Road Traffic Surveillance System for Helmet Detection

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***Abstract*— Surveillance is very essential for the safety of power substation. The detection of whether wearing safety helmets or not for perambulatory workers is the key component of overall intelligent surveillance system in power substation. In our system, a novel and practical safety helmet detection framework based on computer vision, machine learning and image processing is proposed. In order to ascertain motion objects in power substation, the CNN algorithm is employed. Moreover, based on the result of motion objects segmentation, real-time human classification framework C4 is applied to locate pedestrian in power substation accurately and quickly. Finally, according to the result of pedestrian detection, the safety helmet wearing detection and the send fine notification is implemented using the head location/Vehicle Number plate detection, the color space transformation and the color feature discrimination. Extensive compelling experimental results in power substation illustrate the efficiency and effectiveness of the proposed framework.**

***Index Terms*— CCTV Surveillance, Traffic congestion, object detection, Classification, CNN algorithm, traffic signal, etc.**

I. INTRODUCTION

In Proposed surveillance system is considerable significant for power substation safety. Over the past decades, some artificial intelligent techniques like computer vision and machine learning with growing progress has been widely applied in intelligent surveillance in power substation. It can not only avoid time consuming labour intensive task, but also point out the power equipment fault and worker illegal operation in time and accurately against accidents. Now-a-days two wheelers is the most preferred mode of transport. It is highly desirable for bike-riders to use helmet. This paper presents image processing technique by which motorcyclists without helmet can be detected. In this moving vehicles can be detected by thresholding and then classified into motorcyclists and non-motorcyclists by area and aspect ratio. If in case motorcyclist is detected without a helmet, the number plate of motorcycle is read and noted. A simple algorithm is designed that can help to recognize number plates of motor cyclists using images taken by camera. The recognition of number plate algorithm has five parts: image procurement, preliminary processing, fringe detection and segmentation, feature extraction and recognition of character number plates using suitable machine learning algorithms. A database will be generated with the records to identify every offender accurately and arrest of suspects' vehicle, imposing helmet violation fines, the system implements pure machine learning in order to identify ever type of helmet that it comes across with minimum computation cost.

II.LITERATURE SURVEY

KeesariShravya, Yamini Mandapati, Donuru Keerthi, Kothapu Harika, and Ranjan K. Senapati, "Smart helmet for safe driving". Bike driving safer than before. The main purpose of this helmet is to provide safety for the rider. This can be implemented by using advanced features like alcohol detection, accident identification, location tracking, use as a hands free device, fall detection.

Kunal Dahiya, Dinesh Singh, C. Krishna Mohan, "Automatic Detection of Bike-riders without Helmet using Surveillance Videos in Real-time". In this paper, we propose an approach for automatic detection of bike-riders without helmet using surveillance videos in real time. The proposed approach first detects bike riders from surveillance video using background subtraction and object segmentation. Then it determines whether bike-rider is using a helmet or not using visual features and binary classier. Also, we present a consolidation approach for violation reporting which helps in improving reliability of the proposed approach Two-wheeler is a very popular mode of transportation in almost every country. However, there is a high risk

involved because of less protection. To reduce the involved risk, it is highly desirable for bike-riders to use helmet. Observing the usefulness of helmet, Governments have made it a punishable offense to ride a bike without helmet and have adopted manual strategies to catch the violators.

C. J. Behr, A. Kumar and G.P. Hancke, "A Smart Helmet for Air Quality and Hazardous Event Detection for the Mining Industry". A smart helmet has been developed that is able to detect of hazardous events in the mines industry. In the development of helmet, we have considered the three main types of hazard such as air quality, helmet removal, and collision (miners are struck by an object). The first is the concentration level of the hazardous gases such as CO, SO2, NO2, and particulate matter. The second hazardous event was classified as a miner removing the mining helmet off their head. An IR sensor was developed unsuccessfully but an off-the shelf IR sensor was then used to successfully determine when the helmet is on the miner's head. The third hazardous event is defined as an event where miners are struck by an object against the head with a force exceeding a value of 1000 on the HIC (Head Injury Criteria). An accelerometer was used to measure the acceleration of the head and the HIC was calculated in software. The layout of the visualization software was completed; however, the implementation was unsuccessful. Tests were successfully done to calibrate the accelerometer.

