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DETECTION OF MOTORCYCLISTS WITHOUT HELMET AND FINEPAYMENT USING OPEN CV

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ABSTRACT

The helmet is the main safety equipment of motorcyclists, but many drivers do not use it. The main aim of this project is to construct an automatic detection of the motorcyclist without helmet from video using OpenCV library tools. If they are not wearing the helmet, the license plate of the motorcycle is focused automatically. By using Computer Vision technique we can detect and recognize the license plate number. We make the training set of different characters of different sizes. Based on these training set, we extracted the character from images and fine is to be cut-off from the user. This billing system will recognize the character which automatically updates a database of traffic police with the details of user. Once the details are updated, motorcyclists charged for without wearing the helmet and the text sent to the database contains the details of the vehicle. When the system is damaged or not working, it will inform the police through the database system.

Keywords: Detection of motorcyclist, Detection of helmet, Recognize the License Plate, Fine Payment method, OpenCV library too.

I. INTRODUCTION

A motorcycle is a cheaper and more convenient form of transportation which causes less commuter congestion within cities and has less environmental impact than automobile ownership. Due to the large number of vehicles that exist, researches in intelligent traffic systems became popular, including vehicles detection, recognition, tracking and counting, and traffic parameters estimation. Motorcycles segmentation on public roads images can be seen as the first step to develop any research in traffic estimation as speed computation, motorcyclist helmet use, vehicle tracking and occlusion processing.

An accident is a specific, unexpected and unintended external action which occurs in a particular time and place. Carelessness of the driver is the major factor of such accidents. The traffic authorities give a lot of instructions to the vehicle operators. But many of them do not obey the rules. Nowadays most of the countries are forcing the motor riders to wear the helmet and not to use the vehicles when the person is in drunken condition. But still the rules are being violated by the users.

A traffic accident is defined as any vehicle accident occurring on a public highway. In Indian road system, widening of the road is not an alternative solution to avoid traffic. Our work is closely related with the study of helmet detection methods. We divided into 6 algorithms as Vision based method; it is one of the most popular techniques for traffic surveillance due to low hardware cost. Background subtraction, this is one of the methods where image background is extracted for further processing. It is the best approach for detecting objects from videos taken by static cameras. There are many techniques and both expert and new comers can be confused about limitations and benefits of it [1].

This method based on static background hypothesis not applicable in real environments. Object detection, it is process of finding instance of real world objects such as face / nose / mouth / left eye / right eye. We can use Local Binary Pattern, Histogram of Oriented Gradients and Hough transform descriptors Local Binary Pattern, it is used for face recognition in computer vision. In this method image is divided into several small segments and from which features are extracted. It consists of binary patterns and describes surrounding of pixels. The features from segment are joint into single feature histogram.

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This method provides good result in term of speed. Histogram of Oriented Gradients Descriptor, provides better performance than other existing feature sets. It is used to extract human feature from visible spectrum images. It has been determined that when LBP combined with HOG descriptor improves, detection, performance considerably on some datasets. Hough transform descriptor, it is a technique and can be used to isolate features of particular shape with an image. It requires some features in parametric form.

Automatic Number Plate Recognition (ANPR), also known as Automatic License-Plate Recognition (ALPR), Automatic Vehicle Identification (AVI), or Car Plate Recognition (CPR), is a surveillance method that uses Optical Character Recognition (OCR) and other methods such as segmentations and detection to read vehicle registration plates.

When motorcyclist does not wear helmet, it gives a warning to the user. The penalty amount is send to the computer of traffic police. The message contains information about the amount to pay and the registered number of vehicle. Also, it sends a message to the registered cell phone of owner of the vehicle with the penalty amount and the reason of penalty. This message is received by the receiving block of system and it is transmitted to the computer of the traffic police. Police can send a postal form of bill to the address of owner.

When this system is damaged by the owner or any other reason, the police can get notification and can take action against this problem. So this system is a better option for over helmet detection.

