

CS512 - Project - Proposal
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Abstract

When working with a single image, it becomes a challenging problem to remove haze as a single image lacks depth knowledge. So in this project we would use modified conditional Generative Adversarial Network to directly remove haze from the image.

Problem Statement

Haze is traditionally an atmospheric phenomenon in which dust, smoke, and other dry particulates obscure the clarity of the sky. Due to this light gets scattered and from the viewer's perspective, the field of view is minimized. Also, the hazy image has reduced visibility and reduced contrast. So when visibility is of main importance for example in autonomous vehicles this becomes a cause of concern.

Proposed solution

We propose to implement this using the paper [Single Image Haze Removal using a Generative Adversarial Network](#) (Raj and N). With respect to paper, we will implement an end-to-end learning-based approach that uses a modified conditional Generative Adversarial Network to directly remove haze from a single image without explicitly estimating the transmission map. We would use the Tiramisu model for the Generator rather than the U-Net model.

For the data to train the model we would generate the images having haze from the NYU Depth (Fitzgibbon et al. 746-760) dataset and the Make 3D(Hambarde et al. 989-993) dataset. The NYU depth dataset contains 1449 indoor scenes along with their corresponding RGB-D pair, and the Make 3D dataset contains images of outdoor scenes along with their depth information.



Fig. 1. Sample dehazing results using the proposed method. Left: Input hazy image, Right: Output dehazed image.

Reference from the paper

Team Member Names & Responsibilities (in %)

Task	Akshay Jain	Sarvesh Shroff
Data Collection/ Creation	60	40
Data Preprocessing	40	60
Data Modeling	50	50
Performance Measures	50	50
Debugging/testing	60	40
Code Optimization	40	60
PPT / Report	50	50

References

Fitzgibbon, Andrew, et al., editors. *Indoor Segmentation and Support Inference from RGBD Images*. Springer Berlin Heidelberg, 2012.

Hambarde, Praful, et al. *Single Image Depth Estimation Using Deep Adversarial Training*. IEEE, 2019.

Raj, Bharath, and Venkateswaran N. “[1810.09479] Single Image Haze Removal using a Generative Adversarial Network.” *arXiv*, 22 October 2018, <https://arxiv.org/abs/1810.09479>. Accessed 16 March 2022.