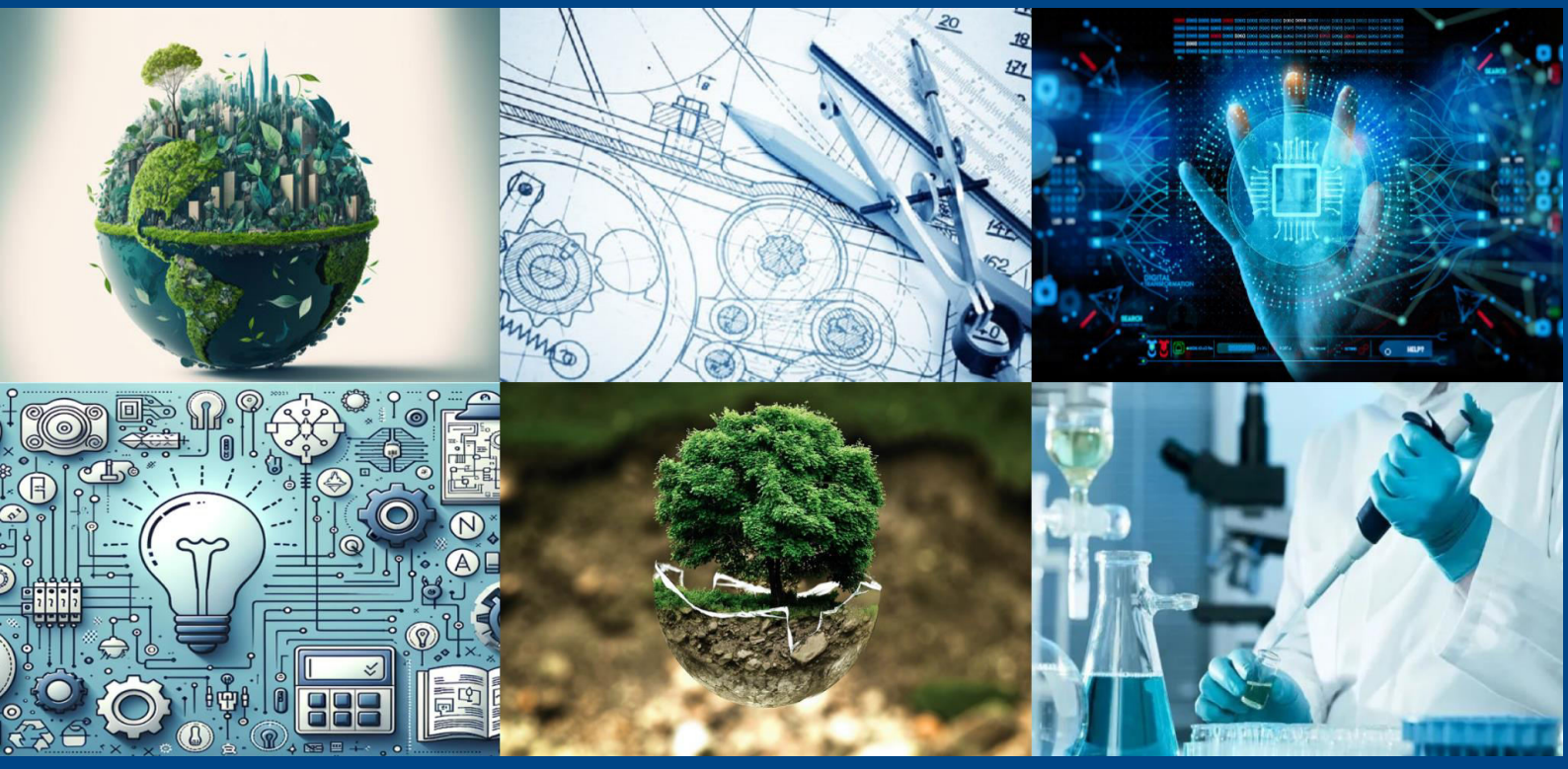
ISSN: 2582-7219

International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206 **Volume 8, Issue 3, March 2025**

© 2025 IJMRSET | Volume 8, Issue 3, March 2025| DOI: 10.15680/IJMRSET.2025.0803239

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Road Vision AI: Helmet and License Plate Detection

