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PARKING MANAGEMENT SYSTEM USING OPENCV

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Abstract: This paper covers image development enhancements based on parking management. This project will work based on the ideas of the Background Removal algorithm. The use of this algorithm will be used as a map tool to reduce vehicle error. Now car parking is a big problem in a smart city. Due to the increase in traffic problems, the clever parking system operated using OpenCV provides an easy way out. Object Discovery has had a major impact about how the world has adapted to artificial intelligence in recent years. Other popular acquisition algorithms are area-based accumulative neural networks, one-time multiple-box detectors (SSDs), and Look Together (YOLO). Among these SSDs has better accuracy, while YOLO performance is better when it comes to speed provided with the selected accuracy. In-depth learning includes SSDs and Mobile Nets for easy access and use for tracking. This algorithm enables accurate detection while not compromising performance. All app functionality is based on the acquisition of an object in a particular location such as whether a rectangular space is completed or not. When found complete it means the site is empty and look for other options.

IndexTerms **- Mobile Networks, COCO, Single Shot Detection.**

I. INTRODUCTION

After, Alex Net enters the research globe in year 2012 Image Net has a great deal of optical recognition, in order to achieve in-depth, far-reaching learning in the traditional viewing methods used in workbook. From a practical point of view, neural convolution networks are broken down into image segregation.

Figure 1 depicts a simple diagram of the discovery and tracing. In paper, algorithms based on SSDs and MobileNets are used to locate and track python location. Object discovery involves finding the object of interest of an object in a particular part of an image. Various methods of frame separation, light flow, background removal. This is a way to find something moving with the support of a camera.

Detection and tracing algorithms are defined by extracting images and videos features of security systems [3], [7], and, [8]. Features is released by applying CNN and in-depth reading [9]. Separators are apply for the image classification and, for the calculation [6]. The YOLO backed algorithm with the help of a GMM models using in-depth learning concepts will provide fine-grained output and, classification in [10]. Phase II describes Literature Review , Phase III the SSD and Mobile Nets algorithm, Phase IV describes the application process, and Phase V describes the simulation and, examination of results.

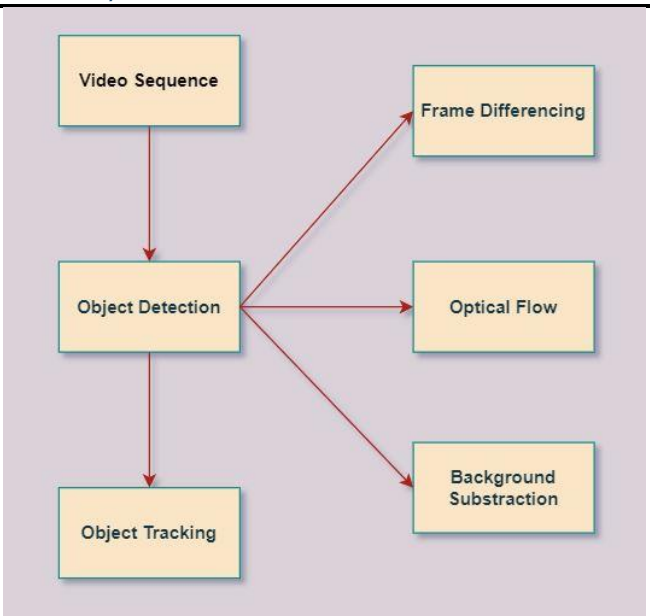

Figure 1 Simple block diagram for object acquisition and Tracking

II. LITERATURE REVIEW

The methods listed range from the very simple algorithm to the latest published method classified based on speed, memory requirements, and accuracy. They used methods: such as the frame difference method, the real-time background subtraction and shadow detection method, and the adaptive background blending model method as real-time mapping. The algorithms they use range from to varying degrees of accuracy and computational complexity. Some of them can even solve problems in real time, such as snow, rain, moving branches, scattered objects, light energy or slow-moving objects.

Wei Lue, et al [1] introduced a SSD, a fast-one-shot object detector for multiple categories. A key feature of our model is the use of multi-scale complexity bounding box outputs connected to multiple feature maps on top of the network. This representation allows efficient modeling of possible boxes, shape and, spaces. We have experimentally confirmed that a more carefully chosen default bounding box with an appropriate learning strategy leads to better performance.

