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Barcode Based Parking Management System

Sachin R Gowda[1], Roshan Raj R[2] , Varun Gowda P R[3]

[1,2] *Department of Electronics and Communication Engineering, MIT Mysore*
[3] *Department of Meechanical engineering, MIT Mysore*

Abstract *- Barcode based parking management system is implemented here. It will provide security besides automation of parking through barcode based technology. Here the driver has to show barcode to the reader machine which is there at the gate, the machine after reading the barcode records the check in time and date. In this work, a camera is used as a sensor to take photos to show the occupancy of car parks. The reason why a camera is used is because with an image it can detect the presence of many cars at once. Also, the camera can be easily moved to detect different car parking lots. By having this image, the particular car parks vacant can be known and then the processed information was used to guide a driver to an available car park rather than wasting time to find one. The proposed system has been developed in both software and hardware platform. An automatic parking system is used to make the whole process of parking cars more efficient and less complex for both drivers and administrators.*

Keywords: Barcode, sensors, Cameras, Raspbian OS, MSE.

INTRODUCTION

Most car parks today are not running efficiently. This means that on busy days drivers may take a long time driving around a car park in order to find a free parking space. Implementing this system will help to resolve the growing problem of traffic congestion, wasted time, wasting money, and help provide better public service, reduce car emissions and pollution, improve city visitor experience, increase parking utilization, and prevent unnecessary capital investments[1]. The system does this by providing more efficient and effective parking enforcement. There are numerous methods of detecting cars in a car park such as Magnetic sensors, Microwave Radar, Ultrasonic sensors and Image processing. Camera is used here because cameras can capture many cars at once making them efficient and inexpensive [3]. One or more cameras are used for image processing. Software is needed to process the images taken by the cameras. This processing is usually done by examining the difference between consecutive images [2].
Another feature of this system is to maintain check-in and check-out time of a particular vehicle. This employs barcode for its process. The intention of the utilization of barcode technology have been encouraged in different ways, by using this manually achieved workloads will be decreased simultaneously[3].Barcode technology is an automated Barcode system enables vehicles to check-in and check-out under fast, secure and convenient conditions. The timing at the gate and additional sensors enables a one by one parking lot circulation thus, preventing multi check-ins check-outs at a time[4]. An additional feature can be provided in this system such that we can also allow a unique parking slot for a particular barcode i.e., when the vehicle enters into a parking lot, a free parking slot is given to that vehicle and then vehicle has to parked in the assigned slot[3]. Once the vehicle enters into the system premises the data is retrieved from the data retrieval system and stores the check-in information of a particular vehicle .Then the camera will be triggered which will be placed at a certain height to view the parking lot. The captured image will then be sent to the microcontroller.

The microcontroller compares the acquired image with the previously stored vacant slot image and then displays the vacant slot number in the LCD screen, which guides the driver to the vacant slot.

PROBLEM DEFINITION

A prototype is built and tested for the implementation of a smart parking system. The main objective is to reduce the human interference in the parking lot and also aims for low power consumption

METHODOLOGY

A prototype of Barcode Based Parking Managing System is developed and tested to check whether it is applicable in the real world scenario.

IMPLEMENTATION

Image processing examines images in order to identify images and judge their significance. Image analyzing actually senses data and attempts to detect, identify, classify, measure and evaluate the significance of objects, their patterns and spatial relationship through logical process. The first stage of any image processing operation is the image acquisition stage. Digital image acquisition is the creation of digital images, typically from a physical scene. The most usual method is by digital photography with a digital camera, RGB to gray conversion. In photography and computing, a gray scale or gray scale digital image is an image in which the value of each pixel is a single sample. Images of this sort, also known as black-and-white, Gray scale images are distinct from one-bit bi-tonal black and white images, which in the context of computer imaging are images with only the two colours, black, and white. MSE technique is used to determine any two images are nearly identical or not. In order to scan the barcode at the entry of the parking lot, a mobile application is designed. This

application triggers a barcode scanning application internally and scans the data in it. The time and date of scanning is maintained as a database in an excel sheet in a predetermined location for further applications. Install NOOBS for raspberry pi 3,then the required software's are imported and the program is written as per the flow chart .The program is compiled and executed in raspberry pi and the expected result is obtained.

Initially, the camera facing the parking lot captures the image of complete parking lot. This image consists of complete information of all the slots of parking lot. This image is cropped to obtain each slot as an individual image. Each of these images are compared with the reference image. The reference image is permanently stored in the data base.

