Extraction of Data Image in the Presence of Dense Fog using Back-Scattered Veil Detection Technique

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Abstract: **This paper proposes the technique of fog detection under the given scenario of back-veil scattering technique. This paper presents the overall scenario of detecting and analyzing the given input video is acquired and processed for fast processing and the expected results are discussed in this paper. The system is efficient in understanding and analyzing the visibility intensity and obstacle detection.**

Key words: **Fog, Back-veil scattering technique, Visibility, Intensity, Obstacle, Detection.**

I. INTRODUCTION

The known fact about fog is that it has apparent mass containing the small water drops which are suspended in the earth's atmosphere. It is been seen like a cloud which is very near to earth surface and impacted deeply by conditions like adjacent bodies of water, topography andwind**.** The fog that contains moisture which is topically and frequently produced by very close water bodieslike an ocean or river or byslightly wet areas. Fog decreases visibility lower than 1 kilometer and in the case of haze, it is the cause for lower weakness of visibility.

Multiple-vehicle collision is particularly deadly as the mass of crumpled vehicles makes escapes for survivors difficult. Even if survivors are able to exit their vehicles, other cars may strike them. Individually vehicles in a multiple-vehicle collision are often hit multiple times at high speed, increasing the risk of injury to passengers who may have survived the first impact with the benefits of now discharged protective airbags. Crash after the initial collision may occur on the sides of the vehicle, where the passenger's compartment is more vulnerable.

The destruction and intense heat may damage the roadways, particularly by melting and burning the asphalt or spelling concrete surfaces. The structural steel of bridges and overpasses can also be weakened by the heat. A fiery pileup inside a tunnel is the most serious, as there is little means to escape the poisonous fumes, and the confined heat may damage structural supports. The large scale of these accidents can close major highway routes for several days,or even longer if highway support structures are damaged.

They are widely used in the petroleum and petrochemical industries, mostly to achieve very rapid gas leak detection for flammable gases concentrations comparable to the lower flammable limit. They are also used but to a lesser extent so far, in other industries where flammable concentration can occur, such as in coal mining and water treatment. In principle the technique can also be used to detect toxic gases, for instance hydrogen sulfide, to the necessary parts per million concentrations, but the technical difficulties involved so far have prevented widespread adoption for toxic gases.

II. SYSTEM DESIGN

The phase of system design involves detailed architectural and data flow diagrams for a detailed analysis of proposed and formulated system. The purpose of this chapter is to provide a clear cut idea on how the proposed system is designed and achieved. It consists of detailed sequence diagram and layered data flow diagrams.

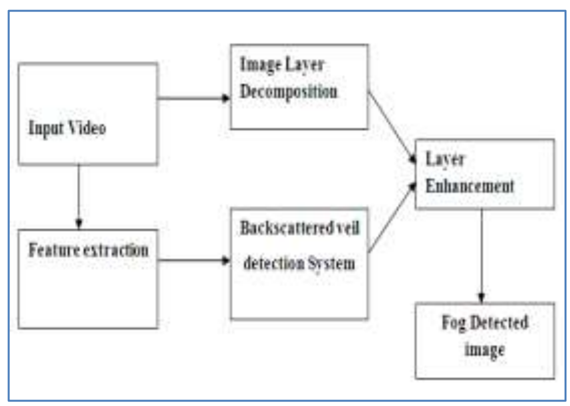

Fig 1: Proposed System Block Diagram

The proposed system architecture is shown in Fig 1.It consists of input video module with feature extraction and image layer decomposition module. Each is independently analyzed and fetched for processing under layer enhancement and finally we have a processing unit for detection of fog in the given image.

