



एनआईसी
National
Informatics
Centre

Aman Vishnoi
Machine Learning Intern
IIT Bhilai

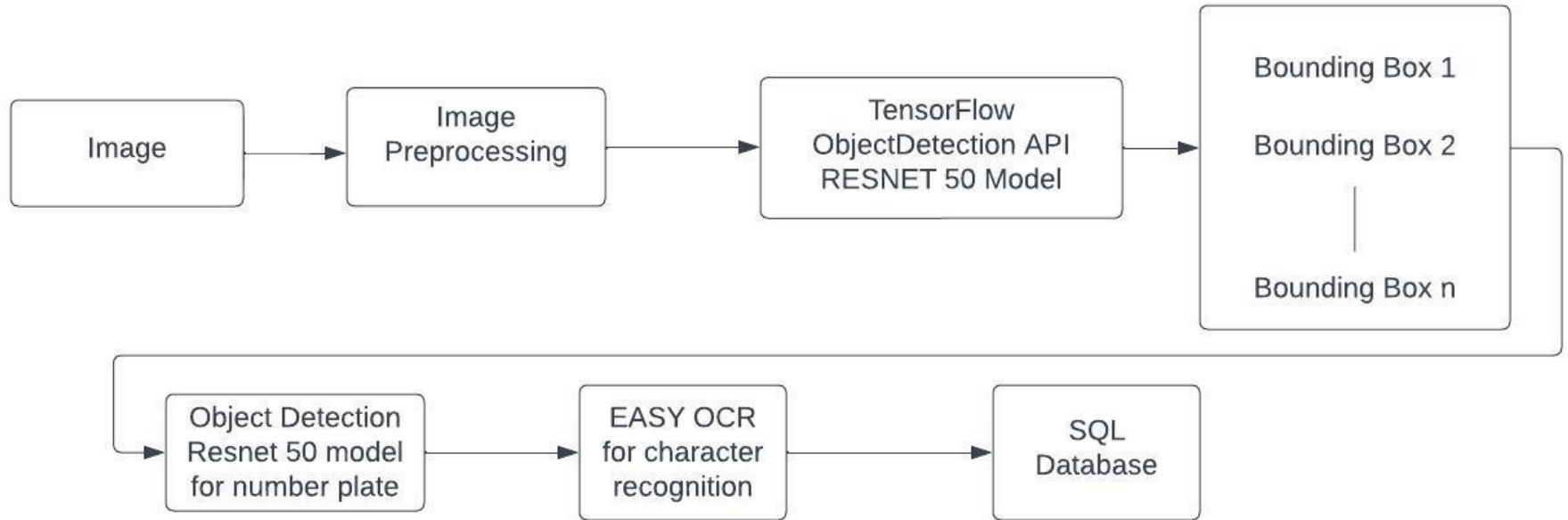
Truck Detection Problem Statement

- Train a machine learning model to detect Indian Trucks in the image
- Parsing and reading their number plates via OCR techniques
- Save the solution to SQL Database



DL1LS9280

End to End Pipeline



Dataset Preparation and Annotation

This problem is treated as a Supervised learning problem where we have annotated images of Trucks and their corresponding number plates. The dataset provided by the NIC is annotated via [LabelImage](#) tool and saved in [TFRecord Annotation](#) format.



