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HELMET DETECTION AND NUMBER PLATE RECOGNITION USING MACHINE LEARNING

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Abstract : Motorcycles have always been the primary mode of transportation in developing countries. Motorcycle accidents have increased in recent years. One of the main reasons for fatalities in accidents is that a motorcyclist does not wear a protective helmet. The most common way to ensure that motorcyclists wear a helmet is by traffic police to manually monitor motorcyclists at road junctions or through CCTV footage and to penalize those without a helmet. But it requires human intervention and effort. So this system Proposes an automated system for detecting motorcyclists who do not wear a helmet and retrieving their motorcycle number plates from CCTV video footage .First, the system classifies moving objects as motorcycling or non motorcycling. In the case of a classified motorcyclist, the head portion is located and classified as a helmet or non-helmet. Finally, for the motorcyclist identified without a helmet, the number plate of the motorcycle is detected and the characters on it are extracted by using the OCR algorithm.

IndexTerms **– Image Selection, Extraction, Machine Learning**

I. INTRODUCTION

Motorcycle riders need to take extra steps to safeguard their bodies in addition to wearing helmets, which try to lower the risk of major head and brain injuries by absorbing the force of a force or collision to the head. When compared to those who don't wear helmets, riders and passengers who do so significantly boost their chances of surviving an accident. Every motorcyclist is required by law to wear a helmet when operating a motorcycle. However, a lot of bikers disregard and operate their vehicle without any form of defence. The policeman made an effort to manually regulate the situation, but it was insufficient given the actual situation. Despite the recent requirement for helmets, many people continue to operate motor vehicles without them. Since helmets are the primary piece of safety gear used in developing nations, the number of fatalities has increased every year.

II. MOTIVATION

In almost all countries, motorcycle is a popular means of transport. However, due to less protection high risk is involved in two wheelers. It is highly desirable for two-wheeler riders to use helmet to reduce the risk. Most of the deaths in the last few years in accidents are due to head injury. This will Avoided.

III. PROBLEM STATEMENT

The proposed approach first captures the real time image of road traffic and then differentiates the two wheelers from other vehicles in the road. It then processes to check whether the rider and pillion rider are wearing helmet or not. People wearing different kinds of helmet which are not safe and hence should be considered as violation of traffic rule. Rider wearing different kinds of caps which should also be considered as violation.

IV. LITERATURE SURVEY

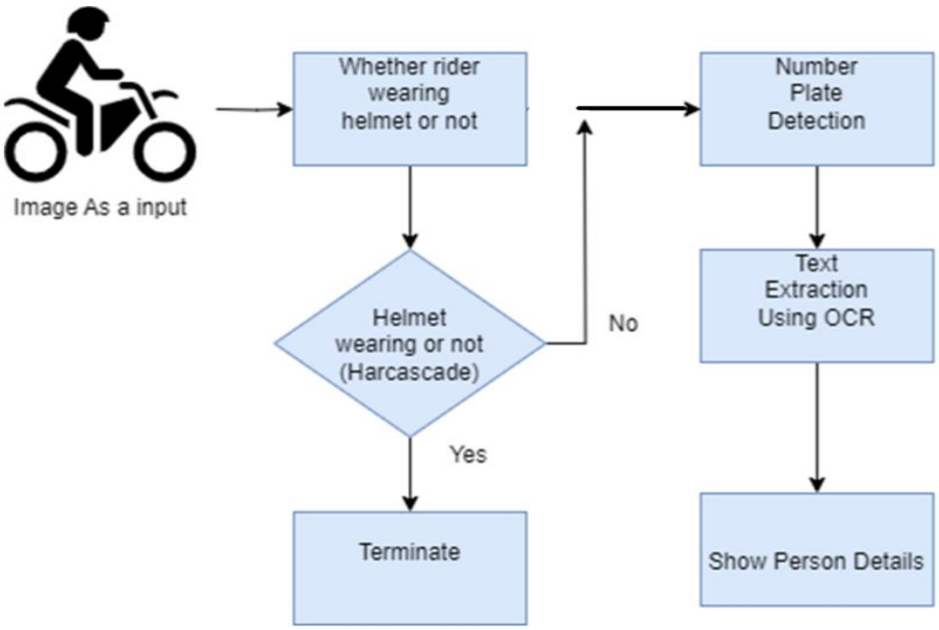
A research paper is a document of a scientific article that contains relevant expertise, including substantive observations, and also references to a specific subject of philosophy and technique. Use-secondary references are reviewed in literature and no current or initial experimental work is published.

