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Alert System for Vehicles to Avoid Collision during Murky Conditions

Gowthaam K[1] , Jayanth V[1] , Keerthi Vasan P[1], R. Ganesamoorthy[2]

B.E Student, Dept. of ECE, Panimalar Engineering College, Chennai, India[1]

Assistant Professor, Dept. of ECE, Panimalar Engineering College, Chennai, India[2]

ABSTRACT: Images taken in poor weather conditions have high amount of **fog** in it. It degrades the visibility and clarity of the image. In this project, we propose the technique to enhance the image and to detect the fog and other objects present in it. The enhancement technique used here is **Dark Channel Prior**, **Bilateral and Guided Filter**. The enhanced image is segmented and the objects are detected using **Saliency Map**. Following which statistical feature is used to classify the detected objects (i.e)**humans, vehicles and Animals.** Finally our method for finding the distance of the object in real-world units from the **camera mounted** vehicle is also proposed. As per the measure of distance, our proposed method can alert the drivers for prevent the accident. An overall accuracy of almost **90.5%** is achieved regarding enhancement and detection using our proposed method.

I. INTRODUCTION

Nowadays public areas are monitored by several cameras in order to increase public order and safety. For most applications, trained and experienced human operators can do this monitoring very well. However, watching multiple camera images at the same time is not only too expensive but also practically impossible. Moreover, surveillance video data is currently used only “after the fact” as a forensic tool, thus losing its primary benefit as an active, real-time medium. The goal of visual surveillance is not only to put cameras in the place of human eyes, but also to accomplish the entire surveillance task as automatically as possible. Thus intelligent visual surveillance (IVS) becomes an active research topic in computer vision.

Detection of foreground objects of interest from a surveillance video sequence is a key step for an intelligent visual surveillance system. In the literature there are various algorithms proposed for object detection. All of these approaches assume that the input images have clear visibility, thus they can achieve satisfying results under clear weather conditions. Unfortunately, this is not always true, such as when videos are taken under bad weather conditions, such as on a foggy day. The image suffers degradation and severe contrast loss. These low quality images are a nuisance for conventional object detection algorithms.

Similarly, Murk is a thick cloud of tiny water droplets suspended in the atmosphere which obscures visibility. Diverse weather situations such as murk, smoke, rain or snow will cause multifaceted visual effects of spatial or temporal domains in images or video. Such artifacts may appreciably humiliate the performances of outdoor vision systems relying on image/video feature extraction or visual attention modelling such as event detection, object detection, tracking and recognition, scene analysis and classification, image indexing and retrieval. They generally fail to correctly detect objects due to low scene visibility. In order to get clear surveillance frames, enhancing visibility is an inevitable task. In recent years, as an active research topic in computer vision, considerable work has been done on haze removal techniques.

II. EXISTING SYSTEM

- In existing, they proposed murk/haze removal by using CLAHE and object detection using Curvelet Transform.
- Initially the RGB image is converted to gray scale image.
- The gray scale image is then filtered using median filter.
- The filtered image is enhanced using CLAHE.
- Finally the enhanced image is segmented by Curvelet Transform.

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III. PROPOSED SYSTEM

The proposed model follows dark channel prior, bilateral and guided filter for enhancement and saliency map for object detection. It consists of five steps.

- Step 1: Collecting the test images from public database.
- Step 2: Image decomposition is proposed in fog image. In image decomposition, image is decomposed into low frequency part and high frequency part (details layers) based on bilateral filter.
- Step 3: After that, dark channel prior based fog removal implement in original fog image; details layers (HF part) enhanced using guided filter for restore the dehazed image with initial fog removed image.
- Step 4: The enhanced image is segmented and the object are detected based on saliency map. And also detected object or obstacles are classified based on the statistical feature i.e. Human, Vehicle and Animal.
- Step 5: To avoid the accident distance was calculated between the detected object and camera mounted vehicle. Finally based on the distance, some alert system provided to drivers.

