Google Cloud's Vision AI (Implementation using Python)

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ABSTRACT:Due to increase in the attempt to steal data and information from the Internet, there is a need to provide more security. Therefore, identify the objects that is visible in the camera installed for security, is being tried with the help of artificial intelligence and machine learning. A large number of object detection algorithms have been developed in the last decades. This review paper examines all the possible methods with challenge object identification such as car, person, mobile, house etc .

KEYWORDS: Google cloud, Python, OpenCV-Python, NumPy ,Matplotlib, TensorFlow etc….

I. INTRODUCTION

"Google Cloud is a big platform launched by the Google, provide a series of services such as computing, data storage, data analysis and machine learning." Google cloud platform provide the serverless computing environment.

Google AI is a part of Google which highly dedicated to artificial intelligence. Nowadays it is very important to analyse the data in real time. Many programmes and systems developed to identify the objects captured from image or from webcam using AI in last few years.

There are many open source systems for stream data processing were created to solve object detection problem. The most popular open-Source systems are Apache Storm, Apache Streaming etc. and the commercials are like IBM infosphere Streams, Amazon Kinesis and MillWheel.

In this paper we are discussing about the detection of objects in real time, and for this purpose programming written in Python using PyCharm IDE. Python is a high level programming language. For writing simple and efficient programming of python we need an Integrated Development Environment(IDE). Here we use PyCharm as an IDE for writing python program.

II. BASIC OF OBJECT DETECTION

Object detection is the process of searching real-world objects such as faces, bicycles, and buildings in images or videos or from webcam. Object detection algorithms typically use extracted features and learning algorithms to identify the object category events. It is used in applications such as surveillance, image detection, security, and automatic vehicle parking systems. Object detection and tracking is currently the most active research topic, primarily for humans and vehicles.

In this research paper we review on latest technology for each step of object detection. Video surveillance has many other applications such as unimaginable detection, abnormal behaviour analysis of person, person identification, traffic management, suspicious instruments like knife or any other harmful instruments. There are mainly four different techniques for object detection, feature based detection, region based detection outline based detection illustration and model based detection.

There are two main goals of Object Detection system is that:
1. Object Identification From the webcam in real time.
2. Filter out the suspicious Object.

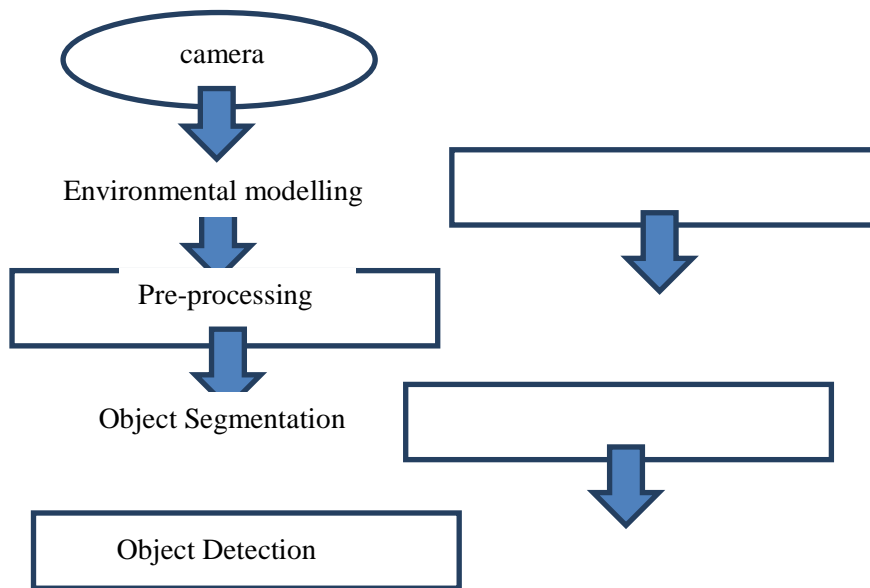The block diagram of a typical object detection can be shown with the help of Figure. 1

Figure 1. Basic Block Diagram of Object Detection System

Object detection is the process of searching real-time objects such as faces, bicycles, and buildings in images or videos. Object detection algorithms typically use extracted features and learning algorithms to identify instances of an object category.

Object detection is often described as a process that first involves four steps; they are: Camera, Environmental Modelling, Pre-processing, Object Segmentation and finally Object Detection.

In the above system may have a separate program for each step, or may combine some or all of the steps into a single process.