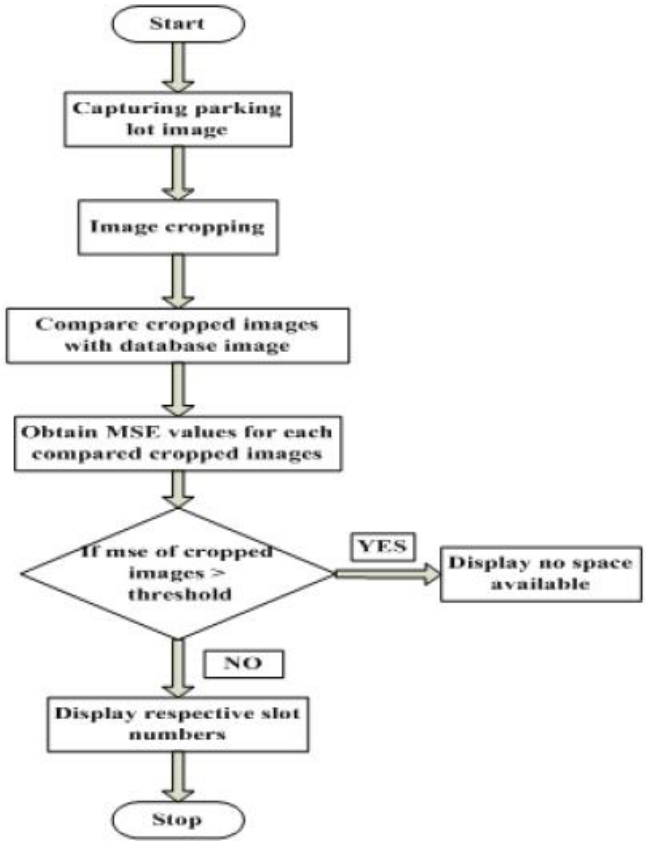

Fig 1.1: Flow chart

After comparing each individual image with the reference image, the mean square error which is termed as MSE, is calculated. If both the images are same, the MSE value will be less, ideally zero. If both images are different then the value will be larger. A threshold is previously set for the MSE value to determine whether the compared images are same or not.

If the MSE value of compared slot image is greater than the threshold value then, it indicates that that corresponding slot is filled, hence is not displayed in LCD. If the MSE value of compared slot image is lesser than the threshold value then, it indicates that that corresponding slot is free, hence is displayed in LCD.

RESULTS

In these section results of proposed vacant space detection in a parking area is discussed. For testing purpose several cases are considered. The results are given with the snapshots in the following sub sections

