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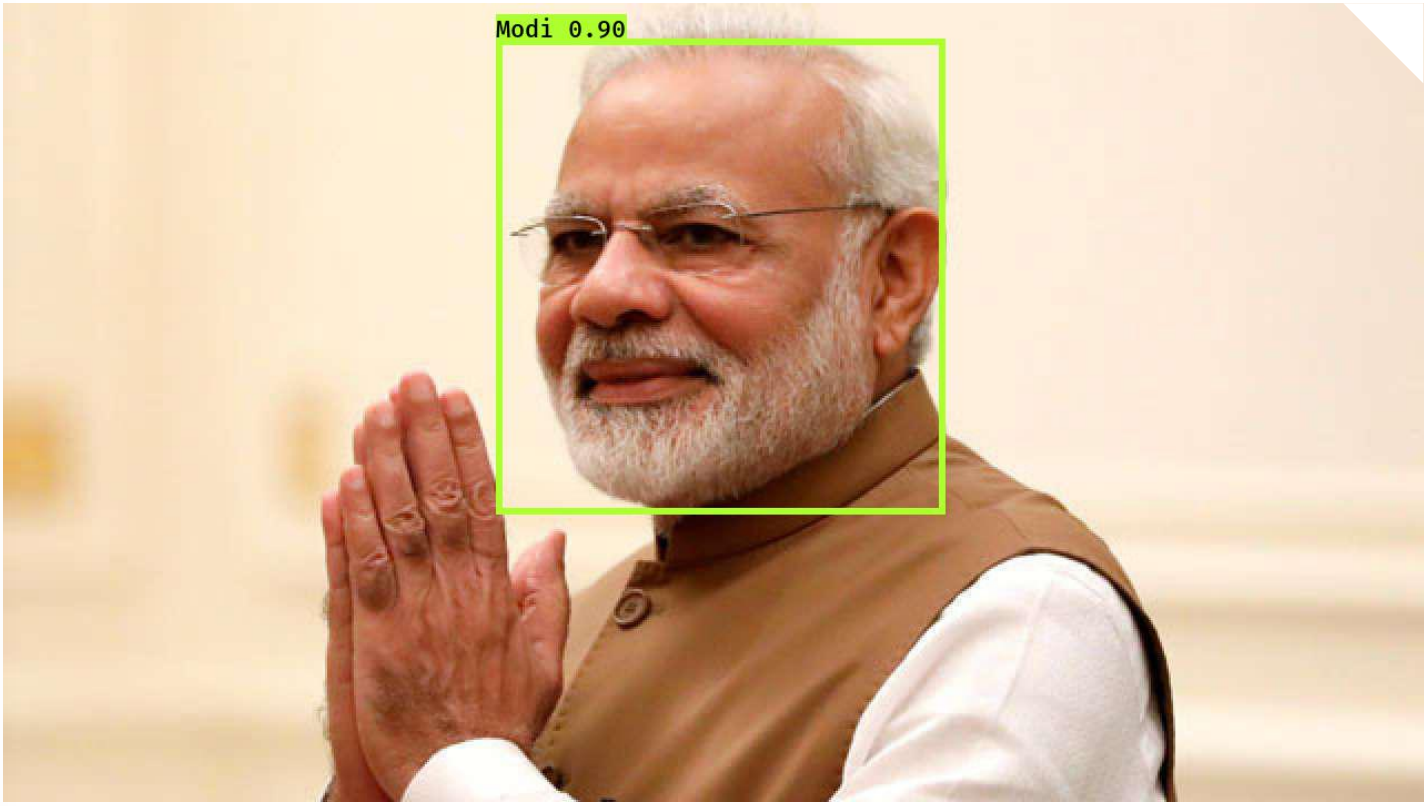
Object Detection

How to Train yolov3 on your own custom dataset?

Enginerd Sunio – 3 May, 2020 • 8 Min Read



custom dataset, so here I am sharing the project from **github.com/AntonMu/TrainYourOwnYOLO** and the way to use his Repo although he has already described everything needs to implement his Repo on Readme page of GitHub, I am simplifying the process and adding problems faced by me while implementing his Repo.

