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AUTOMATED OBJECT DETECTION USING DEEP LEARNING

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ABSTRACT

Automated object detection using deep learning it is very useful for blind people as recently gained significant exploratory focus due to the revelation of the object's intimate association with videotape analysis and picture understanding. Handcrafted characteristics and shallow trainable infrastructures are used to construct traditional object discovery techniques. By generating complex ensembles that incorporate various low-position picture information with high-position environment from object sensors and scene classifiers, their performance fluently stagnates. With the rapid development of deep literacy, more essential tools are being produced to address the challenges that exist in traditional infrastructures. These tools are appropriate for learning semantic, high-position, deeper features. Other aspects of these models include network armature, training approach, and optimization function, among others. We provide a review of deep literacy-based dangerous object discovery fabrics in this design. Our analysis begins with a brief history of deep literacy and the instrument that represents it, the videlicet Convolutional Neural Network (CNN). We also focus on common general object discovery infrastructures, as well as certain modifications and important strategies for improving discovery performance even more. Our trials primarily focus on three types of harmful.

Keywords: Knife, Car, And Gun, For Example.

I. INTRODUCTION

There are lots of terrorists attacks that had happened in past because of failure of object detection. In order to protects us form terrorists attacks either in public area or in your house from dangerous people we need to have monitoring system like security cameras, object detector especially in crowded public places that attract lots of people like tourists places or temples. Most of the attacks like bomb blast or gun fire occurs in crowded arears or any special concerts to prove that they can do anything necessary to harm people. Submillimeter imaging is a good and creative technology for finding objects that are hidden inside your clothes or bags basically you will see in airport, railway station etc it is a very good tool to prevent attacks widely used in the world. These photons have less energy compare to other rays and do not appear to the ionizing parcels of Rontgen radiation. In this innovation there are two important process one is to develop imagine finder or scanner and the other is to develop algorithms regarding that for an image to process to produce result .Creative and effective algorithm are in need accuracy scanning in real time and video processing in real time we will show in this paper. Deep learning has become one of the most widely used technologies for image and video processing. There are primarily three deep learning algorithms: ANN, RNN, and CNN. For this project, we will use CNN because it is most commonly used for the visual imaginary and has also achieved great success in machine learning and computer vision, providing a promising solution for the Submillimeter image detection problem. In the early 1990s, Le Cun et al proposed Le Net. It is a type of feed-forward neural network that has performed well in the categorization of bank handwritten cheques. On the 2012 ImageNet Large Scale picture classification challenge in a big sacle, Krihevsky et al won the championship by employing the Alex Net, which is utilised to find objects in computer applications and had a top-5 test error rate of 15.3 percent on the Image Net classification. Since then, it has been widely utilised in computer vision for object identification and tracking, human position prediction, video classification, and super segmentation all over the world. In the 2014 classification challenge, Visual Geometric Group and GoogLe Net produced excellent results and accuracy. With the advancement of technology, new networks are being discovered to deliver outcomes on a daily basis. When compared to its older predecessor, Alex Net, the GoogLe Net with the starting point structure can achieve

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superior performance on the picture classification challenge by employing fewer limitations. Several considerably deeper neural networks in the category of Conventional have since been developed, such as the Res network and Dense Network, which have demonstrated incredible performance in categorization and detection tasks. X-ray imaging technology has been used in previous investigations to detect hidden harmful equipment For detecting harmful articles in a large number of Xray images, Zhang and Zhu introduced a (BoW)-based local semantic features elimination method combined with an SVM classifier. To overcome the feature discrimination, Zhang used two algorithms: SIFT and SURF. Turc sany et al devised an advanced BoW representation system for detecting weapons in luggage Rutherford ray pictures, employing a class-specific feature clustering algorithm to improve the types of characteristics in various classes.