Case 1

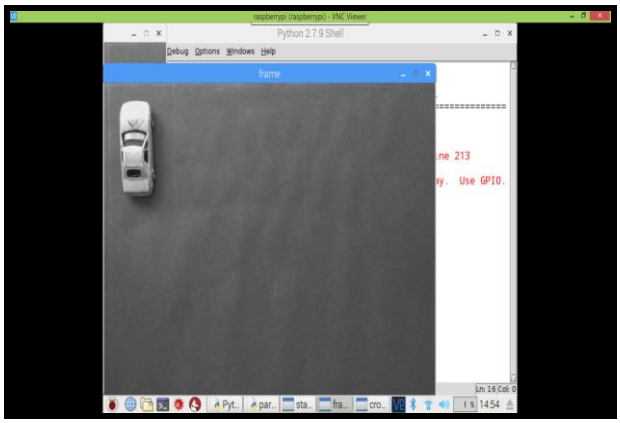

Fig1.2: Parking slot occupied image

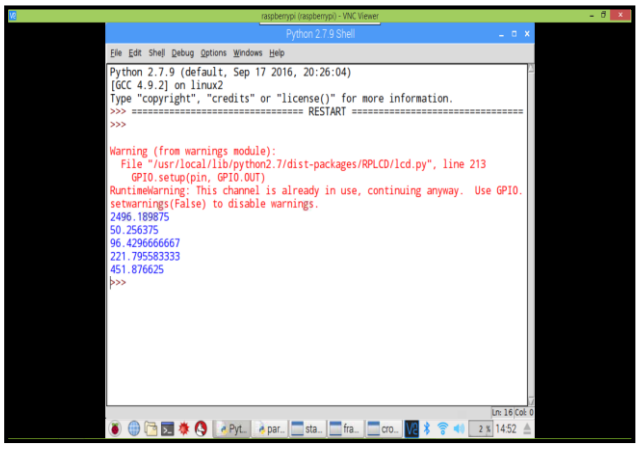

Fig 1.3 MSE values for slot occupied image

FIG 1.4 LCD values of vacant slot

Case 2

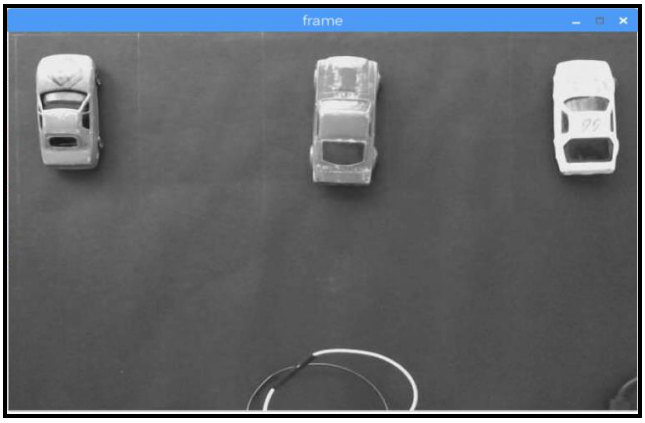

Fig1.5:Parking slot occupied image

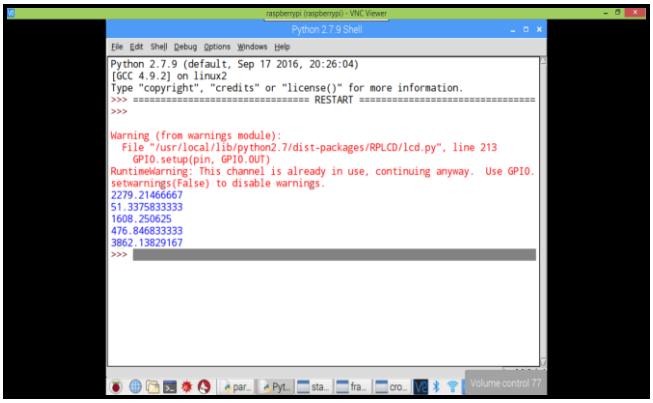

Fig1.6: MSE values for slot occupied image

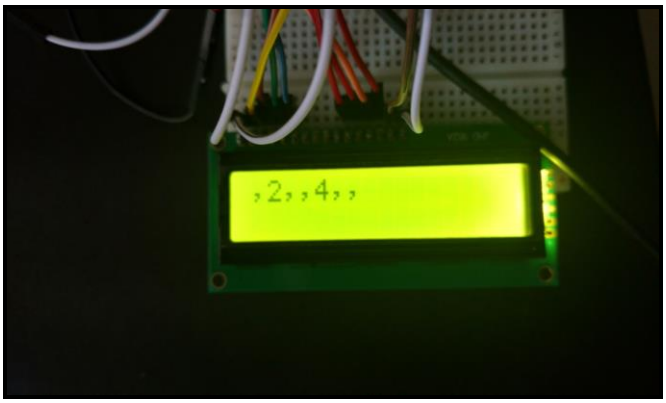

Fig1.7: LCD values of vacant slot

ANALYSIS and CONCLUSION

This system detects a vacant slot in a parking area. We have considered two cases to demonstrate our result which detects the vacant slot.

Case 1: In this case out of 5 parking slots 1 parking slot is made occupied and the remaining 4 slots are vacant , MSE values for all the 5 slots are displayed and those MSE values are compared with the threshold MSE value and by comparing the 1st slot MSE value exceeds the threshold MSE value. So, in the LCD screen it displays the vacant slot i.e., 2,3,4,5.

Case 2: In this case out of 5 parking slots 1,3,5 parking slot is made occupied and the remaining 2 slots are vacant i.e., 2,4. MSE values for all the 5 slots are displayed and those MSE values are compared with the threshold MSE value and by comparing the 1,3,5 slot MSE value exceeds the threshold MSE value. So in the LCD screen it displays the vacant slot i.e., 2,4.

