

# VEHICLE SEAT VACANCY IDENTIFICATION USING IMAGE PROCESSING TECHNIQUE

C.SUMASREE

M.Tech VLSI& Embedded Systems Student  
Gouthami institute of technology &  
Management for women, Proddatur, India

O.MOHANA CHANDRIKA

Assistant Professor, Department of ECE  
Gouthami institute of technology &  
Management for women, Proddatur, India

## Abstract:

Image processing technology is extremely well known at present. It very well may be connected to different applications for identifying and handling the advanced pictures. Face discovery is a piece of picture preparing. It is utilized for finding the essence of human in a given territory. Face identification is utilized in numerous applications, for example, confront acknowledgment, individuals following, or photography. In this exploration, confront discovery strategy is utilized for identifying and including the quantity of travelers electric-vehicle by means of webcam. The webcam is introduced in electric-vehicle and associated with Raspberry Pi 3 display B. At the point when electric-vehicle leaves from the station, webcam will catch travelers' pictures in the seating zone. The pictures will be balanced and enhanced to decrease the clamor which is finished by programming application. The pictures are sent to the server by means of 3G correspondence. At that point, the server forms the pictures by utilizing face location innovation and including the quantity of travelers electric-vehicle. The framework acquires the most extreme number of travelers in electric-vehicle that procedure through the pictures at that point figures the seat opening of the electric-vehicle.

**Keywords: Raspberry Pi, IOT, Seat Identification, Open CV**

## I. INTRODUCTION

These days, a great many people utilize open vehicle rather than individual auto because of the ascending of fuel costs and car influxes. Open organization has been building up the framework for showing the situation of the traveler vehicle for accommodation of clients. Nonetheless, those frameworks just demonstrate the situation of the vehicle however not demonstrate the accessibility of seats in the vehicle. Clients will squander a period for holding up the following traveler vehicle and can't deal with the time travel or exercises accurately. On the off chance that clients know both of the situation of the traveler vehicle and opportunity of seats, clients can utilize the opportunity to different exercises previously the traveler vehicle arrives. Clients can design their movement better. In this examination, the seat opening ID framework is planned by utilizing picture handling strategy. Webcam is associated with Raspberry Pi 2 in the electric-vehicle for distinguishing the question on vehicle and sending the information to the server by means of 3G correspondence. This framework utilizes Open Source Computer Vision (OpenCV) to break down and process the information at that point figured the opportunity of the electric-vehicle by utilizing the most extreme face discovery information.

## II.LITERATURE REVIEW AND RELATED THEORY

"Continuous Integrated CCTV Using Face and Pedestrian Detection Image Processing Algorithm for Automatic Traffic Light Transitions", this exploration ponders the activity light for person on foot that needs to cross the road. On the off chance that the passerby crosses the road, they press the catch and sit tight for movement light. This framework utilizes CCTV rather the catch and utilize picture preparing for recognizing the essence of person on foot. In the event that CCTV identifies the essence of person on foot, the framework will set the red light to appear for 45 second. Then again, if CCTV does not distinguish the face, the red light will appear for just 30 second.

"Investigating Impact of Image Scaling Algorithms on Viola – Jones Face Detection Framework", this examination considers the Viola – Jones calculation about the issue from low nature of the picture and discover the upgrade arrangement from Viola – Jones calculation. The framework utilizes two techniques to scaled

picture that are window scaling and picture scaling. The picture scaling has 5 methods that is closest neighbor, Bi-Linear, Bi-Cubic, Extended Linear, and Piece-Wise Extended Linear. The framework utilizes 5 distinction confront databases for looking at the execution of 5 diverse picture scaling systems. The framework was created by utilizing C++, Visual studio 2010, and Open Source Computer Vision (OpenCV). They utilized perplexity lattice that make out of True Positive, False Positive, and False Negative to assess the execution of every method. From the outcome, they discovered that the examination in arrangement of the window scaling is superior to anything picture scaling.

