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The Smart Traffic Management System

Prof.Hyder Ali Nooruddin Hingoliwala [1], Snehal Mhaske [2], Akshada Pachpande [3], Rutuja Amande [4], Manisha Dukare [5]

[1] *Prof. Hyder Ali Nooruddin Hingoliwala, Dept. of Computer Engineering, JSCOE, Pune, Maharashtra, India*
[2]*Snehal Mhaske, Dept. of Computer Engineering, JSCOE, Pune, Maharashtra, India*
[3]*Akshada Pachpande, Dept. of Computer Engineering, JSCOE, Pune, Maharashtra, India*
[4]*Rutuja Amande, Dept. of Computer Engineering, JSCOE, Pune, Maharashtra, India*
[5]*Manisha Dukare, Dept. of Computer Engineering, JSCOE, Pune, Maharashtra, India*

Abstract - *Motorcycle accidents are on the rise Many years in many nations. More than 37 in India Millions of people use bicycles. Therefore, it is necessary Develop a system to automatically detect helmet wear For road safety. Hence, there is a custom object detection model Created using machine learning based algorithms that can Find motorcyclists. In search of helmets Rider, license plate removed and license plate The number is identified using an optical character recognizer. License plate identification (LPR) plays an important role in this busy world due to the growth of vehicles are being stolen day by day breaking traffic rules the size of the dam is also increasing in a limited space This law is for identifying registration . In Basic process steps such as number plate identification Division of characters and identification of each from the characters, the department plays important art, ever since Identification accuracy is based on how accurate it is The partition is done. To avoid problems like unwanted Illumination, the tilt that damages the partitions that occur through it numerous algorithms affect recognition accuracy Developed for this work. This paper presents a solid Techniques for localization, segmentation and identification Characters in the located plate. Image on still camera Or videos are received and reproduced in grey scale images.*

Key Words: Artificial Intelligence, Machine Learning.

1. INTRODUCTION

Helmets are the main safety equipment of motorcyclists. The helmet saves the motorcyclist from an accident. Although In many countries the use of helmets is mandatory, there are Motorcyclists who do not use or abuse it. On it A lot of work has been done in traffic in recent years Including analysis, vehicle detection and classification Helmet search. There was an intelligent traffic system Implemented using computer vision algorithms, such as: Looking for background and foreground images for the section To move the image in the view and to describe the image Features. Computer intelligence algorithms are also used Such as machine learning algorithms for sorting objects.

Machine learning (ML) is an area of artificial intelligence Which works manually using trained model input Paid during the training period. Machine learning algorithms So create a mathematical model of the known sample data "Training data" for making estimates or judgments And are also used in object detection . Because of that we train model with specific dataset , helmet The search model can be applied. We can easily identify helmet lower rider by using helmet finding model. Class-based rider's license plate found Cropped and saved as image. This image is given Optical Character Recognition (OCR) Model J Recognizes text and assigns license plate numbers Output in machine encoded text format. And it can Activate in real time using a webcam.

1.1 LITERATURE REVIEW

Over the past years, multiple approaches have been proposed to solve the problem of helmet detection. The authors in for differentiate among moving vehicles use a background subtraction method to spot. And they used Support Vector Machines to classify helmets and human heads without helmets. Silva et al. in proposed a hybrid descriptor model built on geometric form and texture features to detect motorcyclists without helmet automatically. They used Hough transform with SVM to spot the head of the rider. Also, they spread their work in by multi-layer perception model for classification of various objects. Wen et al. uses a circle arc finding method based upon the Hough transform. They applied it to detect helmet on the surveillance system. The disadvantage of this work is that they only use geometric features to verify if any safety helmet exists in the set. Geometric structures are not enough to find helmets.

In it proposes a computer vision system targeting to detect and segment motorcycles partly. A helmet detection system is used, and the helmet presence verifies that there is a motorcycle. In order to detect the helmet presence, the edges are computed on the possible helmet region. The Canny edge detector is used. Waranusat et al. proposed a structure to detect moving objects using a k-NN classifier over the motorcyclist's head to classify helmet. These prototypes

were proposed based on statistical information of pictures and had a limitation to the level of accuracy that could be achieved. With the development of neural networks and deep learning models there was further enhancement in the accuracy of classification. Alex et al. introduced a convolutional neural network (CNN) based technique for object classification and detection. A. Hirota et al. use a CNN for arrangement of helmeted and non-helmeted riders. Although they use CNN, their helmet finding accuracy is poor with limitations to helmet color and multiple riders on a single motorcyclist.

