VIDEOS WITH SCENES RECOVERY USING RAIN PIXEL ALGORITHM

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ABSTRACT

Rain removal is a extremely useful and very important technique in many applications such as surveillance and movie editing. Recently, several rain removal algorithms have been proposed, where photometric, chromatic, and probabilistic properties of the rain pixels have been utilized to discover and remove the rainy effect. The existing methods generally work well with relatively static and light rain scenes, but in the existing methods the number of steps and the time required for the development of system are more and accuracy gives poor results as compared to proposed system. Proposed algorithm has better approach in rain removal process compared with existing System in above three parameters. Extensive simulation results show that the proposed algorithm shows a much better performance for rainy scenes than the existing algorithms. Rain produces exact intensity variation in images and videos, which degrade the performance of outdoor vision systems. These intensity variations rely on various factors, such as the camera parameters, the properties of rain, and the brightness of the scene. Removal of rain streaks is one of the challenging problem in video, due to the random spatial distribution and fast motion of rain. Rain removal has found various applications in the field of security surveillance, video/movie editing, video indexing/retrieval and vision based navigation. This paper provides various techniques or methods that are used to remove the rainy effect.

Keywords - Motion segmentation, motion occlusion, motion buffering, adaptive filters, rain removal, noise suppression.

I. INTRODUCTION

Rain removal is a very time consuming task. Due to the dynamic objects or the camera motion object, fluctuations are occur in some of the videos. Caused by this fluctuations the pixel intensity gets changed through its original values and also due to rain there is fluctuations in the pixels to remove this rain. First the analysis was done by Garg and Nayar[2] in account to photometric [2][3] and the physical properties. They detect the intensity and temporary constraints by their observations but they could work for the uniform velocities and directions of the rain drop were limited. Zang[4] proposed further methods in which the chromatic properties where took into considerations. The objects which are in motion the R,G,B intensity will be changes for those object. This algorithm worked only for static scenes and also for only certain colour backgrounds. Tripathi[5] proposed probabilistic spatial-temporal model where they detect fluctuations and the intensity range. This model was suitable for both static and the dynamic background but it gives the poor result. The short coming of the existing methods is the prediction of original value of rainy pixel's and also the rain detection. Because of that the areas having motion is affected and important information are erased a ghost effect is observed. The proposed algorithm is based on frame generation API and we have to use PIQR algorithm for reducing the quality of pixel. Results of experiment show that our algorithm outperforms existing ones.

II. LITERATURE SURVEY

Rain removal is very useful and important technique in applications such as security surveillance, video or movie editing, vision based navigation system, and video indexing/retrieval. Wide ranges of algorithms using various types of techniques are used by various authors.

2.1.Photometric And Dynamic Model

Kshitiz Garg and Shree K. Nayar [2] in 2007 presented first complete analysis of the visible effects of rain on an imaging system and the various factors that affects it. To handle the photometric rendering of rain in computer graphics and rain in computer vision they develop systematic algorithm. They first develop photometric model that describes the intensities produced by individual rain streaks and then they develop a dynamic model that captures the spatiotemporal properties of rain. Together, these models describe the complete visual appearance of rain. By using these models they develop a new algorithm for rain detection and removal. By modeling the scattering and chromatic effects of rain, Narasimhan and Nayar[2] successfully recovered "clear day" scenes from images taken by them in bad weather. But, their assumptions such as the uniform velocities and directions of rain drops limited its performance.

2.2.Temporal and Chromatic Properties

By using both temporal and chromatic properties of rain drops Xiaopeng Zhang, Hao Li [4] presented a K-mean clustering algorithm for rain detection and removal. The temporal property of rain states that an image pixel is never always covered by rain throughout the entire video. The chromatic property of rain states that the changes of R (red), G(green), and B(blue) values of rain affected pixels are approximately the same. This algorithm can detect and remove rain streaks in both stationary and dynamic scenes, using both temporal and chromatic properties of rain which are taken by stationary cameras. But it gives wrong result for those scenes of video which are taken by moving cameras. To handle these situations the video can be stabilized for rain removal and destabilized to restore camera motion effects after rain removal. It can handle both light rain and heavy rain conditions. This method can be applied to static background only, and it gives out false result for particular foreground colures.

2.3. Probabilistic Model

K. Tripathi and S. Mukhopadhyay [5]proposed a efficient, simple, and probabilistic model based rain removal algorithm. This algorithm is well to the rain intensity variations. Probabilistic approach automatically adjust threshold and effectively differentiate the rain pixels and non-rain moving object pixels. Differentiation is done between the rain pixel and non-rain moving objects by using the time evolution of pixels in consecutive frames. This algorithm does not assume shape, size and velocity of the raindrops and intensity of rain, which makes it robust to different rain conditions. Here, it is assumed that the video capturing camera is static. There is a significant difference in time evolution between the rain pixel and non-rain pixels in videos. This difference is analyzed with the help of the skewness and the Pitman test for symmetry. Quantitative results show that proposed algorithm gives the less number of miss and false detection in comparison with the other algorithms. This algorithm helps to reduce the complexity and execution time because it works only on the intensity plane.

