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Automated Vehicle Monitoring System

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Abstract: ***This paper presents a system for data abstraction from the live videos that can be used in many real-world surveillances application. The system is designed to deal with security issue faced by many societies, offices, and other parking lot system. This paper addresses various issues by presenting proper hardware platforms along with real-time, robust, and innovative algorithms. The system is designed to identify the number plate of vehicle without any human effort. The system is designed in such a way that when a vehicle will enter in a society the license plate number will be detected and data base will be checked for the details of car if details are verified then car will be allowed to enter in the society or any other premises. We will use two Monochrome/Colour cameras for this process, one for detecting type of vehicle and other to extract license plate number.***

I. INTRODUCTION

Humans can detect and identify objects present in an image. The human visual system is fast and accurate and can also perform complex tasks like identifying multiple objects and detect obstacles with little conscious thought. The availability of large sets of data, faster GPUs, and better algorithms, we can now easily train computers to detect and classify multiple objects within an image with high accuracy. Computer Vision is branch of computer science and software systems which can recognize as well as understand images and scenes. It consists of various aspects such as image recognition, object detection, image generation, image super-resolution and many more.

Object recognition is to describe a collection of related computer vision tasks that involve activities like identifying objects in digital photographs. Image classification involves activities such as predicting the class of one object in an image. Object localization is referring to identifying the location of one or more objects in an image and drawing an abounding box around their extent. Object detection does the work of combines these two tasks and localizes and classifies one or more objects in an image. The aim of object detection is to detect all instances of objects from a known class, such as people, cars or faces in an image. Generally, only a small number of instances of the object are present in the image, but there is a very large number of possible locations and scales at which they can occur and that need to somehow be explored.

Image processing is a technique used to manipulate an image through several sets of algorithms resulting in an output image or any feature abstracted from an image. The manipulations in an image includes filtering out the noises, image conversions into different colour spaces, blurring the image, edge detection techniques, line detection, circle detection etc. The raw images as such may contain noises according the quality of webcam, lightning the workspace, flickering of light source etc. The lightning conditions may vary with time due to intensity variation of the light source or due to sunlight.

We are going to use these technologies for our project where we will detect the license plate using object detection and we will extract the license plate number by using the algorithm of image processing. By getting all the details of license plate in order to avoid invalid vehicle entry. We are also trying to develop a system which can identify the type of vehicle for example if it is a car, bike, bicycle etc. by making use of vehicle data set.

II. LITERATURE SURVEY

Most smart parking systems provides the way out to mean of parking accessibility in sequence system, parking condition system, tenancy finding, etc. Very little works have been done for the real time recognition of unacceptable parking, routing group of parking charges. A fundamental smart parking ecosystem contains two flow information and traffic. Vehicle drivers obtain parking accessibility data and then get the information about preferred parking areas to park.

If vehicle arrives in or departs from parking space, parking accessibility in sequence alters and advertised to remaining drivers looking for parking space. To get tenancy status of parking spaces, sensors are installed on on- street parking to notice vehicular actions. Sensors form network send most recent information to data storage devices. Drivers can obtain most recent information from variable message signs or their handheld smart strategy that replace communication with roadside infrastructure. Pricing strategies can also be manipulated according to data obtained to increase company's profit.

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In provisions of environment conservation, altitude of pollution can be bargain by declining vehicle discharge (air pollutant) in air. Frequently, such system relies on counting how many cars have enter the parking area and scheming difference flanked by this outline and maximum number of parking spaces to estimation the numeral places available. When car arrives at entrance, it will be blocked at main gate and driver de-boards car. If the accessibility of Parking space is deep rooted, user commands car to get parked to chosen slot. The car traces its pathway in parking area. Here, it waits and particulars essential for parking of car at appropriate slot are communicated.

III. SYSTEM ARCHITECTURE

In various fields, such as parking lot for vehicles there is a necessity to detect the target object such as license plates and also track them effectively while handling occlusions and other included complexities. The nature of the techniques largely depends on the application domain.

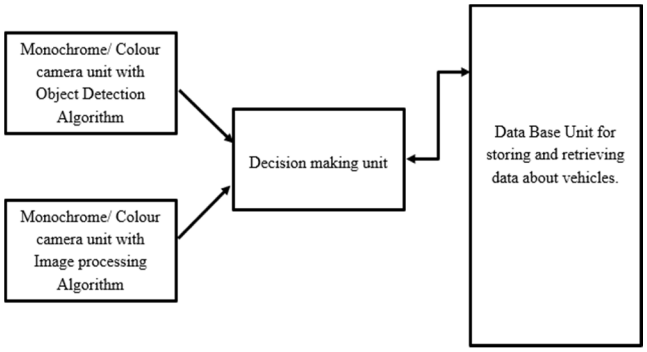

Fig: System Architecture

Our project basically requires two units for operation, which are two Monochrome/ Colour cameras, One embedded with object detection algorithm and other with image processing algorithm. For time being we are making use of TensorFlow library, which is an open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning application such as neural networks, etc. and we are also using some python machine learning libraries such as NumPy, OpenCV, matplotlib, Keras and ImageAI.

