# Brief of the work done during the Summer Internship at Swaayatt Robots:

**Submitted by:**
**Saransh Gupta**
**Contact:**
**Email:** saransh.official.iitkgp@gmail.com
**Mob no. +91-9530277421**

## 1. Bounding Box Prediction using R-CNN:

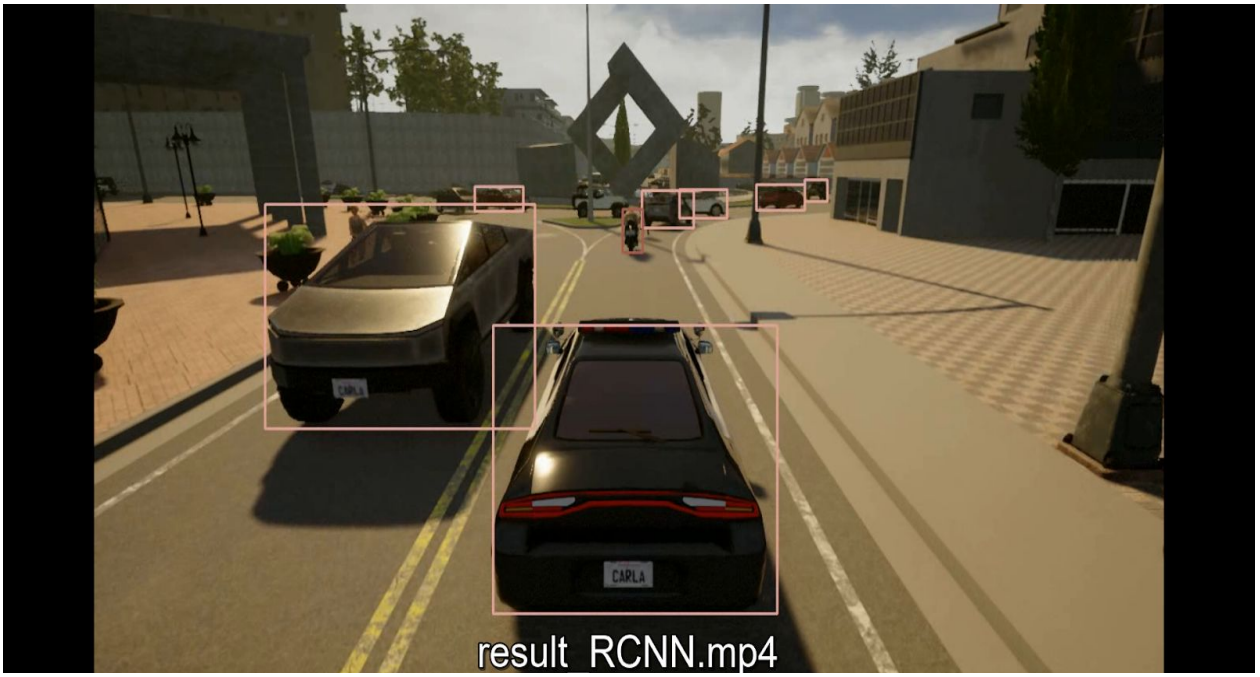
**Reference:**
https://openaccess.thecvf.com/content_ICCV_2017/papers/He_Mask_R-CNN_ICCV_2017_paper.pdf

Implemented the Region-based CNN (R-CNN) approach to bounding-box object detection is to attend to a manageable number of candidate object regions and evaluate convolutional networks independently on each Region of Interest.

**Aim:** Automate the bounding box generation of around the objects in an Image/Video.

**Result: Succes.**

The Algorithm successfully predicts objects in the video and generates a bounding box around them which further was used as an input for the Feature extraction algorithm called SuperPoint.



2. **Implementation of SuperPoint: Self-Supervised Interest Point Detection and Description (SuperPoint) for Visual Odometry and Bounding Box tracking:**

**Reference: https://arxiv.org/pdf/1712.07629.pdf**

Implemented a self-supervised framework for training interest point detectors and descriptors suitable for a large number of multiple-view geometry problems in computer vision.

**Aim:**

A. **Visual Odometry Implementation:**
B. **Bounding Box-tracking using the features obtained.**

**Result: Succes.**

The Algorithm successfully tracks the bounding boxes predicted by the R-CNN algorithm upto many frames. (Parameter can be given inside the code for how long we want the points to be tracked)
The Algorithm Successfully Builds a trajectory of the motion of the vehicle using Visual Odometry.
**Both the above discussed algorithms were connected through a pipeline where RCNN predicts the bounding boxes followed by SuperPoint tracking them.**

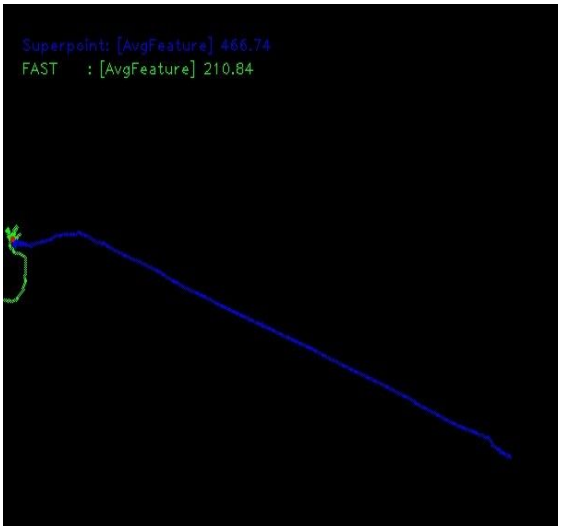



Fig 1: Visual Odometry

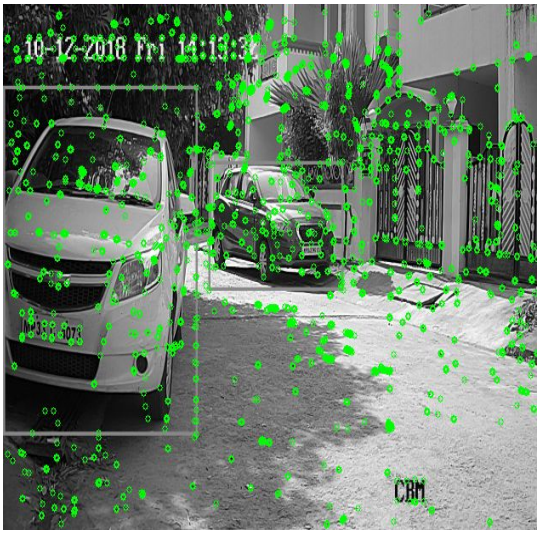



Fig 2: Bounding box tracking

**3. Implementation of Learning Linear Transformations for Fast Arbitrary Style Transfer:**

**Reference:** [https://arxiv.org/pdf/1808.04537.pdf](https://arxiv.org/pdf/1808.04537.pdf)

A style transfer method takes a content and a style image as inputs to synthesize an image with the look from the former and feel from the latter.

**Aim: Transform Road Semantics, weather, day/night conversion in a Frame.**

**Result: Success.**

The Algorithm was able to change a normal road to rainy road/dusty road, convert day scene to night scene to much extent.


**Fig 1: Original Image**

**Fig 2: Day to Night Converted Image**

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By Saransh Gupta
Fourth-Year Undergraduate
Indian Institute of Technology Kharagpur
Kharagpur, West Bengal, India-721302
+91-9530277421

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