Machine Learning
Final Project

Image Dehazing

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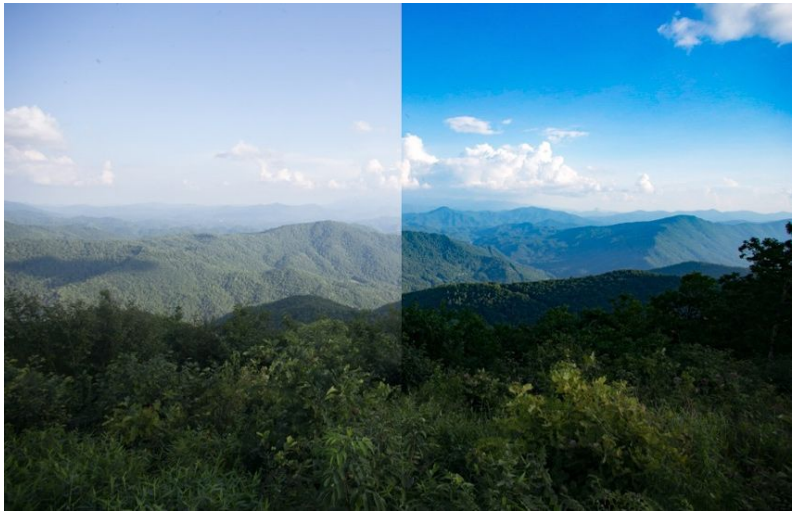
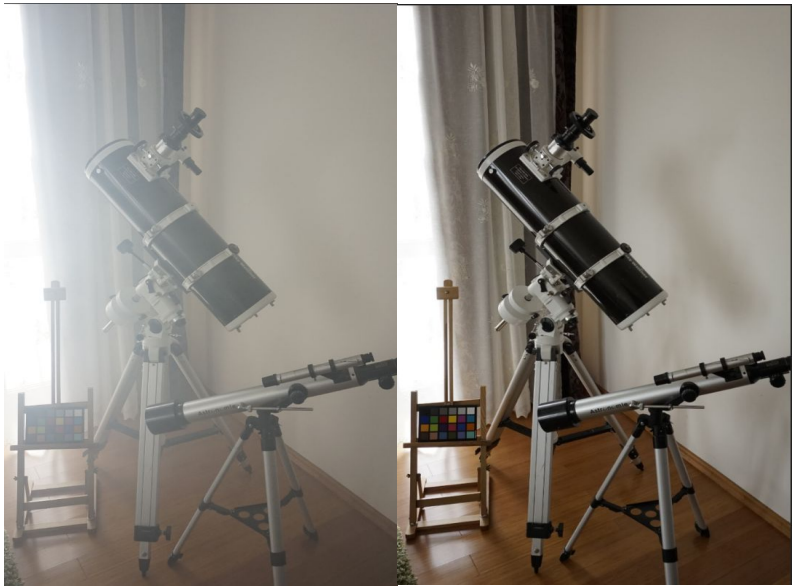
Task Introduction

A dataset of hazy images obtained in indoor and outdoor environments is provided with ground-truth haze-free references which allows for an accurate benchmarking of the performances achieved by the dehazing methods.



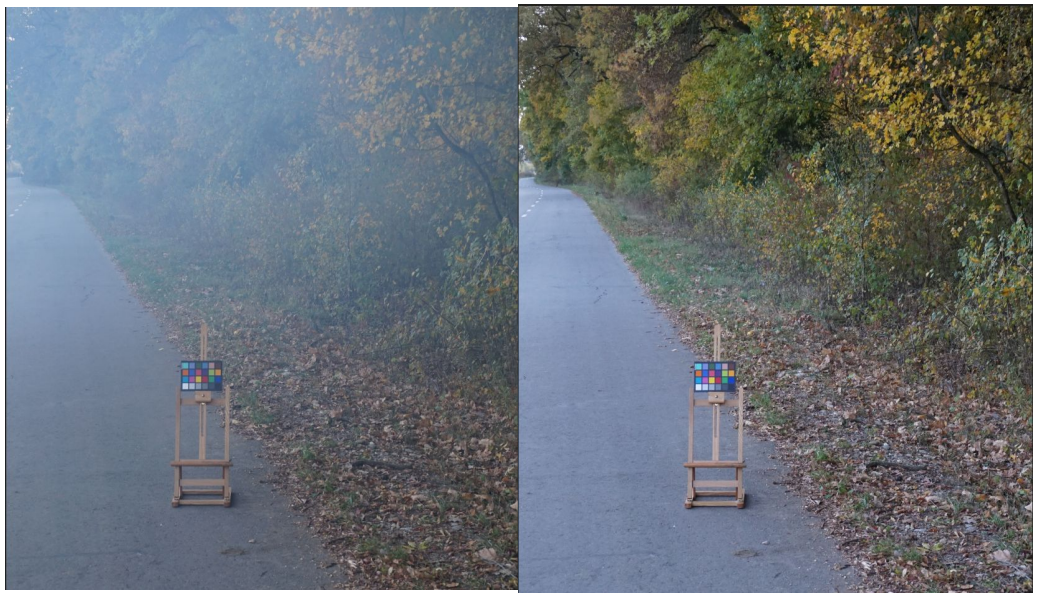
Competition Data - Indoor Images

- 35 hazy images are provided.
- 1-25 : training set | 26-30 : validation set | 31-35 : testing set



