Self Driving Cars

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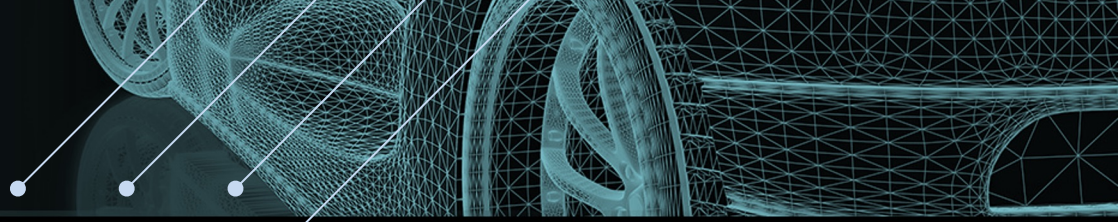
Content



INTRODUCTION

- A self-driving car (also known as an autonomous car or driverless car) is a vehicle that uses a different number of sensors, radars, cameras, and artificial intelligence to travel to destinations without needing a human drive.

- In this project, we trained a machine learning model to help cars to detect objects and recognition them which will help in future work to take decision based on these algorithms.

PROJECT GOALS

1

Greater Road Safety

Automation can help reduce the number of crashes on our roads

2

Greater Independence

Full automation offers more personal freedom . People with disabilities, like the blind, are capable of self-sufficiency, and highly automated vehicles can help

3

More Productivity

Could allow drivers to recapture time. In a fully automated vehicle, all occupants could safely pursue more productive or entertaining activities, like responding to email or watching a movie

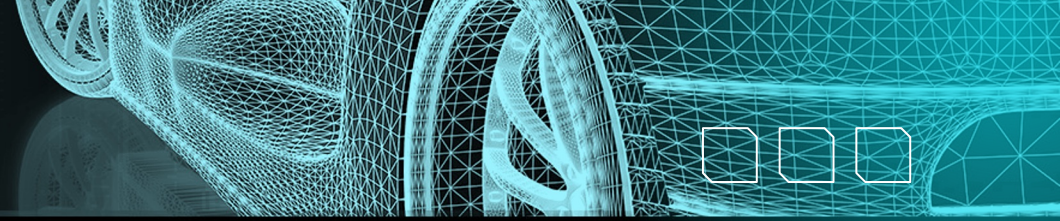
Why Self Driving Cars

1- Data identifies driver behavior or error as a factor in 94% percent of crashes, The greatest promise may be reducing the devastation of impaired driving, unbelted vehicle occupants, speeding and distraction.

2- Self driving cars maintain a safe and consistent distance between vehicles, helping to reduce the number of stop-and-go waves that produce road congestion.

3- Self driving cars helps the environmental to have the potential to reduce fuel use and carbon emissions . Fewer traffic jams save fuel and reduce greenhouse gases from needless idling.

