`RESEARCH ARTICLE`   `OPEN ACCESS`

VEHICLE MONITORING SYSTEM IN SMART CITIES

[1]Hariharasudhan N, [2]Jeya Surya G, [3]Raja Sundar B, [4]Mr.Rajagopal S

([1][2][3]Information Technology, National Engineering College,Kovilpatti,

[4] Assistant Professor (SG)Information Technology, National Engineering College,Kovilpatti)

Email: (hariharasudhan2397@gmail.com, jeyasuryakvs@gmail.com,sundar95114@gmail.com, gopaltarget@gmail.com)

Abstract:

Vehicle monitoring system in smart cities is able to identify the activities of a vehicle in a driving lane and Automatic Number Plate Recognition (ANPR) is an image processing technology which uses number (license) plate to identify the vehicles which are violating the traffic rules. The objective is to design an intelligent transport system for the identification of vehicle violating the traffic rules. The system is implemented on the traffic areas and one way roads. The developed system first detects the vehicles which are violating the traffic rules (flow of vehicles in opposite direction of driving lane) and then captures the violated vehicle as image format. Vehicle number plate region is extracted using the image segmentation from a resultant image. Optical character recognition technique is used for the character recognition which available in the number plates. This system developed with the aid of IoMT Technology. In this technology, the devices are connected wirelessly so the resultant data are stored to cloud database. The detected image is processed in locally and the resultant output is stored at centralized server. This enables the global tracking of vehicle violating the rules. The data's are retrieved from the database at anytime and anywhere.

Keywords **—IoMT, ANPR.**

I. INTRODUCTION

The multimedia system objects foster a large array of applications in each business and military domains. However, augmenting IoT systems with multimedia system devices and content isn't easy and needs the introduction of extrafunctionalities and therefore the revision of existing ones, delivery to a specialised set of IoT, that we tend to check with 'Internet of multimedia system Things' (IoMT). The vehicle detection is employed to spot the situation and activity allotted by vehicle through security and police work. The automated Number Plate Recognition(ANPR)

gained abundant interest throughout the last decade in conjunction with the advance of photographic camera and therefore the increase in machine capability. it's merely the flexibility to mechanically extract and recognition a vehicle variety plate's characters from a picture. It may be wont to discover and stop a large vary of criminal activities and for security management of a extremely restricted spaces like military zones or area around highgovernment offices. The vehicle observance system works in four steps, the primary step is that the sensing of vehicle with regardless activity, the second steps is capturing the scene for the proof. The third section use image segmentation technique to urge individual character from vehicle plate. It proceeded as detection and extraction of variety plate in a picture and optical character recognition (OCR) to acknowledge the individual character. Finally the captured image and therefore

the licenseplate number is send to manage server mail.

II. OBJECTIVE

To develop an automated vehicle monitoringsystem in smart cities.

To promote Intelligent Transport System with the aid of IoMT Technology.

To develop a system which enables continuous tracking and updation of the vehicle violating the traffic rules.

III. TECHNOLOGY

IoT provides applicable solutions fora large vary of applications like sensible cities, traffic jam, waste management, structural health, security, emergency services, logistics, retails, industrial management, and health care. The IoMT is AN extension to the IoT, wherever one among the prime objectives is to modify video streaming as a part of the conclusionof IoT. In IoMT, resourcestrained inexpensive low-power heterogeneous multimedia

system devices willactwithone another and globally accessible by distinctive science addresses with a similar spirit as of the computers and other networking devices connected via the net. The challenges exhibit by IoMTsquare measurelike IoT like managing giant amounts of knowledge, queries, and computation further as some distinct necessities. In IoMT basedmostly wireless multimedia

system networks, the multimedia system devices square measurealleged to be little sized objects equipped with a restricted quantity of power resources that they need to utilize with efficiency to extend network life time. Therefore, energy economical ways square

measure required to be devised for network body procedures. Similarly, multimedia system devices ought to be embedded with application and context aware intelligence, so the multimedia system content from the physical setting is

just noninheritable oncerequired, so minimizing redundant data acquisition.