II. RELATED WORKS

Wen et al. [2] suggested a circle arc detection method based upon the Hough transform. They applied it to detect helmet on the surveillance system of the Automatic Teller Machine. The weakness of this work is that they only use geometric features to verify if any safety helmet exists in the set. Geometric features are not enough to find helmet. The people head can be mistaken with a helmet.

In [3] it was proposed a computer vision system aiming to detect and segment motorcycles partly occluded by another vehicle. A helmet detection system is used, and the helmet presence determines that there is a motorcycle. In order to detect the helmet presence, the edges are computed on the possible helmet region. The Canny edge detector [4] is used. The quantity of edge points which are similar to a circle define a helmet region. The method needs so much information (helmet radius, camera angle, camera height, etc.) that must be provided by user.

Chen et al. [5] presented a system for vehicle detection, tracking and classification. The system separates them into four categories: car, van, bus and motorcycle (including bicycles). A new background Gaussian Mixture Model (GMM) was proposed. A Kalman filter tracks a vehicle to enable classification by majority voting over several consecutive frames. The SVM as classifier and HOG (Histogram of Oriented Gradients) descriptor features was used. The results were not similar when the weather conditions have changed.

Our work is closely related with the study of helmet detection methods [7-16]. We divided into 6 algorithms as Vision based method, it is one of the most popular techniques for traffic surveillance due to low hardware

cost. Background subtraction, this is one of the method where image background is extracted for further processing. It is the best approach for detecting objects from videos taken by static cameras.

The techniques based upon combinations of edge statistics and mathematical morphology [6] have been proven to give good results. Typically in these methods, gradient magnitude and their local variance in an image are computed. They are based on the property that the brightness change in the license plate region is more prominent and easily detectable than otherwise. Then, regions with a high edge magnitude and high edge variance are identified as possible license plate regions. A disadvantage is that edge-based methods alone can

hardly be applied to complex images, since they are too sensitive to unwanted edges, which may also show high edge magnitude or variance

III. PROPOSED SYSTEM

The block diagram of the proposed system is shown in the Fig 1.