"FACE DETECTION USING COMBINATION OF SKIN COLOR PIXEL DETECTION AND VIOLA-JONES FACE DETECTOR", this exploration thinks about the discovery of the human skin. It utilizes a mix of two methods that are a novel half and half shading models and Viola – Jones calculations. Its motivation is to distinguish the question is human or not. The framework is structured in MATLAB and utilize ECU face and skin database to assess the exactness. From the outcome, this technique has superior more than another. At the point when utilize this strategy with Viola – Jones confront locator, it will be more productive.

### III. PROPOSED SYSTEM

In this project, 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. When the electric-vehicle leaves from the station, webcam captured the images and send to the server by using Raspberry Pi and 3G communication. The images were sent completely. This system uses Open Source Computer Vision (Open CV) to analyse and process the data then calculated the vacancy of the electric-vehicle by using the maximum face detection data.

### IV. PROPOSED SYSTEM BLOCK DIAGRAM

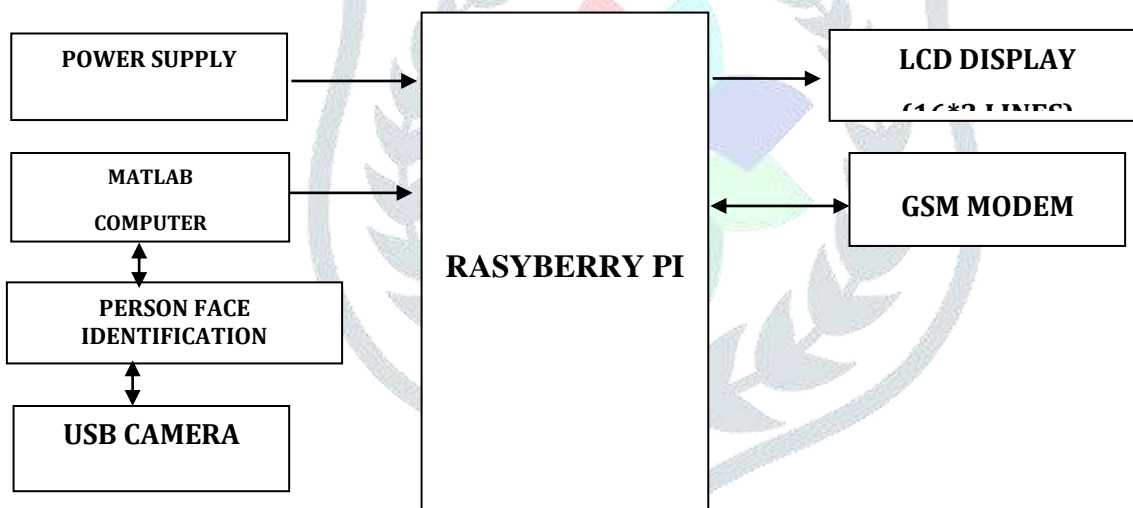


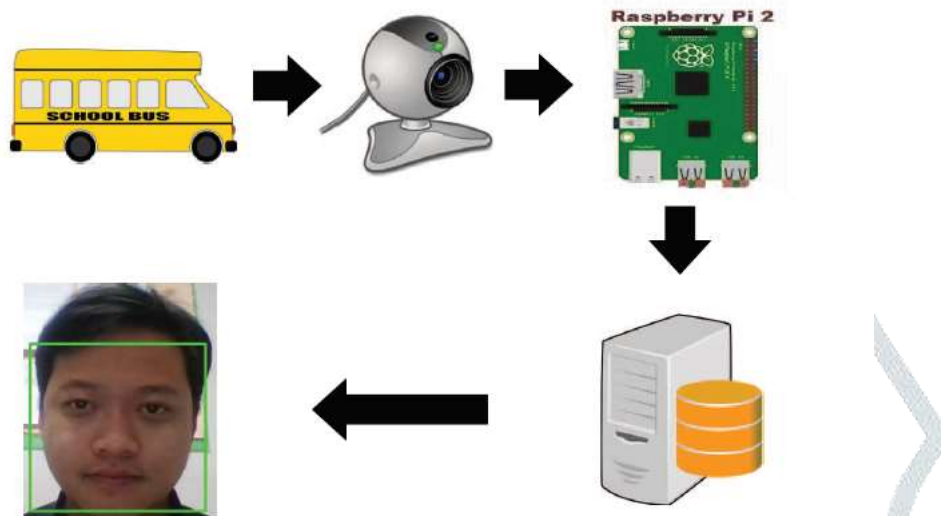
Figure 2. Block Diagram of Proposed system

