IDENTIFICATION AND SEGMENTATION OF HELMETS IN MOTORCYCLES

G.S.Gopika
PG Scholar, Dept. of CSE
SNS College of Technology
Coimbatore-35, India.
gopikags41@gmail.com

R.M.Bhavadharini
Asst. Prof (SG),Dept.of CSE
SNS College of Technology
Coimbatore-35, India.
rmbhavadharini@gmail.com

Dr.S.Karthik
Professor & Dean, Dept. of CSE,
SNS College of Technology
Coimbatore-35, India.
profskarthik@gmail.com

Abstract— **The traffic video surveillance system is present in many countries to monitor the road traffic. The events are monitored as a whole to identify any violations. Our work is to detect whether the motorcycle riders are having the helmets. Even though motorcycles are convenient means of transportation, it is not so safer. Road traffic injuries are a major public health problem and a leading cause of death and injury around the world. Motorcycle and bicycle riders are at an increased risk of being involved in a crash. This is because they often share the traffic space with fast-moving cars, buses and trucks, and also because they are less visible. Motorcycles are difficult to detect using the surveillance cameras, since they overlap with other vehicles in the traffic. Here, we have give a traffic video as input. In this video, we apply background extraction algorithm. This is used to extract the foreground objects in the video which is then extracted as frames. In the next stage, the SIFT (Scale Invariant Feature Transform) algorithm is used to detect a motion object motorcycle. Using the Region of Interest (ROI), it chooses the location where the helmet can be found. This area is extracted and the helmet is detected.**

I. INTRODUCTION

Our project "Helmet Detection for Motorcycles", we have proposed an automatic helmet detection technique for motorcycles. We have done this in the area of Image Processing. And the software used is MATLAB 2010.Image processing usually refers to digital image processing, but optical and analog image processing are also possible. The acquisition of images is referred to as imaging. In image processing the background subtraction is a computational vision process of extracting foreground objects in a particular scene. A foreground object can be described as an object of attention which helps in reducing the amount of data to be processed as well as provide important information to task under consideration. Background subtractions a class of techniques for segmenting our objects of interest in a scene for applications such as surveillance.

Matlab stands for Matrix Laboratory and the software is built up around vectors and matrices. According to the Math works, its producer, it is a "technical computing environment". This makes the software particularly useful for linear algebra but Matlab is also a great tool for solving algebraic and differential equations and for numerical integration.

The language, tools, and built-in math functions enable you to explore multiple approaches and reach a solution faster than with traditional programming languages such as C, C++, and JAVA. Matlab has powerful graphic tools and can produce nice pictures in both 2D and 3D. It is also a programming language and is one of the easiest programming languages for writing mathematical programs. Matlab also has some tool boxes useful for signal processing, image processing, etc.

Our project is to detect whether the motorcycle riders are having their helmets while driving. In this, the first thing that we do is to detect the motorcycles by using the object recognition method. In that the background extraction offers an excellent pre-processing for traffic observation and surveillance so that it reduces the unimportant information in image sequences and speeds up the processing time. Then segmentation is performed once the moving object is segmented, the next step is to determine which of them the motorcycles are. Object occlusion is used to separate the motorcycle image from the rest. SIFT algorithm is mainly used for the object recognition by that the motorcycle object is identified in a bounding box.

Scale-invariant feature transform (or SIFT) is an algorithm in computer vision to detect and describe local features in images. It is also used for gesture recognition, video tracking, individual identification of wildlife and match moving. After that, we take that image as input and perform the helmet detection is by using the automatic region of interest and it will identify whether the helmet existing on the moving object.

II. EXISTING SYSTEM

Video Traffic Surveillance and monitoring system in Bangalore: Bangalore city, has witnessed a phenomenal growth in vehicle population. As a result many of the arterial roads and intersections are operating over their capacity and average journey speeds on some of the key roads in the Central Area are lower than 10kmph in the peak hour. Therefore, it has become necessary to establish plans for efficient traffic management in Bangalore.