IV. HARDWARE

A. RASPBERRY PI

RASPBERRY PI is a micro controller used for developing the system with the help of sensors.

B. IR Sensor

It has a transmitter and receiver module, the signal is transmitted and received when the vehicle is detected.

C. Camera

The Camera module is used for monitoring the violated vehicle in driving lanes.

V. SOFTWARE

A. RASBIAN OS

Raspbian is a Debian-based computer operating system for Raspberry Pi. It has been officially provided by the Raspberry Pi Foundation as the primary operating system.

B. OPENCV

Open Source Computer Vision Library) is an open source computer vision and machine learning software library.

C. PYTHON

Python is an interpreted high-level programming language for general-purpose programming.code readability, and a syntax that allows programmers to express concepts in fewer lines of code.

VI. DATABASE

Thingspeak is an open source internet of things (IoT) application and API to store and retrieve data from things using the http protocol over the internet or via a local area network.

VII. IMPLEMENTATION

There are four modules in the project,

A. VEHICLE DETECTION

The vehicle in the driving lanes is detected using the IR sensors. It has the transmitter and receiver part. The signal is transmitted from the sensor, the vehicle is detected by the

signal and received. The IR sensor (1) is placed at the starting of road and IR sensor (2) is placed at the ending of road. If the vehicle flow direction is correct the IR sensor (1) is detected first and IR sensor (2) is detected next. If it is True the loop get started and it check for another vehicle. Suppose the vehicle flow direction is incorrect the camera captures the scene. The intrusion of vehicle is recorded through initialized camera.
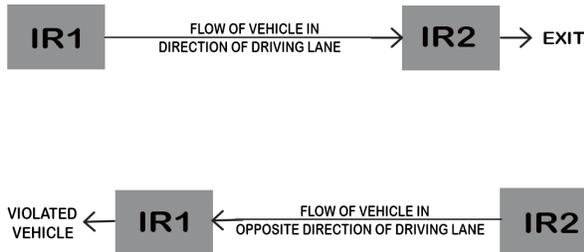
Fig. 1 Initialization of sensor to find the vehicle violating the rules.

B.   IMAGE CAPTURING

The violated vehicle is captured through the camera initialized. The image is of jpeg format. The image resolution is defined by the syntax: **"fswebcam -r 1280 x 720".** If the following process is true it prints image is captured.

C.   LICENSE PLATE RECOGNITION

It is distributed by six stages,
Initially the number plate region is found by the plate detection. Next the binarization method is distributed that Converts the RGB image to BLACK & WHITE. Character analysis is created to search out the character sized-blobs within the plate region. Next it transforms the attitude to a straight-on read supported the best registration code size. The Character Segmentation Isolates and cleans up the characters in order that they will be processed singly. The Optical Character Recognition (OCR) analyses every character image and provides multiple doable letters/confidences. Finally the numbers in registration code is extracted through the assortedprocesses.
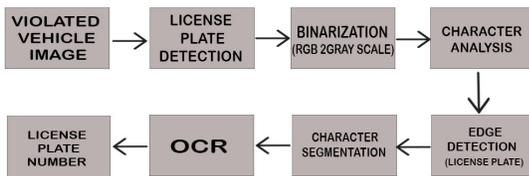
Fig. 1Flow of process carried out in license plate recognition.

ALGORITHM:

LBP algorithm (generally used for face detection) to find possible license plate regions (x,y, width, height).

• Divide the examined window into cells (e.g. 16x16 pixels for each cell).

• For each pixel in a cell, compare the pixel to each of its 8 neighbours (on its left-top, left-middle, left-bottom, right-top, etc.). Follow the pixels along a circle, i.e. clockwise or counter-clockwise.

• Where the centre pixel's value is greater than the neighbour's value, write "0". Otherwise, write "1". This gives an 8-digit binary number (which is usually converted to decimal for convenience).

