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Artificial Intelligence based Helmet Wearing System

V. Vijitha[1], S. Anitha[2], S. T. Kavya[3], S. Mahadhir Mohammed[4], S. Lokesh[5]
[1]*Assistant Professor, Dept. of Electronics and Communication Engg., Knowledge Inst. of Tech., Salem, India*
[2,3,4,5]*Student, Dept. of Electronics and Communication Engg., Knowledge Inst. of Tech., Salem, India*

***Abstract*: The theme of our project is AI Based Helmet Wearing System. In India, nearly 200 million people commute by two-wheelers every day. We usually see people riding two-wheelers without helmet and this is a common sight nowadays. Every day, more than 100 bikers die of head injury in India. 'Safe Biking' advertisements won't work as people are not concerned about the consequences they will have to face. In our project, a camera is to be placed in front of the speedometer in an angle such that it covers the rider's face. When the rider turns on the vehicle, the control unit starts functioning, searches for the helmet's image by taking continuous input from the camera. If the camera finds that the rider is not wearing helmet, it sends a signal to the microprocessor to turn the vehicle off. This prevents the rider from head injury and incidentally, death. And even when the rider is riding for hours and when he tends to remove his helmet, the vehicle turns off unconditionally. Thus, this saves the rider from brain injury. Helmet save humans from head injuries, and preventing from those head injuries save humans from death.**

***Keywords*: Image processing, MATLAB, camera module, microprocessor, speedometer.**

1. Introduction

Our intention is to make our country a safe riding environment. For making a safe journey the bike riders have to wear helmet. People don't usually wear helmets now a days as they don't take that as a serious one our project solves this problem by making all the riders to wear helmet. If a rider needs to ride a bike he/she must wear the helmet, only then the bike starts to ignite. Our product helps to the government and police officers from taking actions on those who break law and from punishing those who don't wear helmet and from making the riders to wear helmet forcibly. Even though the rules by the Government force the riders to wear helmet, the riders are not wearing it. Our product will help them. Our product saves many lives from head injuries. Our objective is to make the riders to wear helmet without using sensors thus making it radiation free.

2. Literature survey

[1] The paper titled as machine vision techniques for motorcycle safety helmet detection explains that video clips from the road sides were taken and converted into images and it first finds how many members are there on the two wheeler and then it determines whether the rider is wearing helmet or not by using the KNN (K Nearest Neighbor) classifier which is based on the features of circularity, average hues, average intensity of each head quadrants.

[2] The paper on intelligent transportation system for accident prevention forwarded a design for smart helmet by using the sensors to verify whether the rider has weared the helmet and whether he has consumed alcohol or not. If the driver has weared the helmet and has not consumed alcohol the controller turns on the bike or otherwise the bike is not ignited. In addition they also added the feature of notifying the accidents happened to the predefined mobile numbers by using the GPS (to send the location of the accidents) and GSM (to send the message to the mobile).This happens when the sensors in the helmets gets tilted which is one of the major disadvantage because even if the rider bends down wearing the helmet and the alert goes to the persons without any accidents and hence there is a less accuracy in prediction of accidents.

[3] The paper on Helmet presence classification with motorcycle detection and tracking explains the system for the automatic classification and tracking of motorcycle riders with and without helmets is therefore described and tested. The system uses support vector machines trained on histograms derived from head images of the motorcycle riders using both static photographs and individual image frames from video data. The trained classifier is incorporated into a tracking system where motorcycle riders are automatically segmented from video data using background subtraction. The heads of the riders are isolated and then classified using the trained classifier. These frames are then classified as a whole using a mean of the individual classifier results. Tests show that the classifier is able to accurately classify whether riders are wearing helmets or not on static photographs.

[4] The paper on Internet of Things (IoT) based smart helmet for accident detection and notification introduced a smart helmet to provide a means and apparatus for detecting and reporting accidents. Sensors, Wi-Fi enabled processor and cloud computing infrastructures are utilized for building the system. The accident detection system communicates the accelerometer values to the processor which continuously monitors for variations. When an accident occurs, the related details are sent to the emergency contacts by utilizing a cloud based service. The vehicle location is obtained by making use

of the global positioning system.

[5]The paper on Full Motorcycle Helmet Detection Scheme Using Canny Detection by Liu, Liao, Chen, and Chen tells us that the studies focusing on helmets detection uses a technique to find a full-face helmet in a scene using circle fitting on its Canny.

[6]The paper on Smart Helmet System Using Alcohol Detection For Vehicle Protection introduces a smart helmet system which detects that, the person wearing helmet or not and also the system detect the person is drunk, If the driver using cell phone during driving means the bike will be jammed slowly. In this system a transmitter is placed in the helmet and receiver at the bike. A switch will be there to ensure that the person is wearing the helmet or not. And also a alcohol sensor is placed in the helmet near the mouth of the driver to check whether the driver is drunk.