METHODOLOGY



01

Choose data

Searching for datasets

02

Exploring data

Looking for data specifications and to understanding the big picture

03

Designing algorithms

Looking for appropriate algorithms and models

04

Coding and results

Writing the codes and getting the desired results

05

Analyzing outcomes

Understanding the outputs and drive some insights

06

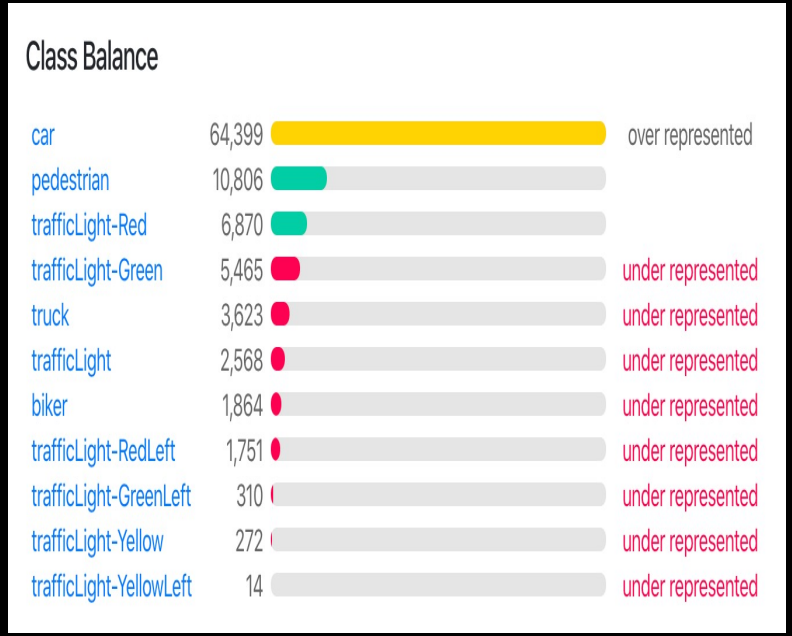
Documentation

Making a report and documented our works

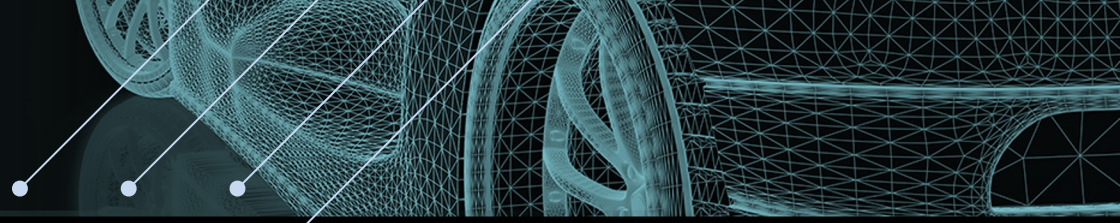
DATASET

Our dataset is Udacity Self Driving Car .
This data contains 97,942 labels across into 11 classes such as (car , biker , truck , traffic light) and we have 30,000 images.
There are 1,720 null examples (images with no labels) .

All images are 1920x1200 (download size ~3.1 GB). We have also provided a version down sampled to 512x512 (download size ~580 MB) that is suitable for most common machine learning models
we implement The TensorFlow2 Object Detection Library for training on dataset.