1. **Paper Name:** Automated Helmet Detection for Multiple Motorcycle Riders using CNN.
   Author: Madhuchhanda Dasgupta, Oishila Bandyopadhyay, Sanjay Chatterji, Computer Science Engineering IIIT Kalyani West Bengal, India.
   Description : Automated detection of traffic rule violators is an essential component of any smart traffic system. In a country like India with high density of population in all big cities, motorcycle is one of the main modes of transport. It is observed that most of the motorcyclists avoid the use of helmet within the city or even in highways. Use of helmet can reduce the risk of head and severe brain injury of the motorcyclists in most of the motorcycle accident cases. Today violation of most of the traffic and safety rules are detected by analyzing the traffic videos captured by surveillance camera. This paper proposes a framework for detection of single or multiple riders travel on a motorcycle without wearing helmets. In the proposed approach, at first stage, motorcycle riders are detected using YOLOv3 model which is an incremental version of YOLO model, the state-of-the-art method for object detection. In the second stage, a Convolutional Neural Network (CNN) based architecture has been proposed for helmet detection of motorcycle riders. The proposed model is evaluated on traffic videos and the obtained results are promising in comparison with other CNN based approaches.

2. **Paper Name:** Helmet and Number Plate detection of Motorcyclists using Deep Learning and Advanced Machine Vision Techniques.
   Author: Fahad A Khan, Nitin Nagori, Dr. Ameya Naik, Department of Electronics Telecommunication K.J.Somaiya college of Engineering Mumbai, India
   Abstract : In today's world, the increasing use of Motorcycles has prompted increment in road accidents and injuries. Helmet not used by the motorcycle rider is one of the major cause. Currently, one procedure is to physically check use of helmet at the pavement junction or through the CCTV footage video, which requires human intervention to detect motorcyclists without helmet. The proposed framework presents a computerization machine structure to distinguish the motorcycle rider with or without helmet from images. The system extracts objects class based on feature extracted. The system uses You Only Look Once (YOLO)-Darknet deep learning framework which consists of Convolutional Neural Networks trained on Common Objects in Context (COCO) and combined with computer vision. YOLO's convolutional layers are modified to detect specified three classes and it uses a sliding window process. The map (Mean Average Precision) on validation dataset achieved 81% by using training data.

3. **Paper Name:** Helmet Detection Using ML, IoT.
   Author: Dikshant Manocha, Ankita Purkayastha, Yatin Chachra, Namit Rastogi, Varun Goel Department of Electronics and Communication Engineering Jaypee Institute of Information Technology Noida, India.
   Description : This paper is about detecting two-wheeler riders without helmet with the help of machine learning and provide them with a user interface to pay challans. The proposed approach first captures the real time image of road traffic and then differentiates the two wheelers from other vehicles in the road. It then processes to check whether the rider and pillion rider are wearing helmet or not using Open-CV. If any one of the riders and pillion rider found not wearing the helmet, their vehicle number plate is processed using optical character recognition (OCR). After extracting the vehicle registration number, a challan will be generated against respective vehicle and all the details of the challan will be sent via E-mail and SMS to the concerned person. An user interface (an app and a website) will also be provided to pay their challans.

