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Helmet Detection and Number Plate Recognition using Image Processing

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Abstract – Motorcycles have long been the primary form of transportation in poor countries, hence there are very few vehicles. In recent years, motorcycle accidents have become more common. Motorcycle riders who have never used fluorescent helmets because they do not feel they provide adequate protection are among those engaged in traffic incidents. When traffic cops see people riding motorcycles without helmets on the road as a whole—or mMotorcycles in intersections—they utilise CCTV footage to take control of the drivers of those vehicles and fine individuals who are riding without one. It can only be accomplished, however, via human activity and devotion. Second, moving vehicles are classified as either motorcycles or nonmotorcycles. For example, in the case of bike riders, the head component is classified as either full face or non-full face. After that, an excellent image analysis of the motorbike number is utilised to recover the characters that the identification software missed, and finally, the motorcycle's character count is discovered, and the motorcycle is analysed using OCR software. A face detection algorithm that uses an object detection algorithm to find individuals in a frame or a live stream. In their work "Rapid Feature Selection Using just a Motivation Increases of Simple Characteristics," Paul viola And michael provide edge or line detection features that the technique employs. There are several distinct existing neural networks, but deep neural networks (CNNs) are the most often used. Image categorization and identification is facilitated by CNNs due to various their high level of accuracy. Using a hierarchical model, the CNN constructs a network in layers, with each layer connecting toward the next, until the final fully-connected layer is reached, when all neurons are interconnected as well as the result is processed.

1.INTRODUCTION

Motorcycles are used by the vast majority of the people in countries such as India, Brazil, Thailand, and Thailand. Helmet rules differ from nation to country, however in India, it is generally needed by legislation for vehicle riders. Even though the safety of individuals who ride bicycles is paramount, wearing a helmet is required. There are also rules in place to safeguard motorcycle riders from accidents; at the moment, traffic cops are in charge of preventing motorbike injuries. However, when there are not enough federal agents to adequately execute the surveillance and search due to the bikers' presence, this technique is less successful. In addition, CCTV has been employed for surveillance reasons in all major cities. They do, however, require human interaction and cannot be completed on their own. Because of the large number of motorbikes on the road and the longer they have been on the road, it has been determined that many people die in traffic accidents, making it a top priority to install more safety measures. This study proposes that the function of tracking motorcycle drivers be automated in the programme. The technology recognises motorists who are not wearing helmets and offers their motorcyclist's licence plate number on demand, without the

need for operators to look it up on driver licence images at camera sites, thanks to machine learning.

1.2 MOTIVATION

While the increasing popularity of motorbikes has resulted in an increase in collision statistics throughout the years, this only happened in the 1980s, when the Honda 750 was upgraded to an 8-horsepower model. Many motorcyclists wear helmets, but many would like to hide their heads—this is understandable for a variety of reasons, including those who wish to avoid attracting the attention of authorities or those who want to avoid being spotted while riding illicit bikes. In North America, most drivers agree that wearing a helmet or a helmet with a face shield minimises the chance of sustaining a head injury in an accident. The driver may die as a result of the crash due to the lack of a helmet; also, major brain damage may be a problem for the driver. There are variety of reasons that make it almost impossible for traffic cops to determine if a motorcyclist is wearing a helmet: The traffic cops have a tough time maintaining a high quality of examination, and the decision-making process is subjective. This programme forbids automobiles from utilising licence plates, allowing non-frequent drivers to be detected and those who do use them to be fined. Permanent number and VIN tracking are in place to prevent people who do not have a driver's licence from driving.

1.3 PROBLEM STATEMENT

As even the amount of bikers in our country starts to grow, so too do the accident rates which result in deaths. Many of these deaths are the result among the most common negligence: failing to wear a helmet. Other deaths are the result of failing to provide the injured person with the prompt medical attention they require.

1.4.PROJCT SCOPE

Protecting an accident victim's head is the primary purpose of a helmet. A motorcycle accident might be lethal if the rider does not utilise a helmet. traffic enforcement cannot keep an eye on every motorbike and check whether or not the motorist is wearing helmets at the same time. Since there was a need to construct an automated system that automatically checks motorbikes for people who are wearing helmets or not, it was created. As a result, a significant amount of effort has been put into finding a solution to this issue. Despite this, the majority of current studies concentrate on a single facet of anomaly identification, such as high dimensionality.