TOOLS & LIBRARIES



1

- Python and google Collaboratory

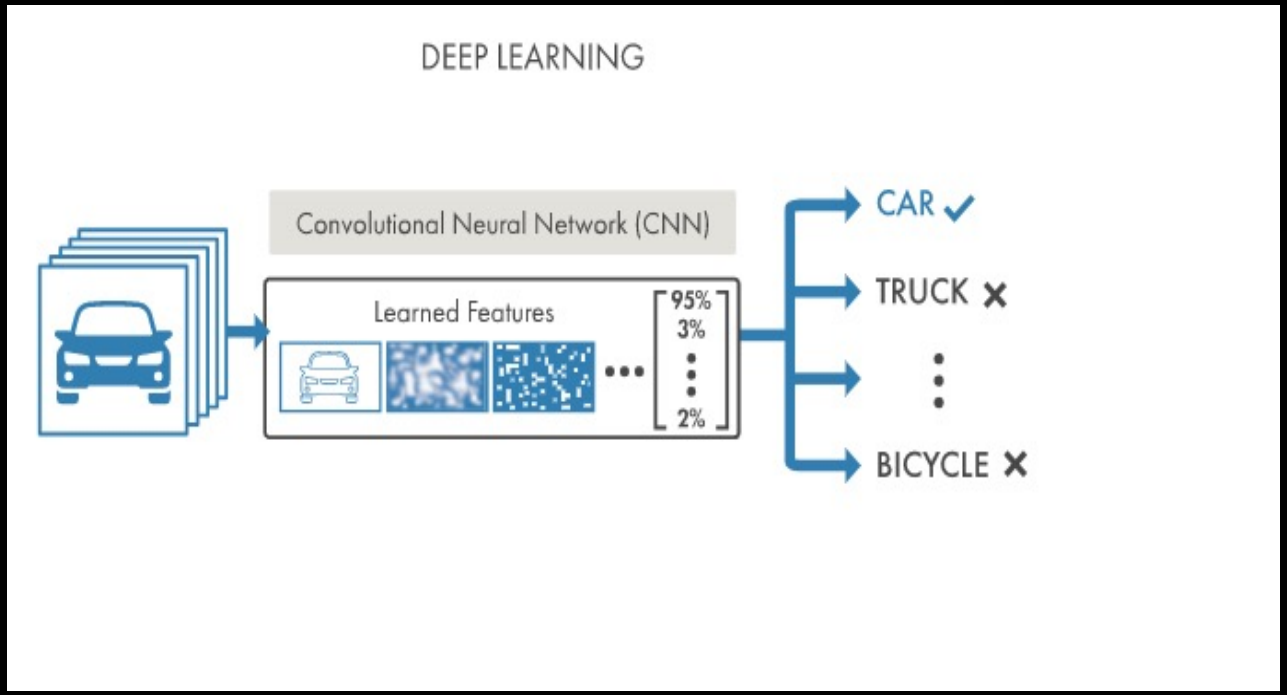
2

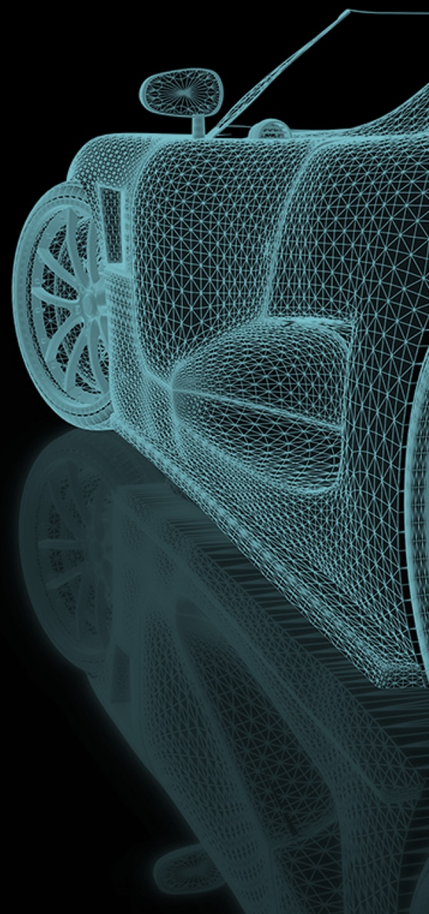
- **Libraries**
  - Sklearn
  - Tensorflow

3

- **Models**
  - Yolov5
  - Yolov5s

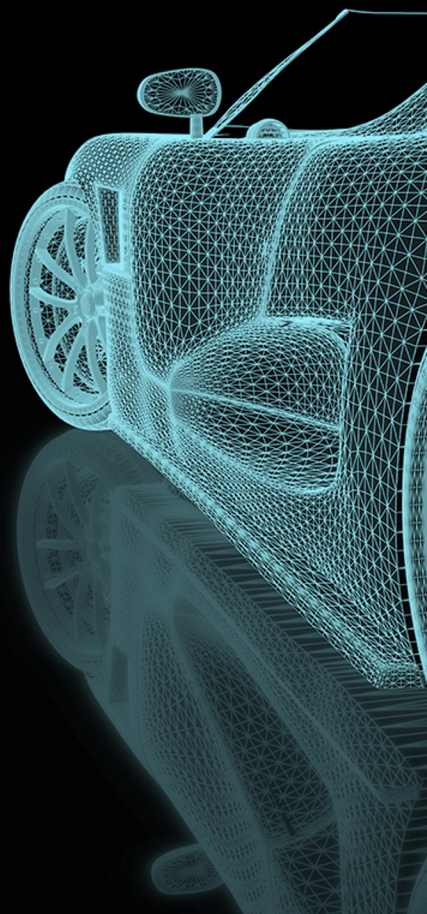
This drawing represents the work of our project