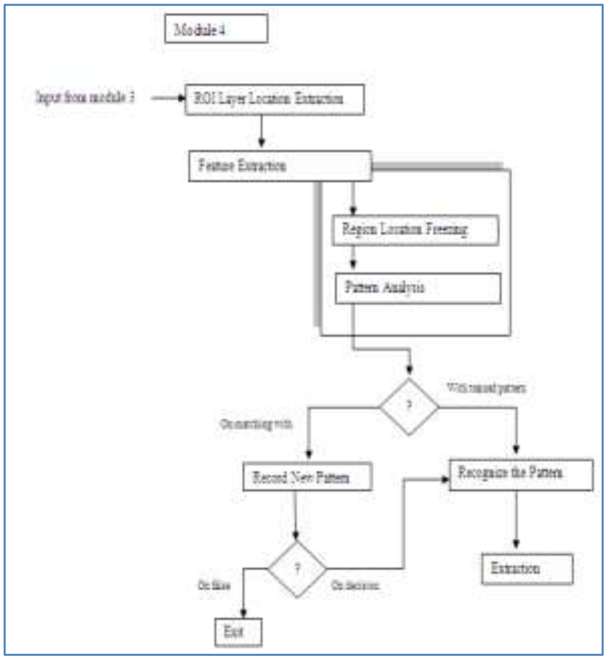

Fig 2: Module Feature Extraction

As ROI is obtained, the features are extracted in early state under a raw domain of analysis.By freezing the r location, scatter pattern of fog is analyzed under pattern analysis unit. On matching with previous image frame, the system is relocated to recognize the previous pattern and process towards decision making. Else the system encounters new patterns and provides a bold value analysis of new patterns.

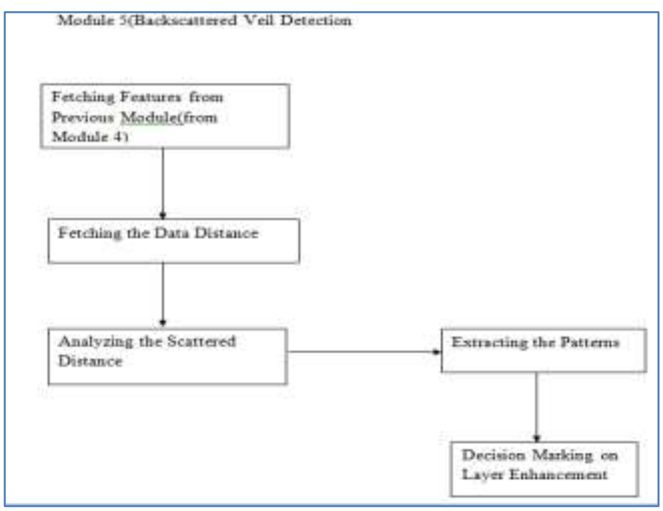

Fig 3: Decision Making Unit

System back scattered distance analysis technique is used to recognize the presence of fog in the proposed system. The technique is used to analyze images at a haloid view and thus compute the overall system efficiency ratio of performing a decision onpresence of fog or absence.

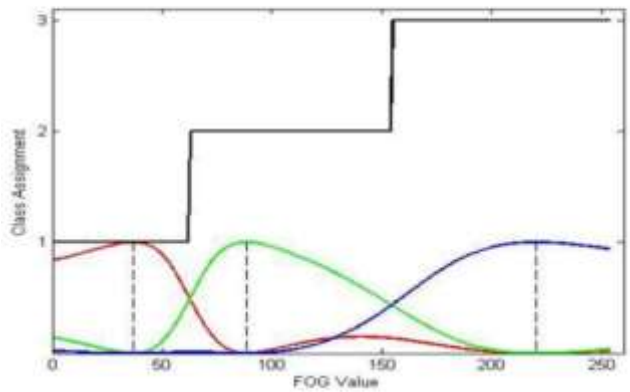

Fig 4: Fog Intensity Values

The proposed system is detecting the fog intensity and by increasing the overall system behavior and thus the system is seen with detection ration under visibility and obstacle detection.

III. IMPLEMENTATION

Implementation of proposed system is constantly monitored and performed right from system design to development. In this chapter, we have discussed various modules and mathematical modeling techniques for practical implementation.

This proposed system consist of following modules

1. Data acquisition and Preprocessing module
2. Framing
3. Segmentation and Analysis
4. ROI extraction
5. Decision Making

3.1 Data acquisition and Preprocessing module

In this phase the source code is developed under MATLAB 2014R version for acquiring video frames and buffering it according to the given time interval. Each frame in the video is analyzed and is broken into multiple and uniform segments of images. In this regards the following pseudo code is shown below.

```
% To get information about video file
file=aviinfo('sample_video.avi');
frm_cnt=file.NumFrames
FileExtension='.jpg'
%Progress bar starts
h = waitbar(0,'Please wait…');
```

