

Pedestrian Protection System for Driver to Anticipate Accidents Using Image Processing

B.Harshavardhan Reddy¹, N.Gayathri²

¹Student, ²Assistant Professor, Electronics and Communication Engineering,
Saveetha School of Engineering, Chennai, SIMATS
¹reddyh984@gmail.com, ²gayathri005ece@gmail.com

Article Info

Volume 83

Page Number: 3678-3680

Publication Issue:

May-June 2020

Abstract

Because of the overpopulation peoples in rural areas are migrated to metro Politian cities. As the populations in metropolitan area are increasing the number of vehicle used by the people in the particular area also increased. Hence in peak hours traffic problems are increased. Understanding traffic signals is essential .Traffic signals acts as a silent conductor of the traffic on the road. Drivers who fail to obey traffic signals put not only themselves but other motorists in danger of accidents and serious injuries. In this paper we are using an image processing based automatic braking system for vehicle riders, if any object, human beings are crossing on the road the sensors which are connected in the end of the road detect the particular object, and it gives signal to the vehicle riders to slow down the speed. So the object or human begins crossing the road will be protected by avoiding unwanted consequences.

Article History

Article Received: 19 August 2019

Revised: 27 November 2019

Accepted: 29 January 2020

Publication: 12 May 2020

Keywords: Transceiver, Wireless communication, Motor driver, Radio frequency.

1. Introduction

Roads are shared by human beings and automobiles. So the road is one of vastly rigorous place. To avoid accidents the government has taken many actions like advertisements and legal actions. Due to such action the number of accidents was reduced. But the numbers of accidents are not reduced in the pedestrian area.

According to the research of USA in 2014 78% accidents are occur in urban areas. In real time computer applications pedestrian detection is an important research topic. From past 10 years many people are doing research in this particular field. The main aim of this research is to find the particular object crossed on the road when the traffic signal is in on state. Various steps were taken from last decade to avoid accidents on the road.

Surveillance cameras are used to monitor the traffic control states and detect the objects. The status is recorded on the database. If the unwanted things will be happened in the pedestrian crossing area, the camera footages are used to identify the problem. In critical traffic affected places more than one surveillance camera also used. During the peak hours vehicle monitoring and object identification is very important. Because most of

the accidents will be occur on only the peak time. There are many disadvantages are using camera in traffic area. The major disadvantage of camera is it is costly and the implementation cost is high. The criminals are also easy to disconnect the camera setup. The camera footages are used later screening. It does not alert the nearest people or police.

To avoid the above problems a new system is used to detect pedestrian objects using current technology called IoT. The automobile users are easily identifying the pedestrian objects near the traffic area and avoid accidents.

2. Literature Review

Shraddha Kallappa Walikar et al., integrates of face identification and pedestrian takes place on the system known as Raspberry Pi. To detect the face of the humans OpenCV is used and it was developed by python programming. The camera was used to take the pictures in real time. The microprocessor was used to processing an image the objects to wait earlier than such limited time period. The controllers were developed with the help of traffic lights. The success rate of the proposed system was 80% and it will be executed properly [1].

Govardhan.S.D et al., said that pedestrians are the major object in real world. Pedestrian detection is the important task of many applications like videotape scrutiny, automatic vehicle driver system etc. The main theme of his research work was to decrease pedestrian identification time and reduce space complexity for saving object details. The detailed empirical study was done in his work [2].

Jae Hee Lee et al., describes about pedestrian identification and tracking was an important research area. The purpose of his study was to implement pedestrian identification and tracking system through Deep learning. He calculated the performance time and correctness of the objects using deep learning algorithms. Kalman Filter algorithm was used in pedestrian system. The concept was applied in pedestrian identifying system, intelligent transportation system and secure system [3].

M. Ameen Chhajro et al., explained that vehicle tracking and object identifications with the help of current technology is very difficult task. Haar-Like Feature technique was presented in his work for pedestrian discovery. He was implemented a system for automobile drivers to design a object detection system when the objects are journey near zebra crossing. For the above purpose 1000 CCTV footages were collected. A Haar based cascade classifiers was used over the images taken from the camera. The above system was trained by objects. This system shows 90% accuracy during pedestrian identification. This system was used to decrease road accidents and make sure provide the road safety management [4].

Yingfeng Cai et al., discussed about night time pedestrian recognition is very significant in driver assistant system. He proposed a new algorithm called saliency-based pedestrian recognition algorithm. The author was used fusion saliency based method to identify pedestrians. In final identification cross kernel based support vector machine classifier is used. The input of the above algorithm is pedestrian assumed sub image. The experiments were performed using real time road images. The above proposed technique produced more pedestrian identification rate with short processing time [5].

Roni Ash et al., said that pedestrian crossing was a hazardous activity for common peoples. Traffic lights integrated with audio voice messages o help the blind people. Mostly traffic lights do not contain audio messages. Blind people were difficult to cross the road without audio signal. The author proposed a new technique to help blind people by identifying traffic signals. This technique contains two parts. They are object identifier using deep learning method and decision making module. The above method is used to activate on a mobile phone using client-server technology. This method provided 99% object detection accuracy [6].