2. PROPOSED METHODOLOGY

We are implementing system for helmet detection and automatically apply charges to user. In our system we develop application for helmet detection .

We implement 3 Modules-

- User
- System
- Admin

2.1 WORKING OF SYSTEM

1. Image procurement: A camera is used to capture vehicle on road in traffic. It is the very first part of any vision system.

A. Preliminary processing techniques:

In this step mainly focuson removal of background noise, enhancing of contrast and banalization of images.

B. Vehicle classification:

By considering two parameters (Aspect ratio and area) of a particular vehicle, Motorcycles are classified and processed further.

2. Helmet detection: After extracting head part classifier which is being trained by a certain amount of pictures of helmets. By trained features, it will be determined whether motorcyclists is wearing a helmet or not.

3. Number plate recognition detects the motorcycle in camera and captures the license plate image.

4. If rider not wearing helmet Apply Appropriate fine on that particular rider. (using extracted number plate information and database of a rider).

5. Generates a database(Time, Date, Location) of all the bike rides driving without wearing a helmet along with a snapshot for proof.

6. Save this database in an application and as well as send it to the rider as a proof(Email).

2.2 WORKING OF SVM

In machine learning, support-vector machines (SVMs, also support-vector networks) are supervised learning models with related learning algorithms that analyse data used for classification and regression analysis. Developed at AT&T Bell Laboratories by Vapnik with, it presents one of the most robust prediction methods, based on the statistical learning framework or VC theory proposed by Vapnik and Chervonenkis and Vapnik. Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns new examples to one category or the other, making it a non- probabilistic binary linear classifier. An SVM model is a representation of the examples as points in space, mapped so that the instances of the separate classes are split by a clear gap that is as wide as probable. New examples are then scheduled into that same space and predicted to belong to a category based on the side of the gap on which they fall.

An SVM model is basically a illustration of different classes in a hyperplane in multidimensional space. The hyperplane will be generated in an iterative manner by SVM so that the error can be minimized. The aim of SVM is to split the datasets into modules to find a maximum marginal hyperplane (MMH).

The below are important ideas in SVM -

• Support Vectors : - Data points that are closest to the hyperplane is called support vectors. Separating line will be well-defined with the help of these data points.

• Hyperplane : - It is a decision plane or space which is split amongst a set of objects having different classes.

• Margin : - It may be definite as the gap between two lines on the closet data points of different modules. It can be intended as the perpendicular distance from the line to the support vectors. Big margin is considered as a good margin and small margin is considered as a bad margin.

The core aim of SVM is to divide the datasets into classes to find a maximum marginal hyperplane (MMH) and it can be done in the following two phases –

• First, SVM will generate hyperplanes iteratively that segregates the classes in best approach.

• Then, it will select the hyperplane that splits the classes correctly.

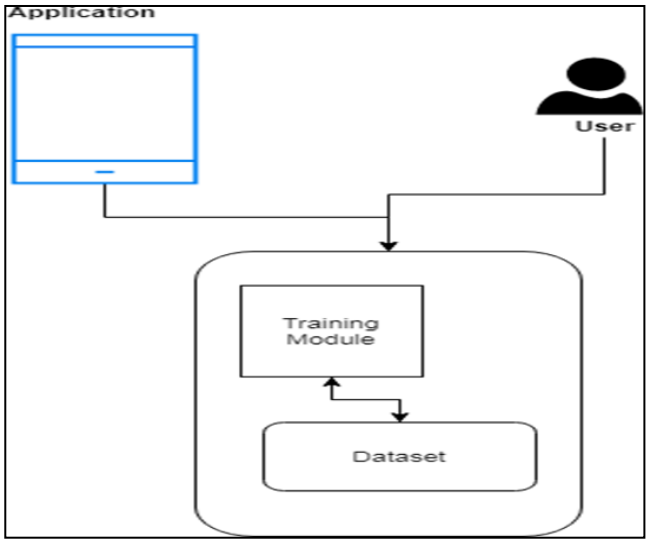

Fig -1: Architecture Diagram

3. CHARACTERISTICS OF MACHINE LEARNING

1. Best Automation:

One of the biggest characteristics of machine learning is its ability to automate repetitive tasks and thus, increasing productivity. A huge number of organizations are already using machine learning-powered
paperwork and email automation.