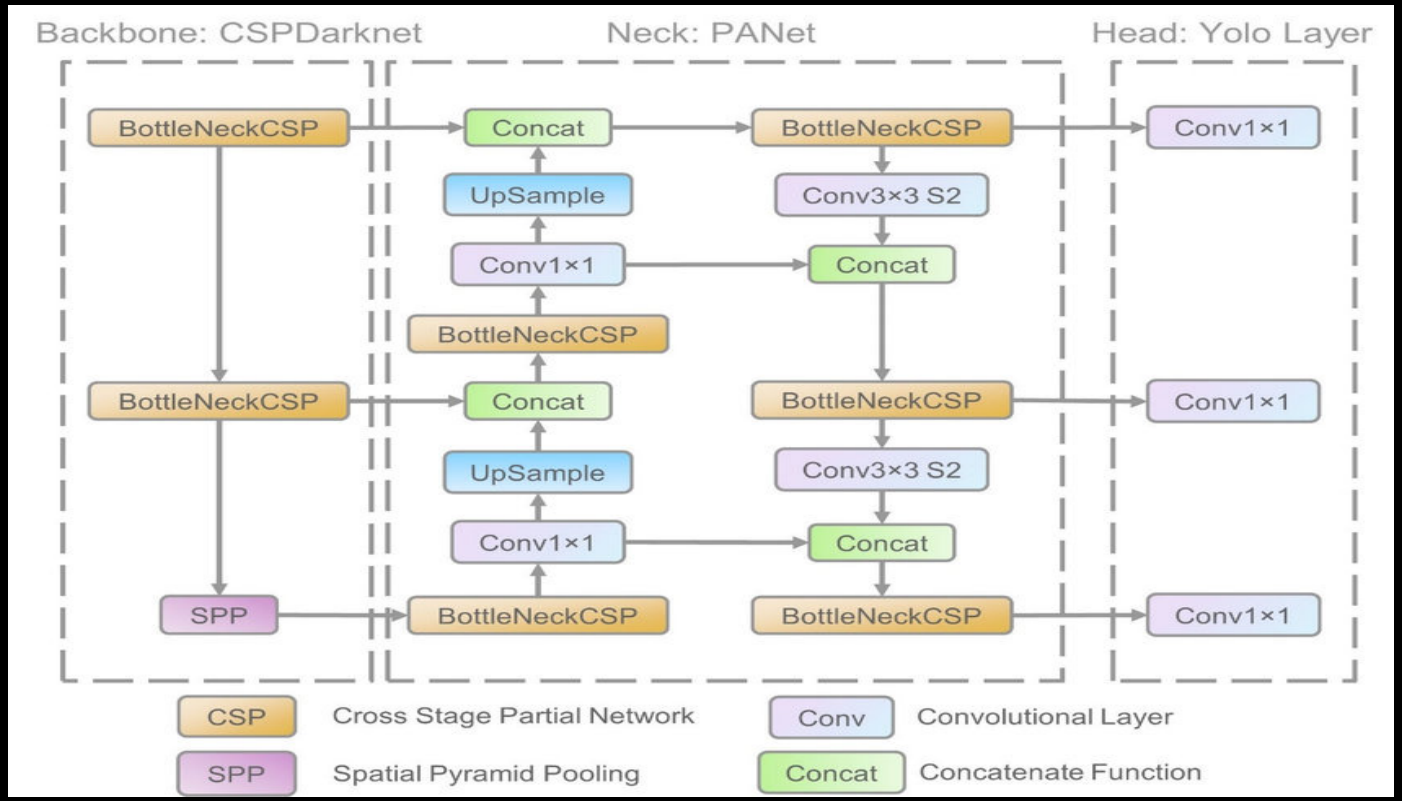


Yolo5 architecture

- The YOLO network consists of three main pieces.
- 1) Backbone - CSP(Cross Stage Partial Networks) are used as a backbone in YOLO v5 to extract rich in useful characteristics from an input image..
- 2) Neck - It aids in the identification of the same object in various sizes and scales, PANet is used as a neck in YOLO v5 to get feature pyramids..
- 3) Head - is mostly responsible for the final detection step. It uses anchor boxes to construct final output vectors with class probabilities, objectness scores, and bounding boxes.