Minsu Kim et al., proposed a new learning architecture for cross-spectral pedestrian identification. The authors was designed a new network for color and

thermal pictures. The experiment result shows the better result compared with existing methods [7].

Q.Zhao et al., constructed a new algorithm for pedestrian identification in real time based on the road customer route identification. From the video stream frame series are collected used to make the object route with fundamental characters like width, speed, and length. For feature detection and decision making fuzzy triangular numbers are used. In decision making process multi variable decision making tree is used. The above method produced 93% accuracy [8].

Pratik Gujjar et al., explored to generate a video feature to predict pedestrian behavior. The authors main input of the above system was learning a series of features. Binary action classifier network is used to determine pedestrian crossing. The experiment result shows the average precision was 81 % [9].

Walter Morales-Alvarez et al., produced an automatic tool for analyzing pedestrian communication. They proposed a new algorithm using pose opinion, feature similarity and facial identification variables. The proposed tool was used for researchers to process large volume of data without human management [10].

3. Proposed System

The following figure 1 shows the block diagram of proposed framework. In this system the sensors and camera are placed near the traffic signals. When the signal is in on state, if any objects are identified by the sensors, immediately the controller is processed and the signal are sent to the bike riders. The signals which are received from the controller automatically reduce the speed of riders from their actual speed. So the rate of accident will be reduced.

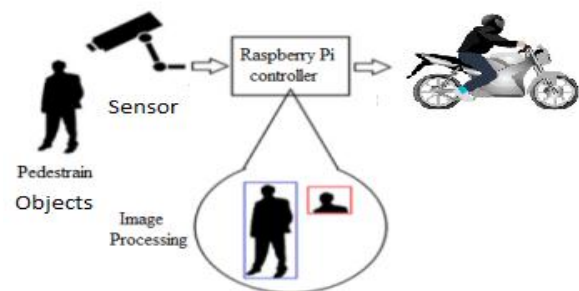


Figure 1: Block Diagram of proposed system

4. Results and Discussion

In our proposed system we are going to design a system that will have a camera placed in front of the vehicle. This camera will be always in ON state whenever the vehicle is moving. The camera will detect the pedestrians such as common humans and animals and when such pedestrians are been found it will give the information to the microcontroller and the microcontroller will make the vehicle slow down automatically. The following diagram shows how the pedestrians are detected through image processing.



Figure 2: Pedestrians detection through image processing

5. Conclusion

In our proposed system we have designed automatic braking system in vehicle by placing a camera to predict the pedestrians in road. This method is very cost effective and also it is easy to install in all vehicles. Thus the valuable life of humans and animals are saved.

References

- [1] Shraddha Kallappa Walikar & Aswatha Kumar, "Pedestrian Detection image processing algorithm for Traffic light system", pp. 1-5.
- [2] Govardhan.S.D & Vasuki.A (2018), "An Empirical Study of Pedestrian Detection Techniques with Different Image Resolutions", International Journal of Engineering and Advanced Technology (IJEAT), Vol. 8, No. 2S, ISSN: 2249 – 8958, pp 195-200.
- [3] Jae Hee Lee & Chang Jin Seo(2019), "Deep Learning based Pedestrian Detection and Tracking System using Unmanned Aerial Vehicle and Prediction Method", International Journal of Innovative Technology and Exploring Engineering (IJITEE), Vol. 8, No. 8S2, ISSN: 2278-3075 , pp 794-799.
- [4] M. Ameen Chhajro, Kamlesh Kumar, M. Malook Rind , Aftab Ahmed Shaikh, Haque Nawaz, & Rafaqat Hussain Arain(2016), "Pedestrian Detection Approach for Driver Assisted System using Haar based Cascade Classifiers", International Journal of Advanced Computer Science and Applications, Vol. 9, No. 6, pp, 111-114.
- [5] Yingfeng Cai , Ze Liu , Hai Wang & Xiaoqiang Sun(2017), "Saliency-Based Pedestrian Detection in Far Infrared Images", IEEE, pp 5013-5019.
- [6] Ash, R., Ofri, D., Brokman, J., Friedman, I., & Moshe, Y. (2018), "Real-time Pedestrian Traffic Light Detection, IEEE International Conference on the Science of Electrical Engineering in Israel (ICSEE).
- [7] Kim, M., Joung, S., Park, K., Kim, S., & Sohn, K. (2019), "Unpaired Cross-Spectral Pedestrian Detection Via Adversarial Feature Learning" IEEE International Conference on Image Processing (ICIP).pp.1650-1654.
- [8] Zhao, Q., Zhang, G. Y., Wood, R. L., & Luo, Z. W. (2009), "Video Based Real-Time Pedestrian Detection on Zebra Cross", 2nd International Congress on Image and Signal Processing, IEEE.
- [9] Scenes Pratik Gujjar & Richard Vaughan (2019)," Classifying Pedestrian Actions In Advance Using Predicted Video Of Urban Driving", International Conference on Robotics and Automation (ICRA).
- [10] Morales-Alvarez, W., Gomez-Silva, M. J., Fernandez-Lopez, G., GarcA-Fernandez, F., & Olaverri-Monreal, C. (2018)., "Automatic Analysis of Pedestrian's Body Language in the Interaction with Autonomous Vehicles", IEEE Intelligent Vehicles Symposium (IV), pp 1-6.