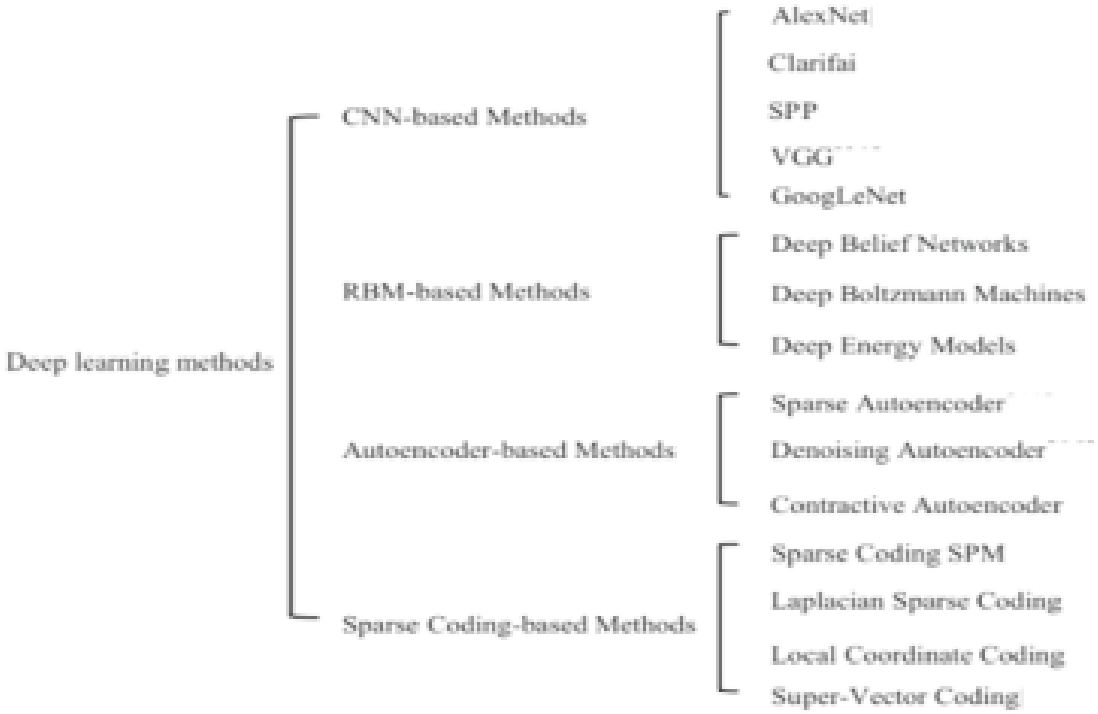

Fig 1: Types of deep learning techniques and their use-case

II. LITERATURE SURVEY

K. SUNG et al. [1] has proposed multilayer preceptrons model In recent years, beside the pc operation speed never-ending enhancement, the computer is utilized to hold on the damaging cargos the examination and also the recognition to get the a lot of and more widespread applications. Aiming at the disadvantage of high false detection rate in target classification detection mistreatment existing feature coaching classifiers, the work proposes a detection algorithmic program for venturous articles with convolutional neural network on the premise of deep learning. For the image to be checked, slippery windows of various scales are wont to verify whether or not there's an object window. For object detection, a convolutional neural network is trained with an oversized range of positive and negative samples. so as to raised adapt to object detection, the topology of the convolutional neural network is improved. The window of suspected venturous article is input into the improved convolutional neural network for dangerous object detection, and also the false detection rate is reduced whereas maintaining the initial detection rate.

P.F Felzenszwalb et al. [2] has proposed the object detection system supported mixtures of multi-scale deformable half models. Our system is ready to represent extremely variable categories of objects and reach progressive leads to PASCAL object detection challenges. though deformable part models became quite popular, their worth had not been established on tough benchmarks similar to PASCAL datasets. Our system relies on new discriminative coaching ways with part labelled data. we tend to mix a margin-sensitive approach for data processing of concrete negative examples with a formalism we decision latent SVM.A latent SVM could be a reformulation of mility in terms of latent variables.

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C. Wojek et al. [3] has proposed pedestrian model Pedestrian detection is a key issue in computer vision, with several applications having the potential to positively impact quality of life. In recent years, the number of approaches to detect pedestrians in monocular images has steadily increased. protocols are used, which makes direct comparisons difficult. To address these shortcomings, we perform an in-depth assessment of the state of the art in a unified framework. We make three main contributions: (1) we gather a large set of realistic and well-commented monocular pedestrian detection data and study statistics on the size, position and occlusion patterns of pedestrians in urban scenes, (2) we offer a refined perframe evaluation methodology that allows us to conduct informative surveys and comparisons, including measuring performance against scale and occlusion, and (3) we evaluate the performance of sixteen advanced detectors pre-trained on six data Our study allows us to evaluate the state of the art and provides a framework for measuring future efforts.