3.2 Framing

The primary concept of framing is to achieve a independent pattern of images from a single range of data set for higher and efficient process of analysis and decision making. The chunk of segment is projected and described below. The major objective of this phase is to achieve system efficiency and reduce the video processing time and minimize the delay in recognizing the fog.

```
%Begin Loop process till End of Frames
for i=1:frm_cnt
% Read the Frame of the Video file
frm(i)=aviread('test.avi',i);
% Convert Frame to image file
frm_name=frame2im(frm(i));
%Create Filename to store
Filename=strcat(strcat(num2str(i)),FileExtension);
% Write image file  to the current folder
imwrite(frm_name,Filename);
waitbar(i/frm_cnt,h)
end
```

3.3Segmentation and Analysis

Segmentation of a input frame is analyzed and the overall system behavior is defined by recognizing a known pattern of data set from previous intervals. Each pattern is segmented and threshold according to the preliminary requirements as shown in pseudo code below,

```
% Create a label image using LUT obtained from a clustering operation of
% grayscale data.
% Intensity range
% Create label image
% Intensity range for k-th class
% Map the intensities in the range [I(i1),I(i2)] to class k
% Unpack Data membership functions to produce membership maps.
% Reshape membership maps to match image dimensions.
```

3.4 ROI Extraction

ROI extraction is retrieved and analyzed. The patterns are defamed and masked for decision making under back scattered technique and thus a systematic analysis is done as shown in pseudo code below.

```
% Default input arguments
% Basic error checking
% Check image format
% Intensity range
% Compute intensity histogram
% Initialize cluster centroids
% Update memberships and cluster centroids
% Distance to the centroids
% Compute fuzzy memberships
% Update the centroids
% De-fuzzify and create a label image
```

3.5 Decision Making

On fetching a detailed view of system design, the system is ready to perform a decision making on final fog detection and its intensity vibrant calculation.

```
I=double(min(im(:)):max(im(:)));
c={'-r''-g''-b'};
for i=1:3
   plot(I(:),U(:,i),c{i},'LineWidth',2)
if i==1, hold on; end
plot(C(i)*ones(1,2),[0 1],'--k')
end
xlabel('FOG Intensity ','FontSize',10)
ylabel('Connected Components','FontSize',10)
set(gca,'XLim',[0 260],'FontSize',5)
```

IV. METHODOLOGIES

- In this we are adding an innovative characterization steps to expand the night-time fog detection algorithm.
- In this to evaluate the method, authentic sequence of videos and particular sensors for reference are used.
- This technique is unique because the method here tried, is the first method for classification of fog solidity at night-timedriving conditions by camera which is an onboard camera.
- The purpose for using a night-time visibility index depends upon the brightness level (BL) of small object which specifies the class of fog solidity that is necessary to classify by the system.

V. OBJECTIVES

- The light from the fog is scattered and thus it becomes a problem to analyses the overall environment.
- In this project we use back-scattering veil technique for analyzing the incoming frames of the video.

VI. ADVANTAGES

- It allows innovative smart speed modification strategies. These strategies are considered for reducing the visibility space.
- The proposed system meets the recommended requirements to achieve the accuracy which is shown by the experimental results.

VII. DRAWBACKS

- Generally, by averaging sequential frames the SNR is increased.
- All current data is not considered by the system.
- With the original image many comparison marks are obtained by using some reference images

VIII. RESULTS

The proposed system is designed and programmed for automobile application in detection of fog and thus retrieve a decision onperformance and its overall behavior. In this system, data preprocessing andunique ID framingis achieved to gain higher range of data mobility and thus generalized frames are obtained. The system is also featured with ROI detection and pattern extraction under normal and hypostatical state of video frames.

The main key presented here is the three modules of fog solidity which are proportional to handler. The work is mainly concerned with two parameters that is protection of drivers and safety systems that should be provided in automobiles in the upcoming technology. For achievement of the goal, the proposed approach is used to identify the existence of night-time fog for evaluating the result of atmospheric visibility space.

IX. CONCLUSION

The proposed system is designed and developed for automobile application in detection of fog and retrieve a decision on performance and its overall behavior. In this system, data preprocessing and unique ID framing is achieved to gain higher range of data mobility and thus generalized frames are obtained. The system is also featured with ROI detection and pattern extraction under normal and hypostatical state of video frames.

The main indexconsists the three classes of fog density directly related to user needs, two of which are concerned with the safety of drivers and should be required in the safety systems that will equip vehicles in the future. To this aim, we propose a methodology to detect the presence of night fog and to estimate the resulting meteorological visibility distance.

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