PREDICTIVE ANALYSIS

Group 2

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Baseline Model (Based on 50 images)

Feature

Depth = 11

Prediction Algorithm

GBM

PSNR	Time
20.89188	2.19s+78.2s=80.39s

Feature Detector

- Canny
- Diagonal
- Large neighborhood
- Canny + Diagonal
- Canny + large neighborhood

Classification Algorithm

- GBM
- XGBOOST

GBM

Feature	PSNR	Time
Canny	22.64799	7.02s+110.08s=117.1s
Diagonal	23.76836	2.33s+46.2s=48.53s
Large Neighborhood	21.52101	2.64s+385.12s=387.76s
Canny+diagonal	21.10425	11.97s+86.55s=98.52s
Canny+large neighborhood	22.20425	13.302s+ 410.21s=523.512s

XGBOOST

Feature	PSNR	Time
Canny	20.97567	7.02s+96.63s=103.65s
Diagonal	20.92569	2.33s+60.14s=62.47s
Large Neighborhood	21.11069	2.64s+236.02s=238.66s
Canny+diagonal	20.89102	11.97s+86.55s=98.52s
Canny+large neighborhood	20.99228	13.302s+ 398.34s=411.642s

Final Model

Feature: Diagonal

Classify Algorithm: GBM

With parameters: Depth=8

Performance

CNN

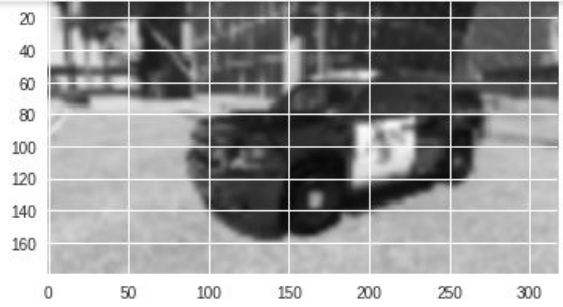
After we read an amazing paper regarding the SRCNN in Cornell University Library. Reference (https://arxiv.org/abs/1501.00092v3).

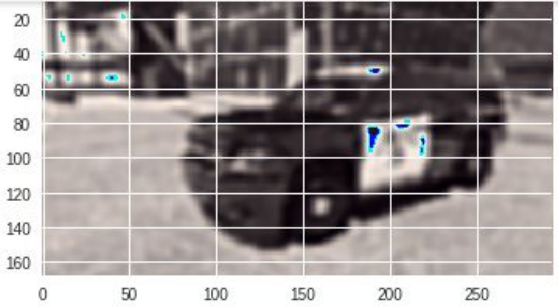
We sample based on the original resolution image and construct the low-resolution image. We pick 33X33 pixels with duplicates as the input and 21X21 pixels as label.And we take the mean variance as our Loss function.

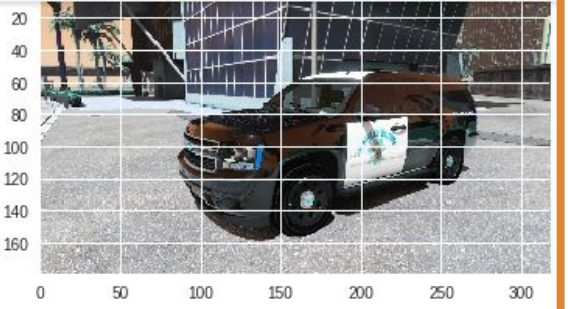
Here we take 14 to be our strides in the training process and strides to be 21 in the test process in order to relief block artifacts.

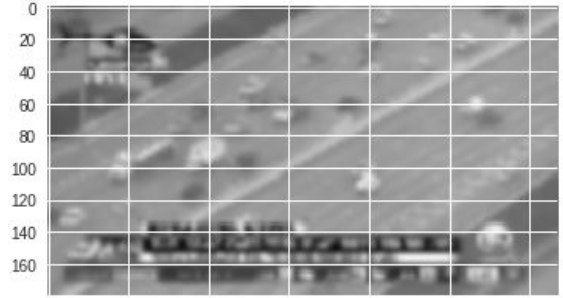
In the training model, we use several parameters, we choose epchos to be 100 which has loss for 0.0016

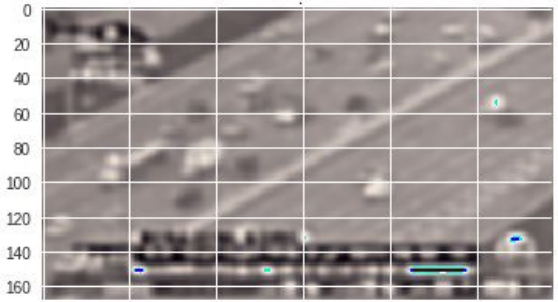
Eventually we have the PSRN roughly 34.3 for 1500 images









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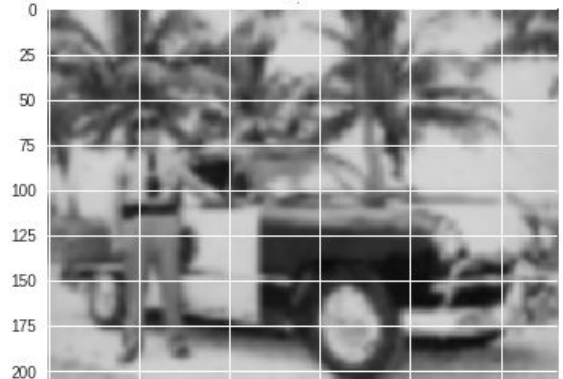

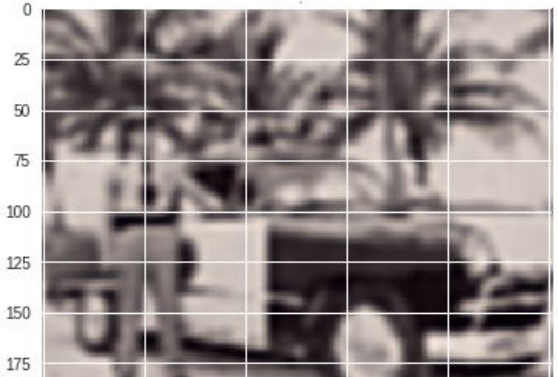

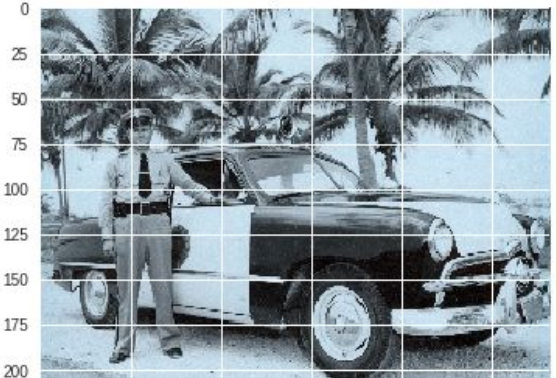

However..

Here the CNN model will super-resolution based on the same dimension. In the prediction test today, we will output the same dimension as the LR, which means it is not satisfied with instructor’s requirement, therefore here we did not use as a improvement test. But definitely, we can hand over this problem by predicting or changing the layer, we will do this research for that problem later.