Car Damage Detection using Deep Learning

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Introduction:

In Car Insurance industry, a lot of money is being wasted on Claims leakage. Claims leakage is the gap between the optimal and actual settlement of a claim. Visual inspection and validation are being used to reduce claims leakage. But doing inspection might take a long time and result in delaying of claims processing. An automated system for doing inspection and validation will be of great help in speeding up the process.

Data Source:

Since the dataset for damage in cars are rare. The car dataset is downloaded from:

https://www.kaggle.com/anujms/car-damage-detection

The above dataset is divided according to the stages we need.

This consists of Train and Validation which each folder has Damage cars pics and whole car pics. A total of 2300 images are present in both train and validation combined.

Modelization:

I have used 3 classes for custom object detection:

1. Glass and Light Broken
2. Car Dent and Scratch
3. Smash

Since there is no data, we can download for this, I have used LabelImg tool for creating bounding boxes and giving classes (we used 800 images only).
After creating data for Yolo, I have created train.txt, test.txt, custom.data, yolov4_custom.cfg, custom.names files as specified for training yolo.
Since we have 3 classes, we will be training yolo for 6000 epochs and weights will be saved for multiples of 1000.
I have used a 3 types of test images to see how each weights are performing. Below are the test images.

Glass and Light Broken Example

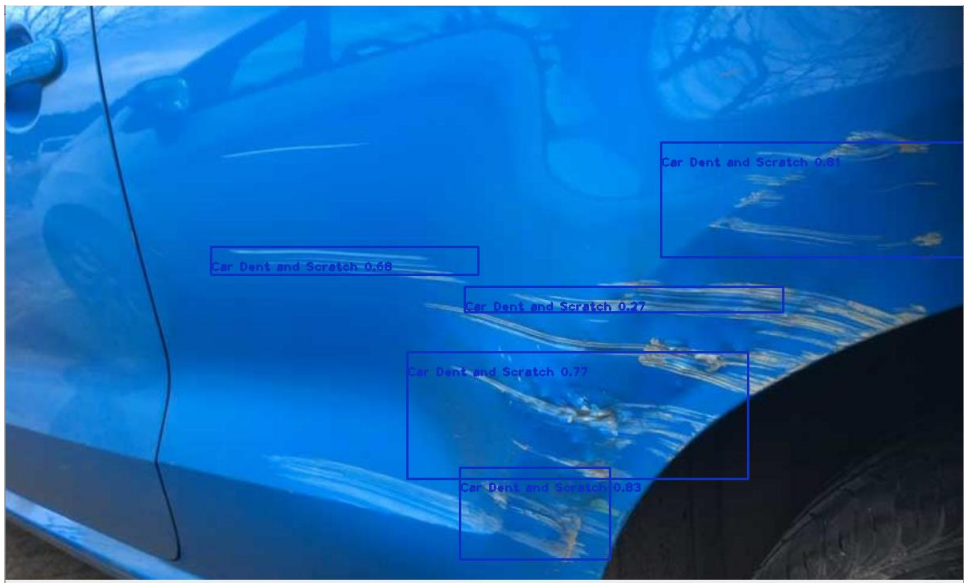
Car Dent and Scratch Example

Smash Example

Results:

After 2600 iteration we got an avg loss of 2.0, Below are outputs of our model:

1. Car Dent and Scratch:


Car Dent and Scratch 0.61
Car Dent and Scratch 0.68
Car Dent and Scratch 0.77
Car Dent and Scratch 0.77
Car Dent and Scratch 0.83


Car Dent and Scratch 0.74

2. Smash:

3. Glass and Light Broken:


Glass and Light Broken 0.85


Broken 0.98