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AUTOMATIC SEAT BELT DETECTION BASED ON DEBC

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ABSTRACT

This paper presents a novel method for the detection of seat belt in a monitoring image which contains the full scene information of the moving car. First, the driver area is located based on the vehicle outline. Then the potential seat belt edges are detected by an effective algorithm based on the direction information measure in the HSV color space.

Result is finally obtained bv further verification of the edges. **Experiments** the method demonstrate makes a good performance even with noisy images.

Introduction

Worldwide more than 1.2 million people die each year in vehicle accidents.But they would have 40-50% probability of survival if they use seat belt properly.

So ensuring that seat belt is worn by every driver is a very important active safety measure. Therefore an approach is proposed which can detect the seat belt automatically in the images taken by surveillance camera.

BACKGROUND OVERVIEW

A. Existing System

A seat belt detection system for a vehicle, comprising: a seat belt assembly, also done by; an

image sensor, located within the vehicle as to be able to receive an image of at least a portion of the seat belt assembly; an image processor, operable to analyze the image to identify said plurality of indicators for image analysis; the image analysis matching the identified plurality of indicators to a predefined set of indicators that characterize at least one particular status for the seat belt assembly.

B. Drawbacks of Existing System

The current practice leads to the following major drawbacks...

- Needs skilled person for installation purpose.
- Quite expensive
- Any object can come inbetween sensor and drivers region.

C. Proposed System

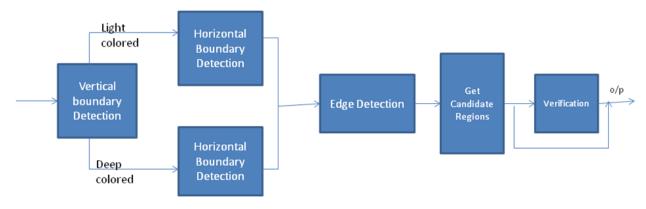
In our system we are detecting the seat belt using image processing. Here camera will capture the area of drivers region. Camera wll be planted in the car itself. If driver is not wearing the seat belt then alarm will turn on giving loud sound. Message will also be displayed on screen. The alarm will keep on ringing until the driver wears seat belt.

This will alert the traffic inspector and fine will be charged to driver.

I. THE PROPOSED SYSTEM

A. System Overview

The above proposed system will be divided into the following sub modules or sections...



Locate the Driver Region

Seat Belt Detection

B. Block Diagram

The Block Diagram of the system is attached behind.

C. Explanations of Blocks

The following are the brief explanations of the working principle of the various major blocks or sections used in the system...

• Vertical Boundary Detection

The left boundary of the driver area is considered here. The original image is converted into HSV color space.

• Horizontal Boundary Detection

The top boundary of the drivers area is considered as top edge of windscreen.

The color of the vehicle plays important role.

In order to determine the vehicle color, M is defined as mean gray value of a region extracted from vehicle body.

• Edge Detection

In edge detection, we convert the image into HSV color space.

where, H is the hue component

S is the saturation component

V is the value component

Experiment demonstrate the method makes good performance even with noisy images.

Noise is removed by using different algorithms like erating and dialation ,blod detection is performed. After countour detection finally decision making is done.

D. Data Flow

• First the driver area is based on vehicle outline.

- The image Acquisition is done by camera interface, then the potential seat belt edges are detected by an effective algorithm based on direction information measure in HSV color space (BGR TO HSV conversion is done).
- Thresholding is done to find the color value and the result is finally obtained by further verification of edges.
- Binarization is done which converts all the surrounding objects into black color and the seat bealt is converted to white color

E. Technology & Programming Languages

• Software Specifications:

1.dot net

2.Open cv

• Hardware specification

1.Camera

• System: Pentium

• Monitor:14' color

• RAM: 512 Mb

• Camera:1.3-2 Megapixel

II. SCOPE & APPLICATIONS

Only the imagination can limit the applications of the above proposed system.

Though the following are some examples...

• System provides more safety to driver.

III. CONCLUSION

In modern automobiles, all the vehicles come equipped with microcontrollers, processors for various sensing and control operations. Taking advantage of

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this phenomenon. We have developed a mechanism for providing drive with more security through an extra layer of lock near the seat belt buckle. The driver is not permitted to drive without the seatbelt. This reduces the risk of fatality to the driver and the occupants. Through our testing we have provided mechanism for safety even during conditions where a driver applies break, the system can be further tested by incorporating the same in real vehicles.

IV. ENHANCEMENTS

A. Limitations

As generally all systems have some limitation, here are some listed for the proposed system...

- Seat belt should be of specific length
- Seat Belt used should of special material

B. Drawbacks

This system has certain drawbacks also as listed...

• Camera should be of good resolution

C. Future Modifications

There is always chance to improve the any system as research & development is an endless process. Our system is no exception to this phenomenon. The following improvements can be done...

- SMS Facility can also be provided.
- Message can be sent to the traffic inspector also.

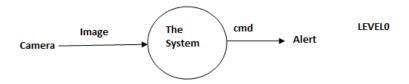
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Camera Image Driver The System Cmd LEVEL1 Result Mage Processing

