Smart Car Parking system

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Abstract **- Smart Parking assistance is a deep learning-based product. In many cities, automobiles are one of the main reasons to rising emissions. According to survey, 30% of the traffic in urban areas is caused by drivers and motorists looking for parking spaces. The smart parking assistance provides a simple and effective solution that is integrated with existing parking space sensors (video cameras). With Convolutional Neural Network (CNN), the parking slot availability status is updated in real-time. User with simple GUI application can book slot on preferred location based on availability of parking slot. Based on choice preferences of user and historical data of user on frequent visit to liked destinations, advanced slot booking option is made available to avoid unnecessary extra charges and smoothen the traffic by reducing traffic congestion.**

Index Terms **- Deep Learning, Convolutional Neural Network, WIFI, Android Application, Machine Learning.**

I.INTRODUCTION

As the population grows, the number of private vehicles increases as well. But the no of parking spaces most of time remains same. According to survey 30% of traffic in urban areas is caused by drivers and motorist looking for pursuing space.

Many times, there are vacant spots, but drivers do not have any information about them. It could be due to free spot is far from them, or it is hidden by some other cars or any other objects. So smart parking assistance will detect parking space using CNN algorithm. CNN are similar to the human neural network build with Synapses () and neurons. Hence Complex tasks are learned by CNN and hence automated parking Detection will get easier to implement. The main purpose behind the implementation of smart parking assistance is to dynamically park the vehicle on preferred location by slot booking based on availability of slot using deep learning approach. Based on past History of User, system will notify the user to book the slot in advance based on frequent visit at particular location.

II. LITERATURE SURVEY

Mike Zheng, Y., Rajasegarar, S., & Leckie, C. (2015, April). Parking availability prediction for sensor-enabled car parks in smart cities. In Intelligent Sensors, Sensor Networks, and Information Processing (ISSNIP), 2015 IEEE Tenth International Conference on (pp. 1-6). IEEE.[1]

This present a prediction mechanism for the parking occupancy rate using three feature sets with selected parameters to illustrate the utility of these features. Furthermore, analyse the relative strengths of different machine learning methods in using these features for prediction.

Abdul Ahad, Zishan Raza Khan, Syed Aqeel Ahmad, "Intelligent Parking System" Scientific Research Publishing, Vol.4, No.2, pp. 160-167, May 2016.[2]

In this paper, a proposed web App system, named "Park Easy" is based on the usage of smart phones, sensors monitoring techniques with a camera which is used as a sensor to take photos to show the occupancy of cars parks. By implementing this system, the utilization of parking spaces will increase. It allocates available parking space to a given driver to park their vehicle, renew the availability of the parking space when the car leaves.

M. M. Rashid, A. Musa, M. Ataur Rahman, and N. Farahana, A. Farhana, "Automatic Parking Management System and Parking Fee Collection Based on Number Plate Recognition.", International Journal of Machine Learning and Computing, Vol. 2, No. 2, April 2012,Published 2014.[3]

This paper discussed on automatic parking system and electronic parking fee collection based on vehicle number plate recognition. The aim of this research is to develop and implement an automatic parking system that will increase convenience and security of the public parking lot as well as collecting parking fee without hassles of using magnetic card

III. PROPOSE SYSTEM

This block diagram shows the overall architecture of the system, how the complete process moves on. The Client application consist of user registration and login page. After login, user can select the location where he or she wants to visit and according to selected location, slot availability can be shown on application and accordingly, user can book the parking slot. Parking slot availability status database will consist of status whether the particular slot is occupied or not.

The data server will continuously store the data received from cameras. Camera will continuously monitor the status of parking slot. With the help of Wi-Fi, Cameras will send the continuous image coming to the server through Internet. Also, there will be Car Parking Database which will consist of number of slots free and the slots which are booked. User can do the payment through e-payment gateway according to duration of vehicle parked.

