Video Dehazing Approach Using Structure Features Prior

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Abstract- *In indoor environment, video is captured in ideal environment because artificial illumination is formed. On other hand in outdoor environment, it is important to remove weather effect. In surveillance outdoor vision systems are used. In dynamic weather conditions, since the droplets have larger size, the objects will get motion blurred. These noises will degrade the performance of various computer vision algorithms which use feature information such as object detection, tracking, segmentation and recognition. Even if a small part of the object is occluded, the object cannot be tracked well. Rain scene has property that an image pixel is never always covered by rain throughout the whole video. For the purpose of restoration, the dynamic bad weather model is investigated. Rain is the major component of the dynamic bad weather. Intensities produced by rain have strong spatial structure and it depends strongly on background brightness. When light passes through it get refracted and reflected which make them brighter than background. But when it falls at high velocity, it gets motion blurred. Thus the intensity of the rain streak depends on the brightness of the drop, background scene radiances and the integration time of the camera. Analysis of rain and snow particles is more difficult. Some scene motions can produce spatial and temporal frequencies similar to rain. In this project, we can implement Difference-Structure-Preservation Prior based on image processing techniques provide detection of rain, fog, snow and removal of unwanted particles. Rain, smoke and for produces sharp intensity changes in images and videos that can severely impair the performance of outdoor vision systems. And we have proposed a dark channel prior and contrast limited adaptive histogram equalization technique, it is based on adaptive histogram equalization. The dark channel prior technique is helpful to clear the hazy images. Removing haze effects on image is a challenging and meaningful task for image processing and computer vision applications.*

INTRODUCTION:

I. IMAGE PROCESSING

In imaging science, image processing is processing of images using mathematical operations by using any form of signal processing for which the input is an image, a series of images, or a video, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it. Images are also processed as three-dimensional signals with the third-dimension being time or the z-axis. Image processing usually refers to digital image processing, but optical and analog image processing also are possible. This article is about general techniques that apply to all of them. The acquisition of images (producing the input image in the first place) is referred to as imaging.

Closely related to image processing are computer graphics and computer vision. In computer graphics, images are manually made from physical models of objects, environments, and lighting, instead of being acquired (via imaging devices such as cameras) from natural scenes, as in most animated movies. Computer vision, on the other hand, is often considered high-level image body magnetic resonance scans). In moder

broader scopes due to the ever growing importance of scientific visualization (of often large-scale complex scientific/experimental data). Examples include microarray data in genetic research, or real- time multi-asset portfolio trading in finance. Image analysis is the extraction of meaningful information from images; mainly from digital images by means of digital image processing techniques. Image analysis tasks can be as simple as reading bar coded tags or as sophisticated as identifying a person from their face.

Computers are indispensable for the analysis of large amounts of data, for tasks that require complex computation, or for the extraction of quantitative information. On the other hand, the human visual cortex is an excellent image analysis apparatus, especially for extracting higher-level information, and for many applications — including medicine, security, and remote sensing — human analysts still cannot be replaced by computers. For this reason, many important image analysis tools such as edge detectors and neural networks are inspired by human visual perception models.

Image editing encompasses the processes of altering images, whether they are digital photographs, traditional photochemical photographs, or illustrations. Traditional analog image editing is known as photo retouching, using tools such as an airbrush to modify photographs, or editing illustrations with any traditional art medium. Graphic software programs, which can be broadly grouped into vector graphics editors, raster graphics editors, and 3D modelers, are the primary tools with which a user may manipulate, enhance, and transform images. Many image editing

