

Image Dehazing

M.Arun Kumar,T.Anuraag,K.Hitesh,G.Akhil

- Introduction
- DCP and CAP
- System Model
- Simulation Results
- Conclusions

- Degraded image due to Atmosphere results in haze image.
- Haze removal helps in some fields like image processing, computer vision etc.,
- Use of traditional techniques for Removal of haze from a single image is challenging task
- Use of DCP and CAP helps in haze removal

Dark Channel Prior (DCP)

The dark channel prior is based on the statistics of haze-free outdoor image

Except sky region most of the local patches in the image have low intensity in atleast one color channel

In haze image intensity of these dark pixels change due to haze

These dark pixels provide estimate of the haze transmission.

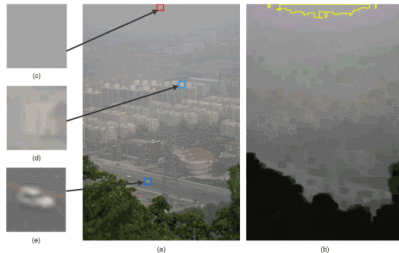


Figure: DCP and Atmospheric Light

Color Attenuation Prior (CAP)

Haze free patches have high saturation

Saturation decreases and brightness increases due to Haze

Brightness decreases because of direct attenuation

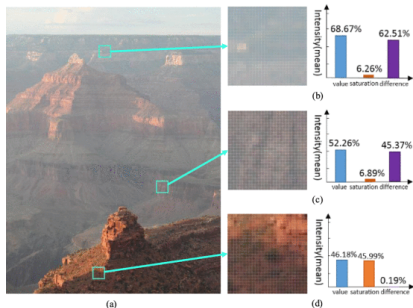





Figure: CAP and Atmospheric Light

Atmospheric Scattering Model

$$\mathbf{I}(x) = \mathbf{J}(x)t(x) + \mathbf{A}(1 - t(x)), \quad (1)$$

$$t(x) = e^{-\beta d(x)} \quad (2)$$

\mathbf{I} is the hazy image, \mathbf{J} is the scene radiance representing the haze-free image, \mathbf{A} is the atmospheric light, t is the medium transmission, β is the scattering coefficient of the atmosphere and d is the depth of scene

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-  Thomas L. Marzetta, "Noncooperative Cellular Wireless with Unlimited Numbers of Base Station Antennas.", *IEEE transactions on Wireless Communications* Vol. 9, no. 11, November 2010
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Thank you