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List of things you should have in your hand in order to implement the GitHub Code for Training yolov3:

- Python 3.6
- vott (Visual Object Tagging Tool)
- Your Image Dataset on to which you want to train yolov3

guide).

- Tensorflow 1.15 or Tensorflow-gpu 1.15 (for GPU only)

All the pip's packages requirements are listed in requirements.txt file on the root of the project from Github Repo.

Let's start it step by step:

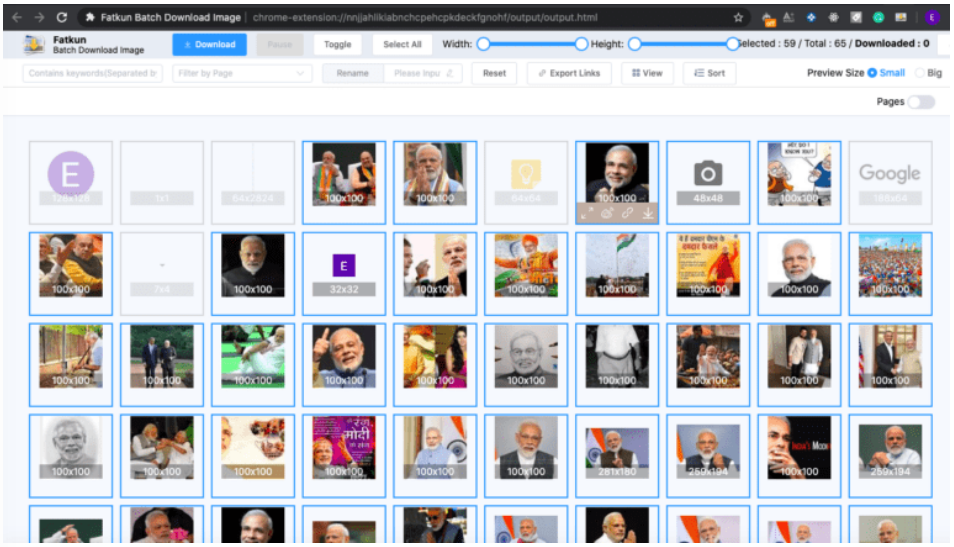
Step 1: Gathering the images data to train

If you have data of images on to which you want to train Yolov3 on then it's fine but you at least have 100 images to get the proper result from Yolov3 training.

If you don't have the images data then you can follow the below process to gather data using google crome extension Fatkun Batch Downloader

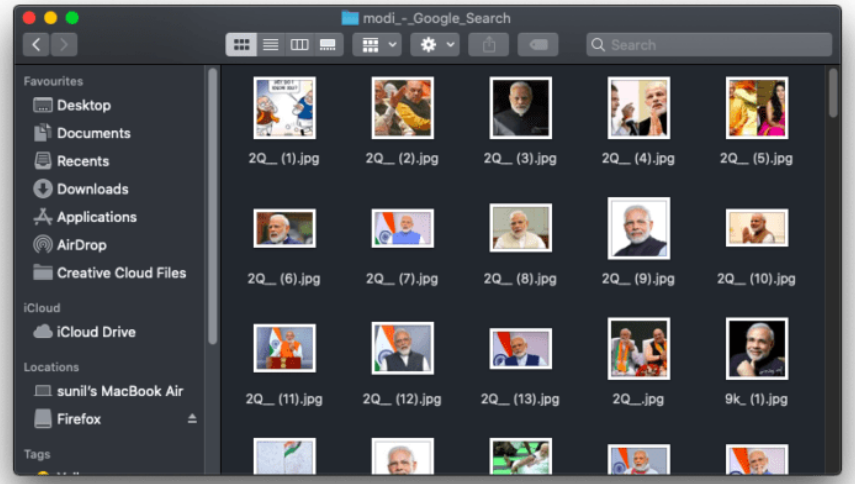
To batch download images from google searched tab you need to add google chrome extension Fatkun Batch Downloader, then you can google search any object you have interest into. To download batch images for supposing here I have searched for my country's Hon. Prime Minister Modi and then you can click little icon listed on your chrome browser's extension bar as shown in the below image.

