

## A survey on Automated Shopping Trolley Follower for Super Market Billing System

Poorvitha H R<sup>1</sup>, Pavithra T N<sup>2</sup>, Sowbhagya T M<sup>2</sup>, Savithramma K B<sup>2</sup>, Omkar Yadav<sup>2</sup>

*Computer Science and Engineering*

*Vivekananda Institute of Technology, Bangalore-74, Karnataka, India*

### **Abstract**

*It introduces the object tracking robot [6] which is directed by wheels and managed with some software along with the computer. The goal of object tracking is to depiction a robot which is cardinally maintained by computer to follow and track the colored object. The significance is given on rigor robotic vision based [1] functions. Image capturing by the trolley is achieved by pi camera, and captured colored object moves to image processing for further dispensation. A new vision-based methodology to the illustration and appreciation of human movement [7] is obtainable. Object tracking is in recent times becoming ever more essential in the field of image processing and analysis. Uses like user-computer interaction, traffic-control, online video exemption and making and video observation need consistent and economically judicious image tracking tools. We reason that the path-following way may still be more proper in some states, and we suggest that the perfect person resulting performance may be a hybrid methodology, with the robot routinely choosing which method to use.*

**Keywords:** Face recognition, Object tracking, and Vision based system.

### **1. Introduction**

Automated Shopping Smart trolley Follower Using Vision-Based System is one such example. In the last decade Using image

processing for object tracking to develop very popular because of its capability to solve daily problems and ease of manufacture, e.g. surveillance through cameras, adaptive traffic lights with object tracking, etc. There are many Tracking procedures with Different methods [2]. The tracking algorithms while functioning in the uncompressed pixel area has the possible to identify object boundary [1] with pixel accuracy with the benefit of fully decoded processed image, before segmentation can be achieved. A new methodology for object tracking in the compressed domain. Rather than using a single cue to resolve this problem Mechanization with computers as their agents has become part and parcel of day to day life.

### **2. Problem statement**

A new smart trolley for Object Recognition and Following image based procedure and also user-friendly. This trolley use to diminish the HUMAN effort [6] by evolving an image based robotic machine creation for object ensuing concept. Its very time consuming for bill generation waiting in queue for the customer and to remove the products while taking count of product when customer having the shortage of amount. And also difficult to push the cart while shopping.

### 3. Proposed system

This survey is considering in two types proposed system and existing system. This external support can be obtained from the senior experts, from the websites, from the books. Before building the system things are consideration are taken into account for developing the proposed system is detection of moving objects in a video stream acquired by an airborne platform, In this paper we proposed a new framework of multi motion layer analysis to detect and track the moving object in airborne platform, the moving objects are firstly detected by registration and temporal differing to establish motion layer system consists of object detection and tracking, evaluated by using real data collected from the router network the performance analysis of a surveillance system to Detecting and Tracking Moving Objects. This paper is considering the concept of cameras placed on trolley with the technology of detecting moving objects has been explained and tracking. But the limitation is the scenario with increasing number or more number of objects.

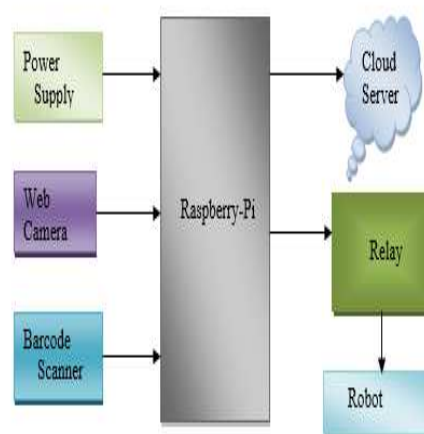
This system is presents a real time object detection and tracking system Which is based on the wheels and controlled by a computer system along with the software and collected by single camera .In this system object detection by using haar feature based cascaded classified on static image and this designed by a computer to track and follow a colored object. This s given on Emphasis precision vision based robotic applications. Vision based person technology is tracking method and two different approaches to person following [5], direction following and path following, Natural Person Following Behavior for Social Robots.

### 4. Objective

It can be then used for different fields like Super-market, construction lines, factory use, etc. For really wants to implementation of this object as mount it on a trolley. It is very

essential to recognize that each real world form of the robot [8] use different passion of power inputs according to the load.

### 5. System Architecture



**Figure 1: System Architecture of automated shopping trolley follower for super market billing system**

Image acquisition by the robot is achieved by web camera, and it is sent to image processing software for the next processing. This is overall describes a visual sensor system used in the field of robotics for identification and tracking of the object. Blob detection methods are aimed at detecting objects in a digital image that different in properties, such as colored object brightness or color compared to surrounding regions. A blob is considering the detect object or image in which some properties are considering constant or approximately constant.

Raspberry Microcontroller will considering to apply several image processing algorithms and the detect the object. And 10 different view of image will be captured then captured mage basis rpm motors are used and they will follow the specific object microcontroller by keeping minimal distance.

## 6. Modules

1. Trolley movement
2. Product with the barcode
3. Object tracking
4. Face detection

### 1. Trolley movement

The trolley movement is considering the human and follow throughout the specific customer ends there shopping, the object tracking we are initially giving the trained object to the system and when will give that trained object to system though picamara it will detect the trained object and follow the human using object tracking detecting system.

### 2. Product with the barcode

The barcode is Scan the product and generate the bill. When we execute or run the code in python and sql query it will automatically upload the specific product information and stored in the database.

