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Parking Prediction Model Using Car Make and Model Recognition System for Malls in Smart Cities.

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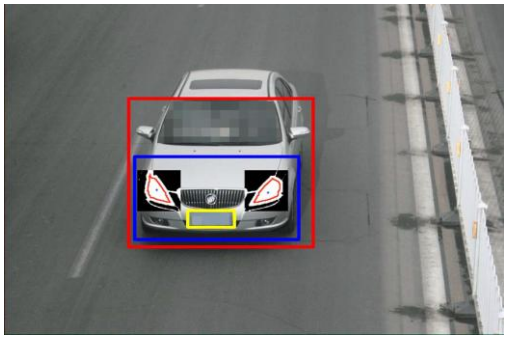
Abstract— *This paper proposes the recognition of car length and height and models from a single image captured by a camera. The camera can capture the image in different lighting conditions. The car features are extracted, normalized, and classified using an ensemble of neural-network classifiers. In this technology, the performance of the proposed method is evaluated on a data set of practical car images. In the database different types of vehicle logos have been stored to recognize the vehicle. As people search for parking slot in peak hour, the traffic is congested. The results prove the effectiveness of the proposed method in vehicle detection and model recognition.*

Key Words: USB Camera, Raspberry Pi2, Keyboard, parking sensor, RFID sensor & Reader, PC Monitor.

1. INTRODUCTION

Designing, developing and producing a leading edge parking technology is called as Smart parking. It is a vehicle parking system that helps user/customer find a vacant spot. Using the IR sensors in each parking slot, it detects the presence or absence of a vehicle, and display to LCD. Smart Parking system is proven as an exact, robust and cost efficient way to ensure that road users know exactly where unoccupied car parking spaces are. Automatic recognition of car model and manufacturer of the car will significantly improve the general law and order and parking management. The realization of the Smart mall is now becoming possible with the emergence of the Internet of Things (IoT), which radically evolves the current Internet into a network of interconnected objects, such as sensors, parking meters, energy measuring devices and actuators. These networked devices have the ability to compute sense and interact with their surroundings in fine spatial and temporal detail, and generate a vast amount of data. One of the key services that malls need to manage is car parking facilities and traffic. Finding an available parking spot in the mall is always troublesome for drivers, and it tends to become harder with the increasing number of private car users. If the drivers can be informed in advance about the availability of parking spaces at and around their intended destination, the traffic congestion can be efficiently controlled. This requires intelligent sensors to be deployed in the parking lots for monitoring the occupancy as well as intelligent data.



II. RELATED WORK

Module-1 Car Recognition

Object detection and recognition are necessary in an artificially intelligent and autonomous system. Eventually, these systems are expected to venture to the outdoor environment. Thus, detection of common objects on the streets is necessary to provide input and feedback into the system. Cars, however, proved to be a more difficult object for detection and recognition due to its varying structure from different perspectives of view of the same car, as well as varying between different makes and models. Car recognition is an important domain of object recognition. The ability to recognize cars (models or specific instances) has obvious applications in physical security, military and law enforcement.

Car recognition has previously been the subject of various papers to some success, but the field remains limited in viable implemented applications to provide real-time car recognition. To illustrate the usefulness of a car-recognition system, consider a scenario where a "smart" parking , camera is stationed at the entrance of an office building parking lot. Throughout a regular work day, a typical employee, customer might drive his/her car into the lot in the morning, exit for lunch, return for the afternoon and leave at night. This behavior would provide many opportunities to build an car database for the smooth parking in apartments, mall, multi Storage Car Parking place. Given a database of training images representing the set of cars, the smart camera should recognize cars as they enter the lot. It should also be able to distinguish unfamiliar visitor cars from known cars. This system would work in an automated fashion, giving visual hints to human users whenever an interesting or new car is detected.

Module 2: Car Rectangular (Rec) Framework

Car Identification: Car-Rec builds upon a set of published algorithms used in object recognition, utilizing a recognition framework similar this framework consists of four stages:

1. **Feature descriptor extraction**: Speeded-Up Robust Features (SURF) [5] is used to localize interest points in an image and describe their features as a vector of values.

2. **Word quantization:** feature descriptors are efficiently converted from high-dimensional vectors into single value words. This is accomplished using a vocabulary tree trained on a database of car-related image features.

3. **Algorithm Design** The Car-Rec search framework is made up of four stages: feature extraction, word quantization, image database search, and structural matching. Prior to search, Car-Rec must be trained on a database of car imagery. The current version of Car-Rec accepts only still images for the training database. The database may comprise images of one or many different cars, each separated into folders labeled by car instance. Using this category system, a car may be represented by images of many different poses. The more exemplar images we have of various poses of a car in a database, the greater likelihood we are to accurately match on this particular car.

4. Structural matching: the top results returned from the image database search are scored using a structural verification algorithm. The top matches are returned as a ranked list. The main contributions of this work are an implementation of a real-time car recognition application and a simple framework, based upon the approach used by Sivic and Zisserman, for general object recognition. Car Rec combines the benefits of multiple algorithmic approaches for car recognition.

Module 3: Parking Slot Information

Among the challenges that we face in our day to day life one of most unavoidable challenge is parking the car wherever we go. As our need increases our travelling increases but due to drastic increase in usage of vehicles and increase in population we face the tough task of parking our car particularly during busiest hours of the day. During peak hours most of the reserved parking area gets full and this leaves the user to search for their parking among other parking area which creates more traffic and leaves them with no indication on availability of parking space. To overcome this problem there is definitely a need for designed parking in commercial environment. To design such parking slot we need to take into the account of reservation of parking slot with optimal parking space which depends on cost and time. Cost function should also combine with the parking cost and proximity to the destination.

