put another way, object classification gives an image a label. The name of the object seen in that picture is written on that label. For example, when a computer is given a picture of a cat, it will attempt to categorize it and assign the outcome the name "Cat." It is simple for us to recognize the items in any picture, but for a computer, classifying objects is a laborious task. When an object is being localized, the computer creates a bounding box—a rectangular box—around it to remove it from the image. Therefore, object detection is the result of combining object localization and categorization, in which we attempt to sort and separate the many objects in the picture. We shall receive the object's name and the bounding box's coordinates in the module's output. These bounding box coordinates will be utilized in the upcoming components to ascertain the object's orientation and to determine the object's distance from the user.

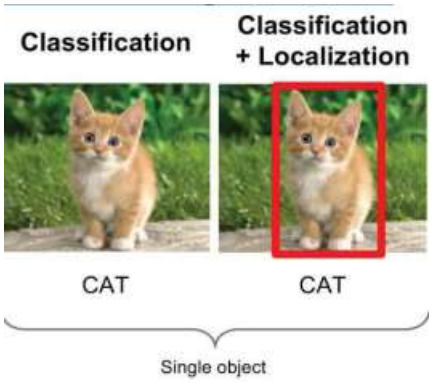


Fig-Object classification and localization.

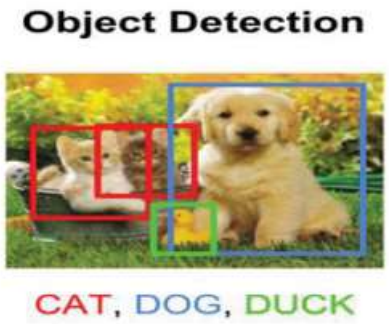


Fig- Object Detection.

Tensor Flow's object detection API model, which can categorize 80 items by default, will be used for object detection. Retraining the model will enable us to classify additional objects. It recognizes objects in real time; capture is not necessary and saves any picture. Every given frame will include several objects .as a result, we will be giving various objects distinct priorities. since it is impractical to advise the user who is blind about anything that is in front of him or her. The items having the ultimate product for each will be based on the top priority picture. Additionally, the accuracy measure provided by the Tensor Flow object detection model indicates the degree of confidence with which the object has been spotted. It is articulated in terms of proportion. The confidence level's threshold value is maintained at 70% to raise the system's accuracy. The user will only receive information regarding the items that have been found with a greater than 70% degree of confidence.

## DISTANCE CALCULATION-

The user with vision impairment will be notified of the object's distance from them. Open CV (Open-source Computer Vision Library) will be utilized for figuring out the separation. The calculation of the distance will be done using Triangle Similarity Law. It would be more advantageous for the visually impaired user to determine the object's distance from him/her since it will provide the user with information about the kin the area surrounding him and the object's distance from him instead than merely being aware of the object's name. The calibration module must be run each time the application is launched to calibrate the device's camera before determining the distance. Calibration's primary goal is to ascertain the camera lens's focal length, which will be required for additional computation.

Fig- Distance Calculation.

## DETERMINING THE DIRECTION OF THE OBJECT-

The visually impaired user will be informed of the object's direction in the following ways: "to the left," "to the right," and "at the center." The guidance will assist the user in find the object's precise location, allowing him or her to make better use of the navigation. We will split the image into three sections along the screen's length to determine the direction. These lengths have a 3:4:3 ratio. The area of the picture where the object's center lies will ascertain the object's direction. As an example, if the first section of the screen is where the object's center is located. It is going to face left. The center's coordinates can be computed using the bounding box's coordinates. The bounding box's x coordinates are the only ones needed to ascertain the center's x coordinate.

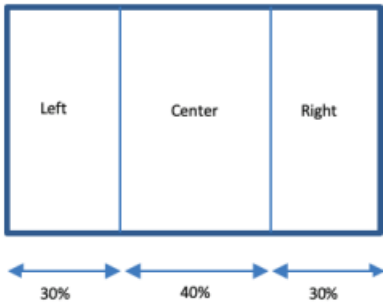


Fig- Direction determination method

## AUDIO OUTPUT-

The last step in this system is audio output. This audio output will include the following:

1) The object's name

2) The object's distance from the user

3) The object's direction

The audio output message might say, for instance, "A car is 10 meters to the left. The audio message's information will assist the visually impaired user in recognizing the objects and obstacles in his environment. It can be sent via ear buds or speakers on the phone. To deliver the audio output, we'll be utilizing The Android Studio Text to Speech library is available. The user may also receive audio output in additional local languages like Marathi and Hindi. The user has the option to choose any whichever of these three languages the individual prefers. In this application, the output produced by various modules is discrete. For example, the object detection module's output will be the object name; The distance will be valued by the calculation module. Well, it is vital to integrate these discrete values into a meaningful whole. phrase that is simple enough for the user to understand. We must make sure that there is no audio output. for the same thing twice in a succession. This will guarantee that the user learns about everything in his immediate environment.