V. SYSTEM ARCHITECTURE



VI. DATAFLOW DIAGRAM

Figure 4.1: Data Flow(0) diagram

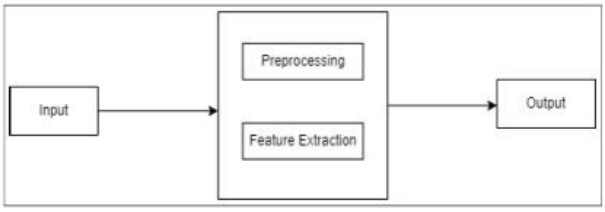


Figure 4.2: Data Flow diagram

Figure 4.3: Data Flow diagram

VII. SYSTEM TESTING

1. **Edraw Max:**
It enables students, teachers and business professional store liable create and publish various kinds of diagram store present any ideas. With this application users can easily create professional- looking flow charts, organizational charts, network diagrams, business presentations, building plans, mind maps, science illustration, fashion designs, UML diagrams and much more.

2. **Star UML:**
Star UML is a fully fledged, open source, UML modelling tool that supports the ability to create software designs, from basic concepts, through to the coded solution. The user should be aware that this tool is more complex than a simple UML diagram editing tool, in that, through the use of the model Drive Architecture (MDA) standard, the tool supports complex modelling which is realizable in code.

- **Type of Testing**

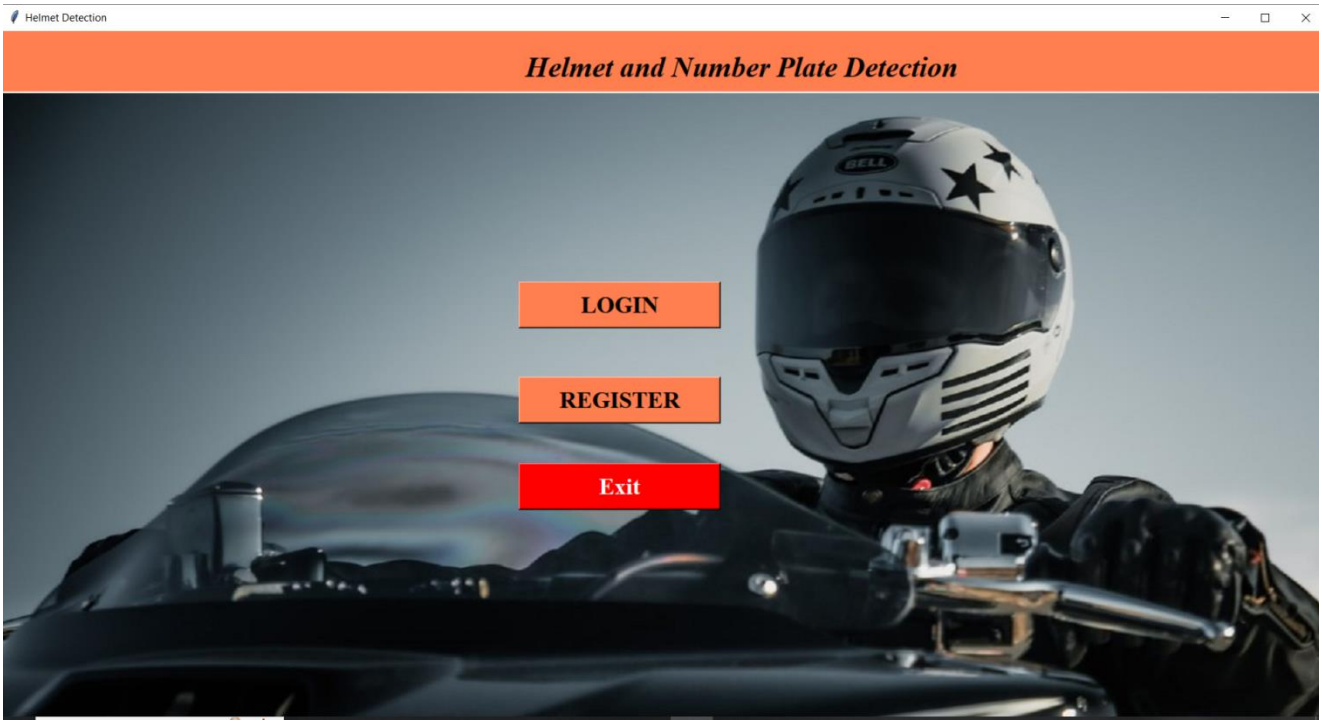
i. **Unit Testing:**
It is the testing of individual software units of the application. It is done after the complexion of an individual unit before integration. Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code f low should be validated. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