processing out of which a machine/computer/software (e.g., videos or 3D full-

programs are also used to render or create computer art from scratch. Raster images are stored in a computer in the form of a grid of picture elements, or pixels. These pixels contain the image's color and brightness information. Image editors can change the pixels to enhance the image in many ways. The pixels can be changed as a group, or individually, by the sophisticated algorithms within the image editors. This article mostly refers to bitmap graphics editors, which are often used to alter photographs and other raster graphics. However, vector graphics software, such as Adobe Illustrator, CorelDRAW, Xara Designer Pro, PixelStyle Photo Editor, Inkscape or Vectr, are used to create and modify vector images, which are stored as descriptions of lines, Bézier curves, and text instead of pixels. It is easier to rasterize a vector image than to vectorize a raster image; how to go about vectorizing a raster image is the focus of much research in the field of computer vision. Vector images can be modified more easily, because they contain descriptions of the shapes for easy rearrangement. They are also scalable, being rasterizable at any resolution.

Many graphics applications are capable of merging one or more individual images into a single file. The orientation and placement of each image can be controlled. When selecting a raster image that is not rectangular, it requires separating the edges from the background, also known as silhouetting. This is the digital analog of cutting out the image from a physical picture. Clipping paths may be used to add silhouetted images to vector graphics or page layout files that retain vector data. Alpha compositing, allows for soft translucent edges when selecting images. There are a number of ways to silhouette an image with soft edges, including selecting the image or its background by sampling similar colors, selecting the edges by raster tracing, or converting a clipping path to a raster selection. Once the image is selected, it may be copied and pasted into another section of the same file, or into a separate file. The selection may also be saved in what is known as an alpha channel. A popular way to create a composite image is to use transparent layers. The background

image is used as the bottom layer, and the image with parts to be added are placed in a layer above that. Using an image layer mask, all but the parts to be merged are hidden from the layer, giving the impression that these parts have been added to the background layer. Performing a merge in this manner preserves all of the pixel data on both layers to more easily enable future changes in the new merged image. an alpha channel. A popular way to create a composite image is to use transparent layers. The background image is used as the bottom layer, and the image with parts to be added are placed in a layer above that. Using an image layer mask, all but the parts to be merged are hidden from the layer, giving the impression that these parts have been added to the background layer. Performing a merge in this manner preserves all of the pixel data on both layers to more easily enable future changes in the new merged image.

II. Steps of Image Processing: Image Acquisition:

This is the first step or process of the fundamental steps of digital image processing. Image acquisition could be as simple as being given an image that is already in digital form. Generally, the image acquisition stage involves preprocessing, such as scaling etc.

III. Image Enhancement:

Image enhancement is among the simplest and most appealing areas of digital image processing. Basically, the idea behind enhancement techniques is to bring out detail that is obscured, or simply to highlight certain features of interest in an image. Such as, changing brightness & contrast etc.

IV. Image Restoration:

Image restoration is an area that also deals with improving the appearance of an image. However, unlike enhancement, which is subjective, image restoration is objective, in the sense that restoration techniques tend to be based on mathematical or probabilistic models of image degradation.

V. ColorImage Processing:

Color image processing is an area that has been gaining its importance because of the significant increase in the use of digital images over the Internet. This may include color modeling and processing in a digital domain etc.

VI. Wavelets and Multi-resolution Processing:

Wavelets are the foundation for representing images in various degrees of resolution. Images subdivision successively into smaller regions for data compression and for pyramidal representation.

VII. Compression:

Compression deals with techniques for reducing the storage required to save an image or the bandwidth to transmit it. Particularly in the uses of internet it is very much necessary to compress data.

VIII. Morphological Processing:

Morphological processing deals with tools for extracting image components that are useful in the representation and description of shape.

Segmentation:

Segmentation procedures partition an image into its constituent parts or objects. In general, autonomous segmentation is one of the most difficult tasks in digital image processing. A rugged segmentation procedure brings the process a long way toward successful solution of imaging problems that require objects to be identified individually. Segmentation is a classifier which helps to fragment each character from a word present in a given image or page. The objective of the segmentation is to extract each character from the text present in the image. After performing Segmentation, the characters of the string will be separated and it will be used for further processing. Different character segmentation techniques has been proposed until like, Dissection Techniques, Recognition Based Hidden Markov Models and Non-Markov Approaches, Holistic Strategies. By dissection is meant the decomposition of the image into a sequence of sub images using general features. The structure consists of a set of states plus transition probabilities between states. A method stemming from concepts used in machine vision for recognition of occluded objects. A holistic process recognizes an entire word as a unit.

