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Review On Image Processing Application For Vehicle Seat Vacancy Identification

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Abstract — *Image processing technology is incredibly popular at present. It can be applied to several applications for detecting and processing the digital images. Face detection is a chunk of image processing. It is worked for discovering the face of human in a certain area. Face detection is operated in numerous applications such as face recognition, people tracking, or photography. Face detection technique is operated for identifying and calculating the number of passengers in electric vehicle through webcam. The webcam is fixed in electric vehicle and linked with Raspberry Pi 2 model B. When electric vehicle go away from the station, webcam will take passenger's images in the seating area. The images will be adjusted and enhanced to shrink the noise which is completed through software application. The images are conveyed to the server through 3G communication. At that moment, the server process the images via face detection technology and calculating the amount of passengers in electric vehicle. The system gains the maximum number of passengers in electric vehicle that process through the images at that moment calculates the seat vacancy of the electric vehicle*

Keywords*-image processing; face detection; real time; raspberry Pi 3;OpenCV.*

I. INTRODUCTION

Currently, maximum people usage of public vehicle in place of separate car as a result of the growing of gasoline rates and traffic jams. Public company has been improving the system for showing the place of the passenger vehicle for suitability of customers. However, those systems only show the place of the vehicle but not display the availability of seats in the vehicle. Customers will spoil a period for waiting the next passenger vehicle and cannot manage the time travel or activities correctly. If customers know both of the position of the passenger vehicle and vacancy of seats, customers can use the time to other activities before the passenger vehicle arrives. Customers can plan their travel better.

In this research, the seat vacancy identification system is designed by using image processing technique. Webcam is connected with Raspberry Pi 3 in the electric vehicle for detecting the object on vehicle and sending the data to the server via 3G communication. This system use Open Source Computer Vision (OpenCV) to analyze and process the data then calculated the vacancy of the electric vehicle by using the maximum face detection data.

II. LITERATURE REVIEW AND RELATED THEORY

"Real-Time Integrated CCTV Using Face and Pedestrian Detection Image Processing Algorithm for Automatic Traffic Light Transitions", this research studies the traffic light for pedestrian that wishes to cross the street. They press the button and wait for traffic light if the pedestrian cross the street. Use image processing for identifying the face of pedestrian this system use CCTV instead the button. If CCTV discovers the face of pedestrian, the system will set the red light to show for 45 second. In contrast if CCTV does not spot the face, the red light will display for just 30 second. [1] "FACE DETECTION USING COMBINATION OF SKIN COLOR PIXEL DETECTION AND VIOLA-JONES FACE DETECTOR", this research studies the finding of the human skin. It manages a fusion of two techniques that are a novel hybrid color models and Viola – Jones algorithms. Its function is to discovery weather the object is human or not. The system is designed in MATLAB and operates ECU face and skin database to evaluate the accuracy. From the result, this technique has great act more than another. When operate this process with Viola – Jones face detector, it will be more efficient. It avoids the subjectivity of the artificial selected objects, combines the merits of the two algorithms and forms an efficient and accurate vacant seat detection algorithm. Using the Ada boost algorithm the background of the image is separated. For verifying human existence in a seat face detection is performed. RGB to HSV conversion is performed by Cam shift algorithm after that the head shoulder detection to give the ratio among head and shoulder. For confirming human attendance in the seat the variety of the head shoulder ratio obtained is used [2]. The idea of this paper is to extend this algorithm and usage of them for detecting human presence by means of the mentioned techniques. The expansion helps in detecting if any of the seats inside a specific place is vacant or occupied and so the amount of vacant seats in that particular place could be easily identified [3]. It improves the speed of organization of people in a place and shrinks the unnecessary waiting time .The system is used to signify the amount of seats engaged in a hall rapidly. It

effectively identifies the amount of empty seats in this manner allowing the people outside the hall to know the amount of vacant seats existing. Thus in crowd monitoring and management the system plays a vital role [4]

III. PROPOSED SYSTEM

The system accurately does once it is put into action. The taken video is ongoing, and at that time a frame by frame examination of the video is completed. Two algorithms that is face detection as well as head shoulder detection algorithms are worked to identify human existence in a seat. To categorize the seats image overlaying methodology is used. If a human attendance is identified, then the vacant seat total is not disturbed, else the count is increased accordingly.