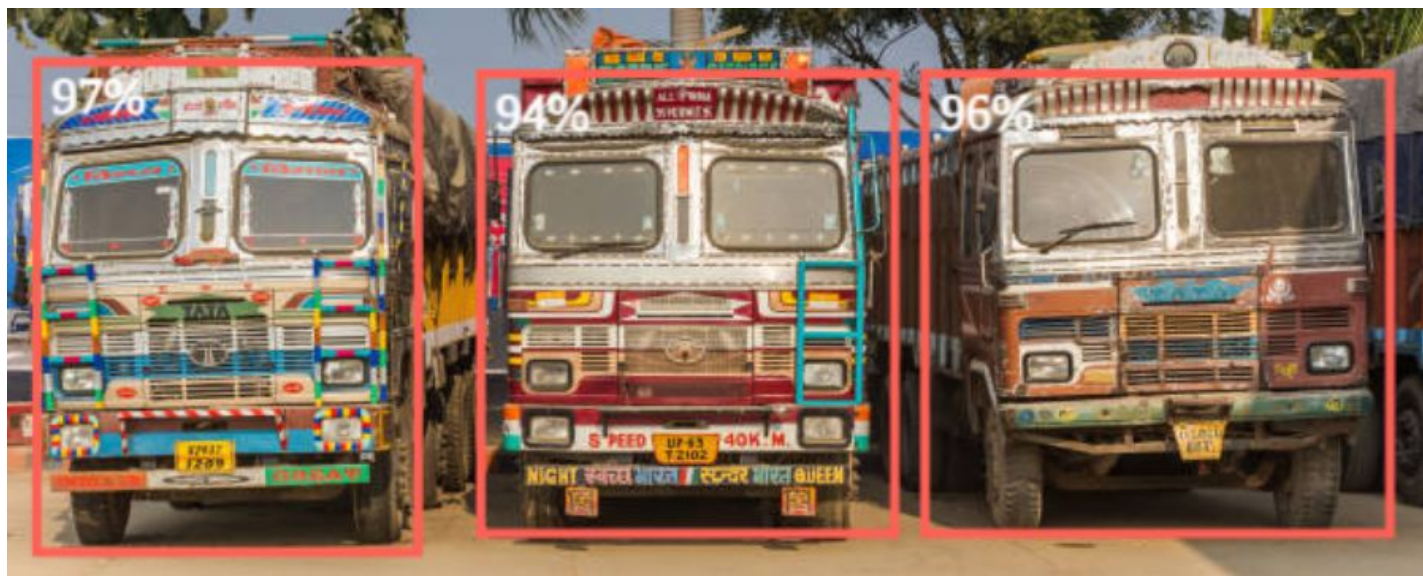
Image Processing

Certain preprocessing steps are done to ensure the accuracy of the algo

1. Converting the image into GrayScale because the problem we are tackling is color invariant
2. Resizing the image into 640*640 to ensure consistency

Truck Detection Problem

The truck detection is done by Tensorflow Object Detection API fine tuned over RESNET-50 model. It return bounding box of detected trucks in the image. Each truck image is then preprocessed with random rotation, shear transform and random cropping from edges to the next stages of the pipeline.



Detecting the number Plates

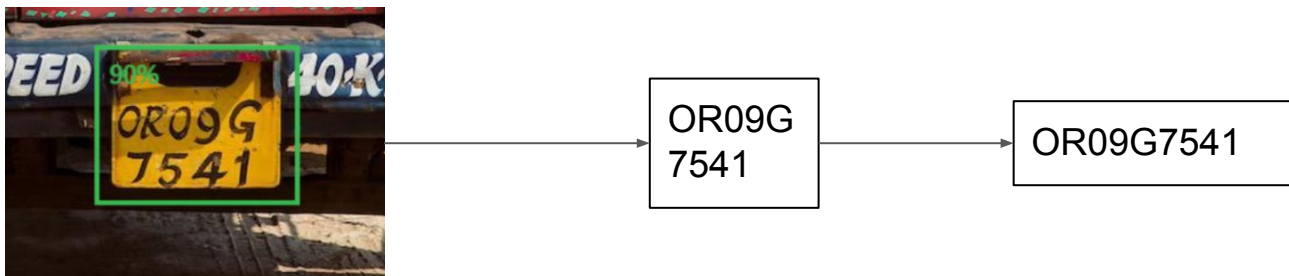
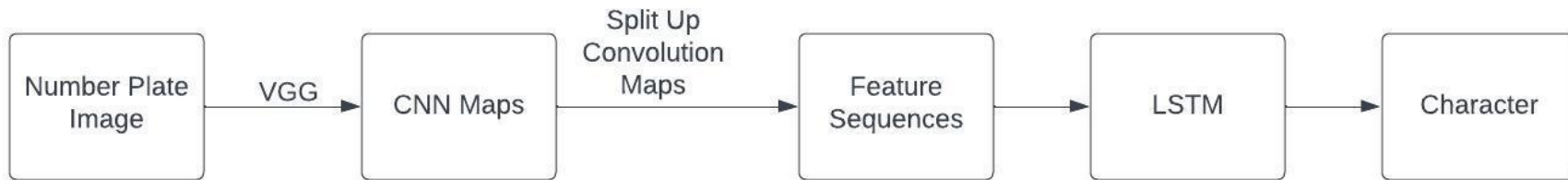
Each of the image of the truck is parsed separately via a number plate detection algorithm. The same Resnet 50 model is trained to detect the number plates.

This is done for each of the 4 augmented images.



Reading the number plates

The number plates are read by EASY OCR technique. The pipeline used by EASY OCR looks somewhat like



Ensemble of Multiple Number Plates

Now since we have multiple number plates detected per-augmented image, we need to ensemble via majority voting on character level. All detections with less than specified number of characters(10 digits) are rejected.

1. OR09G7541
2. ORO9G7544
3. 0R09G7541

Ensemble of the following will yield the: OR09G7541

Problems with the current solution

1. Out Of Distribution number plates



2. Multilingual Number Plates in Kannada, Marathi

Currently the image where number plate is not detected or readable are stored in a separate folder, for human judgement

THANK YOU!!