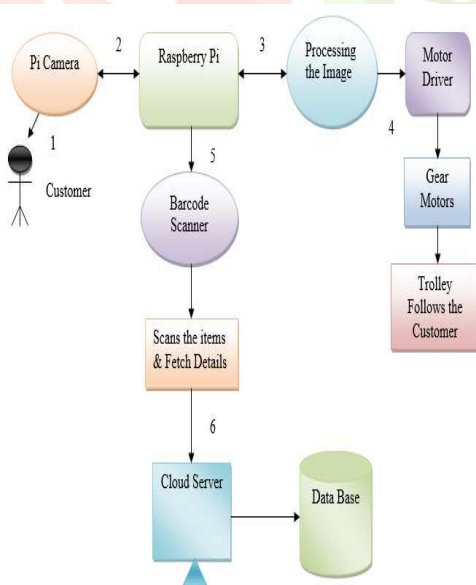


Figure 2: Dataflow diagram

In Fig 2. Shows how Pi camera captures image of the customer then, the captured image is send to Raspberry. Raspberry pi process and analyze the image captured by the pi camera [4]. Then the motor drivers activate and enable gear motors to recognize the customer and follow the particular customer. The customer choose the product and scans these product using barcode scanner. The scanned purchased details will be send to database and store it in cloud server.

### 3. Object tracking and detection

Object detection is a computer technology related to computer vision (eyesight) and image processing that deals with the detecting the object of certain classes like humans in digital image. In our paper, object detection is mainly focused on pi camera and IR sensors. In this, we firstly train and test the object in different angles (in different degrees). Then when we run the program, it searches the trained object. If trained object is detected then it will move forward. And we move the trolley to left and right which follows the trained object with the help of IR sensors. If left sensor sense the object, the right 2 wheels start moving and the left 2 wheels stops with the help of gear motors. Then the trolley starts moving towards left then moving towards right. If right sensor sense the object, the left 2 wheels start moving and the right 2 wheels stops with the help of gear motors. Then the trolley starts moving towards right. If two sensors are sensed together then the trolley stops moving. If trained object is not detected, it means the trained object is not present.

Here, we have used Haar Cascade algorithm for Object detection. It is the only algorithm used in digital image processing. It has four types:

- 1) RGB to Gray conversion: It converts the colored image to Black and white image.
- 2) Binarization: It converts the colored image to binary numbers like 0's and 1's.

3)Edge Detection: It gives values for the edges of the colored image.

4)Feature extraction: It matches the colored image.

#### 4. Face Detection

Face Detection is also another type of computer technology it detects the human face or video sequence. In this paper face detection is also an important part. We can capture the image using pi camera. It takes picture of single image in ten different views (angles). Then it gives ten different values for ten different views. If the face comes in front of the camera, it matches with the ten different views which have been already captured. If the face matches one of views, the trolley moves forward. Otherwise the trolley will be in the same place.

#### 7. Conclusion

We have revived many paper on the smart trolley shopping from that above paper we conclude that the paper is developed with low cost, low power consumption customer can enjoy the shopping without pushing shopping trolley themselves. We are using pi camera and IR sensors on the trolley which can detect and track the customer/human and it follows the human with some limited distance, it will stop when the customer stops and also there is an add on feature barcode scanner fixed on the trolley to scan the product to generate total bills amount of the purchased product automatically. Future scope can be over coming problem like obstacles by using the better quality of sensor through which it can detect directly human and more after customer. By using the powerful battery and more number of dc motor to carry more and more stuff.

#### 8. References

[1]. Concepts of histogram matching and absolute frame subtraction to implement a robust automated object

tracking system, Real time object detection and tracking: Histogram matching and Kalman filter approach, By Mehta M, Goyal C, Srivastava, 2010.

[2]. Structure from motion (SfM) is the extension of classical SfM to dynamic scenes with multiple rigidly moving objects, Multi-body structure-from-motion in practice. By K. E. Ozden, K. Schindler, and L. Van Gool, 2010.

[3]. Himani S. Parekh<sup>1</sup>, Darshak G. Thakore<sup>2</sup>, Udesang K. Jaliya<sup>3</sup> A Survey on Object Detection and Tracking Methods, International Journal of Innovative Research in Computer and Communication Engineering, Vol. 2, Issue 2, February 2014.

[4]. Elgammal A., Duraiswami, R., Harwood, D., Anddavis, L. 2002. Background and foreground modeling using nonparametric kernel density estimation for visual surveillance. Proceedings of IEEE 90, 7, 11511163.

[5]. Abhishek Kumar Chauhan, Prashant Krishna, Moving Object Tracking Using Gaussian Mixture Model And Optical Flow, International Journal of Advanced Research in Computer Science and Software Engineering, April 2013.

[6]. Rupali S. Rakibe, Bharati D. Patil, Background Subtraction Algorithm Based Human Motion Detection, International Journal of Scientific and Research Publications, May 2013.

[7]. R. Gockley and M. Matari'c. Encouraging physical therapy compliance with a hands-off mobile robot. In Proceedings of Human-Robot Interaction, March 2006.

[8]. E. Prassler, D. Bank, and B. Kluge. Key technologies in robot assistants: Motion coordination between a human and a mobile robot. Transactions on Control, Automation and Systems Engineering, 4(1):56-61, Mar. 2002.

[9]. Liu, Y, Tian, L.W., Hu, K.Y., Zhu, Y. L., Computational foraging in bacterial colony over composition environments, Journal of Pure and Applied Microbiology, vol. 7(2), 2013.