IV. SYSTEM ARCHITECTURE

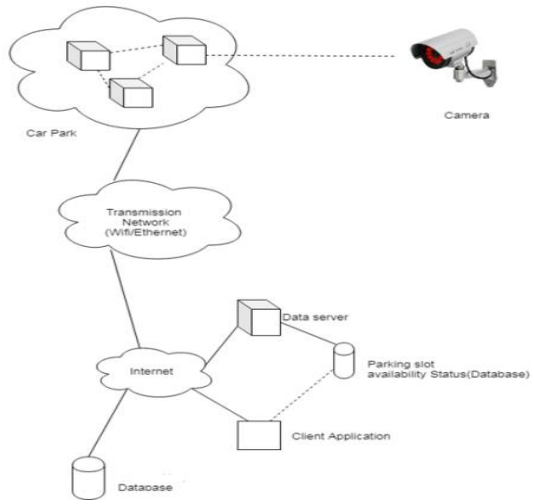
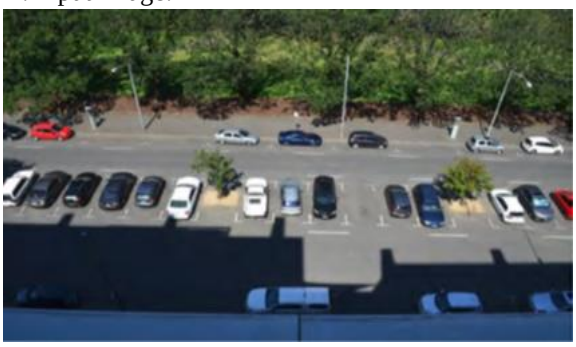


Fig. System Architecture

V. RESULTS

A. Input Image:



B. Output Image:

The experiment is conducted on 10 parking image samples for detection of parking spaces.

Accuracy =(TP+TN)/(TP+TN+FP+FN) (1)

Precision=TP/(TP+FP) (2)

F1score=2*(Precision*Recall)/(Precision+Recall) (3)

TEST RESULTS

Image No	Performance Measure Values		
	Accuracy %	Precision %	F1 Score %
1	96.33	88.31	92.21
2	97.23	90.76	96.14
3	98.28	96.99	98.67
4	97.82	99.21	99.23
5	99.08	83.33	90.9
6	95.01	79.14	88.33
7	98.93	95.55	97.72
8	98.04	92.14	95.91
9	96.44	84.61	91.66
10	92.72	80.95	91.7

Single Image having N no of slots is classified for each marking point and Categorized into Vacant and Occupied Status.

VI.CONCLUSION

The An image-based method of detecting the availability of a car park was modeled and tested with different occupancy scenarios of car parks. This consists of

1. Finding car park coordinates from an empty car park.
2. Acquiring an image with cars
3. Converting the image to black and white for simple analysis
4. Removing noise and Determining whether car parks are vacant or filled.

REFERRENCE

[1] A. M. Iyabode, Y. N. Nureni, A. F. Adebayo, O. A. Olamide, "Cardless-Electronic Automated Teller Machine (EATM) with Biometric Authentication," International Journal of Engineering Trends and Technology (IJETT), vol. 30, no. 1, 2015

[2] History.com Editors. "Automated Teller machine", Internet: http://www.history.com/ topics/inventions/automated-teller-machines, Aug. 21, 2018 [Jul.05, 2018]

[3] Mike Flacy. "SMART ATM USES QR CODES INSTEAD OF CARDS TO DISPENSE CASH", Internet: http://www.digitaltrends.com/cool-tech/smart-atm-uses-qr-codesinstead-of-cards-to-dispense-cash/, Jun. 16, 2012 [Jul. 05, 2018

[4] Kozloski, J. R., & Pickover, C. A. (2015). "PAYMENT CARD FRAUD PROTECTION. U.S. Patent No. 20,150,178,733. Washington, DC: U.S. Patent and Trademark Office.

[5] Greg, R. A. Y., David Lewis, Randall W. Jenkins, Jim Block, Songtao Ma, Natarajan Ramachandran, Jeffery M. Enright, and James Pettitt. (2014). "Detecting unauthorized card skimmers." U.S. Patent Application 14/206,429.

[6] Ubaghs, G. (2015). Ovum Decision Matrix: Selecting a Card Management System Platform, 2015–16.

[7] SHAH, M. H. (2013). Critical success factors for preventing ebanking fraud. Journal of Internet Banking and Commerce,18(2).5 978-1-5386-7147-4/18/$31.00 ©2018 IEEE 310The Fifth HCT INFORMATION TECHNOLOGY TRENDS (ITT 2018), Dubai, UAE, Nov. 28 - 29, 2018

[8] Anderka, M., Klerx, T., Priesterjahn, S., & Büning, H. K. (2014). Automatic ATM Fraud Detection as a Sequence-based Anomaly Detection Problem. In ICPRAM (pp. 759-764).

[9] Priesterjahn, S., Anderka, M., Klerx, T., & Mönks, U. (2015). Generalized ATM Fraud Detection. In Advances in Data Mining: Applications and Theoretical Aspects (pp. 166-181). Springer international Publishing.

[10] Yona, N. F. (2015). Atm fraud and its impacts to financial institutions: The case of NMB and CRDB banks in Arusha