CS 7180 Milestone 1

Nalin Gupta
gupta.nal@husky.neu.edu

Christopher Botica
botica.c@husky.neu.edu

Tyler Brown
brown.tyler@husky.neu.edu

1 Replication

Using the GitHub repository provided by Chen et. al. [1], we were able to run their code but ran into limitations with computational resources. Chen et. al. [1] used a separate model for each of the two cameras. They specified a minimum of 64GB of GPU RAM for the Sony model and 128 GB of GPU RAM for the Fuji model. We decided to try replicating the less resource intensive Sony model.

1.1 Computing Training Parameters

The hardware requirements for this model are nontrivial so we have explored several options.

1. Using AWSEducate did not work
   - Unable to create roles with IAM authentication so it's really hard or impossible to move data from a S3 Bucket to an EC2 Instance
   - Tried to create a $p3.8xlarge$ instance but these instances are not allowed even though they are listed
2. Using regular AWS does work but is costly
   - Ran a single AWS EC2 $p3.8xlarge$ instance with 32 CPU, 244 GB of Memory, 4 Tesla V100 GPUs, and 64 GPU Memory. This costs $12.24 an hour.
   - This is the amount of GPU Memory requested by the paper authors as a minimum amount

Given these initial facts, we then tried to estimate run time requirements for the Sony model. We trained the Sony model for 90 minutes using an AWS $p3.8xlarge$ instance. We were able to complete $\approx$ 12 training epochs. We then tried to use the training parameters to test the model but could not get this to work without modifying the script provided by Chen et. al. [1]. The model parameters were available to download, we used these parameters to run against test data for 30 minutes. Additional time was required to extract the Sony dataset which decompressed to about 115GB of image files. We estimate that replicating the Chen et. al. [1] training parameters for *only* the Sony model takes approximately 500 hours or $ 6,120.

1.2 Test Results from SID Model Parameters

Figure 1 contains example training data. Figure 2 contains example test results. Both Figure 1 and Figure 2 are pictures of a similar yellow bike. We can see a qualitative improvement across the three renderings of the same predicted test image in Figure 2.

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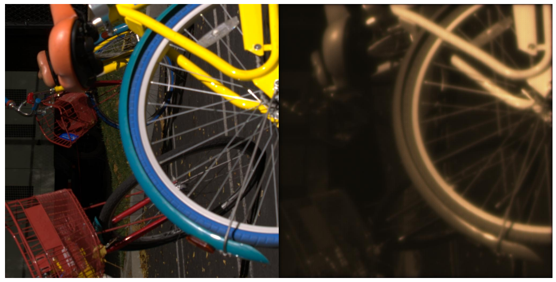
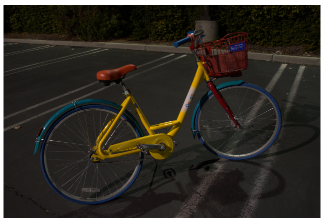
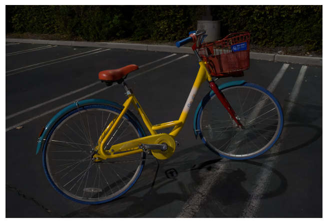


Figure 1: Example Training Data



(a) gt



(b) out

(c) scale

Figure 2: Example Test Data

2 Appendix

References

[1] Chen Chen, Qifeng Chen, Jia Xu, and Vladlen Koltun. Learning to see in the dark. *arXiv preprint arXiv:1805.01934*, 2018.