3. Proposed solution

The solution that we are trying to propose is to make people wear their helmet whenever they ride a bike. We have used camera, and the microcontroller. To make our project effective, we implemented it in different way by using Image Processor. Block diagram has a component of camera module, Image processor, Switch and a motor. The power supply for the camera module and the processor is given from the motor bike battery itself, so that the product will be compact and efficient

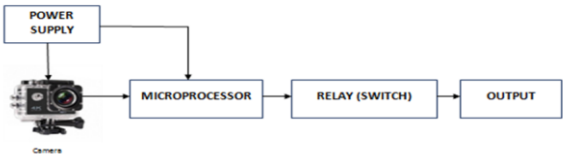

Fig. 1. Block diagram

A. Camera

The camera module is located in such a way that it focuses the rider's face and the helmet. It is placed in a movable position so that it can be adjusted for the rider's convenience. The camera module is switched on when the supply from the battery is given. Then the camera module sends the continuous image output to the Image processor.

B. Image processor

The purpose of the image processor is to check whether the rider wears the helmet or not. The output of the camera module is sent as the input to the processor. Some of the image data of helmets are already fed into the processor. The algorithm used to check whether the rider wears the helmet or not is dumped in the processor. When the processor is on the algorithm checks whether the rider has worn the helmet or not, by comparing the image output from the camera module and the data in the processor. If the comparison is matched the processor sends HIGH signal to the relay [switch], if not the processor sends LOW signal to the switch.

C. Output of the image processor

The image taken by the camera is processed into binary information and it is sent to the controller which turns the bike off if the does not have helmet and turns it on if the image has helmet.

Fig. 2. Monochrome image

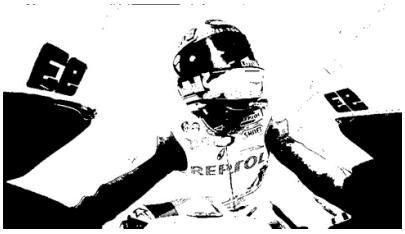

Fig. 3. Binary image

D. Switch

Switch is used between the motor ignition and the processor output signal. The switch is normally in open circuit. There will be signal flow only when the switch is short circuited. When the processor sends the HIGH output signal the switch becomes short circuited thereby triggering the ignition.

E. Innovativeness of the proposed solution

The innovativeness of our solution on comparing the existing prototypes and products is that we use the camera module, whereas the existing prototypes use various sensors like ultrasonic sensors, IR sensors. Thus the innovation in our solution is, not to use sensors that cause radiations and that affect human life slowly, but to use camera. Here the power supply doesn't get wasted because the supply is given directly from the battery of the bike. We also use the image processor to compare the images which is also the unique feature of our proposed solution.

4. Conclusion

Road safety is the most important aspect in our daily life. As the awareness about road safety is depreciating every day, and the number of accidents increases, we designed this project to solve this problem. Although we had some negative feedback in our project, most of the customers we have interacted with, agreed that this idea will be a good turnover to solve the problem in such cities where helmet wearing riders are very less. Our solution has created a very good impact on the bike manufacturing companies and the bike riders they felt that using camera other than sensors is better as it does not cause any ill effects in human body. Yet the people whom we interacted had a major question that what happens if the rider is in some

emergency situation and he lost his helmet how could he ride the bike? The answer will be “the rider can’t”, helmet is mandatory, even in some emergency situations driving without helmet is not advisable because the value of life is very big.

References

[1] R. Waranusast, N. Bundon, V. Timtong, C. Tangnoi and P. Pattanathaburt, "Machine vision techniques for motorcycle safety helmet detection," 2013 28th International Conference on Image and Vision Computing New Zealand (IVCNZ 2013), Wellington, 2013, pp. 35-40.

[2] D. Selvathi, P. Pavithra and T. Preethi, "Intelligent transportation system for accident prevention and detection," 2017 International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, 2017, pp. 442-446.

[3] J. Chiverton, "Helmet presence classification with motorcycle detection and tracking," in IET Intelligent Transport Systems, vol. 6, no. 3, pp. 259-269, September 2012.

[4] S. Chandran, S. Chandrasekar and N.E. Elizabeth, "Konnect: An Internet of Things (IoT) based smart helmet for accident detection and notification," 2016 IEEE Annual India Conference (INDICON), Bangalore, 2016.

[5] C. C. Liu, J. S.Liao, W. Y. Chen, and J. H. Chen, “The Full Motocycle Helmet Detection Scheme Using Canny Detection,” 18th IPPR Conf. on CVGIP, pp. 1104-1110, 2005.

[6] Mugila. G Muthulakshmi. M Santhiya. K, and Dhivya. P, “Smart Helmet System Using Alcohol Detection For Vehicle Protection,” International Journal of Innovative Research in Science Engineering and Technology (IJIRTSE), vol. 2, no. 7 July 2016.