IX. Representation and Description:

Representation and description almost always follow the output of a segmentation stage, which usually is raw pixel data, constituting either the boundary of a region or all the points in the region itself. Choosing a representation is only part of the solution for transforming raw data into a form suitable for subsequent computer processing. Description deals with extracting attributes that result in some quantitative information of interest or are basic for differentiating one class of objects from another.

Object recognition: Recognition is the process that assigns a label, such as, “vehicle” to an object based on its descriptors.

Knowledge Base: Knowledge may be as simple as detailing regions of an image where the information of interest is known to be located, thus limiting the search that has to be conducted in seeking that information. The knowledge base also can be quite complex, such as an interrelated list of all major possible defects in a materials inspection problem or an image database containing high-resolution satellite images of a region in connection with change-detection applications.

Feature Extraction:

In pattern recognition and in image processing, feature extraction is a special form of dimensional reduction. Transforming the input data into the set of features is called feature extraction. If the features extracted are carefully chosen it is expected that the features set will extract the relevant information from the input data in order to perform the desired task using this reduced representation instead of the full size input.

LITERATURE REVIEW

Single Image Dehazing With Optimal Transmission Map, Yi-Shuan Lai

The dehazing performance then highly depends on the accuracy of the given depth map. In order to remove haze with less user intervention, recent approaches conduct different assumptions on either scene radiance or depth. The surface shading and the transmission are assumed to be locally uncorrelated. A fast dehazing algorithm is proposed by inferring the airlight as a percentage of the difference between the local mean and the local standard deviation of the whiteness. The authors assumed that clear images should have higher contrast and thus tried to maximize the number of edges in the dehazed image. This method greatly enhances the visibility of hazy image but unfortunately may result in color distortion. A dark channel prior is proposed for haze-free images. This assumption, however, may fail on white and gray objects. The authors assumed the scene radiance and the depth are two independent latent layers, and iteratively approximate these two unknowns.

However, the derived depth map is usually a rough estimate. Moreover, the methods cannot guarantee a global optimal solution and need to use graph-cut algorithm to find a local minimization. In addition, most of the above methods could only approximate a rough depth or transmission map, and thus limit the accuracy of the dehazing result. In this paper, we propose to first derive an optimal transmission map under a locally constant assumption. To improve the estimation for white/black areas in a scene, we further include a transmission heuristic and formulate the image dehazing as solving the optimal transmission map under the transmission heuristic constraint. Our experiments and comparison shows that the proposed method effectively restore hazy image with excellent quality. Two-stage image denoising by principal component analysis with local pixel grouping, Lei Zhang

In the proposed LPG-PCA, we model a pixel and its nearest neighbors as a vector variable. The training samples of this variable are selected by grouping the pixels with similar local spatial structures to the underlying one in the local window. With such an LPG procedure, the local statistics of the variables can be accurately computed so that the image edge structures can be well preserved after shrinkage in the PCA domain for noise removal. The two stages have the same procedures except for the parameter of noise level. Since the noise is significantly reduced in the first stage, the LPG accuracy will be much improved in the second stage so that the final denoising result is visually much better. Compared withWT that uses a fixed basis function to decompose the image, the proposed LPG- PCA method is a spatially adaptive image representation so that it can better characterize the image local structures. Compared with NLM and the BM3D methods, the proposed LPG-PCA method can use a relatively small local window to group the similar pixels for PCA training, yet it yields competitive results with state-of-the-art BM3D algorithm. First, the dimensionality of the color variable vector is three times that of the gray level image, and this will increase significantly the computational cost in the PCA denoising process. Second, the high dimensionality of the color variable vector requires much more training samples to be found in the LPG processing. Nonetheless, we may not be able to find enough training samples in the local neighborhood so that the covariance matrix of the color variable vector may not be accurately estimated, and hence the denoising performance can be reduced. With the above consideration, in this paper we choose the first approach for LPG-PCA based color image denoising due to its simplicity and robustness.