After clicking on Download button you will be appeared with gallery of all images as shown in below image.



if you want more images then you can scroll down on google search images tab and restart the process.

From above gallery you can select or deselect interested or uninterested images and finally you can click on download button it will batch download all the images and moved those images in folder named searchterm-_Google_Search as shown in below image.



So here we have completed with our very first step to gathering data from internet.

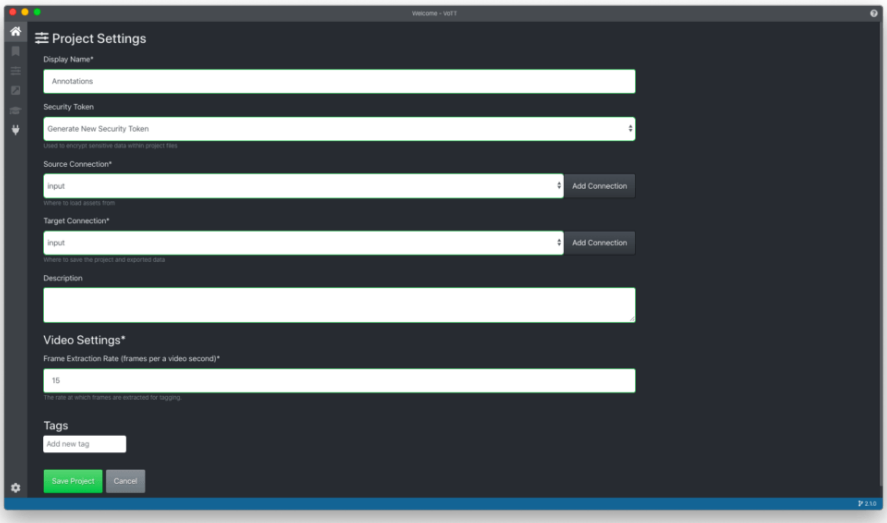
Step 2: Annotate/Label objects on images manually using vott

In order to train YOLOv3 using your own custom dataset of images or the images you have downloaded using above google chrome extension, We need to feed .txt file with images and it's meta information such as object label with X, Y, Height, Width of the object on the image.

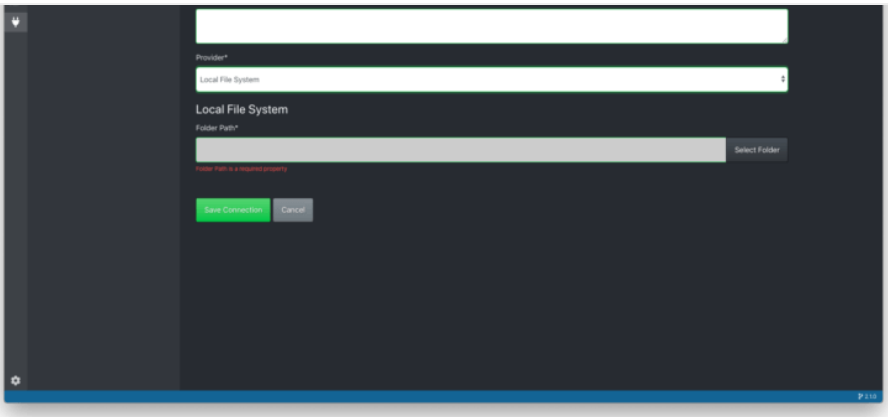
This Meta information will be used by Yolov3 to train itself on the labeled objects. To Label the objects on image and produce .txt file with meta information we will use vott software here.