2.4. Motion Segmentation

This algorithm is based on motion segmentation of dynamic scenes. The pixel intensity variation of a rainy scene is caused by rain and object motion. The variation of pixel intensity caused by rain need to be removed, and the ones caused by object motion need to keep it as it is. Therefore motion field segmentation naturally becomes a fundamental procedure of these algorithms. Proper threshold value is set for detecting the intensity variation caused by rain. For rain detection after applying photometric and chromatic constraints, rain removal filters are applied on pixels such that their dynamic property as well as motion occlusion clue are considered; both temporal and spatial information are then adaptively use during rain pixel recovery. These algorithms give better performance over others for rain removal in highly dynamic scenes with heavier rainfall.

2.4.1. Spatiotemporal Properties

Tripathi and S. Mukhopadhyay[6] used spatiotemporal properties for detection and removal of rain from video. The spatiotemporal properties are elaborate to separate rain pixels from non-rain pixels. For reducing the buffer size and delay, it is thus possible to involve less number of consecutive frames. It works only on the intensity plane which executes time significantly and further reduces the complexity. This algorithm does not assume the shape, size and velocity of raindrops which makes it realistic to different rain conditions. This method reduces the buffer size, which reduces the system cost, delay and power consumption. This method gives out wrong result for dynamic scenes.

2.4.2.Bilateral Filter

A single image- based rain removal framework based on morphological component analysis via properly formulating rain removal as an image decomposition problem. The proposed method first decomposes an image into the low and high-frequency parts using a bilateral filter, instead of directly applying a conventional image decomposition technique. The HF (High Frequency) part is then decomposed into a "rain component" and a "nonrain component" by performing sparse coding and dictionary learning based on morphological component analysis. This is first method which remove rain streak while conserving geometrical details in a single frame, where no temporal or motion information among successive images is required. Here decomposing rain steaks from an image is fully automatic and self-contained, where no extra training samples is required.

III. EXISTING SYSTEM

Existing System Takes rainy video as an input and using frame generation API we generate the sequential frames of given video, frames are saved in a directory and given as an input to rain detection algorithm, this algorithm processes one frame at a time and operates on the frame pixels, Each pixel is a RGB value will be compared with rain RGB constant, if match found then it is replaced with nearby untrained pixel value. After this all reformatted pixels written as a new frame and all rainy frames will go through the same process and saved in another directory, now this new directory will be input to assemble video process. This process creates new video with less rainy effect.

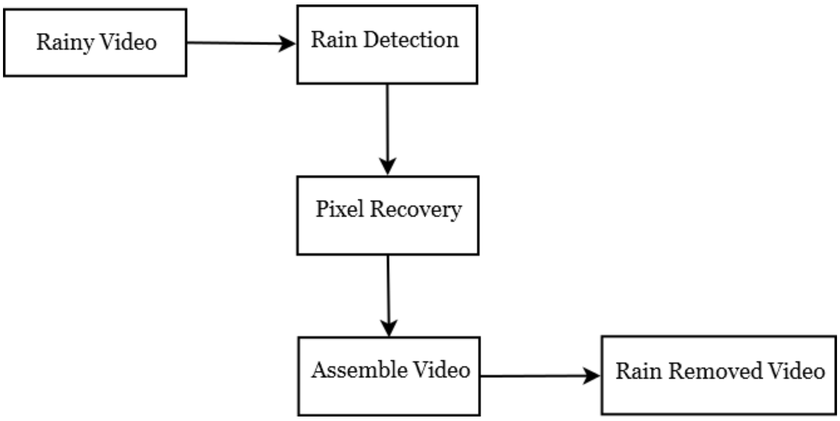

Fig.3.1 Block Diagram of existing system

3.1 Algorithm

Step 1 : Input Video V

Step 2 : GF -> V -> {f1,f2,……..fn}

Step 3 : Write to file

    Rpc-> Rain Pixel Constant

    Px[]->

    if Px[i]==Rpc

        modify Px[i]

    else

        Px[i]

    replace Px[i] neighbouring pixel color

    Store Px[i] -> PS

Step 4 : PS -> Write to File

        New frame {Fn1,Fn2,……,Fnn}

Step 5 : Read Fn1,Fn2,……,Fnn

Step 6 : Assemble Video

Step 7 : Validate

Step 8 : Play Video

Step 9 : End

IV. PROPOSED SYSTEM

Proposed System Takes rainy video as an input and using frame generation API we generate the sequential frames of given video, frames are saved in a directory and given as an input to PiQR Algorithm, this algorithm processes one frame at a time and operates on the frame pixels, Each pixel is a RGB value will be XORed with constant known as intensity reducer, this operation changes the value of pixel and its transparency levels will be increased, then after we compresses the pixel to minimize rain effect. After this all reformatted pixels written as a new frame and all rainy frames will go through the same process and saved in another directory, now this new directory will be input to assemble video process, This process creates new video with more less rainy effect.

