

Automatic Helmet Detection on Public Roads

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ABSTRACT

Bike riding is a lot of fun, but accidents happen. People choose motorbikes over car as it is much cheaper to run, easier to park and flexible in traffic. In India more than 37 million people are using two wheelers. Since usage is high, accident percentage of two wheelers are also high compared to four wheelers. Motorcycles have high rate of fatal accidents than four wheelers. The impacts of these accidents are more dangerous when the driver involves in a high speed accident without wearing helmet. It is highly dangerous and can cause severe deaths. So wearing a helmet can reduce these number of accidents and may save the life. This paper aims for avoidance of accidents and develop helmet detection system. We intend to use background subtraction and optical character recognition for fall detection and for helmet detection we use background subtraction and Hough transform descriptor.

Keywords: Helmet detection system, fatal, impact, Hough transform descriptor, background subtraction

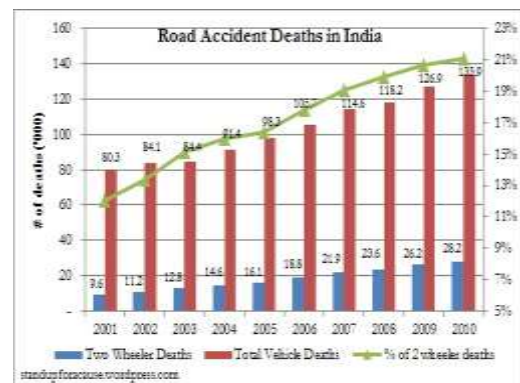
I. INTRODUCTION

The project aims to provide total safety for bike riders. Recently helmets have been made compulsory, but still people drive without helmets. Pune City has approx. 35 lakh two-wheeler riders, which includes 500-600 accidents every year out of which 300-400 are fatal. Pune ranks first in the city when it comes to two wheelers riders. In the last few years, there has been rapid increase in number of road accidents. Due to rise in road accidents, it has now become necessary to generate a system to limit accidental deaths.

India accounts for more than 200,000 deaths because of road accidents, according to the Global Road Safety Report, 2015 “the report states that the Indian road safety laws do not meet the best practice requirements for four out of five risk factors: enforcing speed limits, prevention of drunk driving, safety of children and use of helmets. According to a report by a Tamil Nadu police, there were a total of

15563 injuries in 14504 accidents. The state also topped the list of most accidents among all states for previous ten years from 2002 to 2102.

Even for seat-belts, where the Motor Vehicles Act, 1988, is in consonance with the WHO standards, the enforcement is poor and India has a pathetic score of four out of 10. With respect to vehicle safety, India meets only two out of the seven vehicle safety standards by the World Health Organization (WHO). Two wheelers account for 25% of total road crash deaths. Nearly 75% motorcycle riders involved in accidents continued to wear helmets, crash records show. The main cause of these fatalities is people riding two wheelers under the influence of alcohol results and violation of traffic rules which later on results in serious accidents. “The likelihood of survival of fatalities wearing helmets are high as compared to those not wearing helmets”.



II. CONTRIBUTIONS

The main aim of this study is to propose and develop a system for automatic detection of helmets on public roads. The moto of this project is accident prevention by using the methods of alcohol detection, helmet authentication, fall detection etc.

Helmet Detection:

More than one third who died in road accidents could have survived if they had worn a helmet. Studies shows that usage of helmet can save accident death

by 30 to 40%. The rate at which number of two wheelers in India is rising is 20 times the rate at which human population is growing. The risk of death is 2.5 times more among riders not wearing a helmet compared with those wearing a helmet.

Basically we can detect helmet combining two methods that is background subtraction and Hough transform descriptor. We will extract the background image and then on a particular segment we will apply Hough