Tanaka Yusuke et a1. [4] has proposed model for Object detection is a popular search direction in traditional visual search. Since training the deep learning model for object detection requires a large amount of training data, research on object detection so far is mainly based on datasets of object detection. natural images. While object recognition techniques with natural images are already very mature research on X-ray images is still in its infancy. This article applies X-ray imaging datasets to object detection experiments and specifically aims to build a security X-ray system that can be widely used in airports, subway stations, and halls. high security conference. Our experiments mainly concern three types of dangerous objects: scissors, knives and bottles. The results show that we obtain an average precision of 86.41% and a recall rate of 87.70%.

B N Krishna Sai et al. [5] has proposed Object Detection is wide used in many applications corresponding to detective work vehicles, face detection, autonomous vehicles and pedestrians on streets. TensorFlow' Object Detection API may be a powerful tool that may quickly alter anyone to create and deploy powerful image recognition software. Object detection not exclusively includes classifying and recognizing objects in a picture but in addition localizes those objects and attracts bounding boxes around them. This paper principally focuses on detecting harmful objects like threatening objects. To ease object detection for threatening objects, we've got got Tensor flow Object Detection API to coach model and that we have used quicker R-CNN algorithmic rule for implementation. The model is made on two categories of threatening Objects. The model is evaluated on check information for the 2 classes of detective work threatening object.

Jing Sun et ai. [6] has proposed that In recent years, at the side of the pc operation speed never-ending enhancement, the computer is used to hold on the harmful cargos the examination and therefore the recognition to get the additional Associate in Nursingd more widespread applications. Aiming at the disadvantage of high false detection rate in target classification detection victimisation existing feature coaching classifiers, the work proposes a detection rule for venturous articles with convolutional neural network on the idea of deep learning. For the image to be checked, slippy windows of various scales are wont to confirm whether or not there's an object window. For object detection, a convolutional neural network is trained with an outsized variety of positive and negative samples. so as to raised adapt to object detection, the topology of the convolutional neural network is improved. The window of suspected venturous article is input into the improved convolutional neural network for dangerous object detection, and therefore the false detection rate is reduced whereas maintaining the first detection rate.

K. Galab et al. [7] Knife detection in real time is very useful for people's safety. In general, research to identify dangerous weapons is relatively new. Knife detection is a very difficult task because knives vary in size and shape. In addition, it easily reflects lights that reduce the visibility of knives in video footage. The reflection of light on the surface of the knife and the luminosity on its surface make the detection process extremely difficult, if not impossible. This paper presents an adaptive technique to improve the brightness of knife detection in surveillance systems. This technique overcomes the brightness problem encountered by steel weapons and improves the knife detection process. It offers an automatic threshold to assess the brightness level of the frame. Depending on this threshold, the proposed technique determines whether or not the frame should improve its luminosity. The experimental results verify the

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effectiveness of the proposed technique in knife detection using the deep transfer learning approach. In addition, the most famous deep neuron network models are tested to select the best to detect knives. nature from being ruptured [2] what technologies have developed in domain IOT, security issues and challenges faced in future trends in agriculture. This paper survey was done to know about the potential researchers to detect relevant IOT Problems and, based on the application requirements. Furthermore, the significance of IoT and Data Analytics for smart agriculture has been highlighted [3] Detection of diseases in plant and its growth with thehelp of technology like image processing. In this they will propose a for detecting the dieses and depending upon the types of the diseases, the respective medicine can be given to the crops through an automated prototype [4] Calculating the different types of parameters like temperature, humidity, soil sensor etc. If any object is entered into the intruder detection buzzer will turn on in few seconds. Everything is observed through mobile application [5] As they using Arduino Mega 2560 with Internet of Things to investigate the smart irrigation. In this data is collected automatically with sensor and its water the plant and to analyze the real time conditions of soil of the plant with phone that is connected to internet. The main drawback is it is very expensive for testing for larger areas because for that we need to keep one sensor for the plant. They have changed the experiments based on the 7 days results.[6] Monitoring system for environmental conditions surrounding the crop, their outputs will be seen in android phone as it will save in cloud (Think speak) with Blynk application. They have used soil sensor, Mini - DC pump, Node-MCU [7].

III. EXISTING METHODOLOGY

The existing system consists of object detection for only one particular object or one object of different types and some used yolo algorithm and some used brightness enhancement method to detect object like knife which produces like x-ray images. We are taking the disadvantage of high false detection of target or object classification that are in existing system with improved methodology.