Improved Visibility of Road Scene Images under Heterogeneous Fog, Jean-Philippe Tarel

A cause of vehicle accidents is reduced visibility due to bad weather conditions such as fog. This suggests that an algorithm able to improve visibility and contrast in foggy images will be useful for various camera-based Advanced Driver Assistance Systems (ADAS). One may think of an alarm when the distance to the previous vehicle which is observed within the image is too short with respect to the driver's speed. Another possibility is to combine visibility enhancement with pedestrian and two-wheeled vehicles recognition algorithms to deliver adequate alarms. For this kind of ADAS based on the use of a single camera in the vehicle, the contrast enhancement algorithm must be able to process each image in a sequence robustly in real time. The key problem is that, from a single foggy image, contrast enhancement is an ill-posed problem. Indeed, due to the physics of fog, visibility restoration requires to estimate both the scene luminance without fog and the scene depth-map. This implies estimating two unknown parameters per pixel from a single image. In this paper, we interpret thealgorithm as the inference of the local atmospheric veilsubject to two constraints. From this interpretation, we proposean extended algorithm which better handles road images bytaking into account that a

large part of the image can beassumed to be a planar road. The advantages of the proposedlocal algorithm are its speed, the possibility to handle bothcolor images or gray-level images, and its small number ofparameters. A comparative study and quantitative evaluationwith other state-of-the-art algorithms is proposed on syntheticimages with several types of generated fog. This evaluationdemonstrates that the new algorithm produces similar qualityresults with homogeneous fog and that it is able to better dealwith the presence of heterogeneous fog. The important property of a road image is that a large part of the image corresponds to the road which can be reasonably assumed to be planar.

Vision Enhancement in Homogeneous and Heterogeneous Fog, Jean-Philippe Tarel

The important property of a road image is that a large part of the image corresponds to the road way which can reasonably be assumed to be planar.

Visibility enhancement dedicated to planar surface was first proposed, but this algorithm is not able to correctly enhance visibility of objects out of the road plane. Recently, a visibility enhancement algorithm dedicated to road images was proposed which was also able to enhance contrast for objects out of the road plane. This algorithm makes good use of the planar road assumption but relies on an homogeneous fog assumption. In this work, we formulate the restoration problem as the inference of the atmospheric veil from to three constraints. The first constraint relies on photometrical properties of the foggy scene. The second constraint, named the no-black-pixel constraint, was not used. It involves filtering the image. The algorithm described corresponds to the particular case where two constraints are used with the median filter. To take into account that a large part of the image is a planar road, as introduced first, a third constraint based on the planar road assumption is added. The new algorithm can thus be seen as the extension of the local visibility enhancement algorithm combined with the roadspecific enhancement algorithm. The proposed algorithm is suitable for FVES since it is able to process gray-level as well as color images and runs close to real time. To compare the proposed algorithm to previously presented algorithms, we propose an evaluation scheme and we build up a set of synthetic and camera images with and without homogeneous and heterogeneous fog. The algorithms are applied on foggy images and results are compared with the images without fog. For FVES in which the image after visibility enhancement is displayed to the driver, we also propose an accident scenario and a model of the probability of fatal injury as a function of the setting of the visibility enhancement algorithm.