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Description of each block is as follows:
Environmental modelling: Environmental conditions affecting camera scenes and video images affect the performance of object identification and analysis. You can improveperformance by considering environmental aspects for your video camera.

Pre-Processing : Pre-processing is the process in Machine Learning refers to the technique of preparing the raw data to make it suitable for a building and training Machine Learning models.

Object Segmentation : By applying the object detection model, we will only be able to create a bounding box corresponding to each class in the image. The image segmentation model on the other hand will created a pixel-wise mark for each object in the video. This technique gives us a more granular understanding of the object (s) in the image.

Object Detection: Finally after following all above process system detect the object and display object name in box which highlight the object.

III. METHODOLOGY
To perform this operation using Python we need to follow some following steps:
1. Download the latest version of Pycharm IDE as per the computer specification, then installed it in your computer.
2. Create a new project.
3. Go to the settings
4. Click on project interpreter
5. Download the dependencies of our project such as:
a. **CMake :**CMake is an open source, test and package, cross-platform family of tools designed to build software.CMake is used to handle the software compilation by using simple platform and compiler that can be used in the compiler environment of our choice.

b. **Dlib :**Dlib contain machine learning algorithm. Dlib is a modern C++ toolkit for creating complex software in C++ to solve the real time problems.

c. **NumPy:**Numerical Python also called as NumPy, is a library consisting of multi-dimensional array objects and a collection of routines for processing those arrays. By Using NumPy, mathematical and logical operations based arrays can be easily performed. NumPy is also perform the various array functions, types of indexing, etc.

d. **OpenCV-Python**: OpenCV is the popular library for computer vision. Originally written in C or C++ language, it now provides bindings for Python. OpenCV uses ML algorithms to search for faces within a picture which shows in videos. Because faces are so complicated, there is not one simple test that will tell you, so if it found a face or not. These tasks are also called classifiers.

e. **Matplotlib:** Matplotlib is a plotting library for the Python programming. Matplotlib's numerical mathematics extension NumPy. It provides object-oriented API's for embedding plots in applications using general-purpose GUI toolkits such as Tkinter, wxPython, Qt, or GTK. There is also a procedural "pilab" interface based on a state machine (such as OpenGL), designed similarly to MATLAB. SciPy is also uses Matplotlib.

f. **TensorFlow:**TensorFlowcontaining machine learning end-to-end open source platform. TensorFlow created by Google for deep learning application. TensorFlow is mainly used for object detection in python.

6. After successfully installing all the dependencies, write a program in the window.

7. Run the program.

IV. RESULT

The training samples predict with an accuracy of 96 percent, while the research samples predict with an accuracy of 85 percent. In a real-time webcam, identification are made.
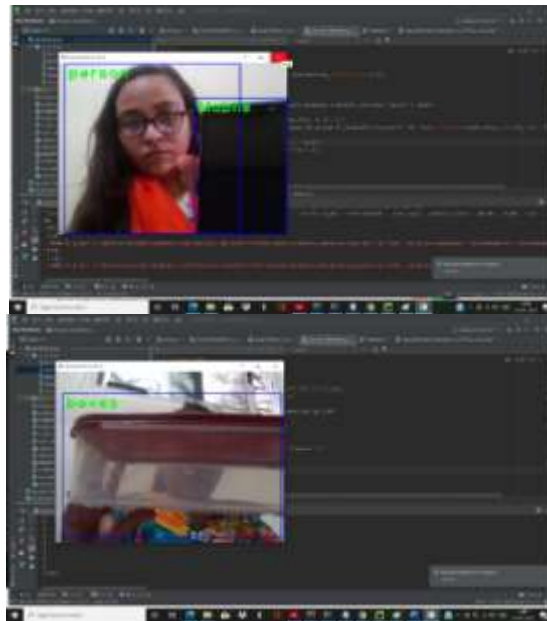
V. CONCLUSION

Due to its powerful learning ability and advantages Snag, scale change and handling background switch, deep learning based object detection. In recent years there has been a research hotspot.

This review paper provides detailed review on in-depth learning based content detection frameworks that handle various sub-problems, such as occlusion, clutter, and low resolution, with modifications to various degrees on R-CNN. Review begins on generic object detection pipelines that providing infrastructure for other related works.

Then, three other common tasks, namely locating the main object, Face detection and pedestrian detection are also summarized Reviewed. Finally, we propose several promising future. Instructions to gain a deeper understanding of the object detection scenario. This review is also worthwhile for developments in neural networks

and related learning systems, which provide valuable insights and guidelines for future progress.

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