Neural Nearest Neighbors Networks

Kanishk Jain (2021701023)
Team #59: GroveStreet

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1 Problem Statement

Introduce a differentiable selection rule for K-Nearest Neighbors, which can be used with an end-end trainable Neural Network. Evaluate the efficacy of the proposed approach on image restoration and image denoising tasks. This project is an implementation of [1].

2 Progress

Implemented the skeleton architecture for N3Net proposed in paper. It includes DnCNN [2] implementation, which is Local processing network used in N3Net, and the skeletal implementation of N3Block proposed in [1], which includes Embedding CNN and Temperature CNN.

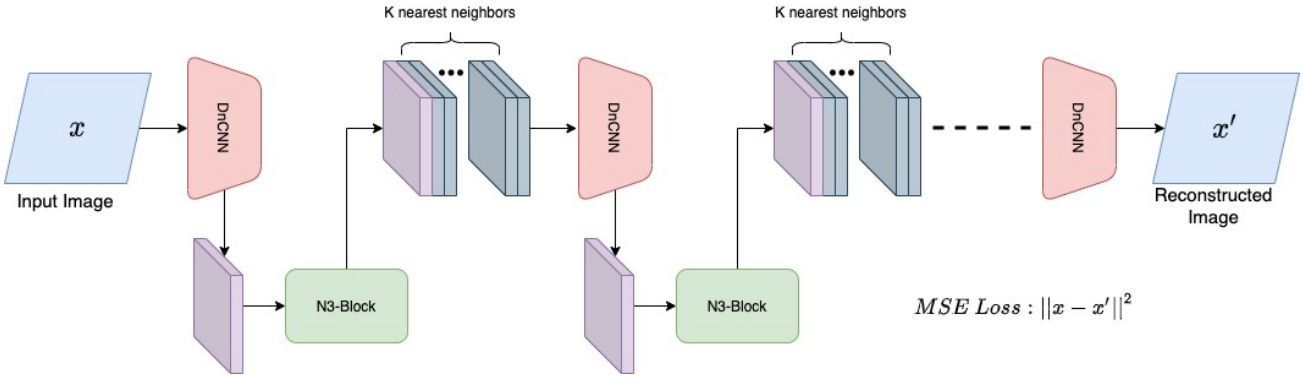

Figure 1: Network Architecture of N3Net proposed in [1].

Additionally, the code for data processing (including augmentation, dataloading), training, validation is also written.

3 Pending Work

Following things are pending:-

- Implementing the Nearest Neighbor logic in N3 block.
- Evaluation of the approach on Image De-noising.
- Ablation Study with different distance metrics.

References

[1] T. Plötz and S. Roth. Neural nearest neighbors networks. *NeurIPS*, 2018.

[2] W. Zuo, K. Zhang, and L. Zhang. *Convolutional Neural Networks for Image Denoising and Restoration*, pages 93–123. Springer International Publishing, Cham, 2018.