Yolo5 architecture



Results on image

Results on video

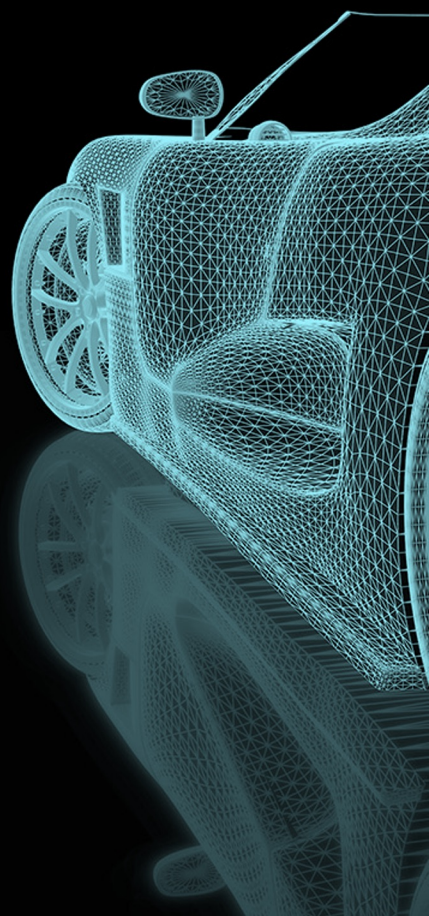
https://www.youtube.com/watch?v=qaCLV4Y_H3M

FUTURE WORK

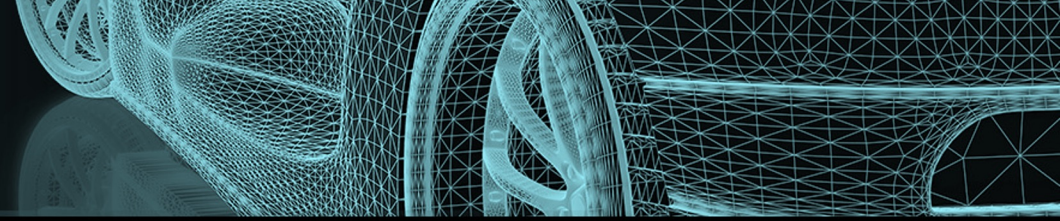
- Self driving car sensors
  - visible-light camera
  - infrared camera
  - audio

- Localization and mapping : where am I ?

- Movement planning : how do i get from A to B ?



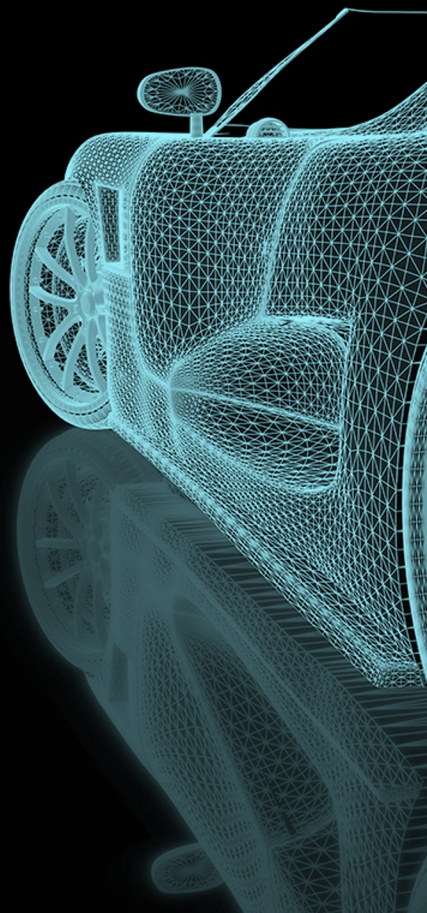
Conclusion



Self-driving cars promise to be an efficient and sustainable mode of transportation for everyone, preventing accidents and making commuting convenient for all.

just believe and give a try to technology and get to enjoy the luxury of computerized driving.

THANK YOU



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