Project Group id

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Symbiote : Surveillance

An image detection algorithm using ML……..

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Abstract

"Symbiote- An object detection tool using SSD Module, is a computer technology related to computer vision and image processing that deals with detecting instances of semantic objects of a certain class in digital images and videos. What makes us different that in same application we are using in the same algorithm that it can detect images some features in general. We are using SSD module to actually detect them. SSD is a single-shot detector. It has no delegated region proposal network and predicts the boundary boxes and the classes directly from feature maps in one single pass. SSD uses a matching phase while training, to match the appropriate anchor box with the bounding boxes of each ground truth object within an image. We have designed it in a way, so that it can detect what a user wants to detect. For example- If a car is stolen and a user needs to detect its car, he or she can give the details of the car and the model will give the relevant data which are same as that the user is looking for. We have a keen vision that it can be used as a theft detecting model in the future, with some sort of modifications in it."

Introduction

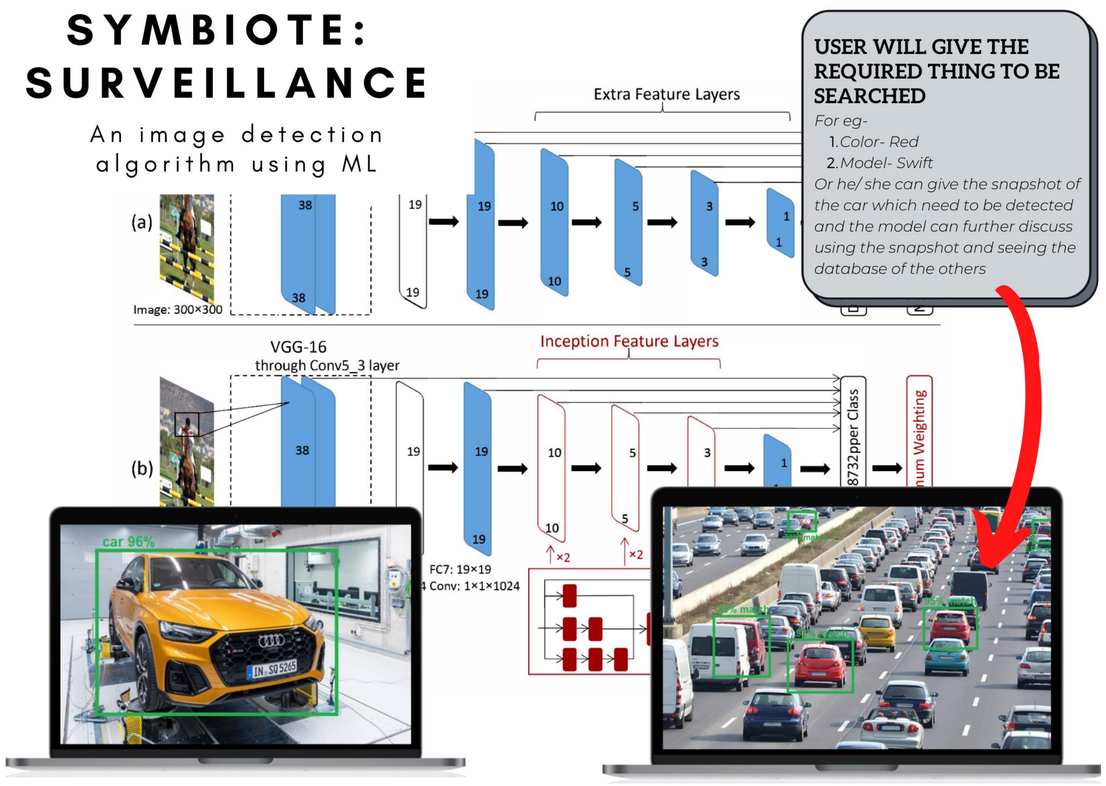
Isn't symbiote excites you a bit? A name that fascinates what can be it in real. It is something which deals with image detection that actually detects image using SSD (Single Shot Detection). Symbiote literal means that an organism living in symbiosis with another or a symbiont. Likewise our project is a combination of detection as well as it helps the user to detect, our model is depended on the dataset that the user provides or the dataset we provided for detection.

We are using SSD as- SSD can be trained end-to-end for better accuracy. SSD makes more predictions and has better coverage on location, scale, and aspect ratios. With the improvements above, SSD can lower the input image resolution to 300 × 300 with a comparative accuracy performance. It runs a convolutional network on input image just one time and computes a feature map.

In this we are using it in a way that it detects the image in such a way that it the user gets the full visuals what actually is there in the video.

Modules and Methods

TensorFlow is a free and open-source software library for machine learning and artificial intelligence. It can be used across a range of tasks but has a particular focus on training and inference of deep neural networks.
Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy. It provides an object-oriented API for embedding plots into applications using general-purpose GUI toolkits like Tkinter, wxPython, Qt, or GTK.
OpenCV-Python is a library of Python bindings designed to solve computer vision problems. Python is a general purpose programming language started by Guido van Rossum that became very popular very quickly, mainly because of its simplicity and code readability.
NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.
SSD is a single-shot detector. It has no delegated region proposal network and predicts the boundary boxes and the classes directly from feature maps in one single pass. To improve accuracy, SSD introduces: small convolutional filters to predict object classes and offsets to default boundary boxes.
The ssd300 model is the Caffe* framework implementation of Single-Shot multibox Detection (SSD) algorithm with 300x300 input resolution and VGG-16 backbone. The network intended to perform visual object detection.
Tkinter provides Python users with a simple way to create GUI elements using the widgets found in the Tk toolkit. Tk widgets can be used to construct buttons, menus, data fields, etc. in a Python application.



Results

The model uses Single Shot Detection for detecting the images. We have trained the data in such a way that it detects the images in the low resolution i.e. 300 x 300 and it takes less time to run. Its accuracy rate is also good enough to run this sort of algorithm. We have a vision to actually use this model as a theft detecting tool- on which we are still working upon and can give a fruitful result in future.
The model is trained and then tested upon various parameters to actually see how the accuracy differ and how accurate our model is. We are using tensorflow as it is used as object Detection using Tensorflow is a computer vision technique. As the name suggests, it helps us in detecting, locating, and tracing an object from an image or a video.
Symbiote is a complete model which is used to detect images and in future can also be used as theft detecting mechanism by the users.

Discussion

Our model/ project deals with the image detection technique using SSD (Single Shot Detection) Algorithm as SSDs are very fast in Object Detection when compared to those big boys like R-CNN or Fast R-CNN, etc, which enables us to detect an image in an ease manner and a user can detect it easily, by running in a single go and it will get some features of the objects or the detected image too.

It is a method for detecting objects in images using a single deep neural network. The SSD approach discretizes the output space of bounding boxes into a set of default boxes over different aspect ratios. After discretizing, the method scales per feature map location. The Single Shot Detector network combines predictions from multiple feature maps with different resolutions to naturally handle objects of various sizes.

In future, we also see this model as a theft detector model which can easily detect and predict the stolen things.

Conclusion

From our model/ project we have concluded that the it can be used as the image detecting algorithm and in future it can also be used as theft detecting software. In future we can further develop our model so that it can be used as the a theft detecting algorithm, by actually adding some more of the dataset and taking the .

Symbiote is a useful model and can be further developed so that it can be used it in a great way.

Refrences

1. Object detection in real time based on improved single shot multi-box detector algorithm. By Ashwani Kumar, Zuopeng Justin Zhang & Hongbo Lyu.
2. SSD: Single Shot MultiBox Detector by Wie Liu, Dragomir Anguelov. Christian Szegedy & Dumitru Erhan.