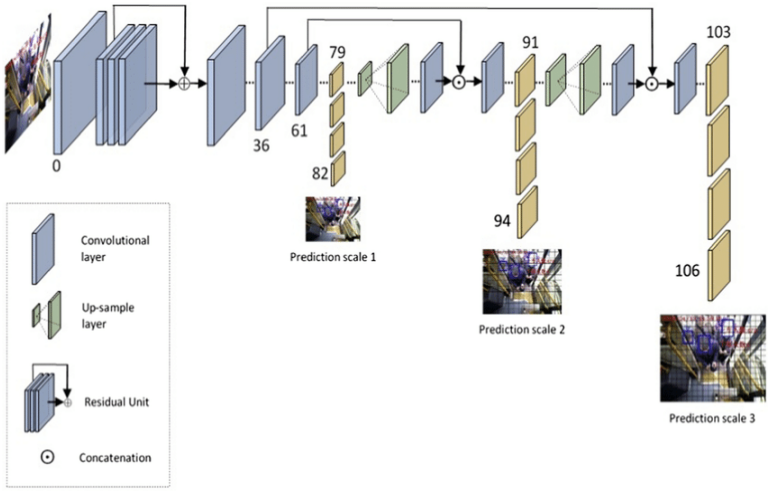

Fig 2: Yolo V3 Architecture with multi scale head detector

Yolo v3 has struggled to detect the close objects and sometimes detect small objects as well. It takes moths to train a yolo model which is a big disadvantage It takes a grid and combines each one of the layer like multi-layer. It takes each model and converts them it a value so to write a code for this it takes lots of time which is a drawback. So to avoid these issues we have other technique and used it in this project. .

IV. PROPOSED METHODOLOGY

This project helps us to harmful objects that are present in the given dataset. The current dataset consists of 84 objects pre-trained since we use CNN algorithm which is used to classify the images. We can increase the dataset by training and changing the dataset. The reason we used cnn algorithm it is very efficient and popularly used for image recognition. Data is insertein the form of dataset and code is written to find the image. We need a web cam or laptop with camera to start the process. When the object is placed in front of the camera the custom model i.e CNN algorithm plays a role here to find the image and test if the images matched in the dataset. If the images matches the image present in the dataset and later it classifies the