1.5.USER CLASSES AND CHARACTRISTICS

Patterns that don't match up with predicted behaviour are known as helmet detection. They're called anomalies, outliers or discordant findings in a variety of application areas since they don't fit in with the rest of the population.

2.LITERATURE SURVEY

Comparison of feature extraction techniques to recognize traffic rule violations using low processing embedded system Manishkumar Purohit Department of Electronics & Communication Engineering Parul Institute of Engineering and Technology, Vadodara, Gujarat, India mrpurohit@gsfcltd.com Arvind R.Yadav Department of Electronics & Communication Engineering Parul Institute of Engineering and Technology, Vadodara, Gujarat, India arvind.yadav@paruluniversity.ac.in Abstract—In India, it is observed that the number of people losing their lives in road accidents especially on highways is more than the death resulting due to naxalite, terrorism activity or epidemic. Government is investing plenty of money to educate people regarding road safety and curb death due to accidents, but people used to avoid it and entering themselves into danger zone. Several lives could be saved if the person(s) make use

of helmet and wear seat belts while driving vehicles. Further, it is next to impossible for traffic police to catch each rider violating traffic rules, thus there is a need of the system to identify people disobeying road safety guideline which involves use of helmet and seat belt. The idea is to impose appropriate fine on such people to force them follow the road safety guidelines. Bike-riders without helmet and driving four wheeler without wearing seatbelt should be caught. Authors have performed four feature extraction techniques namely Scale-Invariant Feature Transform (SIFT), Speeded-Up Robust Features (SURF), Template Matching and Oriented FAST and Rotated BRIEF(ORB) to detect objects like vehicles, helmets, number plates, seatbelts for traffic data sets on Raspberry Pi 2 (B) using OpenCV3.0 and Python 3.4.2. These feature extraction techniques have been evaluated on collected dataset and simulation results performed on raspberry pi on valid dataset. The observation suggests that SIFT algorithm can be used to get higher accuracy compared to SURF and ORB for rule violators at toll system on highways or traffic cross road in city.

Development of A Real 3D Display System Chong Zeng College of Mathematics and information Engineering Longyan University Longyan, China Weihua Li College of Mathematics and information Engineering Longyan University Longyan, China Hualong Guo College of Mathematics and information Engineering Longyan University Longyan, China Tung-lung Wu School of Mechanical and Automotive Engineering Zhaoqing University Zhaoqing, China Dennis Bumsoo Kim College of Mathematics and information Engineering Longyan University Longyan, China Abstract—This paper introduces a three-dimensional light field display system, which is composed of a high-speed projector, a directional scattering mirror, a circular stainless steel bearing plate, a rotating shaft and a high-speed micro motor. The system reduces information redundancy and computational complexity by reconstructing the light intensity distribution of the observed object, thus generating a real three dimensional suspended image. The experimental results show that the suspension three-dimensional image can be generated by properly adjusting the projection rate of the image and the rotation speed of the rotating mirror (i.e. the motor speed). The clarity and accuracy of a three-dimension display depending on the number of slices selected, meaning that the more slices can be projected per minute, the finer the three-dimension display. Finally, this study provides the basic parameter matching, which shows the feasibility of developing a real light field 3D display system with stable performance, strong portability, easy implementation, and low cost. In short, naked-eye 3D allows the observer to view objects from any angle and direction, without the need for any auxiliary tools (such as glasses, helmets, etc.).

Helmet Detection Using ML & IoT Dikshant Manocha, Ankita Purkayastha, Yatin Chachra, Namit Rastogi, Varun Goel Department of Electronics and Communication Engineering Jaypee Institute of Information Technology Noida, India {manocha.dikshant, ankitapurkayastha17, chachrayatin, namitrastogi31} @gmail.com, varun.goel@jiit.ac.in Abstract—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 OpenCV. 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.