A Fast Single Image Haze Removal Algorithm Using Color Attenuation Prior, Qingsong Zhu

Outdoor images taken in bad weather (e.g., foggy or hazy) usually lose contrast and fidelity, resulting from the fact that light is absorbed and scattered by the turbid medium such as particles and water droplets in the atmosphere during the process of propagation. Moreover, most automatic systems, which strongly depend on the definition of the input images, fail to work normally caused by the degraded images. Therefore, improving the technique of image haze removal will benefit many image understanding and computer vision applications such as aerial imagery, image classification, image/video retrieval, remote sensing and video analysis and recognition. In this paper, we propose a novel color attenuation prior for single image dehazing. This simple and powerful prior can help to create a linear model for the scene depth of the hazy image. By learning the parameters of the linear model with a supervised learning method, the bridge between the hazy image and its corresponding depth map is built effectively. With the recovered depth information, we can easily remove the haze from a

single hazy image. To detect or remove the haze from a single image is a challenging task in computer vision, because little information about the scene structure is available. In spite of this the human brain can quickly identify the hazy area from the natural scenery without any additional information. This inspired us to conduct a large number of experiments on various hazy images to find the statistics and seek a new prior for single image dehazing. Interestingly, we find that the brightness and the saturation of pixels in a hazy image vary sharply along with the change of the haze concentration. Thus, caused by the airlight, the brightness is increased while the saturation is decreased. Since the airlight plays a more important role in most cases, hazy regions in the image are characterized by high brightness and low saturation. What's more, the denser the haze is, the stronger the influence of the airlight would be. This allows us to utilize the difference between the brightness and the saturation to estimate the concentration of the haze.

PROBLEM STATEMENT

A Video, captured in bad weather, often yields low contrast due to the presence of haze in the atmosphere like fog, rain falls.

They reduce the visibility of the scenes and lower the reliability of outdoor surveillance system

SYSTEM ANALYSIS

EXISTING SYSTEM:

Images play an important role in the real world, images are used for describing the changes in the environment and also use of traffic analysis. Images are captured in open environment due to the bad weather or atmosphere images are not a clear. Images acquired in the bad weather, such as the fog and haze, are extremely degraded by scatting of the atmosphere and decrease the contrast and create the object features challenging to recognize. The bad weather not only lead to variant of the visual outcome of the image, but also to the difficulty of the post processing of the image, as well as the inconvenience of entirely types of the tools which rely on the optical imaging, such as satellite remote sensing method, aerial photo method, outdoor monitoring method and object identification method. Image captured in outdoor scene are highly despoiled due to poor lighting situation or due to turbid medium in poor weather, such as haze, water droplets, dust particles or due to submergence in water. Haze removal techniques are widely used in many applications such as outdoor surveillance, object detection, consumer electronics, etc. Images of outdoor scenes are usually degraded by atmospheric haze, a phenomenon due to the particles in the air that absorb and scatter light. Haze often occurs when dust and smoke particles accumulate in relatively dry air. Here we propose a dark channel prior method to remove haze from a single input hazy image and contrast limited adaptive histogram equalization technique; it is based on adaptive histogram equalization. The dark channel prior is a kind of statistics of the haze-free outdoor images. The haze is dependent on the unknown depth information.

DISADVANTAGES:

Only remove haze in images Fog removal can be analyzed

Provide rough estimate of the scene depth Can lead to severe reconstruction artifacts.

PROPOSED SYSTEM:

In our proposed method it is able to remove rain without blurring the background. This works in any rain conditions such as light rain, heavy rain, rain in reflection, rain with wind etc. The method does not assume the size, shape and orientation of rain. This requires only 15 or less consecutive frames for detection and removal process.

Properties of Rain

Spatio-temporal Property Rain randomly distribute in space and fall at high speeds when they reach at the ground. Due to high speed any pixel may not always covered by rain in two successive frames. The pixels which are covered by rain have similar intensity distribution.

Chromatic Property A stationary drop is like spherical lens, so when light passes through the drop it gets some internal reflections and thus the drop becomes brighter than background. The increase in chrominance v the brightness of the drop, background scene radiances and the integration time of the camera.

Photometric model assumed that raindrops have almost the same size and velocity. It is also assumed that pixels that lie on the same rain streak have same irradiance because the brightness of the drop is weakly affected by the background.

