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# An Improvement of Road Scene Enhancement Using Hybrid Technique

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**Abstract:** The perceivability of pictures of open air street scenes will by and large get to be corrupted when caught amid severe climate conditions. Drivers frequently turn on the headlights of their vehicles and streetlights are regularly actuated, bringing about restricted light sources in pictures catching street scenes in these conditions. Moreover, dust storms are additionally climate occasions that are regularly experienced when driving in a few locales. The issue embraced for the work is "A change in Road Scenes Captured by Intelligent Transportation Systems". A novel and viable murkiness evacuation way to deal with cure issues brought about by confined light sources and shading movements, which along these lines accomplishes unrivaled reclamation results for single murky pictures. The Road picture debasement can bring about issues for savvy transportation frameworks, for example, voyaging vehicle information recorders and activity reconnaissance frameworks, which must work under an extensive variety of climate conditions. Another issue is that the caught cloudy street picture contains confined light sources or shading movement issues because of dust storm conditions. Movement discovery is known not one of the best issue ranges. There is murkiness issue in the street scene pictures. The goal of this work is to execute the Road Scenes Captured by Intelligent Transportation Systems utilizing Hybrid method. To improve the pictures utilizing distinctive channels and upgrade methods. The distinctive sorts of parameters are computed that is PSNR, MD and Processing Speeds.

**Keywords:** PSNR, MD and Processing Speeds ,videos etc.

## 1. INTRODUCTION

Perceivability in street pictures can be debased because of common air wonders, for example, cloudiness, mist, and dust storms. This perceivability debasement is because of the retention and scrambling of light by climatic particles. Street picture corruption can bring about issues for savvy transportation frameworks, for example, voyaging vehicle information recorders and activity observation frameworks, which must work under an extensive variety of climate conditions [1]. The measure of retention and scrambling relies on upon the scene's profundity between an activity camera and a scene point; in this way, scene profundity data is vital for recuperating scene brilliance in pictures of foggy situations. Movement scene grouping is a rising point with extensive significance in the field of shrewd transportation frameworks. With the expanded accessibility of cameras in vehicles (either on cell phones on the other hand as implanted equipment in rich auto models), there are more conceivable outcomes for streamlining basic keen transportation assignments.

We are particularly keen on enhancing armada administration frameworks. Armada administration frameworks are utilized to track the status of armadas of vehicles having a place with different sorts of organizations (e.g. taxi, conveyance, freight transport and so on.). They utilize GPS sensors to track the vehicle's area, however have little data about the vehicle's surroundings. Some valuable data about the vehicle's environment can be derived by utilizing a camera to record pictures from the driver's point of view, and afterward taking care of an arrangement issue to distinguish intriguing sorts of activity scenes and situations. For instance, this methodology can be utilized to recognize congested roads, or to separate open street situations from urban/provincial streets or tunnels.[2]

Picture characterization as a rule is a typical subject in PC vision, broadly looked into in extraordinary number of papers. Dynamic exploration concentrates for the most part on perceiving pictures in an extensive number of assorted classes [1]. The execution of new picture arrangement strategies is typically assessed on one or a greater amount of numerous freely accessible benchmark datasets (e.g. Pascal VOC, Caltech 101, Label Me and so forth). This empowers a basic and important correlation of cutting edge strategies connected on different spaces. Be that as it may, the scene brilliance recouped by means of the dull channel-earlier based procedures is typically joined by the era of genuine curios when the caught foggy street picture contains confined light sources or shading movement issues because of dust storm conditions. This can be dangerous for some normal street situations. For instance, in severe climate conditions, the drivers by and large turn on headlights when they are driving with a specific end goal to enhance visual recognition, and streetlamps are lit for comparable reasons. The systems taking into account the dim channel former can't create attractive rebuilding results when given these

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circumstances. A novel haze removal approach by which to avoid the generation of serious artifacts by the conjunctive utilization of the proposed hybrid dark channel prior (HDCP) module, the proposed color analysis (CA) module, and the proposed visibility recovery (VR) module. The proposed technique can effectively conceal localized light sources and restrain the formation of color shifts when the captured road image contains localized light sources or color-shift problems.

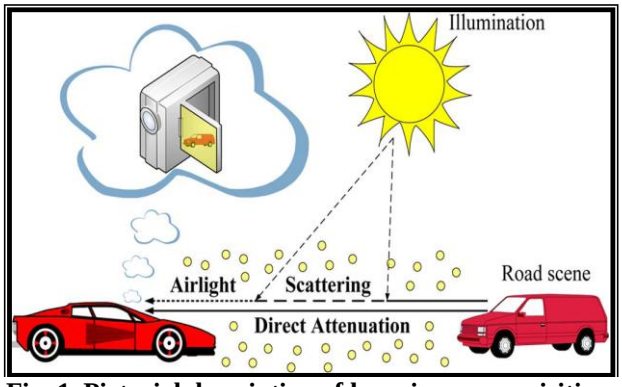


**Fig. 1. Pictorial description of hazy image acquisition via the optical model**

**Optical Model**

In computer vision and pattern analysis, the optical model is widely used to describe the digital camera information of a hazy image under realistic atmospheric conditions in the RGB color space as