• Compute the histogram, over the cell, of the frequency of each "number" occurring (i.e., each combination of which pixels are smaller and which are greater than the centre). This histogram can be seen as a 256-dimensional feature vector.

• Optionally normalize the histogram.

• Concatenate (normalized) histograms of all cells. This gives a feature vector for the entire window.

The feature vector can now be processed using the Support vector machine, extreme learning machines, or some other machine-learning algorithm to classify images. Such classifiers can be used for face recognition or texture analysis.

D.   STORING IN DATABASE

The Thing speak database is used to store the results. The captured scene is send to the control room mail as message. The database is created according to the fields of result by an individual login. The unique API key is generated for accessing the facilities provided by it. The channel http link is called and the key is verified. The required fields to be stored is passed as an argument. After updating of new entities the stored data is retrieved from the database.

VIII.   RESULTS & DISCUSSION

Fig. 3Identification of vehicle in driving lane which are violating the traffic rules.

FIG. 4CAPTURED SCENE OF VIOLATED VEHICLE

FIG. 5 DATA RECORDS EXPORTED FROM THE DATABASE.

The intruded vehicle number is stored in the database, and can be easily maintained in form of data records.

IX.   PROBLEM STATEMENT

- IR Sensor is used to detect the vehicles, but any object crosses the sensor region signal is interrupted and considered as vehicle detected.
- Due to unnecessary detection of object the further process is executed, it provides unnecessary results.

- Camera angle must be maintained for the number plate recognition process.

FUTURE WORK:

To overcome the drawbacks, sensor for detecting only vehicles must be implemented. The accuracy for character segmentation has to be improved for the accurate results for unclear images.

X. CONCLUSION

The analysis of assorted papers within the field of IOT, it concludes that the IOT systems cannot with successunderstand the notion of present property of everything if they're not able to actually embody 'multimedia things'. There comes a perspective vision of 'Internet of multimediasystem issues wherever a wiseheterogeneous multimedia system thing will move and join forces with other things connected to web to facilitate multimedia system primarily based services and applications that are globally accessible to the users. AN IoMT primarily basedVehicle observation system can give a much better resolution for this purpose.

REFERENCES

1) **Sheeraz A. Alvi (2015)**, published in journal **Internet of Multimedia Things: Vision and challenges** describes a specialized subset of Internet of Things, enabling the integration and cooperation among heterogeneous multimedia devices with distinct sensing, computational and communication capabilities and resources.

2) **Daniele Miorandi (2012)**, published in journal **IOT: Vision, Applications and Researchchallenges** describes the next big leap ahead in the ICT sector.

3) **Giuseppe Becchi (2014)**, published in journal **A Distributed System for Multimedia Monitoring, Publishing and Retrieval** describes it present a distributed and interactive multi-user system which provides a flexible approach to collect, manage, annotate and publish collections of images, videos and textual documents.

4) **Navin Thomas (2015)**, published in journal **Multimedia Streaming using Cloud-Based P2P System** describes Cloud Systems, P2P Systems, and their different advantages, disadvantages, and classifications.

5) **Lucia Janusova (2016)**, published in journal **Improving Safety of Transportation by using Intelligent Transport System** describes Intelligent transport systems improve transportation infrastructure.

6) **Wenyangji (2016)**, published in journal **Video Based Construction Vehicle Detection and its Application in Intelligent Monitoring System** describes whole system is composed of two parts: foreground detection and construction vehicle detection.

7) **MallikarjunAnandhalli,Vishwanath P. Baligar**published in journal **A novel approach in real-time vehicle detection and tracking using Raspberry Pi**describes the detection of vehicle using the microcontroller.

8) **Bin Tian; Ye Li; Bo Li; Ding Wen,** Rear-view vehicle detection and tracking by combining

multiple parts for complex urban surveillance, in: IEEE Transactions on **Intelligent transportation Systems, vol.15, no.2, pp. 597–606 (April 2014)**.