The Ada boost algorithm to identify the human faces habitually and helps in effective facial feature detection. It performs a so main part in quick feature evaluation and training classifiers. Ada boost, abbreviation for "Adaptive Boosting", is a Machine learning meta-algorithm. The tests mostly lie in efficient hardware architecture design, while maximum published vision algorithms do not take into consideration hardware characteristics and parallel processing. In that way, Ada boost is usually used in conjunction with other tracking algorithms to increase their performance.

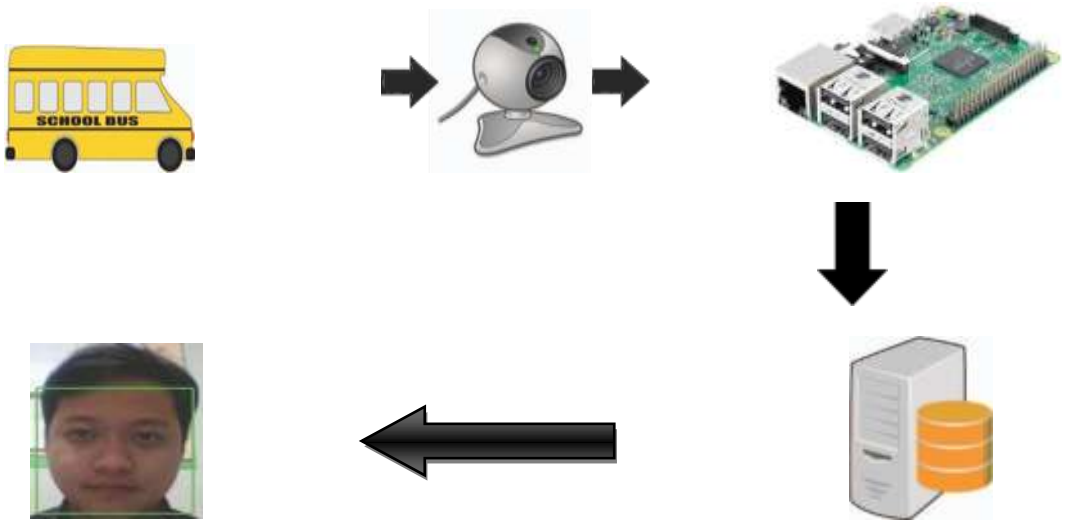

Figure 1. Working of proposed system

In this proposed system, the vehicle seat identification system is design the devices that include webcam, Raspberry Pi 2 model B, and 3G module are connected in electric vehicle at the top-front of the electric vehicle. Raspberry Pi 3 model B have memory card, USB port to attach webcam, router which connect to server. When the electric vehicle leave from the station, the system will take the image in the passenger seat region (1 image per 1 second) and send on to the server by means of 3G communication. The server deal with the images that obtain from Raspberry Pi in electric vehicle by means of Open Source Computer Vision (OpenCV). The system is separated into two portions. The first portion is hardware. It installed and operated on the vehicle. The second portion is program on the server. First phase in this process is to sketch rectangle around individual humans and acquire distinct frames for additional processing. In the same way additional frames are obtained. The later step in processing is to subject the obtained frames for face and head shoulder detection. In the last procedure, the system will use Haar-like feature algorithm for discovering the passenger's faces. The system will identify only the face of human by means of the face shape. In every image, the end result of passengers face detection is not equal. When the procedure ends, the system will give only the largest amount of the passenger face from all of the images. Lastly, the system will use the largest number of the face detection to deduct with the number of the electric vehicle seat and display the remaining seat of the electric vehicle.

IV. CONCLUSION

In this review paper, study of face detection by means of image processing technique. The proposed system can be used for Real-time information on reservations and seat occupancy.

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