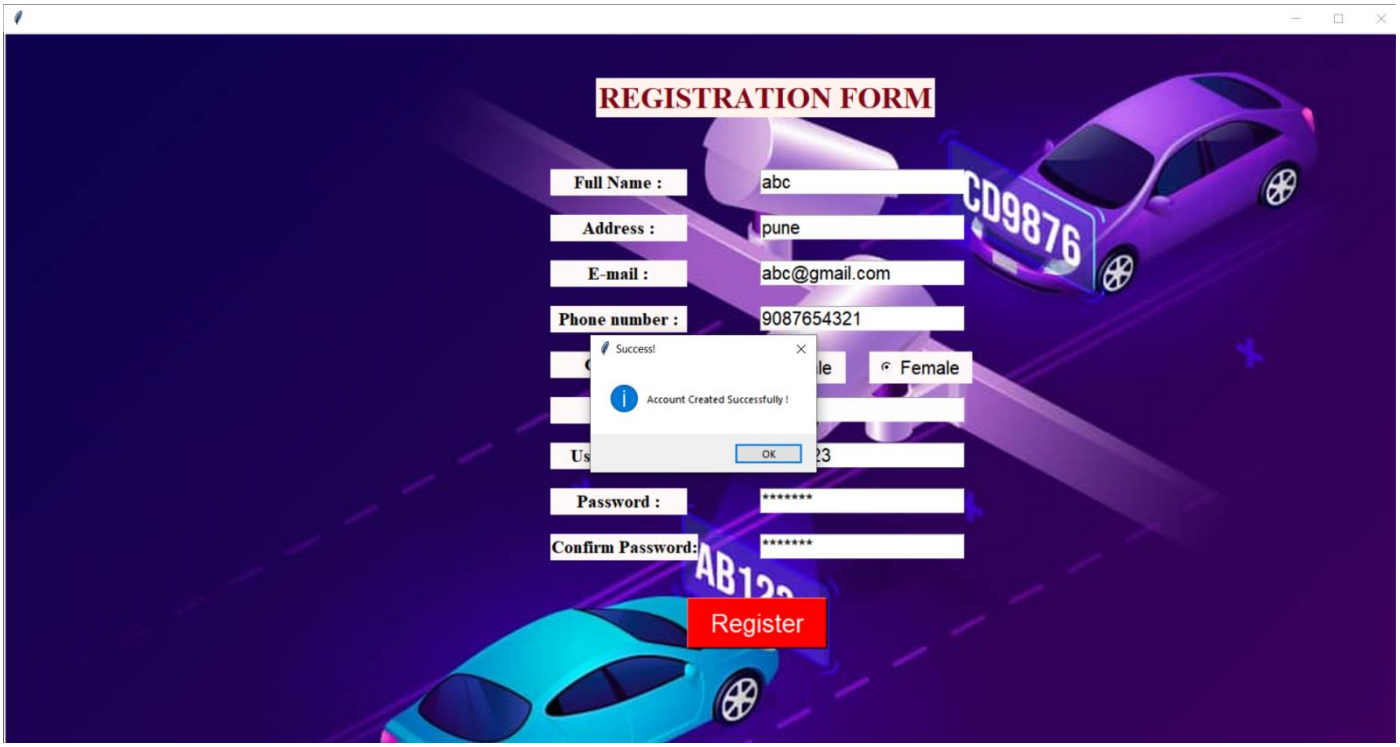
ii. **Regression Testing:**
Regression testing is a software testing practice that ensures an application still functions as expected after any code changes, updates, or improvements. Regression testing is responsible for the overall stability and functionality of the existing features.

iii. **Smoke Testing:**
Smoke Testing comes into the picture at the time of receiving build software from the development team. The purpose of smoke testing is to determine whether the build software is testable or not. It is done at the time of "building software." This process is also known as "Day 0". It is a time-saving process. It reduces testing time because testing is done only when the key features of the application are not working or if the key bugs are not fixed. The focus of Smoke Testing is on the workflow of the core and primary functions of the application.