One of the challenging problems for many vehicle owners in big metropolitan cities is where to park their vehicles. If the parking slot availability is known in advance one can save precious time and fuel wastage. In this paper we would like to propose parking slot allocation system wherein an intended user is informed about the parking slot availability at a particular parking location..The slot availability details are collected using an car parking system and are updated periodically into server.

Module 4: Smart parking allocation Server (SPAS)

The SPAS collects all the car's requests from the web camera over a certain time and makes an overall allocation at decision points in time. An assigned parking space is sent back to LCD via the Smart parking allocation Server. He/she has the choice to reserve that spot. The allocated parking space is updated in the Smart parking allocation Server.

Module 5: RFID Based Payment System

RFID based prepaid Car Parking System has application in many areas like Industries, Companies, Offices, Shopping malls. The project is a car authorizing system where the system can only allow a car entry when a valid RFID card id swiped by the car owner with sufficient balance. The system also had paid parking facility where the amount of parking gets deducted automatically whenever the card is swiped and the available number of car parking are displayed on a seven segment display. The project consists of IR sensors and a microcontroller to monitor the entry and exits of cars.

Raspberry Pi

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. Processor:- The SoC used in the first generation Raspberry Pi is somewhat equivalent to the chip used in older smart phones (such asiPhone / 3G / 3GS). The Raspberry Pi is based on the Broadcom BCM2835 system on a chip (SoC),[1] which includes an 700 MHz ARM1176JZF-S processor, Video Core IV GPU,[7] and RAM. It has a Level 1 cache of 16 KB and a Level.

USB Camera

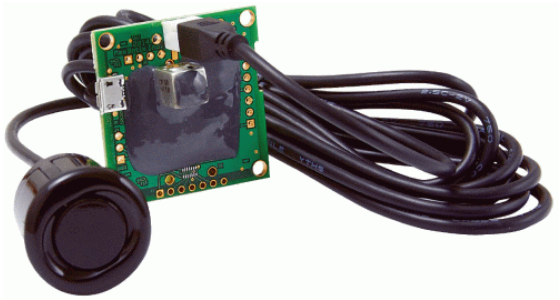
The term 'webcam' (a clipped compound) may also be used in its original sense of a video camera connected to the Web continuously for an indefinite time, rather than for a particular session, generally supplying a view for anyone who visits its web page over the Internet.

LCD or Monitor

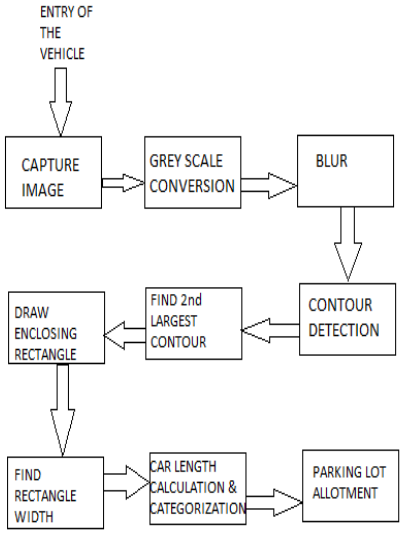
This the most common configuration of LCD that most people prefer mostly due to reduced cost and small footprint. In a 16 x 2 line display LCD module.

Vehicle Detection using Sensor

The MB8450 Car Detection Sensor is a high performance, low-cost USB ultrasonic proximity sensor designed to detect the side of a vehicle that drives up alongside the sensor. The MB8450 Car Detection Sensor features a simultaneous multi-sensor design which allows the sensor to operate even in the presence of other ultrasonic sensors. The sensors utilize a USB Micro-B connector for simple interfacing. Users can integrate many sensors into one system with little to no effect from the sensor-to-sensor interference which can occur with other ultrasonic sensor solutions.



III. BLOCK DIAGRAM



3. CONCLUSIONS

This paper proposed an intelligent system to detect vehicles and recognize car types from camera images, we have shown that the vehicle features, including car length and height can be reliably detected. The features can be used as anchors to rectify projective distortion caused by the change of the view points and distances. The proposed normalization was proved to be an effective technique to improve the recognition precision. Inspite of the achieved system performance there is still large room to improve the recognition precision of car models, and robust features that are invariant to different lightning conditions deserve further research. The presented method has the potential to improve the functionality of current camera systems.

REFERENCES

[1] Chen, Z., Ellis, T., and Velastin, S. A.: Vehicle type categorization: A comparison of classification schemes. In: Proc. 14th Int. IEEE Conf. Intel. Transp. Syst., pp. 74–79 (2011)

[2] Abdel Maseeh, M., BadreI din, I., Abdel kader, M. F. and Saban, M. EI.: Car Make and Model recognition combining global and local cues. In: Proc. IEEE Int. Conf. Pattern Recognition. pp. 910-913 (2012)

[3] Hsieh, J. W., Chen, L. C. and Chen, D. Y.: Symmetrical SURF and Its Applications to Vehicle Detection and Vehicle Make and Model Recognition. IEEE Trans. Intel. Transp. Syst. 15, 6-20 (2014)

[4] Hinton, G. E., Salakhut dinov, R. R.: Reducing the Dimensionality of Data with Neural Networks. Science, 313, 504-507 (2006)

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