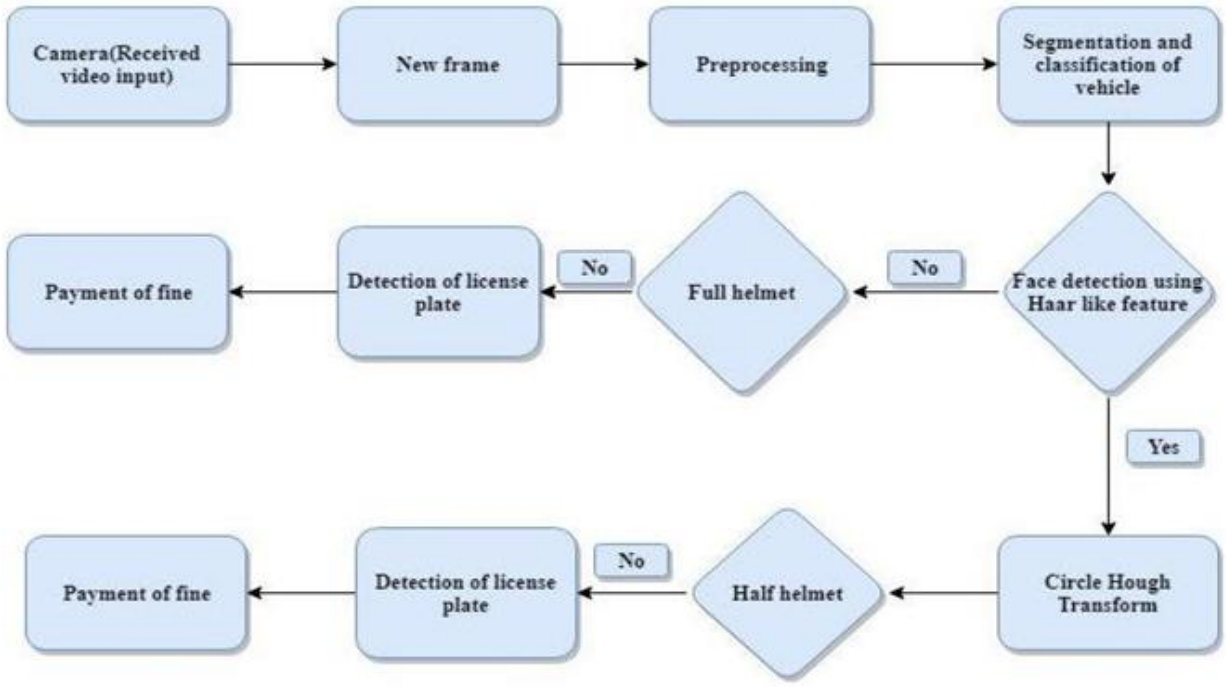

Fig1: Block Diagram

This work first deals with the problem of detecting the helmet by on public roads. Before the segmentation and classification, Pre-processing is used to smooth the input image. This stage will remove the un-wanted artifacts, noises and light reflection from the input image. The image resizing, cropping is completed during this stage. Then problem can be splitted in two steps.The first step consists of segment and classify the vehicle images. This step aims to determine the moving objects in the scene. In this phase the user specifies a line (defined Cross Line - CL) to detect the vehicles .After this, the system classifies them into motorcycle and non-motorcycle. The vehicles are classified into two classes because it is only necessary to know if the vehicle is a motorcycle or not. The second step consists of the helmet detection procedure. A Region of Interest (RoI) was used aiming to improve the computational cost and the accuracy. The helmet detection is made using a hybrid descriptor to extract image features, and the support vector machine classifier is used to classifier an image in helmet or non-helmet. The diagram of the proposed system is shown in Figure 1.

Basically, the proposed license-plate recognition system is designed for moving vehicles on the road by video camera to capture the front vehicles. The proposed license-plate recognition algorithm which is mainly composed of preprocessing (including edge detection and binarization), license-plate location, and character segmentation & recognition.OCR function is used for character recognition.

Motorcyclist does not wear the helmet license plate automatically focused and billing system is activated Computer vision technology detects the license plate and sends text message to a police database and the motorcyclists. The text sent to the database contains the details of the vehicle and the user. The text sent to the owner informs that they have not wearing the helmet and the fine they are supposed to pay. When the system is damaged or not working, it will inform the police through the database.

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IV. RESULTS AND DISCUSSION

The videos used for tests were obtained from a CCD video camera on public roads during the day time, captured as frames. All the algorithms were implemented using the OPENCV library. To ensure bike rider's safety, we have designed this project. Many projects have been designed so far is four wheelers. Very less importance was given to motorbikes. Today accidents caused by motorbikes are more than cars. Thus in this project safety of bike rider is major concern.

The project consists of 4 parts:

V. Motorcycle detection; to ensure that detected vehicle is motorcycle or not.
W. Helmet detection; to ensure that the bike rider is wearing a full helmet or half helmet.
X. Number plate recognition; to get the users details.
Y. Fine payment; if motorcyclist does not wear the helmet, fine should pay by the user.

V. CONCLUSION

We have proposed a method for automatic detection of motorcyclists without helmet and fine payment is introduced. We described a real-time vision-based helmet wearing monitoring system that can be used to detect in a sequence of images. This system overcame various issues raised by the complexity helmet detection problems. Full and half helmet problems with motorcycles in traffic jams will be the subject of future work.

For license plate recognition the characters are recognized in the character recognition stage by using OpenCV tools. The automatic license plate recognition system proposed in this research has several limitations. Most major being that the state information position is assumed to be at top part of license plate. Though most of the plates consists of state information at the upper part of license plate, the proposed system will not be able to recognize the state information if the position of state information is changed.