### V. DESCRIPTION

Image processing technology is very popular at present. It can be applied to various applications for detecting and processing the digital images. Face detection is a part of image processing. It is used for finding the face of human in a given area. Face detection is used in many applications such as face recognition, people tracking, or photography. In this project, face detection technique is used for detecting and counting the number of passengers in electric-vehicle via webcam. The webcam is installed in electric-vehicle and connected with Raspberry Pi 3 model B. When electric-vehicle leaves from the station, webcam will capture passenger's images in the seating area. The images will be adjusted and improved to reduce the noise which is done by software application. The images are sent to the server via 3G communication. Then, the server processes the images by using face detection technology and counting the number of passengers in electric-vehicle. The system obtains the maximum number of passengers in electric-vehicle that process through the images then calculates the seat vacancy of the electric-vehicle.

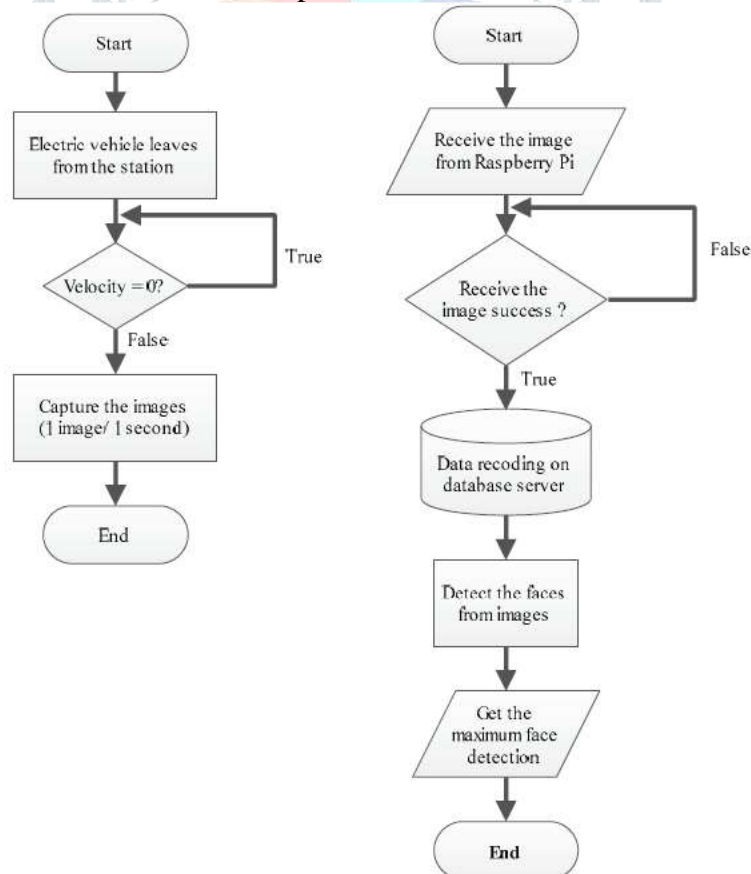
**VI. METHODOLOGY**

The gadgets that incorporate webcam, Raspberry Pi 3 demonstrate B, and 3G module are introduced in electric-vehicle at the best front of the electric-vehicle. At the point when the electric-vehicle leaves from the station, the framework will catch the picture in the traveler situate territory (1 picture for every 1 second) and send to the server by utilizing 3G correspondence. The server forms the pictures that get from Raspberry Pi in electric-vehicle by utilizing Open Source Computer Vision (OpenCV).