The Traffic Management Center (TMC) at the Ashok Nagar Police station is the hub of the transportation management system in Bangalore, where information about the transportation network shall be collected and combined with other operational and control data to manage the transportation network and to produce traveller information. From the traffic signal system, a steady flow of traffic signal timings, traffic flow data etc. would be received by the TMC

and the real time data will to be processed immediately to achieve a synchronized effect on the chosen corridors.

Traffic surveillance cameras located at 160 strategic locations across the city would be beaming live pictures into the TMC. The traffic management team shall look at the live feeds coming from the field and then based on certain parameters like tolerable queue length, congestion or an accident that has occurred on the field would be able to communicate to the field officers and necessary actions will be initiated. Traffic enforcement cameras located at 5 locations across the city would be recording and beaming the violations into the TMC. The enforcement team would have to download the violations and then transfer the information to the automated enforcement system.

The decisions so made from the TMC will be communicated to the officers on the field and for this the wireless equipment available with the police will be made use of.

Helmet Detection Technology in ATMs: A circle/circular arc detection method based upon the modified Hough Transform is used, and applied to the detection of safety helmets for the surveillance system of ATMs. The Hough transform (HT) has been widely used for pattern detection. The drawback of the traditional HT is the large computation and storage requirement, making it difficult for practical application. So the circular arc detection method based on the Hough Transform is used for detecting the helmet.

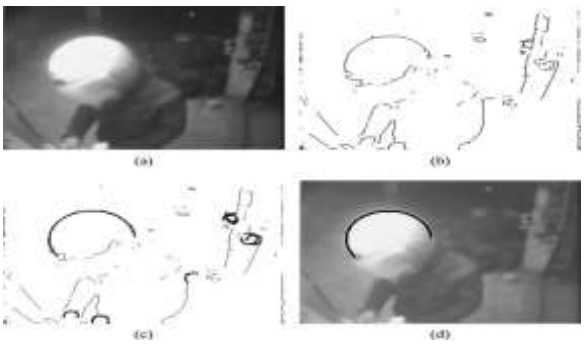

Fig. 1 Areal ATM image for helmet detection (a) Original image;(b) Edge image of (a); (c)Circular detection arc result; (d) Helmet detection result.

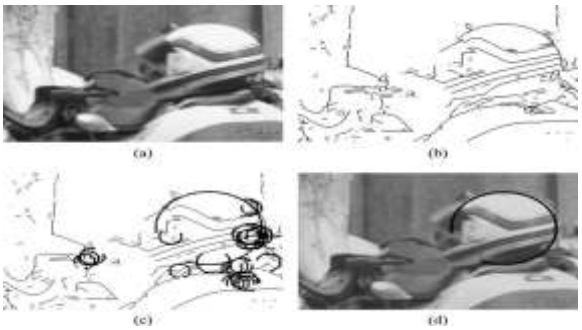

Fig. 2Image of a motorcyclist taken by the outdoor camera (a) original image (b) edge detected image(c) circular arc detection result (d) helmet detection result.

III. PROPOSED SYSTEM

All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified. In our proposed system, we first take a video input. We extract the video in frames at a frame rate of 15 frames per second. From the video, we do background extraction and detect the moving object which is the motorcycle. This motorcycle detection is done using SIFT algorithm. The SIFT algorithm (Scale Invariant Feature Transform) is an approach for extracting distinctive invariant features. Thus the motorcycle is detected and segmented.

Scale Invariant Feature Transform (or SIFT) is an algorithm in computer vision to detect and describe local features in images. Applications include object recognition, robotic mapping and navigation, image stitching, 3D modelling, gesture recognition, video tracking, individual identification of wildlife and match moving. After the segmentation process, this image is given as input for detecting the helmet. For the detection of helmet, we make use of automatic ROI (Region Of Interest) technique.