Transform Descriptor. Hough Transform descriptor is basically used for detecting

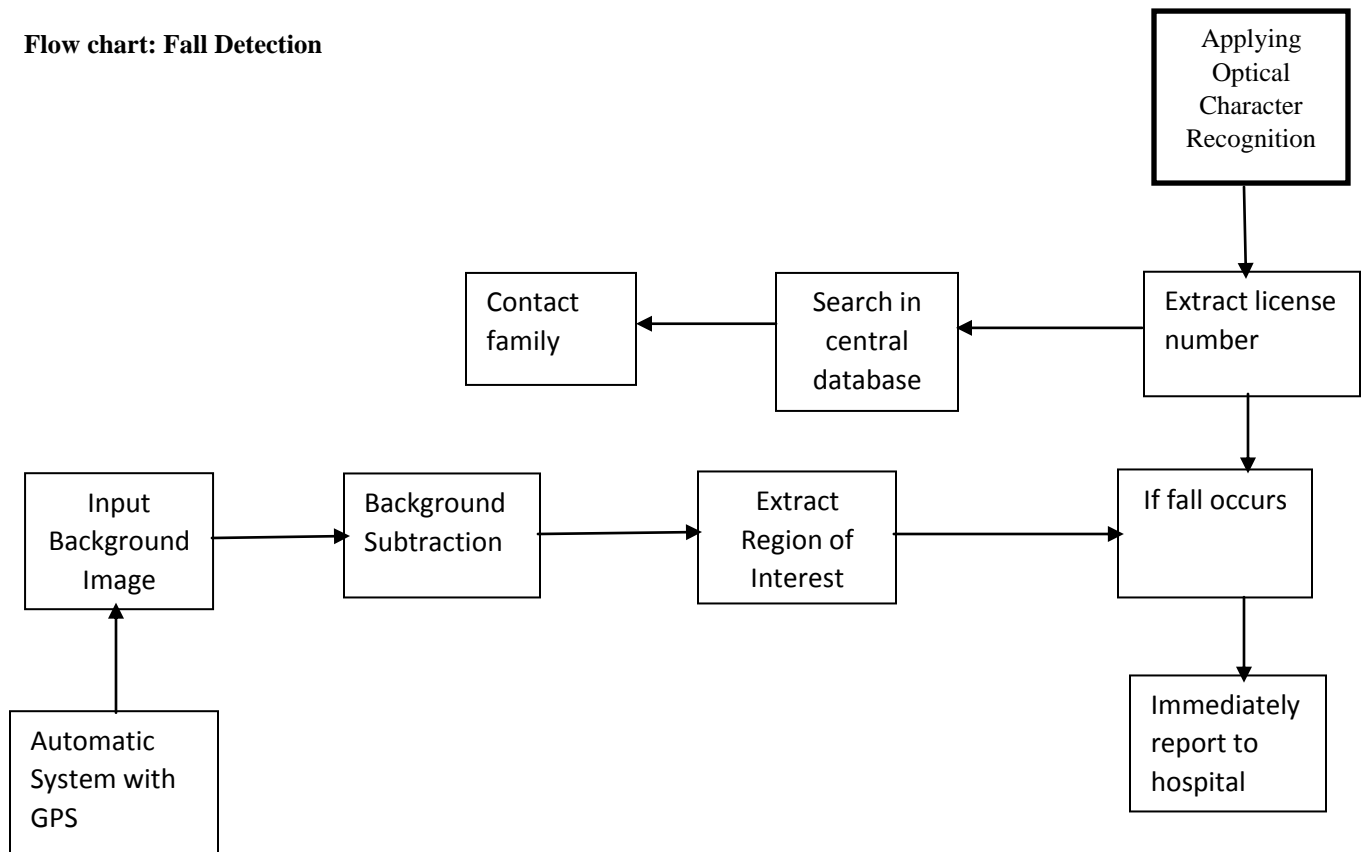
regular curves such as lines, circles etc. We will detect circles here and find whether a person is wearing helmet or not. If a person is not wearing helmet, use back ground subtraction method for extracting the license plate and use optical recognition method, to get license number of the

vehicle. Then look into the database and send the ticket to the matched person.