Dr. D.J. Samatha Naidu, K. Venkata Ramya, V. Nagendra Babu

Professor, Dept. of MCA, APGCCS, New Boyanapalli, Rajampet, A.P, India

Assistant Professor, Dept. of MCA, APGCCS, New Boyanapalli, Rajampet, A.P, India

PG Student, Dept. of MCA, APGCCS, New Boyanapalli, Rajampet, A.P, India

ABSTRACT: In current situation, we come across various problems in traffic regulations in India which can be solved with different ideas. Riding motorcycle/mopeds without wearing helmet is a traffic violation which has resulted in increase in number of accidents and deaths in India. Existing system monitors the traffic violations primarily through CCTV recordings, where the traffic police have to look into the frame where the traffic violation is happening, zoom into the license plate in case rider is not wearing helmet. But this requires lot of manpower and time as the traffic violations frequently and the number of people using motorcycles is increasing day-by-day. What if there is a system, which would automatically look for traffic violation of not wearing helmet while riding motorcycle/moped and if so, would automatically extract the vehicles' license plate number. Recent research have successfully done this work based on CNN, R-CNN, LBP, HoG, HaaR features. But these works are limited with respect to efficiency, accuracy or the speed with which object detection and classification is done. In this research work, a Non-Helmet Rider detection system is built which attempts to satisfy the automation of detecting the traffic violation of not wearing helmet and extracting the vehicles' license plate number. The main principle involved is Object Detection using Deep Learning at three levels. The objects detected are person, motorcycle/moped at first level using YOLOv2, helmet at second level using YOLOv3, License plate at the last level using YOLOv2. Then the license plate registration number is extracted using OCR (Optical Character Recognition

I. INTRODUCTION

Our purpose of this study is to develop a Non-Helmet Driver Detection. Approach that will automate overall process of identifying traffic offences including not wearing helmets & retrieving its vehicle's license number plate. Object recognition using Deep Learning at 3 layers is the basic principle concerned.At first step, the item has been used to identify the people; & at second step, YOLOv3 has been used to identify the motor bike.

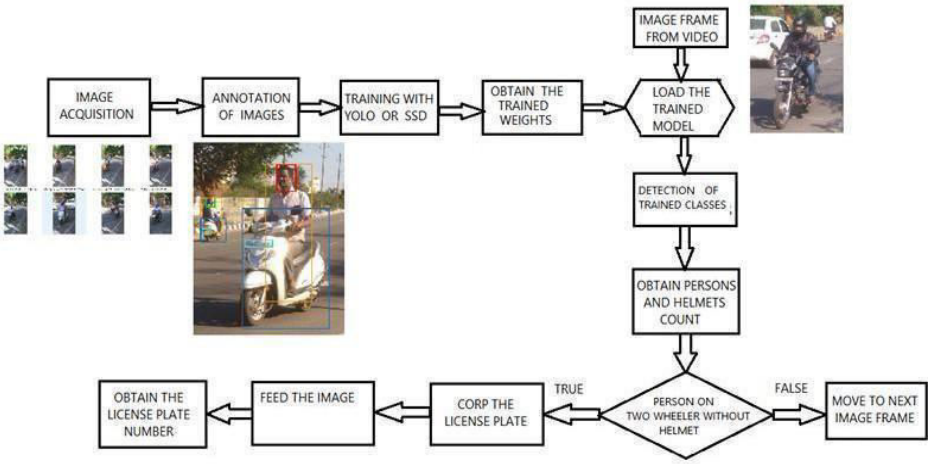


Figure 1: System Architecture

© 2025 IJMRSET | Volume 8, Issue 3, March 2025| DOI: 10.15680/IJMRSET.2025.0803239

