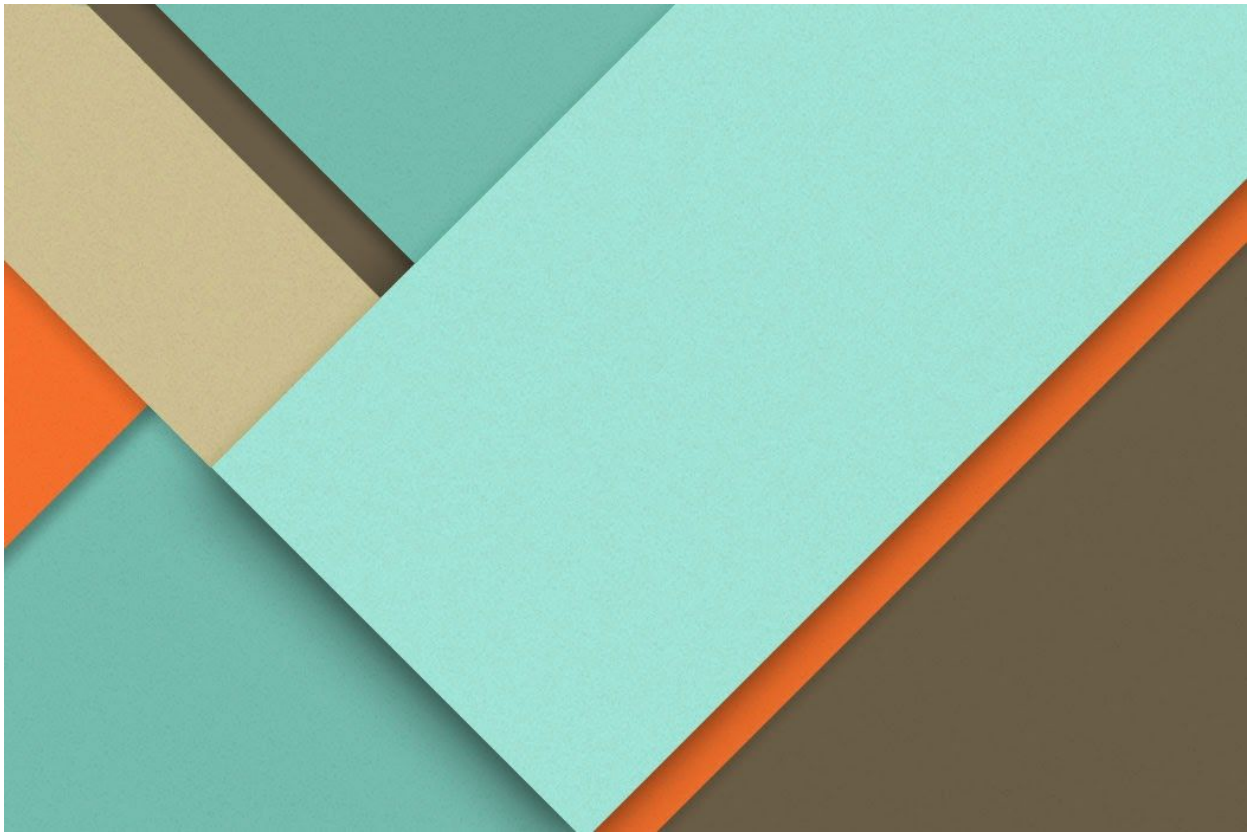

Optimized Image Dehazing

PROJECT PROPOSAL

Under the Guidance of Dr Kapil Ahuja

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Overview

In the field of image processing and computer vision, image degradation due to the natural factors manifests as a very challenging problem. There are many aspects that affect the quality of an image in terms of visual perception and interpretation. Some aspects caused due to natural factors include loss of contrast, poor rendering of colour and loss of depth information. When such an image is to be processed, it manifests into the reduced image understanding and difficulty in feature detection and identification of the object of interest. To overcome these disadvantages, many researchers have worked in areas related to the removal of atmospheric effects like haze, fog, smoke etc. It is a well-known phenomenon that every particle of significant size in the atmosphere scatters and absorbs light from the scene; thereby causing degradation in the scene visibility. This degradation in acquired images caused due to homogeneous atmospheric haze is modelled as:

$$I(x) = J(x)t(x) + A(1 - t(x))$$

The first term J(x)T(x) represents decayed scene radiation and hence is called as the direct attenuation term. Here, J(x) denotes haze-free image intensity value at pixel x and T(x) denotes the transmission map describing the amount of light that is not scattered. It is to be noted that the transmission map has a direct relation to the depth of the scene point from the camera. The second term A(1-T(x)) represents the scattered light from the atmospheric particles. It is called the air light attenuation term in which A describes the global atmospheric light and is independent of the position of the object point. To restore visibility of images from given hazy image I(x), one needs to infer global atmospheric light A and transmission map T(x) from the given image information.

Goals

1. To use different optimization techniques to get fast dehazed and clearer image.
2. To implement convex optimization and compare the algorithm with popular image dehazing algorithms.
3. To display the output at every iteration and compute its execution time.