Helmet and Number Plate detection of Motorcyclists using Deep Learning and Advanced Machine Vision Techniques Fahad A Khan Department of Electronics &

Telecommunication K.J.Somaiya college of Engineering Mumbai, India khan.fa@somaiya.edu Nitin Nagori Department of Electronics & Telecommunication K.J.Somaiya college of Engineering Mumbai, India nitinnagori@somaiya.edu Dr. Ameya Naik Department of Electronics & Telecommunication K.J.Somaiya college of Engineering Mumbai, India ameyanaik@somaiya.edu 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.

Convolutional Neural Network-based Automatic Extraction and Fine Generation Y Mohana Roopa Computer Science and Engineering Institute of Aeronautical Engineering, Hyderabad, India ymohanaroopa@gmail.com Sri Harshini Popuri Computer Science and Engineering Institute of Aeronautical Engineering, Hyderabad, India Gottam Gowtam sai Sankar Computer Science and Engineering Institute of Aeronautical Engineering, Hyderabad, India Tejesh Chandra Kuppili Computer Science and Engineering Institute of Aeronautical Engineering, Hyderabad, India Abstract Numerous reasons lead to dangerous accidents. Lack of helmet is one of the major reasons for death during accidents. People are negligent regarding helmet usage. This needs to be controlled by proper surveillance. The present traffic control system is mostly based on human power. A police officer cannot manage the whole traffic and look out for rule-breakers. It would be a very tough job and will need a lot of human power to cover all the areas. This can be solved through our new automated system where two-wheelers with no helmets will be recognized through yolov2 and the respective frames are taken from the video from which the number plate of the particular vehicle is extracted and the fine for disregarding traffic rules. This fine detail will be updated over the server and message is sent to the phone number registered along with number plate. This paper is about an automated system where traffic surveillance videos are scavenged for vehicles, where extraction of number plates of vehicles with no helmet and generation of electronic fine management system takes place.

Automatic Number Plate Recognition for Motorcyclists Riding Without Helmet Yogiraj Kulkarni, Department of Computer Engineering and Information Technology, College of Engineering, Pune Pune, India kulkarniyp14.it@coep.ac.in Amit Kamthe, Department of Computer Engineering and Information Technology, College of Engineering, Pune Pune, India kamthead14.it@coep.ac.in Shubhangi Bodkhe Department of Computer Engineering and Information Technology, College of Engineering, Pune Pune, India bodkhesn15.it@coep.ac.in Archana Patil Department of Computer Engineering and Information Technology, College of Engineering, Pune Pune, India abp.comp@coep.ac.in Abstract—Motorcycles have always been the primary mode of transport in developing countries. In recent years, there has been a rise in motorcycle accidents. One of the major reasons for fatalities in accidents is the motorcyclist not wearing a protective helmet. The most prevalent method for ensuring that motorcyclists wear helmet is traffic police manually monitoring motorcyclists at road junctions or through CCTV footage and penalizing those without helmet.

But, it requires human intervention and efforts. This paper proposes an automated system for detecting motorcyclists not wearing helmet and retrieving their motorcycle number plates from CCTV footage video. The proposed system first does background subtraction from video to get moving objects. Then, moving objects are classified as motorcyclist or non motorcyclist. For classified motorcyclist, head portion is located and it is classified as helmet or non-helmet. Finally, for identified motorcyclist without helmet, number plate of motorcycle is detected and the characters on it are extracted. The proposed system uses Convolutional Neural Networks trained using transfer learning on top of pre-trained model for classification which has helped in achieving greater accuracy. Experimental results on traffic videos show an accuracy of 98.72% on detection of motorcyclists without helmet

3. PROPOSED SYSTEM

We initially use adaptive background subtraction to identify moving items in the proposed system. Using these moving items as input, a CNN classifier divides them into two groups: motorcycle riders and non-riders. To get to the following stage, only objects anticipated to be motorcyclists are sent via the first CNN classifier, which determines whether or not the rider is wearing a helmet. Because the head is assumed to be situated in the upper portion of all incoming photos, the head is positioned to be about one-fourth of the images. A second CNN is taught to distinguish between motorcyclists who wear helmets and those who don't.