Self billing system is implemented in any vehicles. This system can track the speed from anywhere. When this system is damaged, the police can get notification and can take action against this problem. It can reduce accidents.

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REFERENCES

1. Pathasu Doungmala, Katanyoo Klubsuwan, "Half and Full Helmet Wearing Detection in Thailand using Haar Like Feature and Circle Hough Transform on Image Processing," in IEEE International Conference on Computer and Information Technology., 2016.
2. C.-Y. Wen, S.-H. Chiu, J.-J. Liaw, and C.-P. Lu, "The safety helmet detection for atm's surveillance system via the modified hough transform," in IEEE 37th Annual International Carnahan Conference on Security Technology., 2003, pp. 364-369.
3. C.-C. Chiu, M.-Y. Ku, and H.-T. Chen, "Motorcycle detection and tracking system with occlusion segmentation," in WIAMIS '07, USA,2007.
4. J. Canny, "Finding edges and lines in images," Cambridge, MA, USA,Tech. Rep., 1983
5. Z. Chen, T. Ellis, and S. Velastin, "Vehicle detection, tracking and classification in urban traffic," in 15th ITSC, 2012, pp. 951– 956.
6. Fernando Martin, Maite Garcia, and Jose Luis Alba. "New methods for automatic reading of vlps (vehicle license plates)". In Proc. IASTED Int. Conf. SPPRA, pages 126–131, 2002.

7. A. Leelasantitham and W. Wongseree, "Detection and classification of moving thai vehicles based on traffic engineering knowledge," in ITST 2008, oct. 2008, pp. 439 –442.
8. B. Duan, W. Liu, P. Fu, C. Yang, X. Wen, and H. Yuan, "Real-time on road vehicle and motorcycle detection using a single camera," in ICIT 2009, feb. 2009, pp. 1 –6.
9. V. Milane´s, D. F. Llorca, J. Villagra´, J. Pe´rez, C. Ferna´ndez, I. Parra, C. Gonza´lez, and M. A. Sotelo, "Intelligent automatic overtaking system using vision for vehicle detection," Expert Systems with Applications,vol. 39, no. 3, pp. 3362 – 3373, 2012.
10. S. Sheik Mohammed Ali, B. George, L. Vanajakshi, and J. Venkatraman, "A multipleinductive loop vehicle detection system for heterogeneous and lane-less traffic," Instrumentation and Measurement, IEEE Transactions on, vol. 61, no. 5, pp. 1353 –1360, may 2012.
11. S. Messelodi, C. Modena, and M. Zanin, "A computer vision system for the detection and classification of vehicles at urban road intersections," Pattern Analysis & Applications, vol. 8, pp. 17–31, 2005.
12. C.-C.Chiu,M.-Y.Ku,andH.-T.Chen,"Motor cycle detection and tracking system with occlusion segmentation," in WIAMIS '07. Washington, DC, USA: IEEE Computer Society, 2007, pp. 32–. [Online]. Available: http:/dx.doi.org/10.1109/WIAMIS.2007.60.
13. J. Canny, "Finding edges and lines in images," Cambridge, MA, USA, Tech. Rep., 1983
14. M. Zengqiang, P. Cunzhi, H. Ke, and C. Qiandong, "Research on seg-mentation of overlapped vehicles based on feature points on contour," in FBIE 2009, dec. 2009, pp. 552 –555.
15. K. Takahashi, Y. Kuriya, and T. Morie, "Bicycle detection using pedaling movement by spatiotemporal gabor filtering," in TENCON 2010 -2010 IEEE Region 10 Conference, nov. 2010, pp. 918 –922.
16. S. Sonoda, J. K. Tan, H. Kim, S. Ishikawa, and T. Morie, "Moving objects detection at an intersection by sequential background extraction," in ICCAS 2011, oct. 2011, pp. 1752 –1755.