## RESULT-

With 87% accuracy, the system can identify objects in the user's immediate environment. The system needs to be re-trained with a larger data set in order to detect more objects.

Fig- Output screen of the system

The output screen of the Android app created for the object detection system is displayed in the above figure. The user can successfully receive information from the application regarding utilizing an audio output to help surround objects.

## METHODOLOGY

The two phases of the suggested CNN-based moving object detection system are object detection and tracking. The suggested generalized block diagram mechanism is depicted in Figure.

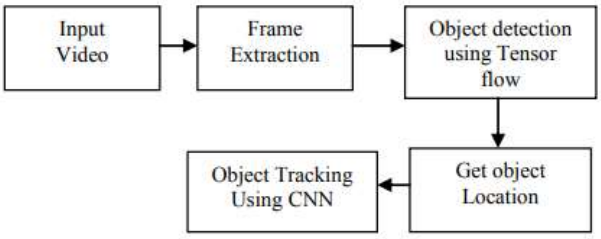


Fig-Block Diagram of proposed system.

The video is fed into this system and used as an input. Frames are taken out and processed further. Object tracking and object detection are the two primary methods in use. using techniques for deep learning. Object detection is detailed in the flow that follows. The computer vision algorithm used for object detection is influenced by several factors such as changes in light and lighting; blockage and the system find it challenging to identify the numerous items. Thus, Tensor Flow based object is used in this paper. An algorithm for detection has been employed.

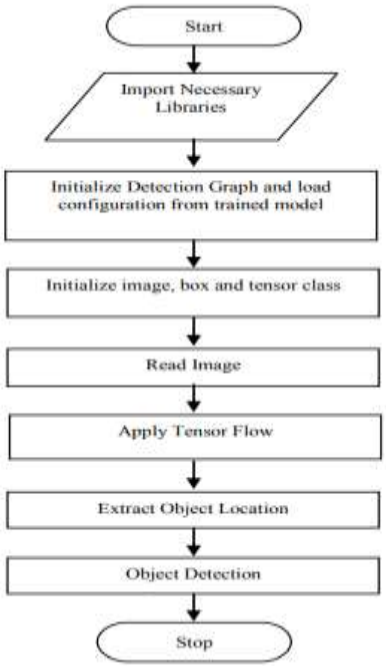


Fig-Tensor Flow Based Object detection flowchart.

An open-source platform for object detection API built on Tensor Flow. Because Tensor Flow is the foundation around which it is based, creating, training, and detecting models is made straightforward. In this method, the required libraries are imported first. Next take the trained object detection model and import it. The masses are initializing the tensor class, box, and both. Following initialization of all the tensor flow model's parameters, the picture in which item is read in order to be detected. Make use of the loaded Tensor Flow-based model tests the flow model on the image and give back the object's location (x, y, w, h) in the picture. In this method, the CNN-based object tracking algorithm receives the item coordinates acquired from the Tensor Flow-based object detection methods. The starting places are taught to the model, and the identical points are looked up in the net frames through the CNN model's testing procedure.