In a rain video taken from a static camera, raindrops are randomly distributed in the space. Due to the random distribution of raindrops, a pixel at a particular position is not always covered by the raindrops in every frame. It is a common practice to analyze the rain pixels. To analyze the nature of rain, time evolution of pixel variations is exploited. There can be positive fluctuation in intensity variations. The intensity values of a pixel at a particular position present in the rain region for consecutive frames is quite different from that of the pixel present in moving object region. For the rain pixel, intensity values below and above mean are more rhythmic than those for the moving object pixel. Intensity variations produced by the raindrops are somewhat symmetric about the mean of the intensities of consecutive frames at particular pixel position. A zero value indicates that the values are relatively evenly distributed on both sides of the mean. But in real time applications, it is not possible to get skewness value zero for the data items. When the background is static, we can see that there will not be any change in the intensity value for particular positions at some consecutive frames, but when rain is present the difference in the change of intensity values between consecutive frames will be small. The rain pixels will have low value of skewness than non-rain moving object pixels. For finding the discrimination between rain and non-rain pixels, this difference in the intensity waveform is considered.

Advantages:

Video dehazing can be implemented in real time scenario

Heterogeneous scenes are processed and improve the accuracy at dehazing

Restore the actual scene in videos

Feasibility Study

Depending on the results of the initial investigation the survey is now expanded to a more detailed feasibility study. “FEASIBILITY STUDY” is a test of system proposal according to its workability, impact of the organization, ability to meet needs and effective use of the resources. It focuses on these major questions:

What are the user’s demonstrable needs and how does a candidate system meet them? What resources are available for given candidate system?

What are the likely impacts of the candidate system on the organization?

Whether it is worth to solve the problem?

During feasibility analysis for this project, events and alerts are to be considered. Investigation and generating ideas about a new system does this.

Technical feasibility

A study of resource availability that may affect the ability to achieve an acceptable system. This evaluation determines whether the technology needed for the proposed system is available or not.

Can the work for the project be done with current equipment existing software technology & available personal?

Can the system be upgraded if developed?

If new technology is needed then what can be developed?

Economical feasibility

Economic justification is generally the “Bottom Line” consideration for most systems. Economic justification includes a broad range of concerns that includes cost benefit analysis. In this we weight the cost and the benefits associated with the candidate system and if it suits the basic purpose of the organization i.e. profit making, the project is making to the analysis and design phase. The financial and the economic questions during the preliminary investigation are verified to estimate the following:

The cost to conduct a full system investigation.

The cost of hardware and software for the class of application being considered.

The benefits in the form of reduced cost.

The proposed system will give the minute information, as a result the performance is improved which in turn may be expected to provide increased profits.

This feasibility checks whether the system can be developed with events and alert monitoring does not require the manual work. This can be done economically if planned judicially, so it is economically feasible. The cost of project depends upon the number of man hours required.

Operational Feasibility

It is mainly related to human organizations and political aspects. The points to be considered are:

What changes will be brought with the system?

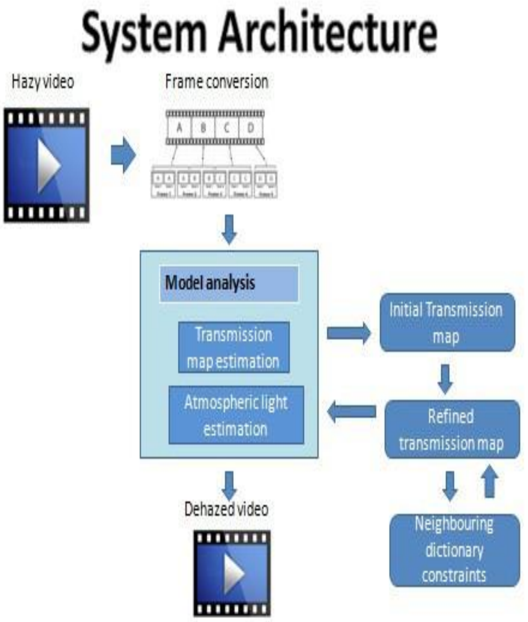
What organization structures are disturbed?

