

# TensorFlow Object Detection API

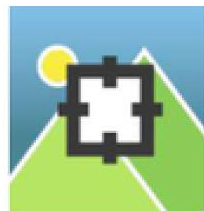
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# Assignment-3 (Computer Vision and Sensor Fusion)

- **Goal:** Learn to create an object detector from the scratch with an awesome tool (TensorFlow object detection API). Learn how to utilize the API to create a new dataset, analyze it, and then make predictions on test photos.
- **Labellmg:** it is an open-source graphical image annotation tool that allows you to label images for object detection tasks. It provides an easy to use graphical interface and support for various types of bounding boxes, including Pascal VOC, YOLO, and CSV formats. The annotations created using Labellmg can be exported as XML files, which can be used to train machine learning models. It is widely used in the computer vision community



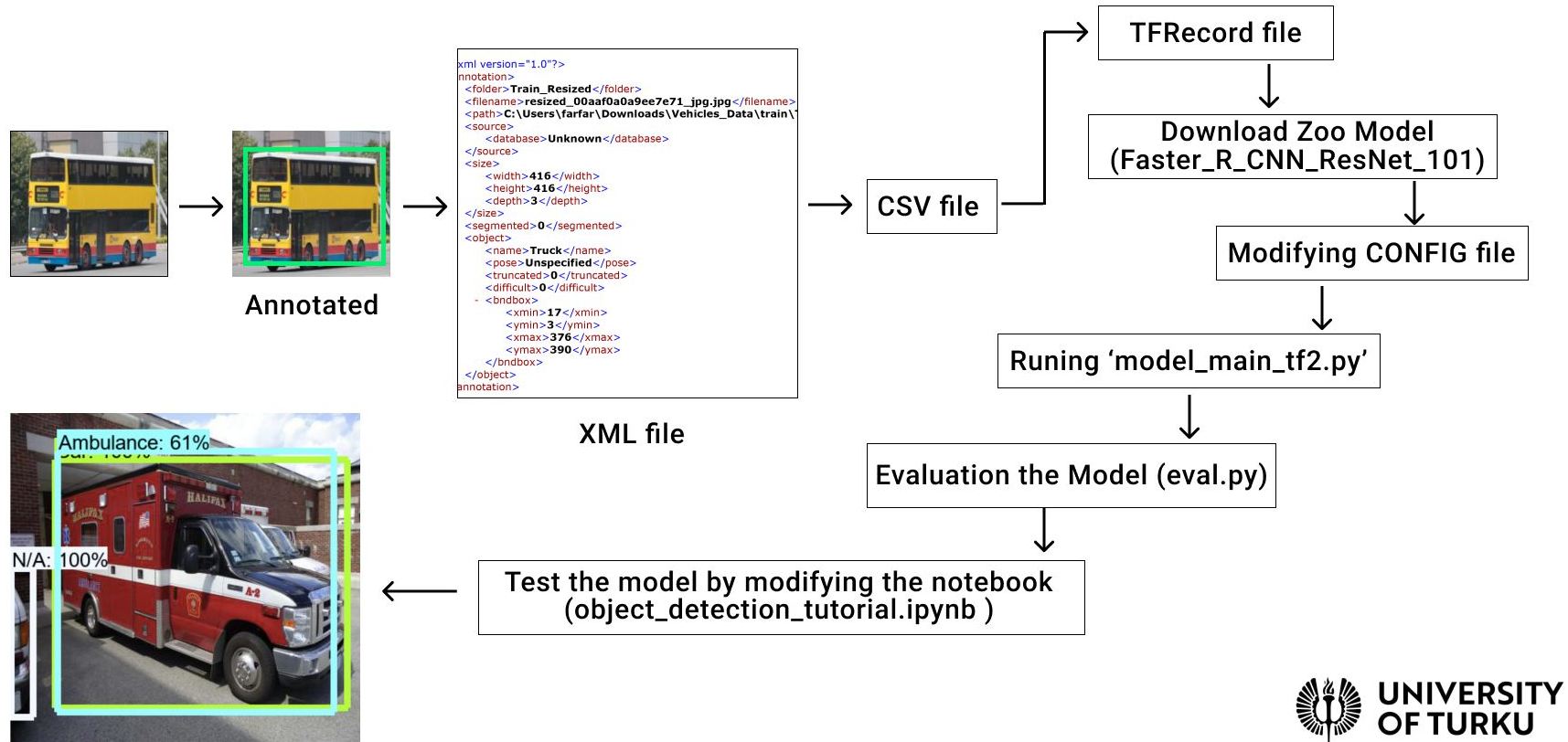
# Dataset

- 630 vehicles images have been collected and downloaded from Google search engine.
- All images are resized to **640 x 640** pixels.
- Format of images are checked, and they are converted to **.jpg** images.
- Images are divided into two categories: 80% of images for **Train (504)** and 20% of images for **Test (126)**.
- By using Labelling tool, all image are annotated.
- A XML file has been generated for each image.
- Creating Label\_Map.pbtxt

```
item {  
  name: "Car"  
  id: 1  
  display_name: "Car"  
}  
item {  
  name: "Ambulance"  
  id: 2  
  display_name: "Ambulance"  
}  
item {  
  name: "Truck"  
  id: 3  
  display_name: "Truck"  
}  
item {  
  name: "Motorcycle"  
  id: 4  
  display_name: "Motorcycle"  
}  
item {  
  name: "Bus"  
  id: 5  
  display_name: "Bus"  
}
```



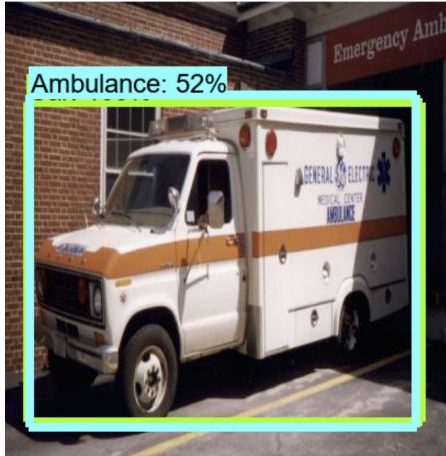
# Training Process





# Results

- The model load in to the 'object\_detection\_tutorial.ipynb' file, and the model are tested on the test image data. Some obtained results are showing below:



# Conclusion

- In conclusion, this assignment looked at how to use TensorFlow's Object Detection API to execute object detection tasks on photos. I began by configuring the environment by installing all of the necessary libraries and frameworks. Then I proceeded through the process of preparing the dataset, which included image annotations and conversion to the TFRecord format, which is required for use in TensorFlow.
- Following that, I used transfer learning to improve the accuracy of a pre-trained model in spotting objects relevant to my specific use case.
- Lastly, I applied the trained model to new photos to recognize objects and visualized the findings with the Matplotlib tool. This highlighted how object identification may be used to automate tasks like spotting items in satellite photos or security camera footage in real-world circumstances.
- Overall, TensorFlow's Object Detection API is a robust and adaptable tool for conducting object recognition tasks, with a plethora of pre-trained models and adjustable parameters to meet unique requirements.