Label objects with vott

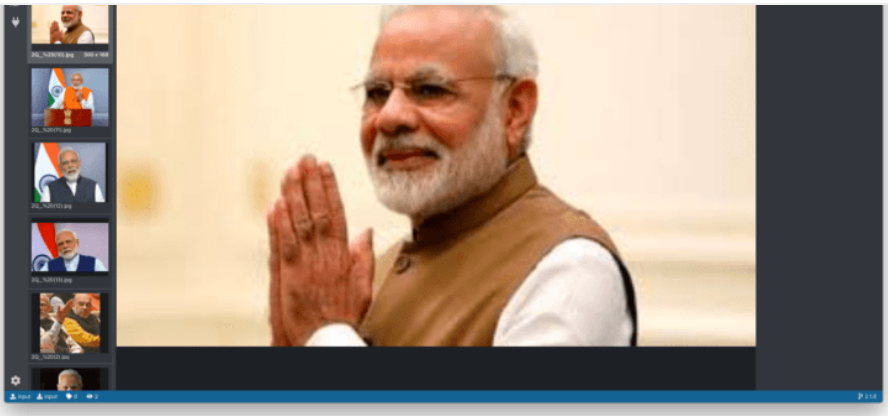
otherwise you can choose any name as you want but you need to rename exported CSV file to Annotations-export.csv) and other details such as Source connection and Target connection. Remain rest options as it is as shown in below image.



- For creating connection click on Add connection button and follow the other configuration as shown in below image.



- Name a connection as input or what so ever you like and select provider from the dropdown as a local file system then select your data images folder into which your data images reside.
- After adding a connection you can go back to the project setting and select the created connection for source and target connection.
- Now Click on save the project and you will be welcomed by your data images and a tagging sidebar tool to create tags as shown in the below image.



- Using sidebar Tagging tool you can create as many as tags needed by your image by clicking on + icon at top of toolbar.
- i.e. I have added Modi tag here as my all images contains only one object and that should be labeled as Modi.

Let's start labeling…

You can simply select arrow tool from tool bar and start to draw rectangle over your object on image as shown in below image.

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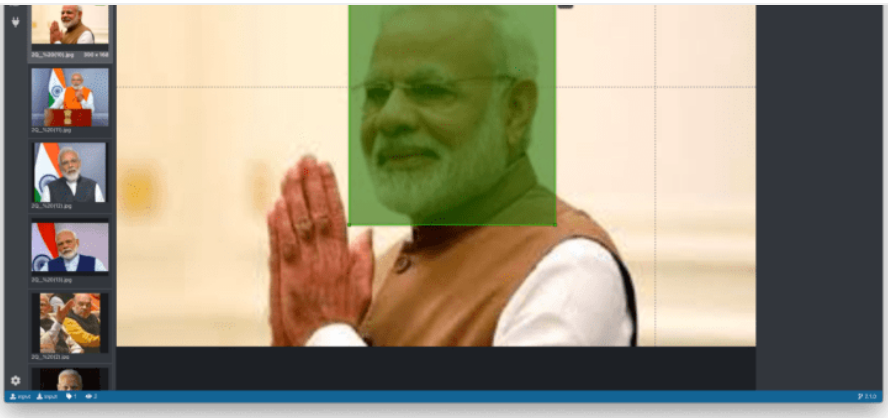
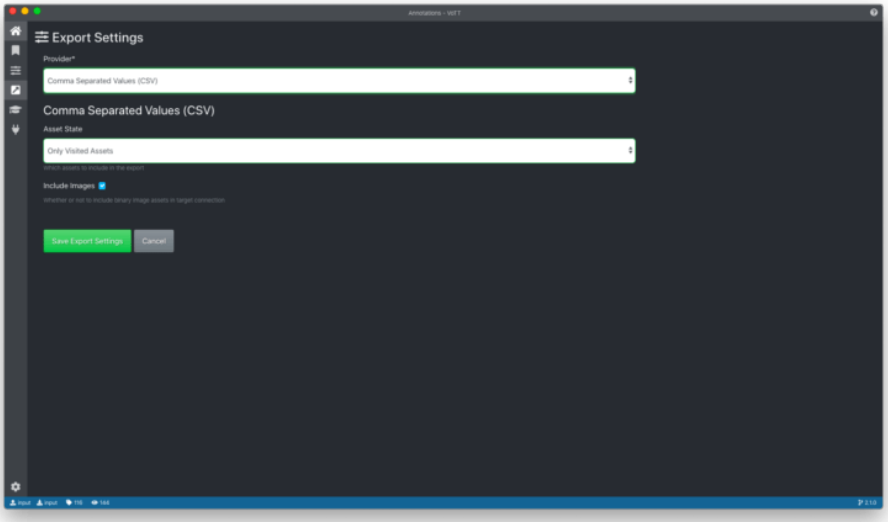


After selecting interested region you can press index number of your tag from keyboard to label it and (shift + s, Arrow Down) to go to the next image. Similarly you have to label whole dataset.