Justin Lai, et al [2] highlights Real-time object detection is use to improve surveillance and give a promising application of Convolutional Neural Networks (CNNs). A specific application which is the detection of hand-held weapons like guns. Therefore, until now was a prior work focused on the detection of hidden weapons using infrared data.

Andrew G, et al [3] brief about MobileEnenCTS is based on a sorted architecture that makes a light deep neural network using a deep extra discharge gas. We introduce two simple global hyper matters that are effectively exchanged with delay and accuracy. These hyperloops allow modeling models to select the right dimension model of the application according to the problem, so we present a wide range of experiments on resource and accuracy and demonstrate a powerful indicator compared to other popular models of the ImageNet and classification. It then shows the effects of mobile in a wide range of applications, including object detection, fanegrain classification, face attribute, and large-scale substrate analysis of information.

Akshay Mangawati, et al [4] provided a comprehensive overview of different object tracking algorithms under different environmental conditions and identifies efficient algorithms for different types of tracking. In this article, objects are tracked based on color and the movement of one or more objects (vehicles) is detected and counted over multiple frames. Additional integrated algorithms can be developed to track objects given their shape, color, texture, object of interest, and object movement in multiple directions.

Apporva Raghunandan, et al [5] described accurate and efficient object detection systems have been developed that achieve metrics comparable to state-of-the-art system health. This project uses the latest technologies in computer vision and deep learning.

X. Zhou, et al [6] proposed a simple yet powerful pipeline that provides fast and accurate text detection in natural scenes. The pipeline directly predicts randomly oriented words or text strings and quads from complete images, eliminating unnecessary intermediate steps (such as candidate aggregation and word segmentation) with a single neural network. Because the pipeline is simple, you can focus on developing loss functions and neural network architectures.

R. K. Harahap, et al [7] created and reviewed a parking space detection system. The results obtained make it easier to monitor parking spaces and increase the efficiency of parking systems, as well as identify and notify free parking spaces. Based on testing with video data in the form of a playback video stream, information can be presented in the form of text with information about available parking spaces. For further development, the Internet of Things (IoT) can be implemented.

S. Azabarika, et al [8] explain one of the important points in parking monitoring is to provide visitors with information about the number of vehicles in the parking lot. Several systems have been used, one of which uses an ultrasonic sensor. But often, visitors spend time looking for parking. They did not receive detailed information about the parking space.

B.Y Prabwo, et al [9] inform about the server room is a room where data is stored and contains information about the company (DPC). Overheating of the server room can degrade device and network performance. Therefore, administrators must maintain the stability of the server space to maintain server and network performance.

C. Breglar, et al [10] discussed that the ease of a fully electronic world is now being tried in parking systems. Here, the parking system makes it easier for users to decide where to park, and this system makes it easier to develop and develop from parking reservations. and parking paying systems. Electric money management system. When creating this system, researchers rely on their own edge methods. This method makes calculations between the data already entered by the system and the new data it will collect in real time while the system is running.

Liang Wang, et al [11] highlight human body feature extraction is based on 2D images processing which is an efficient method for many purposes. Non-contact measurement of body dimensions, building three-dimensional models of people and recognition of human behavior. In this paper, we propose a systematic approach to automatically detect feature points of the human body from front and side images of the human body.

Anderson, et al [12] provides an efficient line of marking approach for target image recognition and localization. Meanwhile, the smooth filtering and high-efficiency fuzzy control methods are designed to improve the stability of the robot and its feasibility is tested in various circumstances. An appropriate image system is designed according to the characteristics of the experimental environment, and the resulting image is pre-processed to obtain a corrected grayscale image.

Harmeet Singh, et al [13] designed system is use to avoid the problem of traffic conjunction in commercial areas that which consumes a lot time, this paper provides the easy reservation of system for parking. In this application the user can view the various parking slots and check for the availability of the slots.

Shivayo, el al [14] provided a Smart Parking System solution utilizing IoT technology. The IoT app monitors the availability of parking spaces with real-time data stored in the cloud, and users access this data through an Android app.

Thanh Nam Pham1, el al [15] proposed a system to help users automatically find the cheapest free parking space-based technique on a new performance metric to evaluate the user's parking cost based on the street and the total number of free spaces in each parking lot. This cost is used to propose a solution to find an available parking space according to the user's request and to propose a new parking lot if the current parking lot is full.