IV. WORKING PRINCIPLES

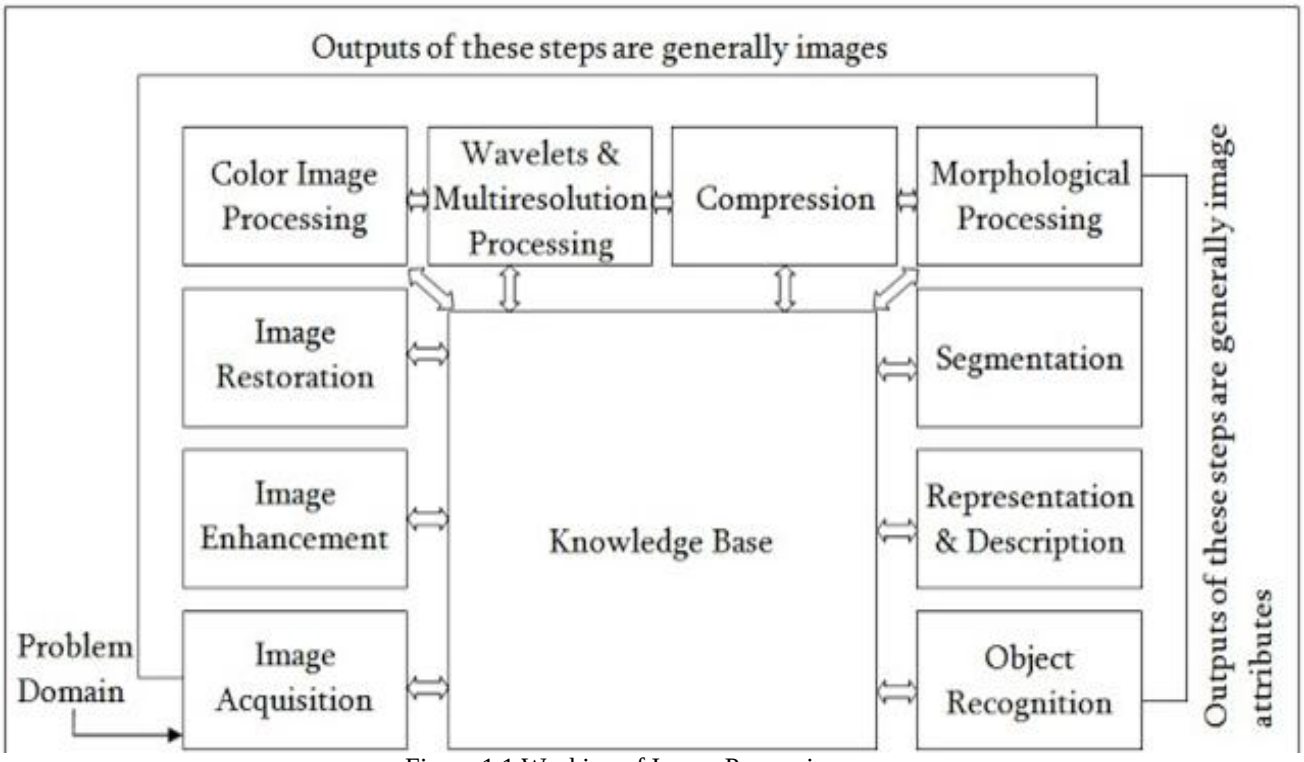

Figure 1.1 Working of Image Processing

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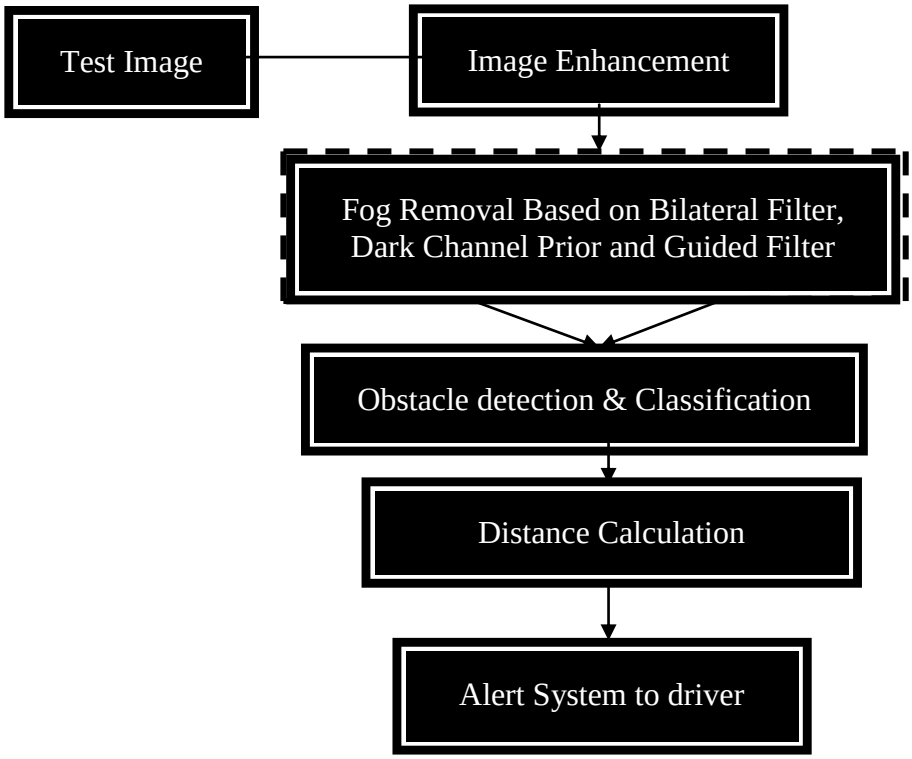
V. BLOCK DIAGRAM OF PROPOSED SYSTEM