1) *NumPy:* NumPy is library of Python programming language, adding support for large, multi-dimensional array and matrix, along with large collection of high-level mathematical function to operate over these arrays. NumPy is open-source software and has many contributors.
2) *OpenCV:* OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code.
3) *Matplotlib:* Matplotlib is a Python programming language plotting library and its NumPy numerical math extension. It provides an object-oriented API to use general-purpose GUI toolkits such as Tkinter, python.
4) *Keras:* Keras is an open-source neural-network library written in Python. It is capable of running on top of TensorFlow, Microsoft Cognitive Toolkit, Theano, or Plaid ML. Designed to enable fast experimentation with deep neural networks, it focuses on being user-friendly, modular, and extensible.
5) *ImageAI:* ImageAI provides API to recognize 1000 different objects in a picture using pre-trained models that were trained on the ImageNet-1000 dataset. The model implementations provided are Squeeze Net, Res Net, InceptionV3 and Dense Net.

IV. CONCLUSION

With the proliferation in the technologies we have come across a number of advancements in the field of computers. The implementation of the automated vehicle monitoring system has been presented it is efficient in alleviating the traffic problem that arises especially in the city areas and also finding out the invalid vehicle parked. Preceding technologies were oppressed which proved to be either not efficient or too expensive. Here, we have engaged the online way of detecting and recognizing the vehicle which seemed to be cost efficient with easy setting up and preservation. The components worn for implementation of system afford efficient output at a variety of stages of execution. In future, certain changes can be included as per necessities of organizations implementing system.

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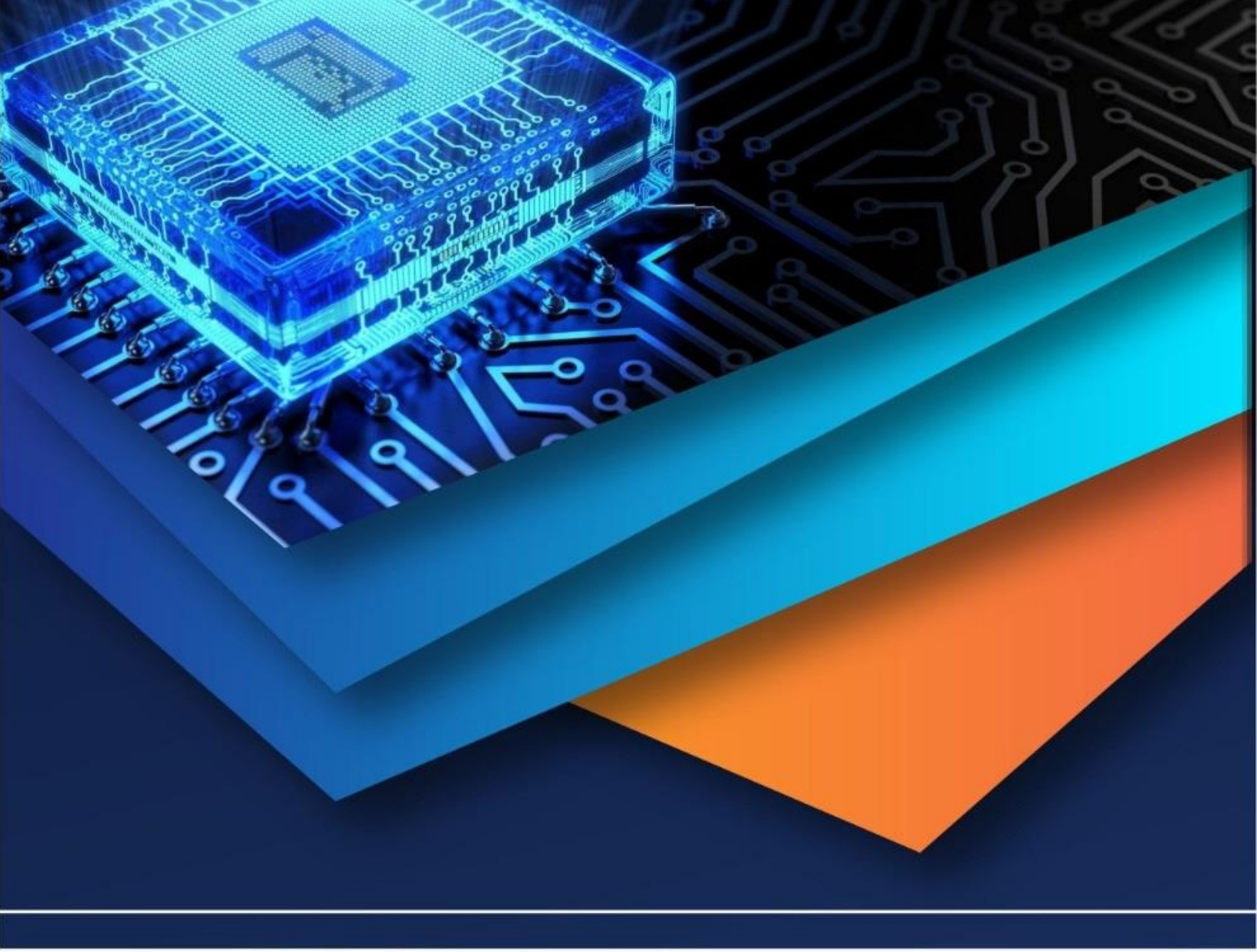

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