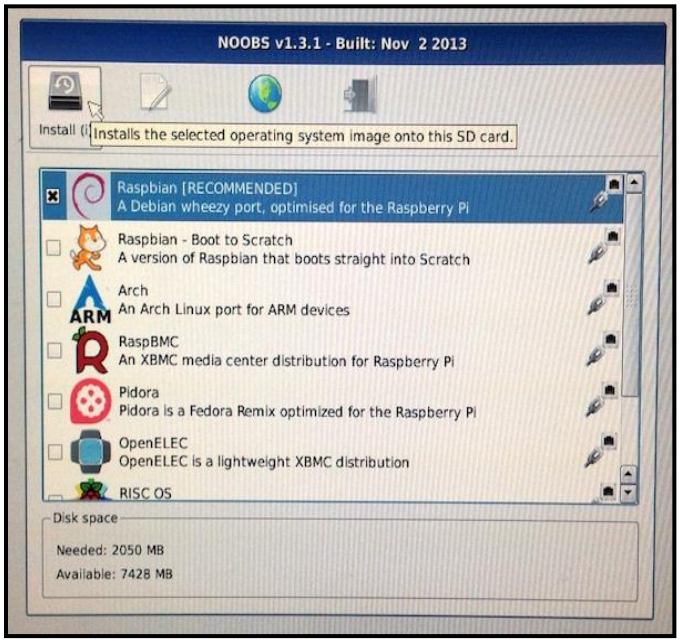

Fig: Raspbian OS installation screen

Fig: Raspberry pi OS boot screen

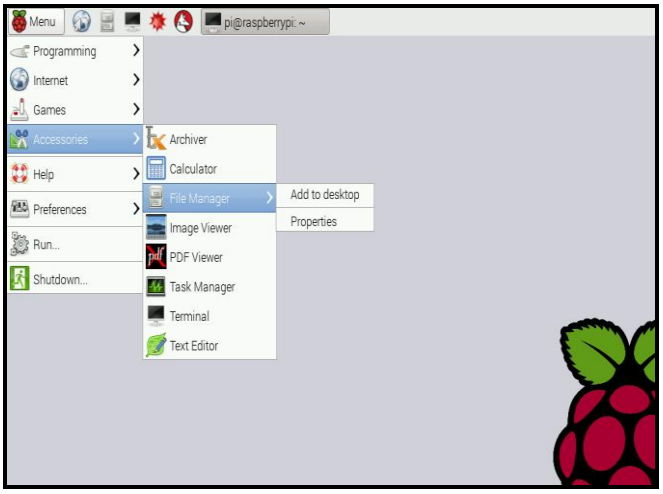

Fig: After installation of Raspbian OS

REFERENCES

[1] Yu, H.M., Pang, Z. F. and Ruan, D.R. (2008) The Design of the Embedded Wireless Vehicles Monitoring Management System Based on GPRS : Evidence from China. International conference on Intelligent Information Technology, Shanghai, 21-22 December 2008, 677-680.

[2] Wang, L.F., Chen, H. and Li, Y. (2009) Integrating Mobile Agent with Multi-agent System for Intelligent Parking Negotiation and Guidance. 4th IEEE Conference on Industrial Electronics and Applications, 25-27 May 2009, Xi'an, 1704-1707.

[3] Abdallah, L., Stratigopoulos, H.-G., Mir, S. and Kelma, C. (2012) Experiences With Non-Intrusive Sensors For RF Built-In Test. 2012 IEEE International Test Conference (ITC), Anaheim, 5-8 November 2012, 1-8.

[4] D. Kim and W. Chung (2008) Motion Planning for Car-Parking Using the Slice Projection Technique. IEEE/RSJ International Conference on Intelligent Robots and Systems, Nice, 22-26 September 2008, 1050-1055.

[5] Zhang, B., Jiang, D.L., Wang, F. and Wan, T.T. (2009) A Design of Parking Space Detector Based on Video Image. The Ninth International Conference on Electronic Measurement & Instruments, Beijing, 16-19 August 2009, 253-256.

[6] Sreedevi, A.P. and Nair, B.S.S. (2011) Image Processing Based Real Time Vehicle Theft Detection and Prevention System. 2011 International Conference on Process Automation, Control and Computing (PACC), Coimbatore, 20-22 July 2011, 1-6.

[7] Zhang, X., Li, Y., Wang, J. and Chen, Y. (2009) Design Of High-Speed Image Processing System Based on FPGA. The Ninth International Conference on Electronic Measurement & Instruments, Beijing, 16-19 August 2009, 65–69.

[8] Jermsurawong J., Ahsan, M., et al. (2012) Car Parking Vacancy Detection and Its Application in 24-Hour Statistical Analysis. 10th International Conference on Frontiers of Information Technology, Islamabad, 17-19 December 2012, 84-90.

[9] Lin, S., Chen, Y. and Liu, S. (2006) A Vision-Based Parking Lot Management System. IEEE International Conference on Systems, Man, and Cybernetics, Taipei, 8-11 October 2006, 2897-2902.

[10] Conci, A., Carvalho, J. and Rauber, T. (2009) A Complete System for Vehicle Plate Localization, Segmentation and Recognition in Real Life Scene. IEEE Latin America Transactions, **7**, 497-506.

[11] Lee, K. (2012) Colour Matching for Soft Proofing Using a Camera. IET Image Processing, **6**, 292-300.

[12] Tang, V., Zheng, Y., Cao, J., Hong, T. and Polytechnic, K. (2006) An Intelligent Car Park Management System Based on Wireless Sensor Networks. 1st International Symposium on Pervasive Computing and Applications, 3-5 August 2006, Urumqi, 65-70.