$$I^c(x,y) = J^c(x,y)t(x,y) + A^c\,(1 - t(x,y)) \quad (1)$$

where c ∈ {r, g, b}, $I^c(x, y)$ represents the captured image, $J^c(x, y)$ represents the scene radiance that is the ideal haze free image, $A^c$ represents the atmospheric light, and t(x, y) represents the transmission map describing the portion of the light that arrives at a digital camera without scattering. The first term of (1), i.e., $J^c(x, y)t(x, y)$, represents the direct attenuation describing the decayed scene radiance in the medium. The second term of (1), i.e., $A^c(1 - t(x, y))$, represents the airlight that resulted from the scattered light and leading to the color shifting in the scene.

**HDCP Module**

The dark channel prior technique [3] can work well for haze removal in single images that lack localized light sources. However, haze removal by the dark channel prior technique [2] usually results in a seriously underexposed image when the captured scene features localized light sources. The proposed HDCP module can produce a restored image that is not underexposed by using a procedure based on the dark channel prior technique [3]. The dark channel prior technique in [1] can employ large patch size operation for the captured image in order to acquire the correct atmospheric light. However, the use of a large local patch will result in invariable transmission and thereby leads to the generation of halo effects in the recovered image. In contrast, when the dark channel prior technique [1] uses a small patch size, the recovered image will not exhibit halo effects. However, localized light will be misjudged as atmospheric light. Hence, we present the HDCP module that ensures correct atmospheric light estimation and the subsequent avoidance of halo effects during the haze removal of single images based on the hybrid dark channel prior technique.

This technique will be introduced in the following. To effectively estimate the density of the haze featured by an image, we combine the advantages of small and large patch sizes via different weights. In addition, we use the large patch size to acquire the correct atmospheric light during the implementation of the hybrid dark channel prior technique.

## 2. METHODOLOGY

The work is to improvement in Road Scenes Captured by Intelligent Transportation Systems. It is based upon GUI (graphical user interface) in MATLAB. It is an effort to further grasp the fundamentals of MATLAB and validate it as a powerful application tool. There are basically different files. Each of them consists of m-file and figure file. An effective approach for the haze removal of single images captured during different environmental conditions that not only avoids the generation of artifact effects but also recovers true color. Our approach involves three proposed modules, i.e., an HDCP module, a RGB module, and a VR module and enhancement techniques and filters.

The proposed HDCP module designs an effective transmission map to circumvent halo effects in the recovered image and estimates the location of the atmospheric light to avoid underexposure. In order to recover the true color of scenes featuring a wide range of weather conditions, we propose the RGB module. This RGB module determines the intensity statistics for the RGB color space of a captured image in order to acquire the color information.

The following steps are proposed for this work:

**Step 1:** Read the image that includes the road scenes.
**Step 2:** Apply the preprocessing technique to process the image.
**Step 3:** Apply the hybrid technique to enhance the road scenes.
**Step 4:** Apply the enhancement technique to enhance the image and road scenes.
**Step 5:** Remove the darkness of the images.
**Step 6:** repeat the step for multiple road scenes.
**Step7:** calculate the parameters.
**Step 8:** Stop.

## 3. RESULT

There are different snapshots that display the results of the research work.

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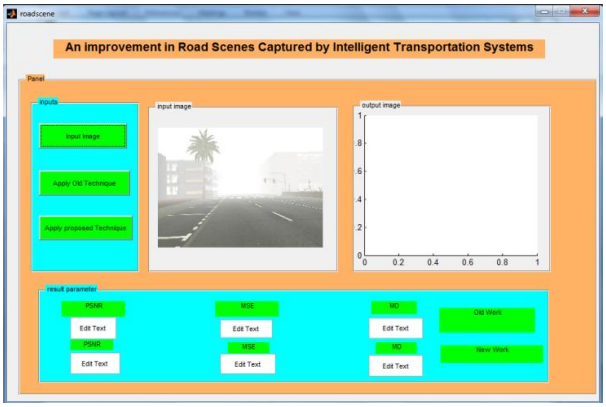