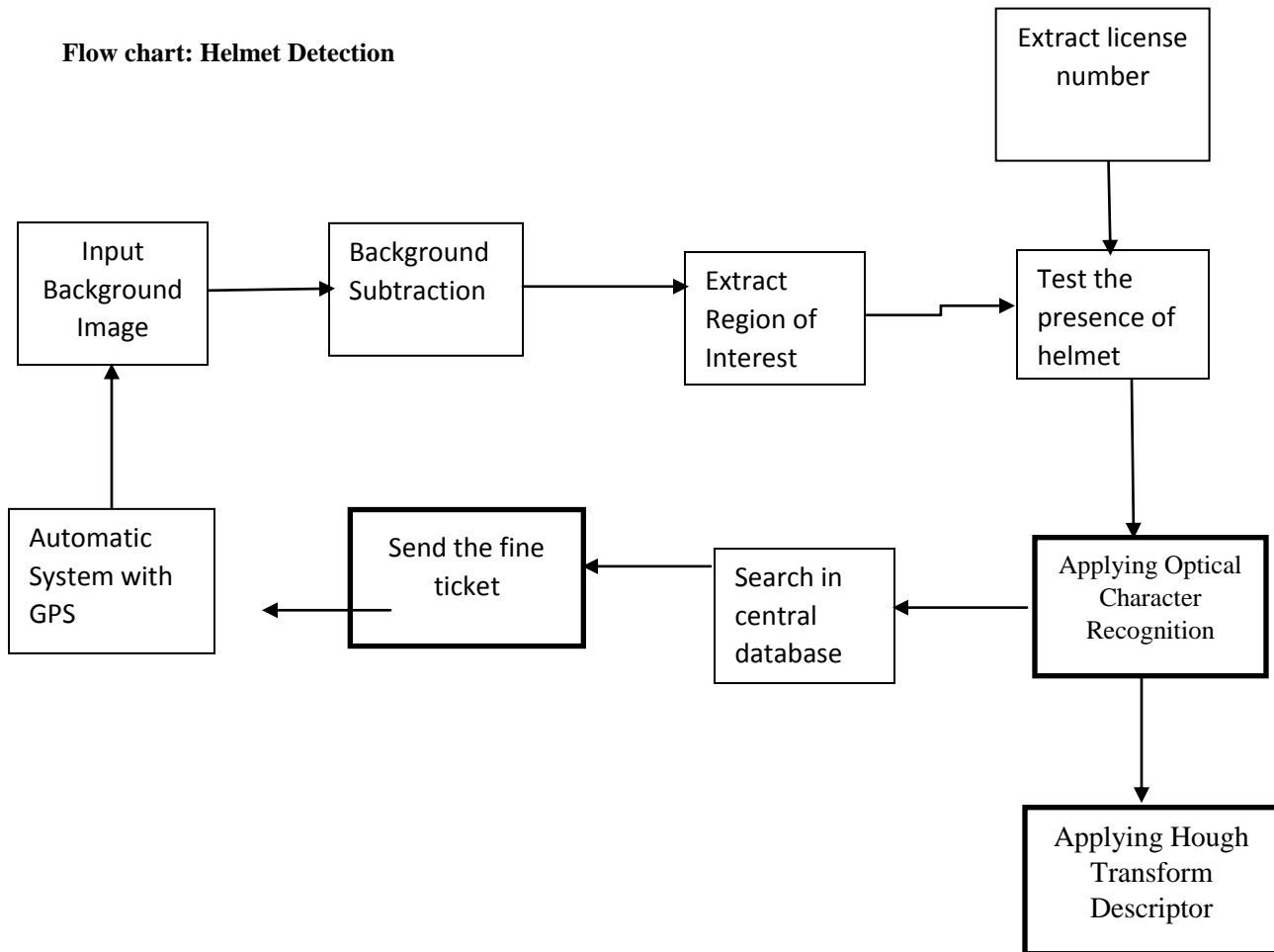
Fall detection:

Fall detection indicates accident has occurred. If any fall is detected, then a message should be sent automatically to his family. We can detect fall detection by using optical recognition technique. First of all, we will use background subtraction where image background is subtracted. An automatic system which is linked with GPS device to get information such as location, time. If any fall is detected by the system, the system will extract license number plate from image frame and will search in central database and will find owner's information. The system will immediately report to the nearby hospital informing them about the accident. System will also contact family informing them about accident.

Flow chart: Fall Detection



Flow chart: Helmet Detection



I. RELATED WORKS

Our work is closely related with the study of helmet detection methods.

A. Vision based method:

It is one of the most popular techniques for traffic surveillance due to low hardware cost.

B. 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. There are many techniques and both expert and new comers can be confused about limitations and benefits of it. This method based on static background hypothesis not applicable in real environments.

C. Object detection:

It is process of finding instance of real world objects such as faces. We can use Local Binary Pattern, Histogram of Oriented Gradients and Hough transform descriptors

D. Local Binary Pattern:

It is used for face recognition in computer vision. In this method [5] image is divided into several small segments and from which features are extracted. It consists of binary patterns and describe surrounding of pixels.

The features from segment are joint into single feature histogram. This method provides good result in term of speed.

E. 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 it improves, detection, performance considerably on some data sets.

F. 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. It is most commonly used for detecting regular curves such as lines, circles, ellipses etc.

IV .RESULTS

To ensure bike rider's safety, we have designed this project. Many projects have been designed so far but they all are concentrated more on 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 3 parts:

1. Helmet Authentication; to ensure that the bike rider is wearing a helmet.
2. Alcohol detection; to ensure that the bike rider has not consumed any type of alcohol.
3. Fall detection; in case of accident, to inform bike rider's family about the accident.

V. Conclusion

In this paper we have proposed an approach which would detect fall & helmet detection of a two-wheeler driver run-time. Our system would inform nearby hospitals, family members & law enforcement agencies in case of emergency. Hence it ensures safety of the drivers while driving.

Automatic accident detection and reporting system is the motivation of this project. To prevent road accidents, our approach is very useful. Thus safety of bike riders is ensured.

In future we intend to use more advanced safety measures like to check alcohol consumption, lane change detection, collision detection, traffic information, e-toll collection, license renewal etc. We also think of applying deep neural network techniques & make transportation more intelligent.

VI. References

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