Deep Learning based Dent and Scratch Detection for four wheelers using YOLO Algorithm

Project Idea

To detect/recognise dents and scratches from images of cars. The dataset contains car images with one or more damaged parts. The folder has all 80 images in the dataset. There are three more folders train/, val/ and test/ for training, validation and testing purposes respectively. Using this data for training a object detection model to identify and classify Dents and Scratches using the YOLOv5 model which is extensively used in autonomous vehicles and vehicle self damage detection.

Abstract

In the rage of emerging automotive technologies, many real world infotainment systems have been developed for automotive with the help of machine learning techniques. One such invention is autonomous cars, autonomous cars in the sense an automatic car which makes its own decision based on experience. As a diagnosis system in autonomous cars a self damage identifying system is essential during any external disturbance. Our proposed system identifies and classifies the Dent and Scratch in the car using Object Detection Techniques. Dents and Scratches can be identified at any part of the car using the ML models which will be further used as a test case in Car Accident Detection system and can be employed in the car dashboard as an notification during external disturbance.

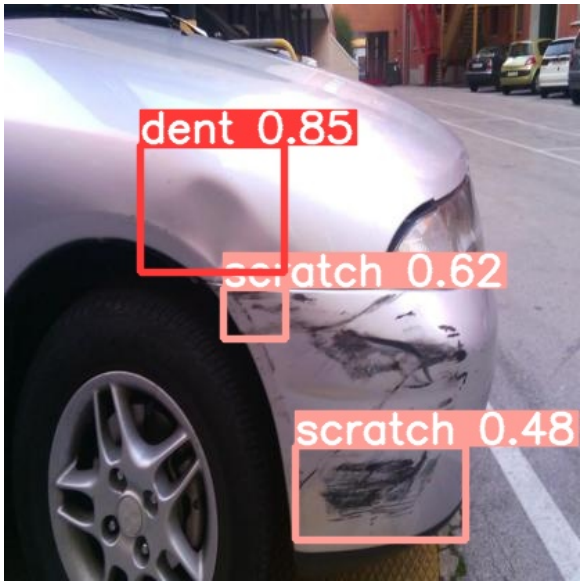
YOLOv5

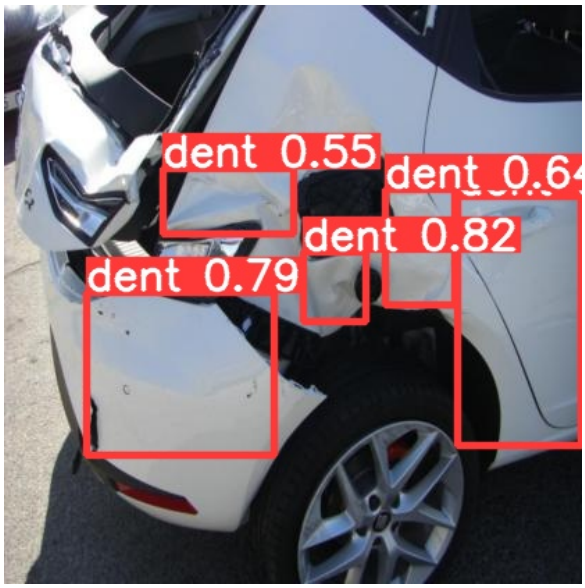
YOLO, an acronym for 'You only look once', is an object detection algorithm that divides images into a grid system. Each cell in the grid is responsible for detecting objects within itself. YOLO is one of the most famous object detection algorithms due to its speed and accuracy.

Dataset

[Dataset Folder]