After completing tagging on all dataset images you have to go to export setting and select the provider from dropdown as CSV (Comma Separated Values) and Asset state to Only tagged assets as shown in below image.



Hello Guys, in this video I am goir you How to capture Video from liv process it and save it to directory.

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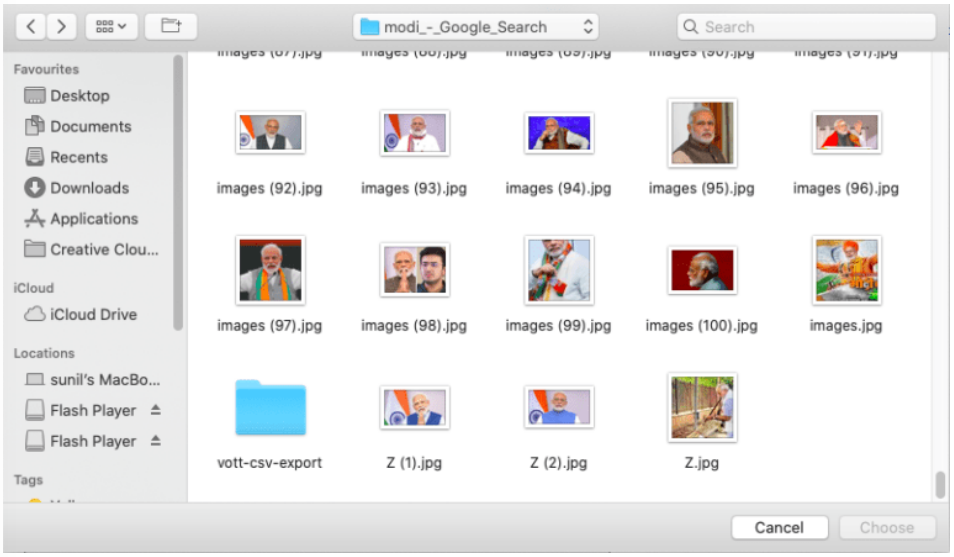
exported csv from the source of your data images folder.

A new folder named vott-csv-export created and that folder contains Annotaions-export.csv and list of images as shown in below image.



Now, this folder is useful to train Yolov3 using the above GitHub project structure.

As I stated we need .txt file to train Yolov3 but we are having .csv with us so folder name 1_Image_Annotation (stated in the second step) contains python code in Convert_to_YOLO_format.py file to convert those .csv data to .txt and to generate data_classes.txt file too to use it for training.

So Let's start with coding….

training

You can clone the Repo from **github.com/AntonMu/TrainYourOwnYOLO** and
You will found following structure of folders as:

1_Image_Annotation (directory):

- The very first step after labeling data is to converting .csv file exported by vott software to .txt

- Convert_to_YOLO_format.py file of this folder used to convert .csv to .txt file

2_Training (directory):

- This folder used to Download pre-trained YOLO weights and then Train Yolov3 on your own custom labeled dataset.

- Download_and_Convert_YOLO_weights.py and Train_YOLO.py used respectively for Downloading and Training model.

3_Inference (directory):

- This folder contains Detect.py file which is used to test your trained model on test images from Data/SourceImages/Test_Images.

image for each object found on it and store that image into Data/SourceImages/Test_Image_Detection_Resu folder.

Data (directory):

- Data Directory contains Model_Weights and Source_Images folder that contains images and trained model, checkpoints and logs, etc on the respective folder.

Utils (directory):

- Utils folder mostly contains utility functions and classes that the developer of Repo has built for code reusability and cleanliness.