I. OBJECT SPOTTING AND TRACKING ALGORITHMS

A. Single Shot Detector (SSD) algorithm

SSD is a popular acquisition algorithm built on Google Incorporated. [1]. Based on the construction of VGG-16. Therefore, SSDs are simple and convenient to use.

It’s depicted the dummy VGG 16 SSD. A set of the default fields is created to view the different functional maps as transformation methods. Points are awarded if the purchased item is one of the feature identifiers during prediction. The shape of the element is adjusted according to the position field. Each box predicts a change in attitude and confidence. During training, the automatic box is compared to the actual bottom box. All, fully interconnected stacked layers are deleted in SSD format. The model loss is calculated as the average summation of confidence loss and, performance loss. The predictable variation of the predictive field from low

reality field is a loss of local performance. Confidence is a measure of how dependent a system is on whether the predicted object is real.

Complete feature upgrades and installing all computers in one network using Single Shot Detection makes it simple to trained with Mobile Net. Collate to YOLO, the SSD is also faster in the way it makes clear regional proposals and integration (includes the Faster R-CNN).

B. MobileNets algorithm

Mobile Nets uses deep divisive synchronization that helps build stacked neural networks. The Mobile Nets models are best matched for mobile-based and embedded vision app where there is no process control. Mobile Net' main idea is to improve delays when building small emotional networks at same time. It focused at size only without focusing too much on speed. Mobile Nets is built on deep integration. In standard conversion, the input feature mapped is divided into many map features after conversion [2].
The total number of parameters in this model is greatly reduced by using deep separation convolutions compared to the fact that the network consists of standard convolutions of similar depth. Reducing the parameters results in a lightweight stacked network.

II. SYSTEM OF ACCOMPLISHMENT

The working of whole application is based on object detection and a CCTV camera mechanism. When a car enters in the premises the first step is to connect the car screen with the application and check whether any empty slot available if yes than it gives the location of all available location with green rectangle and rest with red rectangle in this way user can identify which location to go and where not.

Object detection Framed isolation Frames are shot on camera from time to time. The difference is measured in consecutive frames. Flow of vision This process measures and to calculates the optical flow field with the algorithm which used for the optical flow. A local algorithm is used in validation of it. Sound filtering is done with an adaptive algorithm. It contains a broad overview of quantity and size of items and helps to avoid time-consuming and complex methods of preparation.

Removing the Background

Backgrounds (BS) are the fastest way to create moving objects from camera video. This generate the first step in a multi-level vision plan. Such, process simply split background from the front side of the image.

In Figure 3 shows the flowchart of the system, when a car enters the first task is to check whether there is any slot available If “No” it simply returns No slots available, if condition is “Yes” than it capture the image frame wise and pass through the certain algorithm which detect whether the slot is filled or empty. If found filled than represented by red rectangle and If green it means they are vacant and now there you can park your car. If any filled slot become available than the application automatically does its task and show vacant on screen through a green rectangle (0).

Figure 2 Vehicle detection by background subtraction

Figure 2 shows detection of vehicles in the rear range. The front or car is isolated from the back of the image for further processing. After intelligent display of the segmentation results, the effect of forming a breeding area occurs.