What new skills will be required? Do the existing staff members have these skills? If not, can they be trained in due course of time?

The system is operationally feasible as it very easy for the End users to operate it. It only needs basic information about Windows platform.

Schedule feasibility:

Time evaluation is the most important consideration in the development of project. The time schedule required for the developed of this project is very important since more development time effect machine time, cost and cause delay in the development of other systems. A reliable video haze removal system can be developed in the considerable amount of time.



SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

Processor	: Dualcore processor 2.6.0 GHZ
RAM	: 1GB
Hard disk	: 160 GB
Compact Disk	: 650 Mb
Keyboard	: Standard keyboard

Monitor : 15 inch color monitor

SOFTWARE REQUIREMENTS

Operating system : Windows OS (XP, 2007, 2008)

Front End : .NET (C#)

IDE : Visual Studio

Back End : SQL SERVER

ABOUT THE SOFTWARE:

.NET framework:

The .NET Framework (pronounced dot net) is a software framework developed by Microsoft that runs primarily on Microsoft Windows. It includes a large library and provides language interoperability (each language can use code written in other languages) across several programming languages. Programs written for the .NET Framework execute in a software environment (as contrasted to hardware environment), known as the Common Language Runtime (CLR), an application virtual machine that provides services such as security, memory management, and exception handling. The class library and the CLR together constitute the .NET Framework.

The .NET Framework's Base Class Library provides user interface, data access, database connectivity, cryptography, web application development, numeric algorithms, and network communications. Programmers produce software by combining their own source code with the .NET Framework and other libraries. The .NET Framework is intended to be used by most new applications created for the Windows platform

Design Features Interoperability

Because computer systems commonly require interaction between newer and older applications, the

.NET Framework provides means to access functionality implemented in newer and older programs that execute outside the .NET environment. Access to COM components is provided in the System.Runtime.Interop Services and System. Enterprise Services namespaces of the framework; access to other functionality is achieved using the P/Invoke feature.

Common Language Runtime engine

The CommonLanguage Runtime (CLR) serves as the execution engine of the .NET Framework. All .NET programs execute under the supervision of the CLR, guaranteeing certain properties and behaviors in the areas of memory management, security, and exception handling.

Language independence

The .NET Framework introduces a Common Type System, or CTS. The CTS specification defines all possible datatypes and programming constructs supported by the CLR and how they may or may not interact with each other conforming to the Common Language Infrastructure (CLI) specification. Because of this feature, the .NET Framework supports the exchange of types and object instances between libraries and applications written using any conforming .NETlanguage.

Base Class Library

The Base Class Library (BCL), part of the Framework Class Library (FCL), is a library of functionality available to all languages using the .NET Framework. The BCL provides classes that encapsulate a number of common functions, including file reading and writing, graphic rendering, database interaction, XML document manipulation, and so on. It consists of classes, interfaces of reusable types that integrate with CLR (Common Language Runtime).

Simplified deployment

The .NET Framework includes design features and tools which help manage the installation of computer software to ensure it does not interfere with previously installed software, and it conforms to security requirements.

Security

The design addresses some of the vulnerabilities, such as bufferoverflows, which have been exploited by malicious software. Additionally, .NET provides a common security model for all applications. Portability

While Microsoft has never implemented the full framework on any system except Microsoft Windows, it has engineered the framework to be platform-agnostic,[3] and cross-platform implementations are available for other operating systems (see Silverlight and the Alternative implementations section below). Microsoft submitted the specifications for the Common Language Infrastructure (which includes the core class libraries, Common Type System, and the Common Intermediate Language), the C# language, and the C++/CLI language[8] to both ECMA and the ISO, making them available as official standards. This makes it possible for third parties to create compatible implementations of the framework and its languages on other platforms.