VI. OUTPUT OF PROJECT PHOTOS

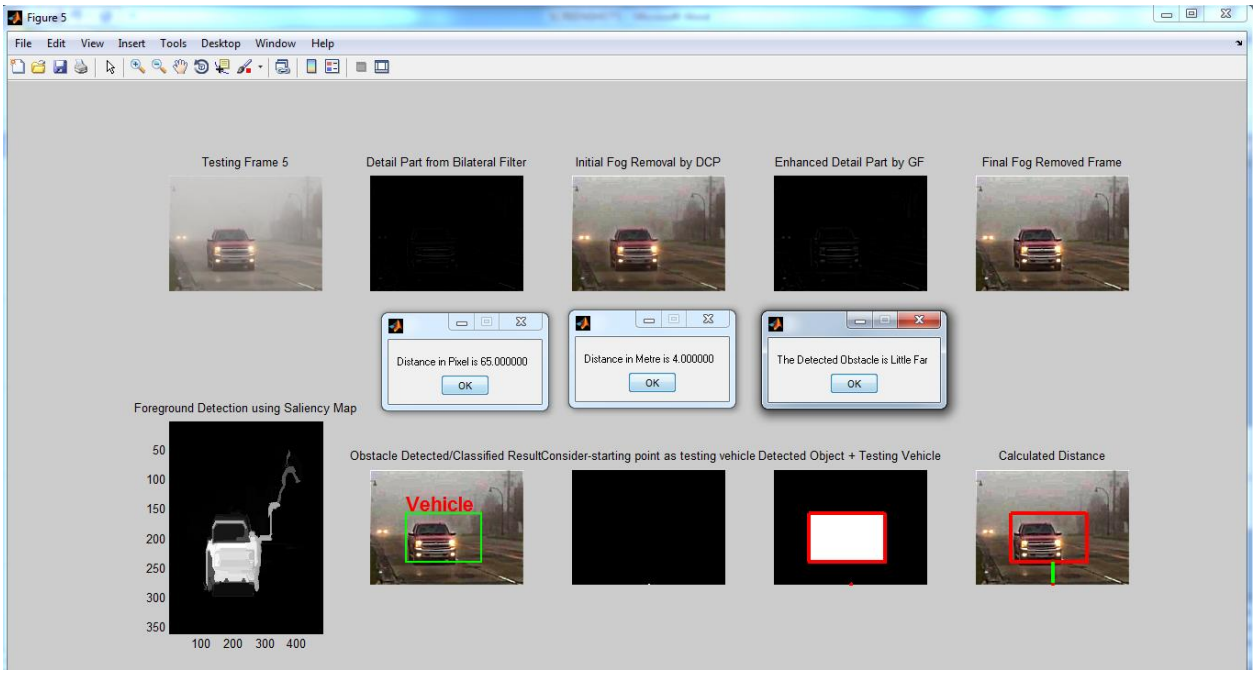


Figure 5: Detected and classified as vehicle

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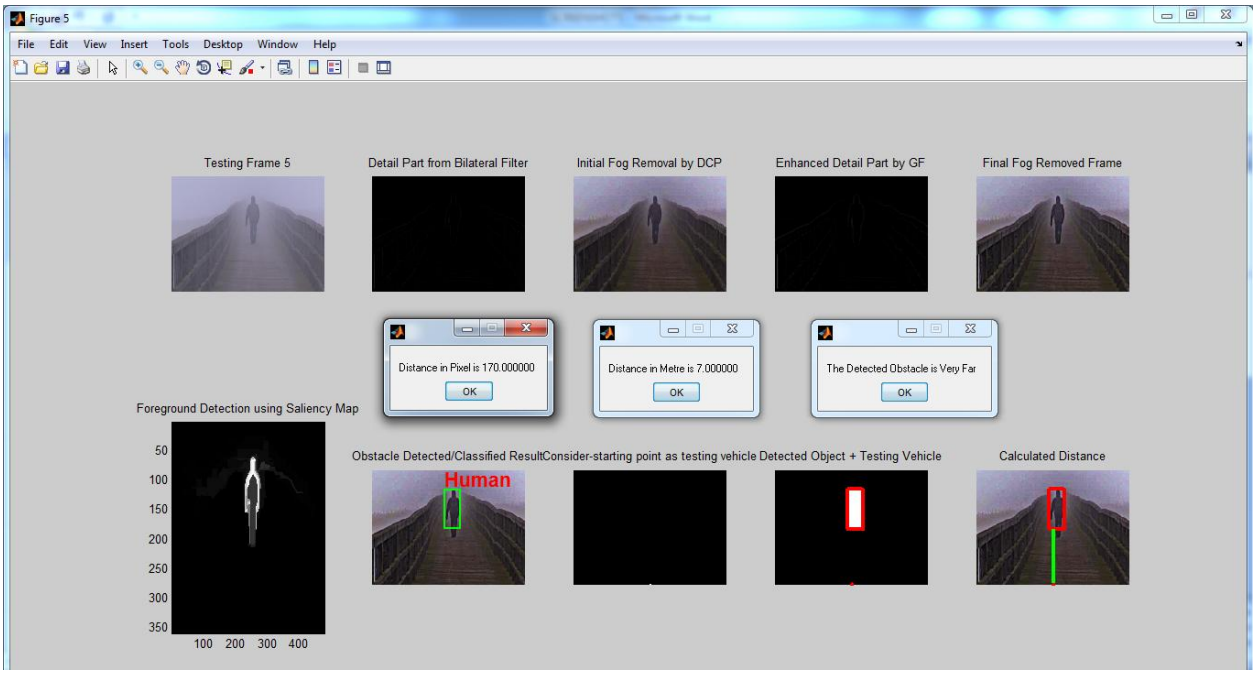
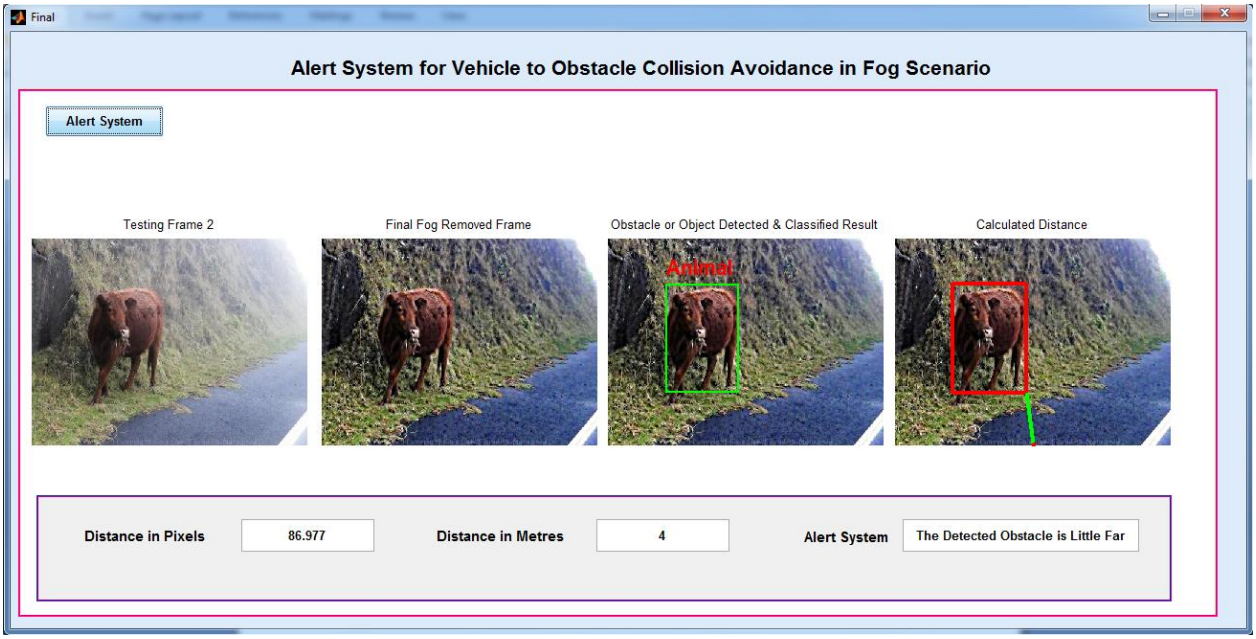


Figure 5: Detected and classified as human



Final figure: Detected and classified as animal

VII. CONCLUSION & FUTURE ENHANCEMENT

7.1 CONCLUSION:

The image enhancement has become one of the active areas in the field of image processing. In this paper the fog images are filtered using Bilateral Filter, Dark Channel Prior and Guided Filter. Then objects or obstacles are yet to be extracted from the enhanced fog image based on the Saliency Map. Finally distance is calculated between detected object and camera mounted vehicle. Thus, efficient automatic vehicle detection and a warning system can help drivers in reducing the number of accidents occurring between the one vehicle and the any obstacles on roads and highways.

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7.2 FUTURE SCOPE:

As a future step, we have to analyze the behavior forimages from other categories too. Furthermore another interesting question is if and how this method would work on night-time scenes .

And as a hardware setup, we have to install our modules in a vehicle and to test it in a real-time scenario and to check out the practical output of our design and to install more cameras to monitor from all sides of the vehicle as the obstacles can reach out and hit our vehicle in any directions.

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