2. Accurate data analysis:

Machine learning comes as the best solution to all these issues by offering effective alternatives to analyzing massive volumes of data. By developing efficient and fast algorithms, as well as, data-driven models for processing of data in real-time, machine learning is able to generate accurate analysis and results.

3. Data scientists are valued:

When a new data scientist is brought into the organization, the documentation and defined business goals (that adhere to reasonable, established constructs in the data environment) enable these new scientists to come up to speed in weeks, not quarters.

4. Models and data are actively managed:

Data cataloged, accessible, performing according to expectations, and well-managed. This means all enterprise data and relevant external data is captured and utilized. It means there are data warehouse and data lake infrastructures and a data catalog over the top capturing the location of information. It means the commitment to the cloud is real and the data governance program is pervasive across major subject areas throughout the enterprise.

6. Continuous Improvement:

As ML algorithms gain experience, they keep improving in accuracy and efficiency. This lets them make better decisions. Say you need to make a weather forecast model. As the amount of data you have keeps growing, your algorithms learn to make more accurate predictions faster.

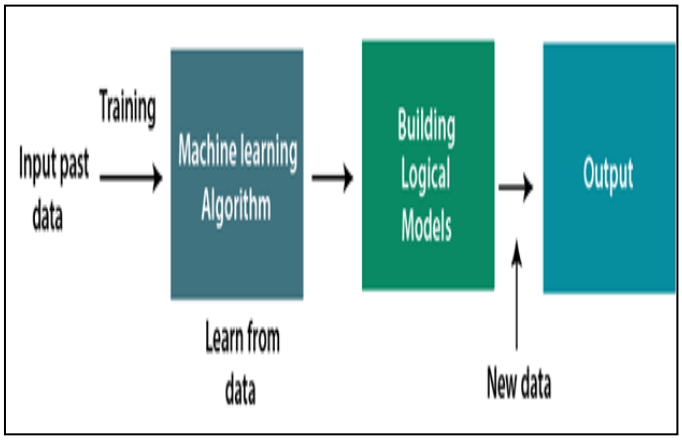

Fig -2: Machine Learning

4. CONCLUSIONS

From the results shown above, it is clear that Yolo Object Detection is suitable for real-time processing and is capable of accurate classification and localization of all object classes. The proposed end-to-end model was successfully developed and has all the capabilities to be deployed for automation and maintenance.

Some techniques for removing number plates have been designed in different situations, such as considering multiple drivers without a helmet and handling them in most cases. All the libraries and software used in our project are open source and therefore extremely flexible and expensive. The project is primarily designed to focus on the problem of efficient traffic management. So we can say that if deployed by any traffic management department they will make their work easier and more efficient.

ACKNOWLEDGEMENT

This system gives an idea of how much traffic is stopped in an area. It creates a database of all cyclists driving without helmets without snapshots for proof. Using free and open source technologies like TenserFlow, OpenCV and Tescrat make software relatively inexpensive. Under appropriatelighting conditions, this system was tested for

complete proof and accurate results. Overall public awareness will increase the impact of the system.

REFERENCES

[1] Navneet Dalal and Bill Triggs, "Histogram of orientedgradients for human detection".
[2] Ross, Jeff, Trevor and Jitendra "Rich feature Hierarchyfor Accurate object Detection"
[3] Shaoqing Ren, Kaiming He, Ross Girshick, Jian Sun, "Fast R-CNN" (Submitted on 4 Jun 2015 (v1), last revised6 Jan 2016 (this version, v3)).
[4] Joseph Redmon, Ali Farhadi, "YOLO9000: Better, Faster, Stronger", University of Washington, Allen Institute Of AI.
[5] Wei Liu, Dragomir Anguelov, Dumitru Erhan, Christian Szegedy, Scott Reed, Cheng – Yang Fu, Alexander C. Berg.
[6] Joseph Redmon, Ali Farhadi, "YOLOv3: An Incremental Improvement", University of Washington, Allen Institute of AI
[7] Viola and Jones, "Robust Real-time Object Detection",IJCV 2001.