Competition Data - Outdoor Images

- 45 hazy images are provided.
- 1-35 : training set | 36-40 : validation set | 41-45 : testing set



Dehaze Dataset - Link

Dehaze Dataset/

-- Training_hazy/

I-- Indoor/

I-- Outdoor/

-- Training_GT/

I-- Indoor/

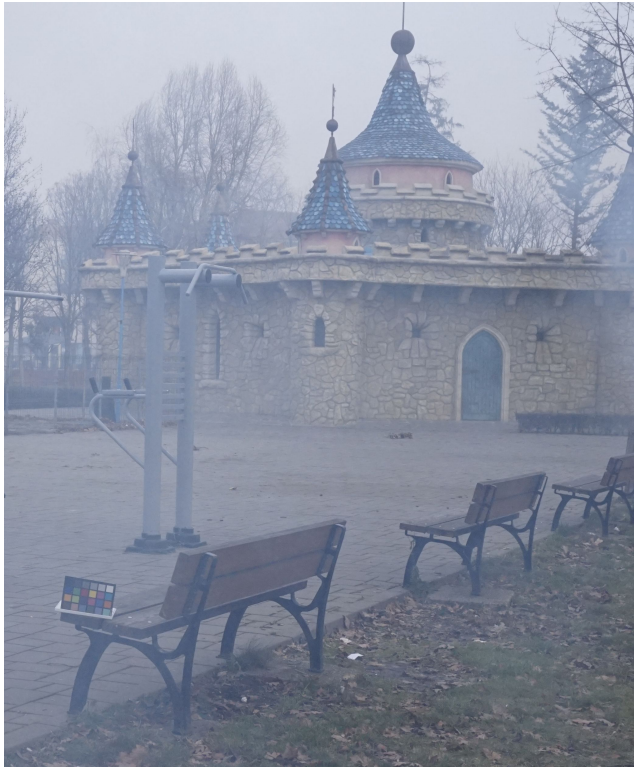
I-- Outdoor/

-- Testing_Images

I-- 1.jpg , 2.jpg , ... , 10.jpg

-- Sample_submission

I-- 1.jpg , 2.jpg , ... , 10.jpg



Evaluation

Peak Signal-to-NoisE ratio(PSNE) :

PSNR is most commonly used to measure the quality of reconstruction of lossy compression.

$$PSNR = 10 \cdot \log_{10}\left(\frac{MAX_I^2}{MSE}\right)$$

Structural SIMilarity (SSIM) :

SSIM is used for measuring the similarity between two images

$$\mathrm{SSIM}(\mathbf{x},\mathbf{y}) = [l(\mathbf{x},\mathbf{y})]^{\alpha}[c(\mathbf{x},\mathbf{y})]^{\beta}[s(\mathbf{x},\mathbf{y})]^{\gamma} \ ,$$

$$l(\mathbf{x},\mathbf{y}) = \frac{2\mu_x\mu_y + C_1}{\mu_x^2 + \mu_y^2 + C_1} \cdot c(\mathbf{x},\mathbf{y}) = \frac{2\sigma_x\sigma_y + C_2}{\sigma_x^2 + \sigma_y^2 + C_2} \cdot s(\mathbf{x},\mathbf{y}) = \frac{\sigma_{xy} + C_3}{\sigma_x\sigma_y + C_3} \ .$$

Baseline

Evaluation Method : PSNR x SSIM

Simple Baseline : 16.312726

Platform : JudgeBoi (TBA)

Hint - Previous LeaderBoard

Team	user	Track 1: Indoor		Track 2: Outdoor	
		PSNR	SSIM	PSNR	SSIM
Scarlet Knights[36]	rutgerssprinter	24.973_{1}	0.881	24.029_{3}	0.775
BJTU	Team T-brain	22.866_{3}	0.857	24.598_{1}	0.777
FKS	fks	22.909_{2}	0.864	23.877_{4}	0.775
KAIST-VICLAB[27]	hjsim	20.354_{7}	0.829	24.232_{2}	0.687
Ranjanisi[22]	ranjanisi	20.911_{5}	0.751	23.180_{6}	0.705
KAIST-VICLAB[17]	Team KAIST-VICLAB	22.421_{4}	0.852	22.705_{9}	0.707
Ranjanisi[22]	ecsuiplab	19.860_{8}	0.747	22.997_{8}	0.701
Dq-hisfriends	liujl09	17.622_{12}	0.817	23.207_{5}	0.770
CLFStudio	Team CLFStudio	20.549_{6}	0.803	20.230_{13}	0.722
Mt.Phoenix	MTLab			23.124_{7}	0.755

Hint - Paper/Github Link 1

Image Dehazing by Joint Estimation of Transmittance and Airlight using Bi-Directional Consistency Loss Minimized FCN

Paper

Github

Hint - Paper/Github Link 2

Progressive Feature Fusion Network for Realistic Image Dehazing (PFFNet)

Paper

Github

Hint - Paper/Github Link 3

Cycle-Dehaze: Enhanced CycleGAN for Single Image Dehazing

Paper

Github

Hint - Paper/Github Link 4

Multi-scale Single Image Dehazing using Perceptual Pyramid Deep Network

Paper

Github