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image present in harmful category or non-harmful category that means it must the object found using CNN algorithm must match the category of harmful object written in code. We used tensor flow for fast computing and to access different libraries which can used to detect object with high accuracy

```
REQ_CLASSES=["stop sign","bear","fork","knife","scissors","car","motorbike","bus","train","truck","umbrella","book"]
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Fig 3: Code

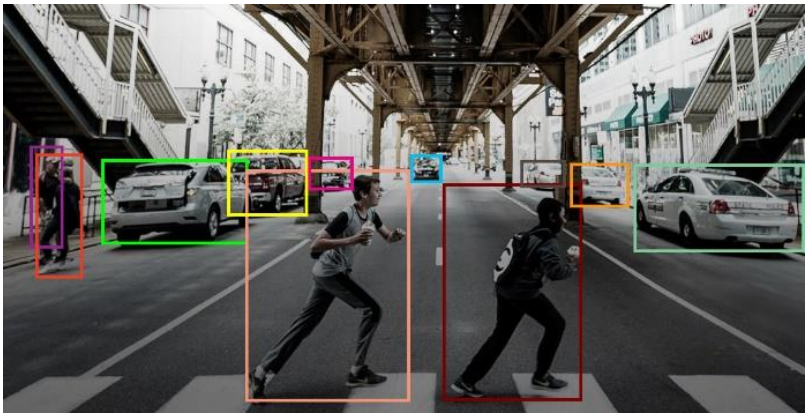

Fig 4: Tensor Flow Real Time Object Detection

We used python as our programming language. In the above mentioned figure are the harmful objects. If we want to add more harmful objects you just need to add more names in that particular area of the code. The size of the dataset can be increased if u wish to add more objects in the future.

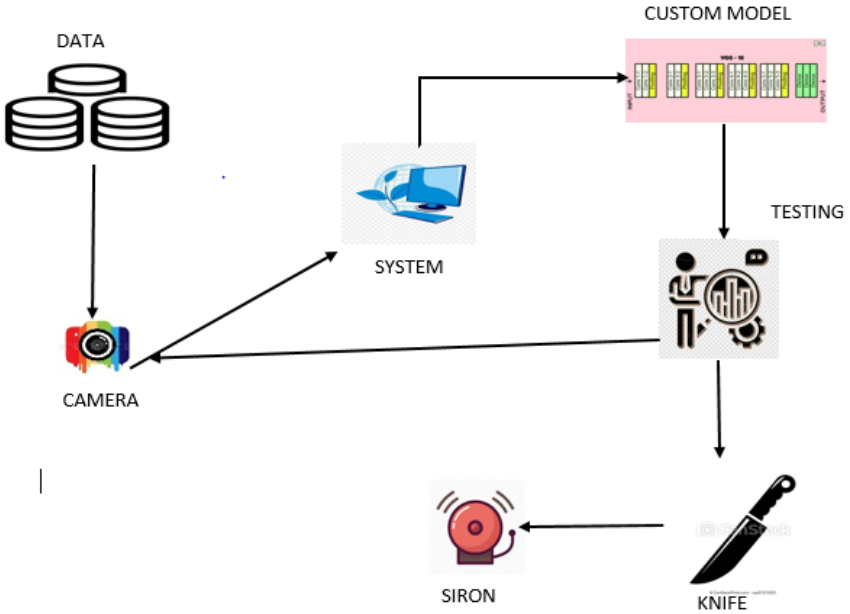

Fig 5: Architecture of the project

ADVANTAGES

- Easy to scale up compare to yolo V3 which consumes lots of time for scaling.
- Multiple Objects detection at the same time.

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V. FLOW CHART

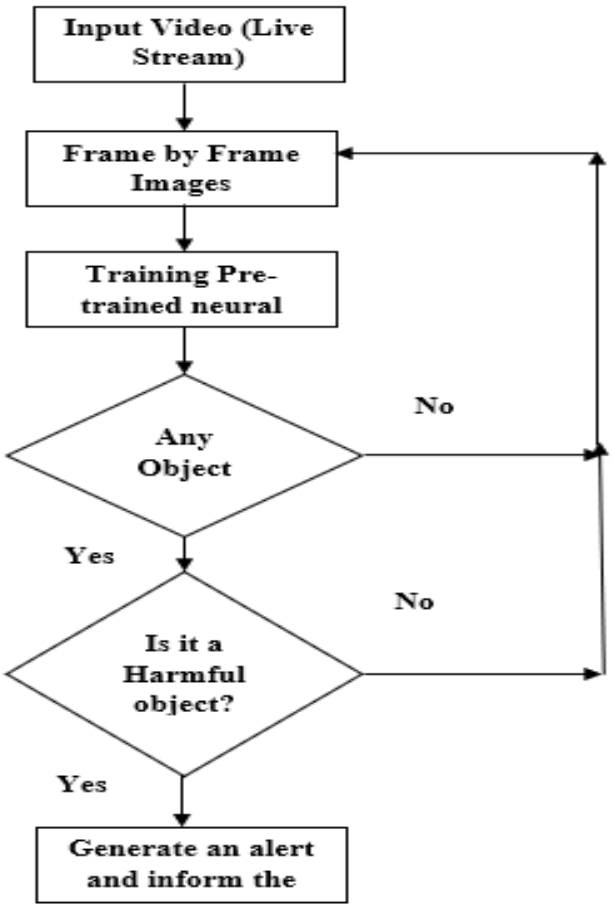

Fig 6: Flow Diagram of system

When the video is recording of the object detects it converts frame by frame images then compare it to the given objects If the object is harmful it triggers an alarm if not it will in the from you in the form of green light displayed on the screen

VI. RESUTS AND DISCUSSION

From doing above project we believe it will help the blind people mostly and for other security purposes. It very useful for blind people while crossing roads and we have also added an alarm sound which they can hear and be alert when they are in trouble. They can carry a chip inserted in their stick or mobile phone application.

```
person 99.956828355/8918
person 99.97925758361816
person 99.76797699928284
person 99.88920092582703
person 99.5930552482605
person 99.2203414440155
person 95.22421956062317
person 96.54815793037415
person 98.62142205238342
```

Fig 7: Accuracy of an object is shown

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Fig 8: Object detection result

VII. CONCLUSION

In this application, we have successfully created a process to generate Buzzer sound whenever a harmful object is passed in video. The system is likely to collect information from the user to predict the requirements.

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