Common Language Infrastructure (CLI)

The purpose of the Common Language Infrastructure (CLI) is to provide a language-neutral platform for application development and execution, including functions for Exception handling, Garbage Collection, security, and Runtime, or CLR.

The CIL code is housed in CLI assemblies. As mandated by the specification, assemblies are stored in the Portable Executable (PE) format, common on managed heap, a pool of memory managed by the CLR. As long as there exists a reference to an object, which might be either a direct reference to an object or via a graph of objects, the object is considered to be in use. When there is no reference to an object, and it cannot be reached or used, it becomes garbage, eligible for collection. NET Framework includes a garbage collector which runs periodically, on a separate thread from the application's thread, that enumerates all the unusable objects and reclaims the memory allocated to them.

The .NET GarbageCollector (GC) is a non-deterministic, compacting, mark-and-sweep garbage collector. The GC runs only when a certain amount of memory has been used or there is enough pressure for memory on the system. Since it is not guaranteed when the conditions to reclaim memory are reached, the GC runs are non-deterministic. Each .NET application has a set of roots, which are pointers to objects on the managed heap (managed objects). These include references to static objects and objects defined as local variables or method parameters currently in scope, as well as objects referred to by CPU registers.[10] When the GC runs, it pauses the application, and for each object referred to in the root, it recursively enumerates all the objects reachable from the root objects and marks them

CONCLUSION

This paper proposed a dehazing algorithm on the difference structure preservation prior ,which can estimate the optimal transmission map and restore the actual scene in uploaded videos. The allocated contiguously) using reflection. All objects not marked as reachable are garbage. This is the mark phase. Since the memory held by garbage is not of any consequence, it is considered free space. However, this leaves chunks of free space between objects which were initially contiguous. The objects are then compacted together to make used memory contiguous again. Any reference to an object

as reachable. It uses CLI metadata and reflection to discover the objects encapsulated by an object, and then recursively walk them. It then enumerates all the objects on the heap (which were initially allocated contiguously) using reflection. All objects not marked the object is updated by the GC to reflect the new location. The application is resumed after the garbage collection is over.The GC used by .NET Framework is actually generational. Objects are assigned a generation; newly created objects belong to Generation 0. The objects that survive a garbage collection are tagged as Generation 1, and the Generation 1 objects that survive another collection are Generation 2 objects. The .NET Framework uses up to Generation 2 objects.

invalidated by moving the object is updated by the GC to reflect the new location. The application is resumed after the garbage collection is over.The GC used by .NET Framework is actually generational. Objects are assigned a generation; newly created objects belong to Generation 0. The objects that survive a garbage collection are tagged as Generation 1, and the Generation 1 objects that survive another collection are Generation 2 objects. The .NET Framework uses up to Generation 2 objects. dehazing algorithm are based on atmospheric scattering model. The experimental results shows that both our transmission map and dehazed results are superior to other works.

REFERENC
ES

[1] B. Xie, F. Guo, and Z. Cai, ―Improved single image dehazing using dark channel prior and multi- scale Retinex,‖ in Proc. Int. Conf. Intell. Syst. Des. Eng. Appl, 2010, pp. 848–851.

[2] H. Xu, J. Guo, Q. Liu, and L. Ye, ―Fast image dehazing using improved dark channel prior,‖ in Proc. IEEE Int. Conf. Inf. Sci. Technol, Mar. 2012, pp. 663–667.

[3] G. Meng, Y. Wang, J. Duan, S. Xiang, and C. Pan, ―Efficient image dehazing with boundary constraint and contextual regularization,‖ in ICCV, 2013.

[4] Y. S Lai, Y. L. Chen, and C. T. Hsu, ―Single Image Dehazing With Optimal Transmission Map‖, in Proc. Int Conf on Pattern Recognition, Tsukuba,