M. Swapna TahniyathWajeehShaziyaJabeen, "A Hybrid Approach for Helmet Detection for Riders Safety using Image Processing, Machine Learning, Artificial Intelligence". Now-a-days two wheelers is the most preferred mode of transport. It is highly desirable for bike riders to use helmet. This paper presents image processing technique by which motorcyclists without helmet can be detected. In this moving vehicles can be detected by thresholding and then classified into motorcyclists and non-motorcyclists by area and aspect ratio. If in case motorcyclist is detected without a helmet, the number plate of motorcycle is read and noted. A simple algorithm is designed that can help to recognize number plates of motor cyclists using images taken by camera. The recognition of number plate algorithm has five parts: image procurement, preliminary processing, fringe detection and segmentation, feature extraction and recognition of character number plates using suitable machine learning algorithms. A database will be generated with the records to identify every offender accurately and arrest of suspects' vehicle, imposing helmet violation fines, the system implements pure machine learning in order to identify ever type of helmet that it comes across with minimum computation cost.

Rattapoom Waranusast, Nannaphat Bundon, Vasan Timtong and Chainarong Tangnoi Pattanawadee Pattanathaburt, "Machine Vision Techniques for Motorcycle Safety Helmet Detection". This paper presents a system which automatically detect motorcycle riders and determine that they are wearing safety helmets or not. The system extracts moving objects and classifies them as a motorcycle or other moving objects based on features extracted from their region properties using K-Nearest Neighbor (KNN) classifier. The heads of the riders on the recognized motorcycle are then counted and segmented based on projection profiling. The system classifies the head as wearing a helmet or not using KNN based on features derived from 4 sections of segmented head region. Experiment results show an average correct detection rate for near lane, far lane, and both lanes as 84%, 68%, and 74% respectively.

III.PROBLEM STATEMENT

Recently Social as well as Road networks have been employed as a source of information for event detection, with specific reference to road traffic activity like jamming, congestion and accidents. So we implement a system to address the Helmet detection and alert/fine notification.

IV. PROPOSED SYSTEM

Nowadays Secure helmet wearing detection is very necessary in power substation. At first, the CNN algorithm is exploited to detect moving object under a view of fix surveillance camera in power substation. After obtaining the movement region of interest, the feature is squeeze out to relate inner human. And then, based on the result of quality selection, the Support Vector Machine (SVM) is developed to classify walkers. Finally, the safety helmet detection will be executed by color feature identification. gripping experimental results indicated the accuracy and effectiveness of our proposed

method. The construction industry suffers from the large amount of fatalities among all factories, that is, one of five workman expires in private factories were in power substation. Tremendous loss has occurred to the worker's family members, the factory, and the countries. Considering the highest and increasing number of substation projects that are being handled in the, there is a highest necessity of developing innovative methods to automatically monitor the safety for the workers at power substation.

In this project, a novel and practical safety helmet detection framework based on computer vision, machine learning and image processing is proposed. In order to ascertain motion objects in power substation, the ViBe background modelling algorithm is employed. Moreover, based on the result of motion objects segmentation, real-time human classification framework C4 is applied to locate pedestrian in power substation accurately and quickly. Finally, according to the result of pedestrian detection, the safety helmet wearing detection is implemented using the head location, the color space transformation and the color feature discrimination. Extensive compelling experimental results in power substation illustrate the efficiency and effectiveness of the proposed framework.

V. SYSTEM ARCHTECTURE

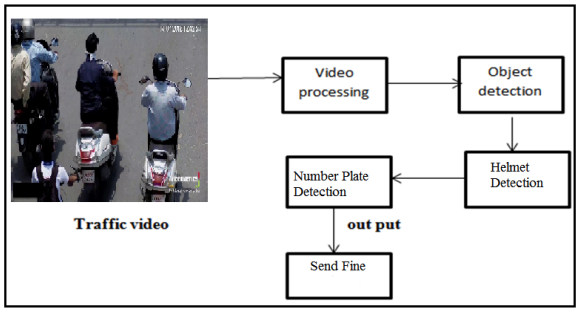

Fig.1 System Architecture

VI.RESULT ANALYSIS

This system aims to give an idea about the number of traffic offenders in an area. It generates a database of all the bike rides driving without wearing a helmet along a snapshot for proof. Use of Open and free technologies like tensorflow, opencv and tesseract, makes the software relatively less expensive. Under fair lighting conditions, this system was tested to give foolproof results. The overall awareness on the general public will be increased as an impact of the system.

VII.CONCLUSON AND FUTURE WORK

The proposed system focuses on presenting information of traffic rules breaking and unfollow guidelines of users. Using this idea, we have developed a novel and practical safety helmet wearing detection system to determine perambulatory workers to whether wear safety helmet or not. ViBe background modelling algorithm has realized excellent motion object detection.

Road networks have been employed as a source of information for event detection, with specific reference to road traffic activity like jamming, congestion and accidents. So we implement a system to address the real time traffic detection and released signal as per vehicles arrived, detected wrong parking, wrong side, Zebra crossing, helmet detection, alert notification

VIII.ACKNOWLEGEMENT

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