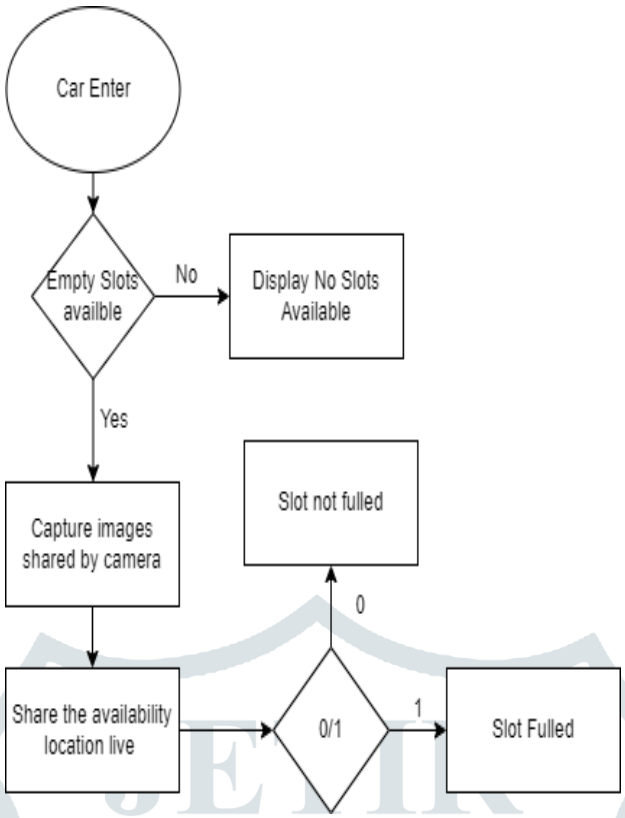

Figure 3. Flow Chart of the application

A. Object tracking

It is made with video sequences as security cameras and CCTV, surveillance feeds; the purpose is to track the process, the speed of the object. The real-time detection rate can be increased by using object tracking and the implementation of a few frames that are filmed over a set period of time. Acquisition of an item can work with slow-moving independent values for items you can lock and once those items are found and locked, tracking an item, can work at a faster frame rate.

Figure 4. Track of car

Figure. 4 shows vehicle tracking. In the example above, there are two ways to track an item. (1) Follow the order received. It creates a continuous traffic video sequence from CCTV cameras. Let's say someone wants to track the movement of a car here. We will take different pictures at different times. With this picture you can see something like a car. If you then look at how my objects move to another video frame, you can calculate the object by checking the movement of the object in a red box that is imported from another location.

An improved method of "gaining power". In this way the balance of movement or movement of the vehicle occurs. By checking its location on a certain time period 't' and measuring its location at the time of let's say add (10, t). via this realistic picture of a car during the add (10, t) it can be done with the help of scales.

III. SIMULATION OUTCOME AND ANALYSIS

These outcomes are observed after the successful scanning, detection and, tracking of video which is feed by the video sequences camera.

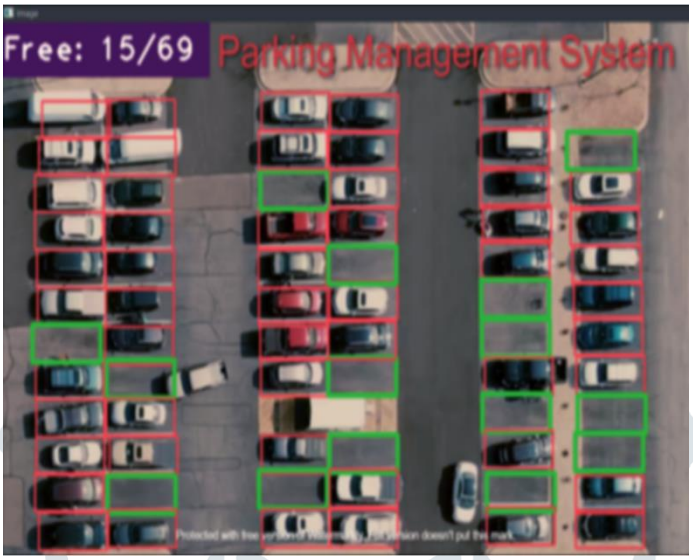

Figure 5. Vehicles Detection

Figure 5 show real-time detection of vehicles respectively. The model is trained to get 69 parking location out of which 51 are filled for now and left with 15 free spaces. The green rectangle represents the vacant places and red use spaces.

IV. CONCLUSION

In real-time situations, we use the SSD algorithm to get the elements. In addition, the SSD showed results with high reliability. The main purpose of the SSD algorithm is use to detect various objects like in a video sequence in real time and load them in real time live data. This model has demonstrated the positive effectiveness of detection and tracking in professional facilities and can be in some cases we used to detect, track and respond according to the targeted video at reception. This real-time ecosystem analysis can deliver positive results by improving the security, order and usability of any business. In case of a terrorist attack, we constantly increase the work of finding bullets and bullets to set the alarm. This model can also be used with CCTV systems, drones and other surveillance devices to watched in many areas where parking management is difficult, such as schools, government agencies and hospitals. This application simplifies your work by performing fully automatic task management. All functions, such as connecting to the vehicle screen and exchanging real-time data with the driver, make parking management less efficient.

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