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

II. LITERATURE REVIEW

Many researchers have paid attention to the location privacy since Ozturk first proposed his concept [12]. Recently, location privacy has been widely researched in industrial wireless sensor networks [13], vehicular ad-hoc networks [14], cloud computing [15], social network [16] and so on. Location privacy covers the source location privacy and the sink location privacy. In this paper, we focus on the source location privacy protection. Manjula et al. used virtual sources to protect the source location privacy [17]. In their scheme, a routing technique was proposed to maximize the safety time. By adding random walk into the routing process, nodes in non-hotspot areas participated in the establishment of multiple routing paths. Hence, the safety time increased without influencing the network lifetime. Matthew et al. proposed two algorithms using fake sources to protect the source location privacy [8]. In the first algorithm, fake sources were dynamically deployed around the sink. Then, the sink used flooding to select fake sources. This algorithm can provide a good source location privacy at the expense of the huge energy consumption. To cope with this, another algorithm called dynamic single path routing algorithm (DynamicSPR) was proposed. By using directed random walk, nodes away from the source were selected as fake sources, which significantly reduced the energy consumption. However, fake sources were related to the relative location of the source and the sink, sensor nodes in a specific area might exhaust energy. Jing et al. considered a more powerful adversary and proposed a privacy enhancing routing algorithm to protect location privacy [18]. In their research, a global adversary using Bayesian maximum-a-posteriori (MAP) estimation strategy tried to monitor the communication between nodes. Then, a decision-making framework was put forward to reduce the adversary's detection probability. Finally, the problem was converted into the adjustment of parameters.

However, the number of converged routing paths was not clearly defined and the energy collected by nodes around the sink might be less than the energy costed by transmitting packets. Chen et al. in [20] proposed a constrained random walk mechanism. In their mechanism, a next- hop candidate selection domain was generated based on the offset angle of current node's neighbors and the danger distance, which made the selection domain look like an ellipse. Then, the weight of each node in the domain was calculated by the ratio between a current node's offset angle and the sum of total offset angle. The smaller the ratio, the higher the probability that this node became the next-hop candidate.

III. METHODOLOGY OF PROPOSED SURVEY

The Software Development Life Cycle (SDLC) is a series of stages that provide a structured approach to the software development process. It encompasses understanding the business requirements, eliciting needs, converting concepts into functionalities and features, and ultimately delivering a product that meets business needs. A proficient software developer should possess adequate knowledge to select the appropriate SDLC model based on project context and business requirements. Therefore, it is essential to select the right SDLC model tailored to the specific concerns and requirements of the project to ensure its success. To explore more about choosing the right SDLC model, you can follow this link for additional information. Furthermore, to delve deeper into software lifecycle testing and SDLC stages, follow the highlighted links here.The exploration will cover various types of SDLC models, their benefits, disadvantages, and when to use them. SDLC models can be viewed as tools to enhance product delivery.
Types of Software developing life cycles (SDLC)

- Waterfall Model
- V -Shape Model
- Evolutionary Prototyping Model
- Spiral Method (SDM)
- Iterative and Incremental Method Method
- Agile Development

Waterfall Model

The Waterfall Model follows a linear, sequential flow, where progress moves steadily downwards (like a waterfall) through the phases of software development. Each stage in the development cycle begins only after the previous stage is completed.. It is the oldest and most well-known method used for software development. The five-stage waterfall

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

model, based on Winston W. Royce's requirements, divides development processes into the following stages:

Advantages

1. Simple to clarify for the clients.
2. Structures approach.
3. Stages and exercises are distinct.
4. Assists with arranging and timetable the task.

IV.CONCLUSION AND FUTURE WORK

The speed detection system is able detect vehicles speed even with shadows also. With fast processors or high-end smart phones, it can be seen as a future vehicles speed detector. Since the cost of this system is many times less. It can used manage traffic and avoid accidents at a cheaper price. A Non-Helmet Rider Detection system is developed where a video file is taken as input. If the motorcycle rider in the video footage is not wearing helmet while riding the motorcycle, then the license plate number of that motorcycle is extracted and displayed. Object detection principle with YOLO architecture is used for motorcycle, person, helmet and license plate detection. OCR is used for license plate number extraction if rider is not wearing helmet. Not only the characters are extracted, but also the frame from which it is also extracted so that it can be used for other purposes. All the objectives of the project is achieved satisfactorily.In the mid-term, expanding the system to detect helmets and license plates on other types of vehicles, such as motorcycles and trucks, will be essential. Leveraging edge computing to reduce latency and improving driver and vehicle analytics will also provide valuable insights. Moreover, developing predictive analytics powered by artificial intelligence will help forecast and prevent accidents.

REFERENCES

1. Python Crash Course 2nd Edition - this is a basic level book for beginners.
2. Learning python 5th Edition - this book is a practical learning book for basic to advanced level.
3. Python Cookbook - this book for advanced programmer interested in learning about modern python development tools.
4. Automating Boring Stuff With Python - In this book you will learn to write programs in python.
5. Head First Python - this book covered the fundamental of python.
6. Think Python - the basics of programming concepts and cover advanced topics like data structure and object-oriented design.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com