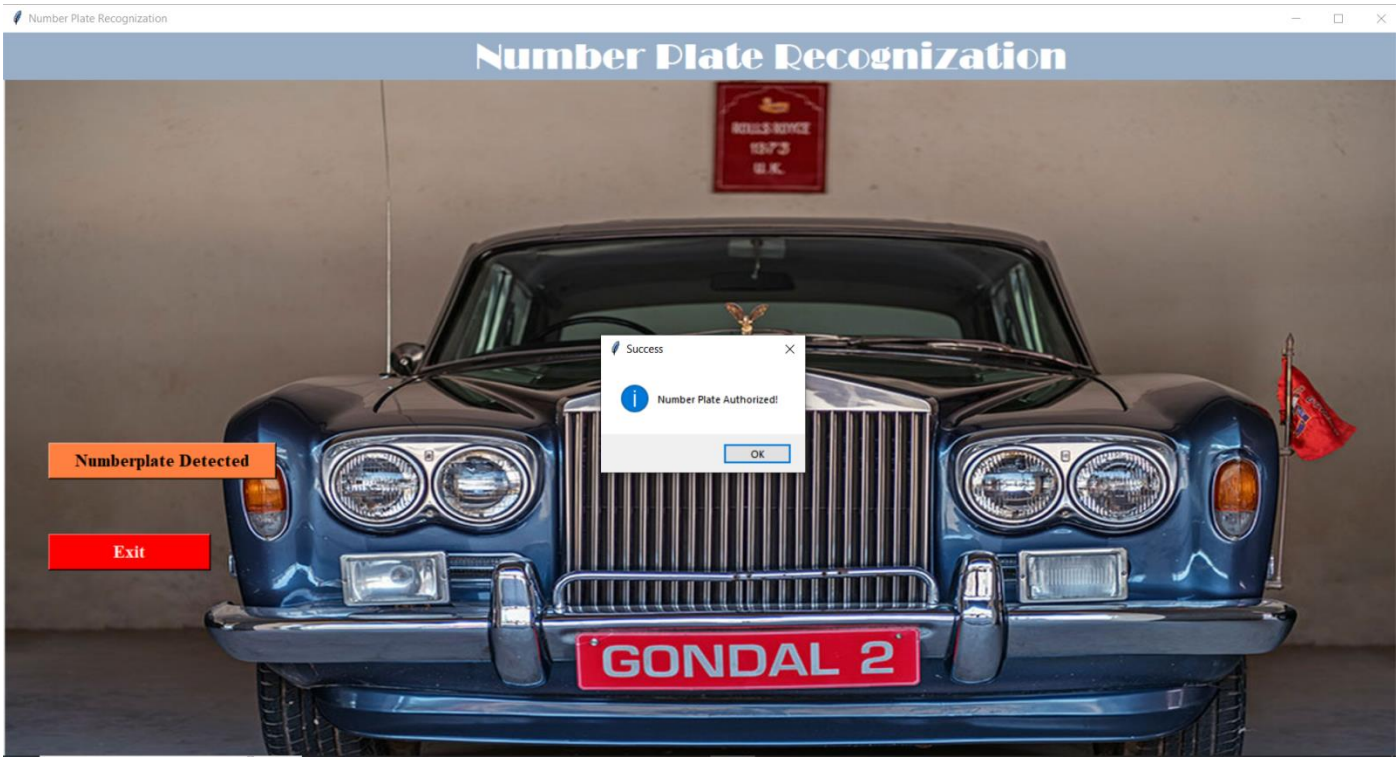
iv. **System Testing:**
System Testing is a type of software testing that is performed on a complete integrated system to evaluate the compliance of the system with the corresponding requirements. Integration Testing Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.
Variables of the study contains dependent and independent variable. The study used pre-specified method for the selection of variables. The study used the Stock returns are as dependent variable. From the share price of the firm the Stock returns are calculated. Rate of a stock salable at stock market is known as stock price.