In this technique, we take the region of interest specifying the place where the helmet will be found. And when the helmet is found, this area is marked by creating a mask around the helmet. This area inside the boundary is extracted. In this extracted image, the blobs are identified and the number of blobs is also displayed. Then using the information of that image, we mark the boundary of the helmet.

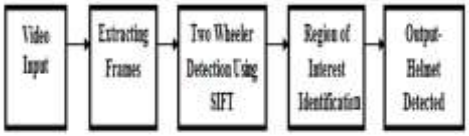

Fig.3 Architectural diagram

IV. RELATED WORKS

The proposed system detects the helmet and does the process as explained earlier. And in the future work, if the absence of helmet in a motorcycle rider is detected, then the license plate of the motorcycle can be recognized. By identifying the license plate number of a motorcycle, the owner of the motorcycle can be found out. Based on this, the fine can be included along with the electricity bill of the particular person.

V. CONCLUSION

The existing traffic video surveillance system takes video of the traffic. This video is being watched manually by a traffic police. As a result, the motorcycle riders not wearing a helmet are identified by the traffic police. This information is then passed to the next traffic signal police and then those motorcycle riders are made to pay fine. Here we have proposed an automatic helmet detection technique. In this, the video of traffic is taken. From the video, the motorcycle as an object is tracked and extracted as frames. Then the motorcycle image is taken as input and the helmet is identified.

REFERENCES

[1] Andreas Ess, Konrad Schindler, Bastian Leibe, Luc Van Gool '*Object detection and tracking for autonomous navigation in dynamic environments'*

[2] Che Yen Wen '*The Safety Helmet Detection Technology and Its Application to the Surveillance System'*.

[3] FarajAlhwarin, Chao Wang, DanijelaRisti -Durrant, Axel Gräser '*Improved SIFT-Features Matching for Object Recognition*' Institute of Automation, University of Bremen, FB1 / NW1

[4] M. Basset, C. Cudel, V. Georges, S. Mouhoub, J. Baujon '*Automatic Region of Interest tracking for visual characterization of the driver's behavior'* (2004) IEEE Intelligent Vehicles Symposium University of Parma.

[5] Min-Yu ku, Chung-Cheng chiu, Hung-Tsung Chen and Shun-Huang Hong '*Visual Motorcycle Detection and Tracking Algorithms'* Department of Electrical and Electronic Engineering, Chung-Cheng Institute of TechnologyNationalDefense University

[6] John Francis Canny '*Finding Edges and Lines in Images' MIT Artificial Intelligence Agency*, Cmabridge, Massachusetts.

[7] Oge Marques and Liam M. Mayron 'Using visual attention to extract regions of interest in the context of image retrieval' Florida Atlantic University.

[8] P. KaewTraKulPong and R. Bowden '*An Improved Adaptive Background Mixture Model for Realtime Tracking with Shadow Detection'* Vision and Virtual Reality group, Department of Systems Engineering, Brunel University.

[9] Prithviraj Banerjee and SomnathSengupta '*Human Motion Detection and Tracking for Video Surveillance'* Indian Institute of Technology, Kharagpur

[10] Reza Oji *'An automatic algorithm for object recognition and detection and detection based on Asifkeypoints'* Shiraz University, Shiraz, Iran.

[11] RijurekhaSen and Bhaskaran Raman *'Intelligent Transport Systems for Indian Cities'* Indian Institute of Technology, Bombay

[12] Y. Carona, P. Makrisa, N. Vincent *'Use of power lawmodels in detecting region of interest'* Journal of Pattern Recognition Society

[13] Yiwei Wang and John F. Doherty 'Moving Object Tracking in Video' The Pennsylvania State University, University Park, PA16802, USA

[14] Y. M. Chan, S. S. Huang, L. C. Fu, P. Y. Hsiao and M. F. Lo (2011)*'Vehicle detection and tracking under various lighting conditions using a particle filter'* .