**Figure 3. Overview of Overall system**

The system is divided into two parts. The first part is hardware. it is installed and worked on the vehicle. The second part is program on the server. It is used for process the data from hardware.

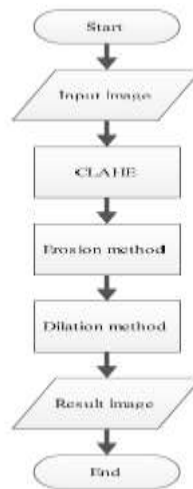


**Figure 4. Flowchart of the system in the Vehicle and Server**

When the system finishes adjusting histogram then the image noise will be reduced by using the morphological process. The image noise is processed by using the erosion method for removing unwanted

pixel. Then, the dilation method applies after the erosion method to increase the edge pixel of the image. The result of the face in the image is clearer when compare with the original image.

The program has process to reduce the image noise. It uses method from Open Source Computer Vision (Open CV). It is shown in below figure,



**Figure 5. Reducing noise method flow chart**

In the last procedure, the framework will utilize Haar-like element calculation for finding the travelers faces. The framework will recognize just the essence of human by utilizing the face shape. In each picture, the consequence of traveler's face discovery isn't equivalent. At the point when the procedure complete, the framework will give just the greatest number of the traveler look from the majority of the pictures. At last, the framework will utilize the greatest number of the face discovery to subtract with the quantity of the electric-vehicle seat and demonstrate the rest of the seat of the electric-vehicle.

## VII. EXPERIMENTAL RESULTS

Hardware implementation and its proposed execution was shown below



**Fig6. Hardware assembling for the design and simulation Results.**

## VIII. CONCLUSION

Vehicle Seat Vacancy Identification utilizing Image Processing Technique was planned and tried. Webcam and Raspberry Pi were introduced in electric-vehicle. At the point when the electric-vehicle leave from the station, webcam caught the pictures and send to the server by utilizing Raspberry Pi and 3G interchanges. The pictures were sent totally. The quantity of pictures have an immediate effect to the face recognition result. On the off chance that the quantity of pictures builds, the exactness of face discovery is increment too. Since the framework will have more opportunity to identify the travelers look from numerous pictures. The clamors in pictures happen from condition inside and outside the vehicle, for example, the light and face obscure. The framework enhances nature of pictures by utilizing contrast restricted versatile histogram balance and morphological process.

**REFERENCES**

- [1] Cyrel O. Manlises, Jesus M. Martinez Jr., Jackson L. Belenzo, Czarleine K. Perez, and Maria Khristina Theresa A. Postrero, "Continuous Integrated CCTV Using Face and Pedestrian Detection Image Processing Algorithm For Automatic Traffic Light Transitions", School of Electrical, Electronics and Computer Engineering, Mapua Institute of Technology, 2015.
- [2] Himanshu Sharma, Sumeet Saurav, Sanjay Singh, Anil K Saini, and Ravi Saini, "Dissecting Impact of Image Scaling Algorithms on ViolaJones Face Detection Framework", Advanced Electronics System, Academy of Scientific and Industrial Research, CSIR-Central Electronics Research Institute, 2015.
- [3] GUAN-CHUN LUH, "FACE DETECTION USING COMBINATION OF SKIN COLOR PIXEL DETECTION AND VIOLA-JONES FACE DETECTOR", Department of Mechanical Engineering, Tatung University, 2014.
- [4] Paul Viola, and Michael Jones, "Quick Object Detection utilizing a Boosted Cascade of Simple Features", Mitsubishi Electric Research Labs, Compaq Cambridge Research Lab, 2001.
- [5] K. Sreedhar, and B. Panlal, "Improvement OF IMAGES USING MORPHOLOGICAL TRANSFORMATIONS", International Journal of Computer Science and Information Technology (IJCSIT), Vol 4, No 1, pp. 33-50, Feb 2012.
- [6] Damien LEFLOCH, "Continuous People Counting framework utilizing Video Camera", Department of Computer Science and Media Technology, Gjøvik University College, 2007.