VIII. OUTPUT

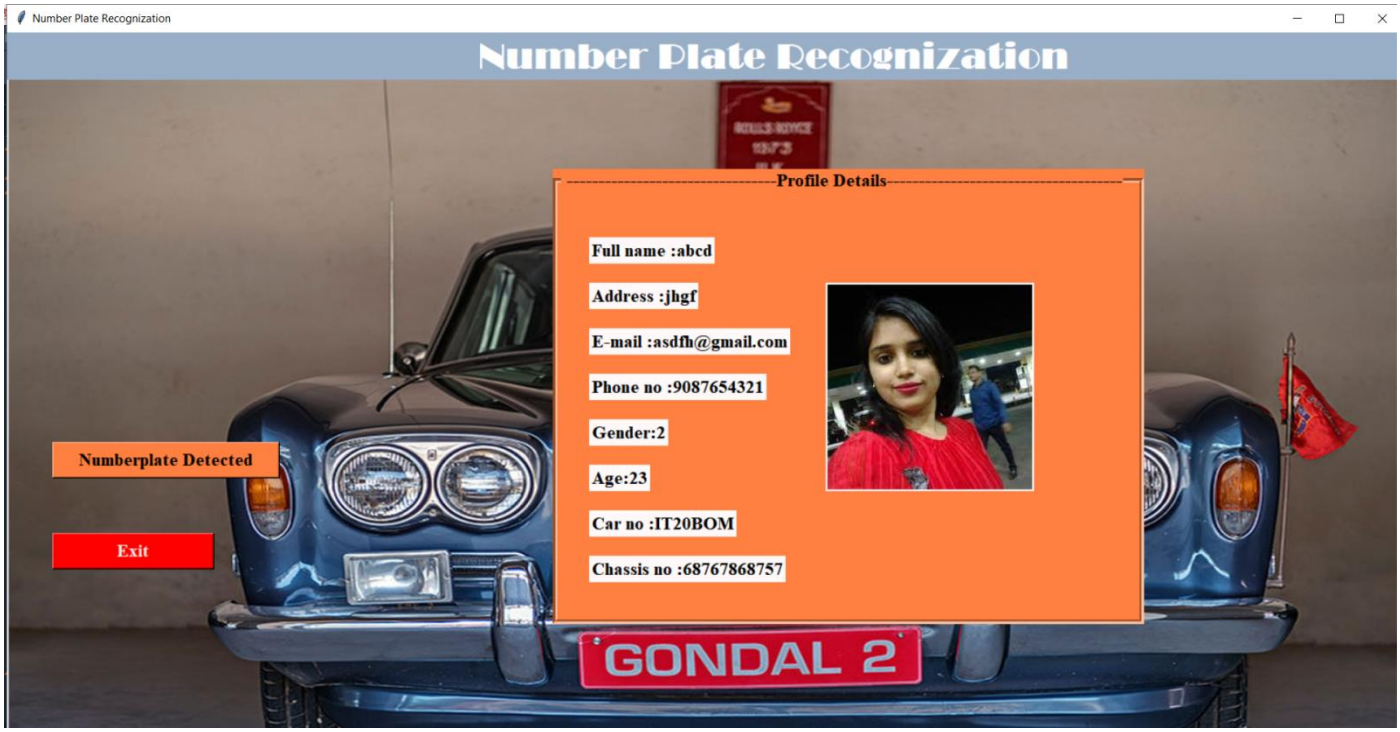

Helmet Detection
Helmet and Number Plate Detection
LOGIN
REGISTER
Exit


REGISTRATION FORM
Full Name :
abc
Address :
pune
E-mail :
abc@gmail.com
Phone number :
9087654321
Female
Success!
Account Created Successfully !
OK
Password :
Confirm Password:
Register