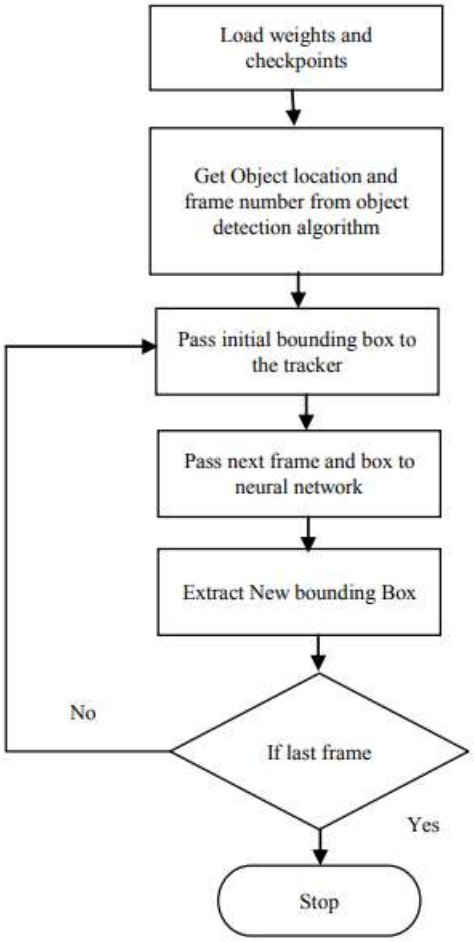


Fig-Flowchart for object detection

The crucial phase in computer vision algorithms is object tracking. Robust tracking necessitates object knowledge and comprehension, such as motion and its change. With time. Tracker needs to be compatible with its model and used in fresh insights. Using this method, first load the trained subject's weights prototype. The time dimension can be integrated into the model details. Instead of concentrating on the test objects the previously taught model, which has been trained on a wide range of items in actual time. This portable model can track the item with a 150 frames per second frame rate. Furthermore, it can eliminate the occlusive barrier.

## CONCLUSION

This research presents a novel conventional neural network-based technique to object detection and tracking. The method used to detect moving objects is Tensor Flow API for object recognition. The object identification module finds the object with robustness. The object that has been discovered monitored by means of the CNN algorithm. Thinking of human tracking as a unique instance of temporal and spatial object detection classes during offline training, the facilities were learned. The utilization of the shift variant architecture has expanded traditional CNNs and integrated the worldwide features and local qualities in an organic manner. The suggested methodology reaches 91.24% specificity, 92.14% sensitivity, and 90.88% accuracy rate.

## RESULT

Many strategies have been developed in recent years to help the blind and visually impaired navigate and identify objects in their environment. However, because of the high cost of most of these systems, visually impaired people cannot use them in their daily lives. the price of the infrastructure required to

put these into practice systems. Our objective is to create a system that can assist the visually challenged to distinguish nearby objects while indoors and go about on their own when outside. The visually impaired user does not require any special skills to operate our system. Additionally, because the suggested system only requires a smartphone, it has a very low cost. We don't use hardware, like sensors, in our object detection system, in contrast to other suggested systems, therefore lowering the system's overall cost. An application prototype has been created that presently possesses every feature listed in this article aside from the capability of calculating distance. In addition to the functionality for calculating distance, we will be retraining. The object detection model in Tensor Flow can be used to detect more Items.

## FUTURE SCOPE

A text-to-speech feature that can identify the text in front of a visually impaired user and output it as audio can be added to the system. This will allow the user to comprehend the surrounding written text. An improved iteration of this system can allow for a visually impaired reader's ability to read a standard book without buying an audio book; it can also assist the user in determining different medications on their own. Thus, a Speech to Text A feature within our system can enhance its usability exponentially. It is possible to retrain the model to recognize different foods and dishes. When dining at a buffet, the visually impaired user may find food detection helpful. It is possible to train the system to identify those who frequently meet family members, for example, and friends using facial recognition software. An additional feature that can be developed is currency denomination recognition, which will enable the visually impaired person to identify the denomination of the sum of money he will be managing. Even so, the money Notes have tangible components that assist the individuals with visual impairments to recognize the denomination, A feature that recognizes currencies can facilitate visually users' inability to handle money due to the physical characteristics of Because of the "soiling," the notes might not be as clear during circulation. A voice command recognition module that can identify various voice commands given by the visually impaired user can be added to the system. These commands are useful for choosing different functionalities. within the system. The writers discussed indoor navigation support for people with visual impairments. It would also be simple to incorporate the same module into our system. Making use of the voice commands, the user can select the desired destination. go, and the system will be able to direct him to that spot. For example, the user issues the following command: "set destination" "bathroom," and the system will direct him to the restroom. The method described above can also be used to implement outdoor navigation assistance. The device's GPS can be used by the system to pinpoint the location while traveling and Google Maps can be utilized to obtain the directions API. As of right now, our system can output in three languages: Marathi, Hindi, and English. This function can be expanded to incorporate several additional languages to allow users to Every county should make use of this system.

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