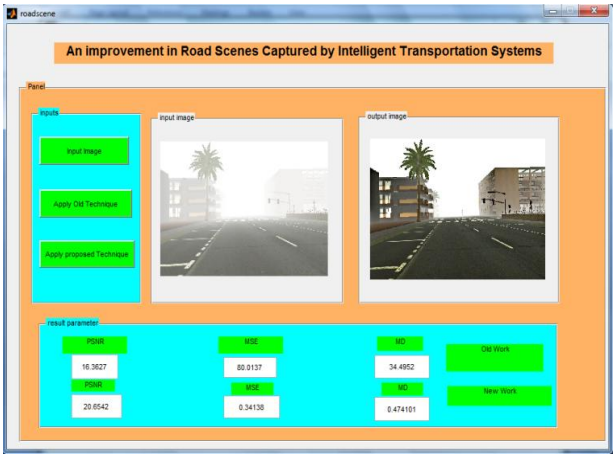



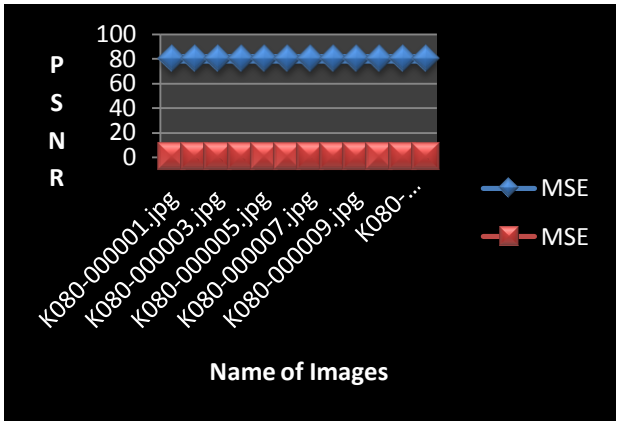


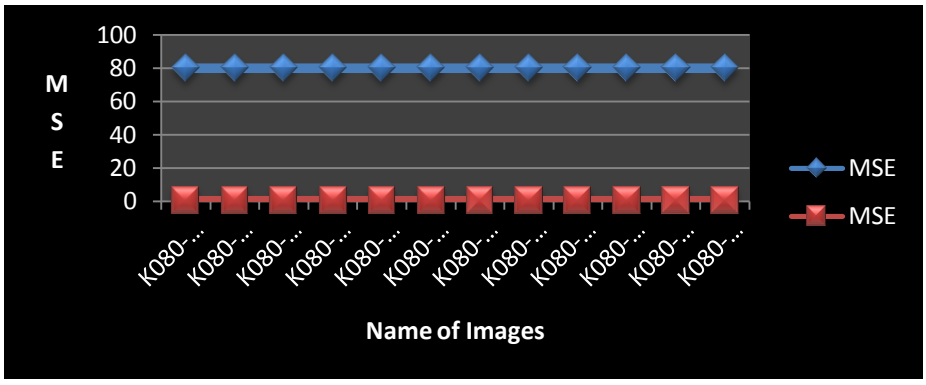


| | Old Work | | | Proposed Work | | |
|---|---|---|---|---|---|---|
| Name of Image | PSNR | MSE | MD | PSNR | MSE | MD |
| K080-000001.jpg | 14.47 | 80.0071 | 54.052 | 21.6534 | 0.3919 | 0.51854 |
| K080-000002.jpg | 11.4823 | 80.0137 | 54.0082 | 22.0008 | 0.4064 | 0.56131 |
| K080-000003.jpg | 13.6507 | 80.0082 | 54.0588 | 21.6019 | 0.38986 | 0.52437 |
| K080-000004.jpg | 14.0076 | 80.0073 | 54.0563 | 22.113 | 0.39644 | 0.54032 |
| K080-000005.jpg | 15.1526 | 80.0061 | 54.0399 | 21.884 | 0.41807 | 0.54386 |
| K080-000006.jpg | 13.6662 | 80.0085 | 54.0643 | 21.9136 | 0.42296 | 0.56526 |
| K080-000007.jpg | 12.8927 | 80.0097 | 54.038 | 22.6973 | 0.44524 | 0.59667 |
| K080-000008.jpg | 13.0823 | 80.0079 | 54.0527 | 21.9633 | 0.38573 | 0.48057 |
| K080-000009.jpg | 11.0367 | 80.0153 | 54.0881 | 21.0976 | 0.37124 | 0.5055 |
| K080-0000010.jpg | 12.351 | 80.0114 | 54.0722 | 21.1277 | 0.36704 | 0.48388 |
| K080-0000011.jpg | 11.716 | 80.0133 | 54.0842 | 22.127 | 0.46215 | 0.61173 |
| K080-0000012.jpg | 13.6323 | 80.0084 | 54.0662 | 21.4386 | 0.37098 | 0.50138 |


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## 4. CONCLUSION & FUTURE WORK

A novel and effective haze removal approach to remedy problems caused by localized light sources and color shifts, which thereby achieves superior restoration results for single hazy images. The Road image degradation can cause problems for intelligent transportation systems such as traveling vehicle data recorders and traffic surveillance systems, which must operate under a wide range of weather conditions. Another problem is that the captured hazy road image contains localized light sources or color-shift problems due to sandstorm conditions. A hybrid technique is implemented to remove the problems and get the better PSNR and MSE and MD from the old work as shown in the table. In the future work the road scene image enhancement we have used pixel point descriptor with dark channel and the color model, this work is further implemented with the help of SVM or KNN and with the help of neural network to enhance the lighter and darker images to get the better results.

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