Minimal_Example.py (file):

- For systematically We would follow from step 1 to step 3 folder from the above structure but if you don't want to do it manually then you can run this file and it will handle the steps itself so you don't have to change directory back and forth.

requirements.txt (file):

- This file contains all pip's packages need to install in prior to run this project with

First step in coding is to create virtual environment named as same as TrainYourOwnYOLO by typing following commands on terminal:

```
python -m venv TrainYourOwnYOLO
```

If the environment successfully created then a new folder named “TrainYourOwnYOLO” will be created, then you have to cd into it and activate this Virtual Environment by using below commands:

```
Scripts\activate.bat (windows)
```

```
source bin/activate (MacOS)
```

From here you can clone the Repo using below command:

```
git clone
https://github.com/AntonMu/TrainYourOwnYOLO.g
```

Note: you must installed git for using git commands onto terminal.

Now Remember the folder vott-csv-export we created?? Copy that folder from there and paste it into “Data/Source_Images/Training_Images” folder.

```
python Convert_to_YOLO_format.py
```

If command successfully runs then you will find data_train.txt file in vott-csv-export folder from Training_Images folder.

As I told you we have successfully created .txt file with all it's Meta information now it's time to train Yolov3.

Go to 2_Training by terminal and type below command to start training:

```
python Train_Yolo.py
```

Now you will be prompt by an error as below image:

This error is for Downloading pretrained weights file of Yolo which you can do it by below command:

```
python
Download_and_Convert_YOLO_weights.py
```

After Downloading completes you can rerun python Train_Yolo.py command to start the training.

Train_Yolo.py file has 51 epochs for yolov3 pretrained graph and 51 for your custom data. You can change it according to your requirements on line no. 136 exactly.

- If you only want to change epochs for your custom data training then you can do it by line no. 264 exactly by replacing epoch2 with your digits.

- After applying 51 + 51 epochs and completing training on my image dataset I got a loss of around 13 using CPU with more than an hour of the time period for training. don't be panic even at this loss your model will work as expected.

Note: Train_Yolo.py file stores checkpoint at frequent time intervals and full model after completing training at Data/Model_Weights location.

step 3: Test Trained Model with Yolov3

After successful training, you can test your model and check it how it's working by putting all your test image dataset into Data/Source_Images/Test_Images location.

detect objects from your test images:

Note: you first need to cd to 3_Inference folder from terminal.

```
python Detector.py
```

If detector successfully runs then you will found test result at Data/Source_Images/Test_Image_Detection_Results location.

I have listed result from my trained model on my test images below:

If you face any error during the above steps then try to find solutions from below listings.

Errors and workarounds:

AttributeError: module ‘tensorflow’ has no attribute ‘reset_default_graph’

Confirmed yourself that you are running tensorflow 1.15 not 2.1 or latest version.

keras in Train_Yolo.py to tensorflow.keras and also do same for files yolo.py, model.py from 2_Training/src/keras_yolo3 and other respective files as shown in error console.

Not using GPU

If you want training should use your GPU then you have to install tensorflow-gpu and installed CUDA 10.0 (mostly) or 9.0 respectively and you also need to set full path of your CUDA installed directory into the environment variable.

Early Stopping

Early stopping is happening due to it's misconfiguration of patients, which is valued 10 currently at line no. 175 but you can change that according to your requirements or you can turn it off by removing it from callbacks lists at line no.266

For more information about early stopping and checkpoints you can check keras official documentation about callbacks at https://keras.io/callbacks/

FileNotFoundError when running Train_YOLO.py

So if you face this error then make yourself confirmed that Your Master folder with virtual

FileNotFoundError when running Convert_to_YOLO_format.py

Recheck whether your Annoations-export.csv is in vott folder or not?

1

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Enginerd Sunio

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Tagged custom, dataset, object detection, train yolo, vott, yolo, yolov3

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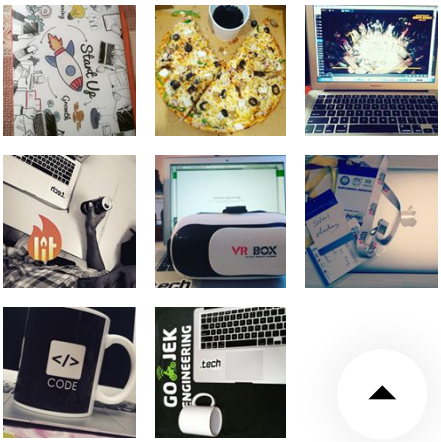

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