Number Plate Recognization
Helmet and Number Plate Recognization
Number Plate Registration
Helmet Detect
Exit


Number Plate Recognization
Number Plate Recognization
Success
Number Plate Authorized!
OK
Numberplate Detected
Exit
GONDAL 2


helmet 0.79


Number Plate Recognization
Number Plate Recognization
Profile Details
Full name :abcd
Address :jhgf
E-mail :asdfh@gmail.com
Phone no :9087654321
Gender:2
Age:23
Car no :IT20BOM
Chassis no :68767868757
Numberplate Detected
Exit
GONDAL 2

IX. REFERENCES

[1] News Mobile, 'Chill your head while riding bike with AC helmet', 25- Dec 2017. [Online]. Available: http://newsmobile.in/articles/2017/12/25/chill-head riding-bike-achelmet/. [Accessed: 30- Nov- 2019]

[2] TheTimesofIndia, 'Helmet must for pillion riders in Karnataka from Jan 12', 08-Jan-2016. [Online]. Available: https://timesofindia.indiatimes.com/city/bengaluru/Helmet-must-forpillion-riders-in-Karnataka-from-Jan-12/articleshow/50499061.cms. [Ac cessed: 30- Nov- 2019]

[3] G. Sasikala, K. Padol, A. A. Katekar and S. Dhanasekaran, "Safeguarding of motorcyclists through helmet recognition," 2015 International Conference on Smart Technologies and Management for Computing, Communication, Con trols, Energy and Materials (ICSTM), Chennai, 2015, pp. 609-612.

[4] N. Boonsirisumpun, W. Puarungroj and P. Wairotchanaphuttha, "Automatic Detector for Bikers with no Helmet using Deep Learning," 2018 22nd Interna tional Computer Science and Engineering Conference (ICSEC), Chiang Mai, Thailand, 2018, pp. 1-4.

[5] L. Chen, W. Chang, J. Su and Y. Chen, "i-Helmet: An intelligent motorcycle helmet for rear big truck/bus intimation and collision avoidance," 2018 IEEE International Conference on Consumer Electronics (ICCE), Las Vegas, NV, 2018, pp. 1-2.

[6] M.A.V. Forero, "Detection of motorcycles and use of safety helmets with an algorithm using image processing techniques and artificial intelligence mod els," MOVICI-MOYCOT 2018: Joint Conference for Urban Mobility in the Smart City, Medellin, 2018, pp. 1-9

[7] C.A.Rohith, S. A. Nair, P. S. Nair, S. Alphonsa and N. P. John, "An Efficient Helmet Detection for MVD using Deep learning," 2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI), Tirunelveli, India, 2019, pp. 282-286.

[8] Helmet Saves, 'Riding rules you must follow without fail', 05-Oct2017. [Online]. Available: https://helmetsaves.life/riding-rules-youmust-follow-without fail-2903dee05ab3. [Accessed: 30- Nov- 2019]

[9] Live Mint, 'Helmet regulation: who will take the responsibility to protect riders' head?', 28-Apr-2016. [Online]. Available: https://www.livemint.com/Politics/HXMRx9DqMu1v46hGyIzv1O/Helmet-regulation-who-will-take-the-responsibility-to-prote.html. [Accessed: 30 Nov- 2019]

[10] India Today, 'Two-wheeler riders, you could soon face heavy penalties for using helmets without the ISI mark', 24-Jun-2017. [Online]. Available: https://www.indiatoday.in/mail today/story/isihelmets-two-wheelers-ministry-of-road-transport-and-highways984453 2017-06-2.