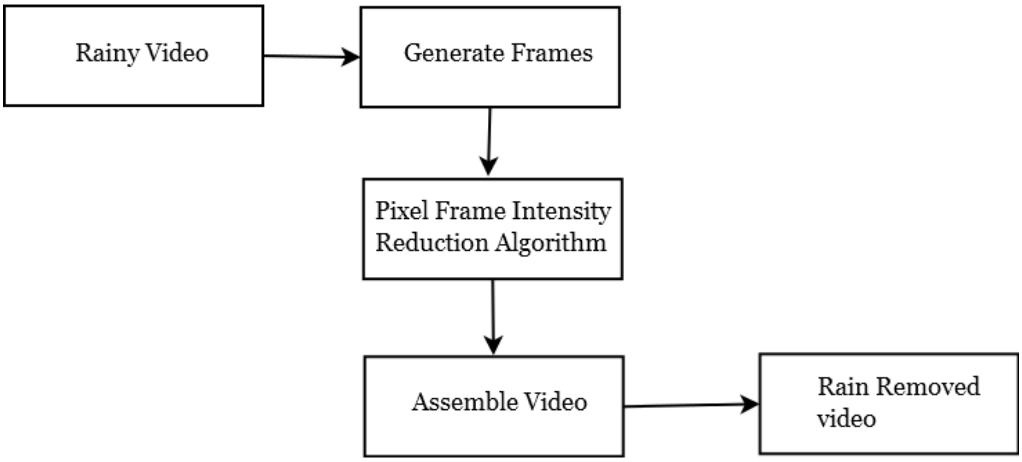

Fig. 4.1 Block Diagram of rain pixel recovery algorithm

4.1 Algorithm

Step 1 : Input Video V

Step 2 : GF -> V -> {f1,f2,……..fn}

Step 3 : for fx = (f1 to fn)

Fx -> Pixelrate

Px[] ->

Px [i] XOR Rpx(v)

Store Px[i] -> PS

End for

Step 4 : PS -> Write to File

New frame {Fn1,Fn2,……,Fnn}

Step 5 : Read Fn1,Fn2,……,Fnn

Step 6 : Assemble Video

Step 7 : Validate

Step 8 : Play Video

Step 9 : End

V. IMPLEMENTED MODULE

5.1 Video Selection Module

Fig.5.1.1 Video Selection

Here we have to select the video file that is "Heavy Mansoon Rain in Wayanadu, Kerala, India !mp4" as input. Then it gives the file selection message and generate the frames of that video in the next step.

5.2 Rain Reduction Module

Fig.5.2.1 Rain Reduction

Once the frames are generated, in the Rain reduction each pixel's RGB value will be XORed with constant known as intensity reducer. This operation changes the value of pixel and its transparency levels will be increased, then after we compresses the pixel to minimize rain effect.

5.3 Generation of new video Module

Fig.5.3.1 Generation of new video Module

After this all reformatted pixels written as a new frame and all rainy frames will go through the same process and saved in another directory. Then this new directory will be input to assemble video process, and this process creates new video with more less rainy effect

5.4 Result analysis

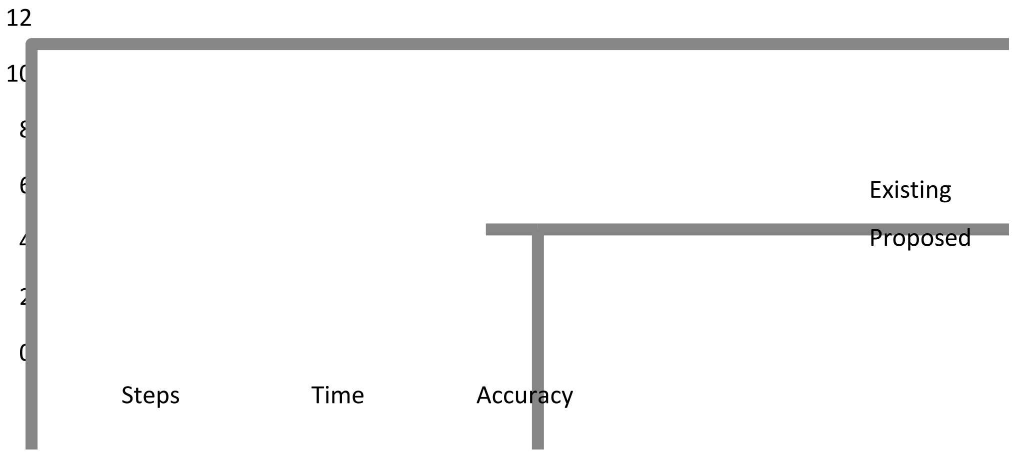

Fig.5.4.1 Result Analysis

VI. CONCLUSION

Here we are concluded that proposed approach reduces no of steps and Reduces time required to create new video. By using this proposed approach also improve the accuracy in some videos. Proposed algorithm has more better approach in rain removal process compared with existing System in above three parameters.

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