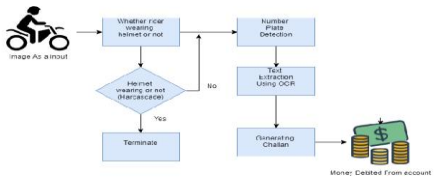
Haar Cascades employ machine learning techniques to train a function from a huge number of sample pictures, as previously indicated. Features are extracted in this algorithmic step. When a face is extracted, the algorithm utilises training data to identify characteristics that it considers to be face.

4.ALGORITHM

For feature extraction and classification, the acronym OCR stands. Optical character readers (OCRs) and text recognition are other terms for this device. Scanners and digital cameras may be used to capture the pictures of paper documents, and then turn them into editable, searchable data. OCR software uses different techniques to detect characters, but the two most common are being used to analyse a single letter, phrase, or block of text at even a time. This is done by giving the OCR software with a variety instances of text in multiple formats and styles, so they can learn the shape or pattern of letters and recognise them correctly.

2) Character or number feature detection: OCR applications use this method to identify characters or quantities. The amount of angled, crossed, or curved lines in a character is one example of a feature. It's indeed possible to store letters by using two parallel lines that are united at one end by a straight axis and connected at the middle.

5. SYSTEM ARCHITECTURE



We've used a picture of a bike racer as an input, and it then verifies whether or not the rider is wearing a helmet. It examines if the bike owner is wearing a helmet using the haar cascade method, and if so, it ends the process; if not, it checks the number plate using text recognition using OCR technology, and then it generates the chalan receipt and debits the money from the bike owner.

5.1 MODULE

Pre-processing: Pre-processing is a term used to describe activities involving pictures at the most basic level of abstraction, where both the input and output are intensity images. Pre-processing is used to improve picture data by suppressing undesired distortions or enhancing certain visual qualities that are relevant for later processing.

Feature Extraction: Feature extraction is a step in the dimensionality reduction process, which divides and reduces a large collection of raw data into smaller groupings. As a result, processing will be simpler.

Classification is an important machine learning technique in which the algorithm trains from the data input and then applies what it has learned to categorise fresh data

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6.SOFTWARE QUALITY ATTRIBUTES

There are a slew of positive attributes associated with software, as listed below: -

Users of this programme will have no trouble customising it to their own needs because to its high degree of adaptability.

All users can download and use this programme. Everyone can get their hands on the programme because it is readily available.

It is possible for the software developer to easily maintain the project once it has been deployed.

A higher level of software dependability is ensured as a result of improved programme performance.

Since the programme is a graphical user interface (GUI), the output provided is more user friendly.

Authenticity measures the degree of control over unauthorised access to programme or data. As far as security is concerned, users are validated via many security processes to ensure their safety.

It's important that the programme is able to withstand rigorous testing.

7.CONCLUSION

To date, our bike scanning and tracking device has successfully identified helmetless motorcyclists without the need for human intervention, and it has already proven to be extremely effective in identifying motorcycle use, at least with respect to actually achieving the beginning stages of regulating motorcycle use. The total number of right answers on a multiple-choice question yields this score out of 100. Only when the cars are in 'expanded size' may actions be taken, regardless of how much motion they still have. A motorbike has a unique serial number, which means it can carry the serial numbers of other motorcycles in its class. A licence plate number registry and licence information are all that is required to expand this programme. Anyone who has any doubts about the skillfulness of reckless drivers will have their doubts confirmed.

FUTURE WORK

We utilised a jupyter notebook to implement the software, and it was a success. In Python, our project was successfully tested. We also looked at the project's uses and future scope. Our solution can be linked to traffic cameras and, with a few tweaks, used to identify helmets in real time. We may also combine the automatic licence plate identification algorithm with a system that produces challans for people who do not wear helmets.

OBJECTIVE

1.Provide more security

2.Reduce crime rate

3.Easy to handle

LIMITATIONS

1).If the training not get successful or get interrupt because of any reason then system can not work proper.

2).If the accuracy of training less then system can not work properly

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