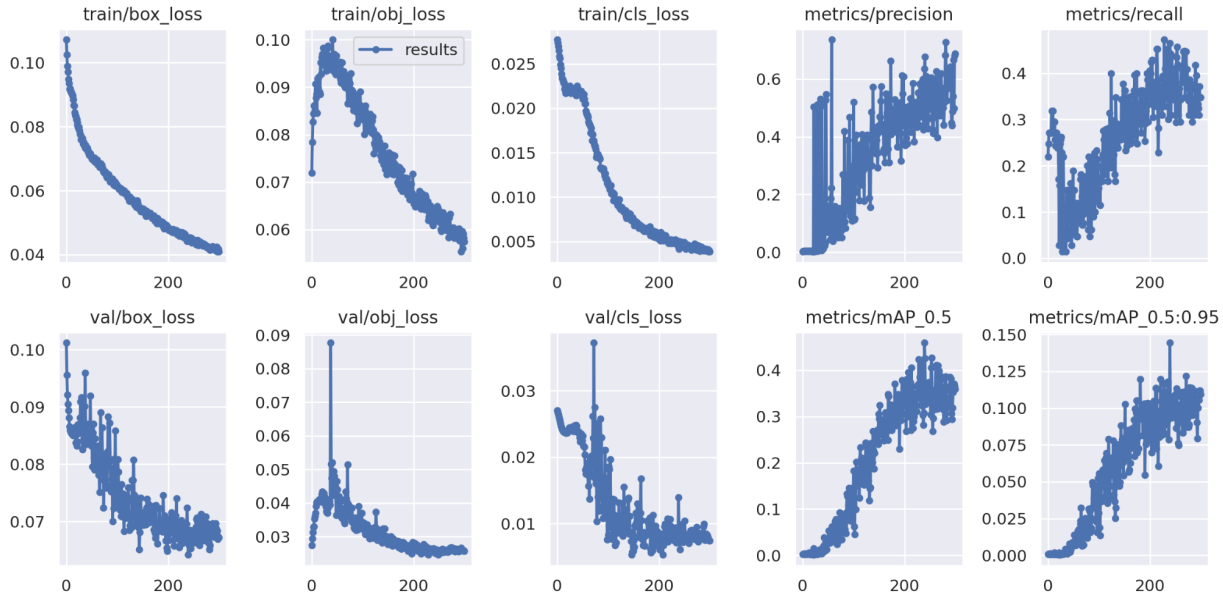
Classified Output



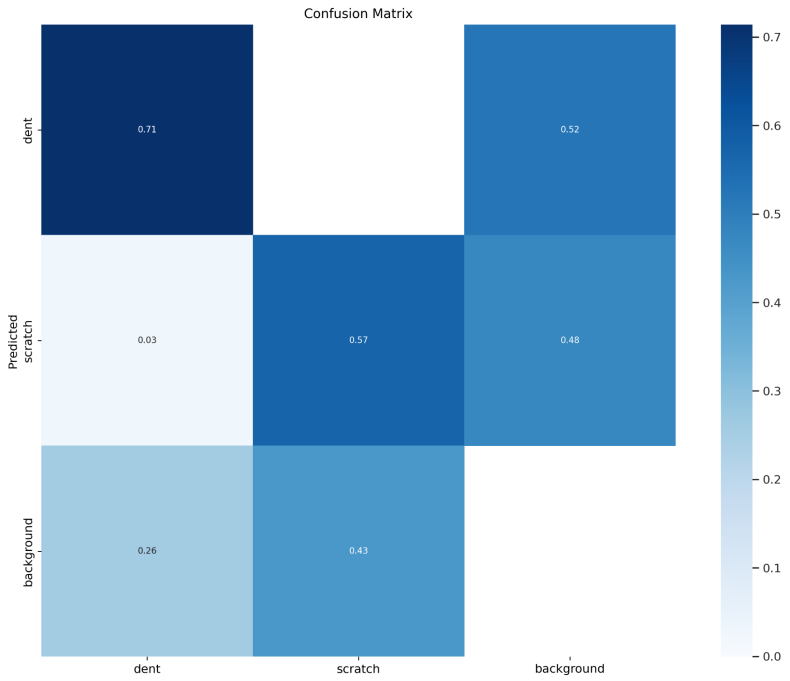


Test Results

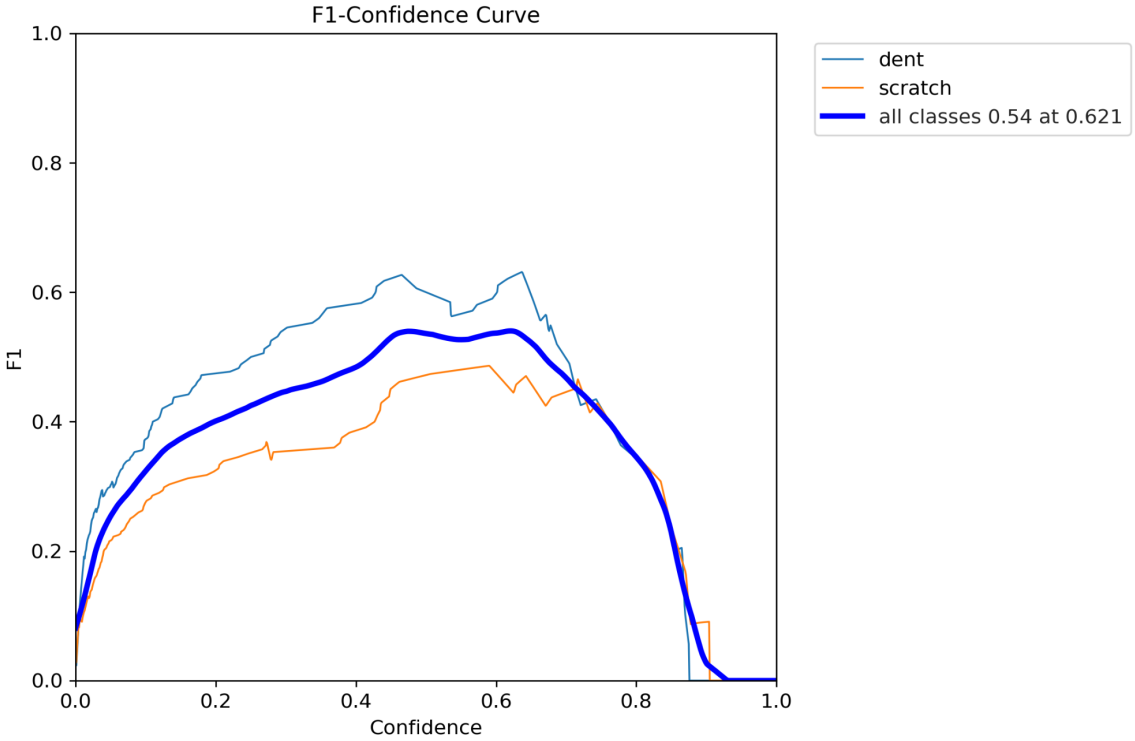
results.csv



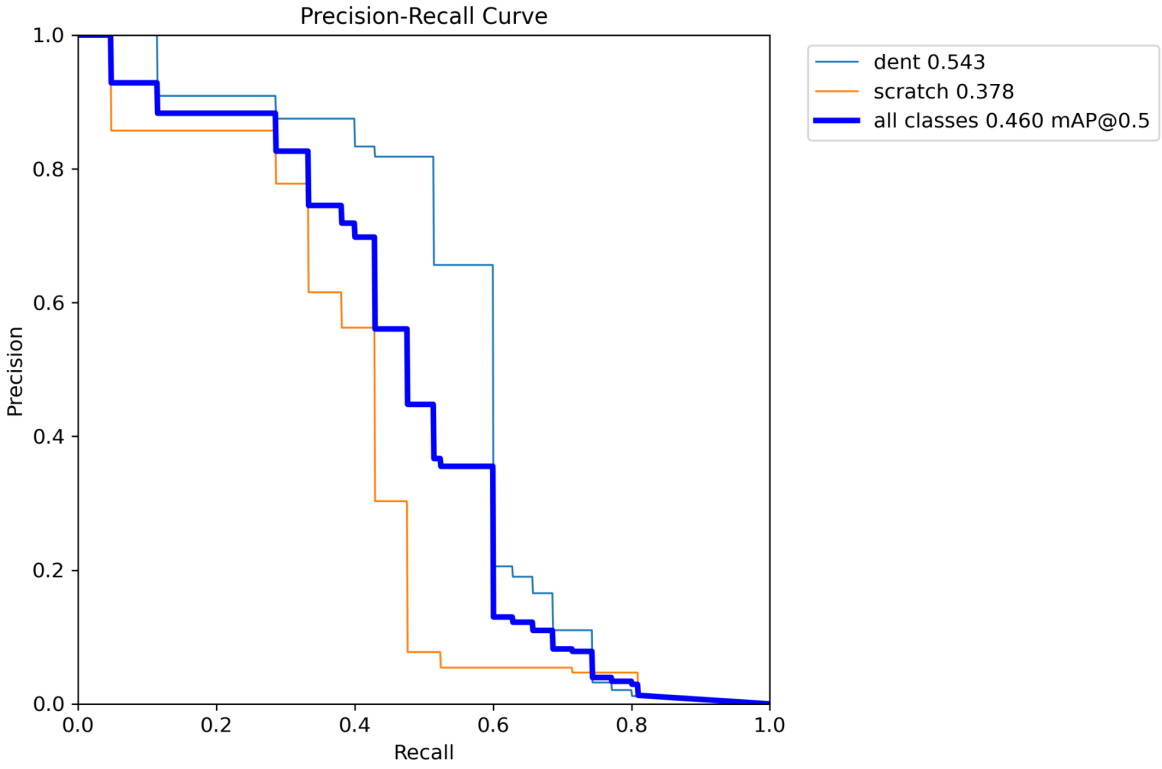
Confusion Matrix



Confidence Curve



Precision_Recall Curve



Conclusion

The model is trained for detecting and classifying the dents and scratches in cars for both real time and pre-captured images.