

Automated Super Shop using image processing (Python)

Suraj Chopade¹, Prof. Smita Palnitkar², Sujit Chavan³, Anirudha Deshpande⁴

^{1,2,3,4} Dept. of E & TC Engg., Smt. Kashibai Navale College of Engineering, Savitribai Phule
Pune University, Pune

¹chopadesuraj3@gmail.com ²smitpalnitkar@gmail.com ³sujitchavan085@gmail.com
⁴anirudhadeshpande.98@gmail.com

Abstract

Unstaffed retail shop is been emerging out in the past years and has significantly affected conventional shopping styles. In this area, unmanned retail container plays an very important role, it can highly influence the shopping experience of user. the traditional way based on weighing sensors can't sense what the customer is taking. This paper proposes a smart unstaffed retail shop scheme based on Image processing using python, aiming at exploring the feasibility of implementing the unstaffed retail shopping. Based on the data set of images in different scenarios that includes different types of stock keeping unit (SKU) with variable sizes, an end-to-end classification model of unstaffed shop trained by the method is developed for SKU recognition & counting, and the proposed solution in this study is able to achieve counting and recognition accuracy on the test data table, which indicates that the system can make up a good choice over deficiency of traditional unmanned container.

Keywords— cashless economy, security, distributed database, visual cryptography, hash algorithm.

I. INTRODUCTION

This project is employed for automating the billing system in supermarkets the database of this project will consists of some predefined shapes. The camera will capture the image of goods, it will find the objects which are predefined then it compares with the database, the software part will calculate the amount of bill. Now there will be two sorts of customers registered & non registered, if the customer is registered then the amount of bill can directly be debited from his account. 3D Object recognition systems can be terribly useful for an automatic billing system with minimum human involvement. Several beholding algorithms are developed to boost performance of that varies in terms of accuracy, computation time etc. in terms of accuracy, computation time etc. A laptop vision system for automatic application should be easy with accuracy as a mismatch can result in wrong having large economic impact. Barcodes are widely used in many grocery supermarkets like Hyper market, -marts, Easy Day for billing and statement generation. Check-out counters use laser bar-code readers in supermarkets but the space between the sensor and the object could be nearly zero when the reader is applied. The billing has to manipulate either the reader or the objects. This makes the task difficult for the human worker. particularly in huge stores wherever many customers comes for looking in an exceedingly day and thousands of objects have to be compelled to be scanned in an exceedingly day. Every object has to be scanned separately taking abundant time and making the task simple for the billing personnel particularly in huge stores wherever many customers comes for looking in an exceedingly day and thousands of objects have to be compelled to be scanned in an exceedingly day. In the modern era, the people have more income to spend and lesser time to spend, so they generally typically opt for supermarkets for grocery and alternative looking instead of native outlets. Truly the client is in a position & absolves to opt for product from large on the market varieties which attract the large customers mainly in big cities thus therefore long queues of shoppers are seen at these stores. In several cases, the barcode is either broken or there is also downside in reading barcode because of lighting effects, low resolution etc. A bar code based billing system is also expensive as it requires bar coding of all products. The planet is moving towards an era of automation and creature is a great asset which should be utilized in

additional intellectual works instead of manual, monotonous works.. The evolution in technology has led to high speed computers with wonderful processors and storage capability. The concepts of Robotics, 3D Object recognition, AI could be helpful to develop an application for real time automated billing to ease laborious human work. For the purpose of automation, the human operator needs to be removed from the process. Computer processor vision based systems could be developed and deployed for such an automated billing application where minimum number of human interference and lesser wait time is required leading to customer satisfaction. The recognition in tangled real-world scenes has to be unaffected, fractional obstruction, orientation. Local descriptors are generally engaged in numerous real-world applications like image retrieval and object recognition as they are resistant to fractional obstructions, relatively unaffected to deviations in view and can be computed easily. There are two things to be kept in mind while using local descriptors. First, the interest point in position and scale must be chosen to safeguard only those points that are most probable to remain stable over transformations. Second, the interest point descriptor must be built distinctive, concise, and invariant over transformations. Thus, the main steps in object recognition are computation of local interest points, computation of descriptors and indexing/matching- In detection, some operators are applied to find typical key points during the feature detection stage to match well in other images. In description, the detected features are termed on the basis of the neighbour pixels around it during the feature description stage. In matching, each demanded feature is matched to the similar features with the referred one during this stage. Various types of local feature detector and descriptor have been developed but various recognition rates, efficiency, computation times, memory requirements are obtained by using various descriptors interest point algorithms for detection, description and matching. The challenge is to find the algorithms which are suitable for the automated billing application and finding the balance between various parameters to best suit the application. Corner Detectors detect corners which can be stated as a juncture of two or more edges.

II. RELEVANCE

Image Processing System for Automatic Segmentation and Yield Prediction of fruits using Open CV :
Lizheng Liu¹, Bo Zhou², Zhuo Zou¹, Shih-Ching Yeh¹, Lirong Zheng¹[2]

Published in: 2018 International Conference based on Emerging Trends and Innovations in
Engineering and Technological Research (ICETIETR)

Unstaffed retail shop has been emerging in the past few years and significantly affected conventional shopping styles. In this field unmanned retail container plays an important role, it can highly influence the user shopping experience, the traditional method on weighing sensors cannot sense what the customer is taking. This paper proposes a smart unstaffed retail shop scheme based on image processing & open CV python which aiming at exploring the feasibility of implementing the unstaffed retail shopping style. Information regarding Automatic segmentation & counting of fruits using image processing and open CV python. The merits of this paper are that it use open CV python which gives more than 98% accuracy & It is better than manual counting while the demerits are unemployability will be increased because one machine can do work of many persons.

Automatic Detection & classification of weaving fabric defects based on digital image processing.
Gorbunov Vladimir(&), Ionov Evgen(&) , and Naing Lin Aung [4]

Published in: 2019 Second International Conference on Green Computing and Internet of Things (ICGCIoT)

This paper describes the detection and classification of fabric defects based on digital image processing. It provides the higher speed and accuracy of defect detection than human vision and to search the source of the defects. At first It will find the size and position of wefts or warps of fabrics from an image. Then calculate the pattern of weft and warp positions and calculate whether there is a defect or not. The patterns of weft and warp may be varied based on the type of fabrics. OpenCV library and python programming language are used for the experiment. Seven kinds of defects on the fabrics model images are detected and five real fabric images are used for the experiment. Using OpenCV & python we get the result of successful defect detection with 95% rate, and it is 50% faster than human vision in fabrics density calculation. The type of pattern should be same if different then it

can give less accuracy for defect identification.

Performance comparison of weed detection Algorithm:

Sarvini T, Sneha T, Sukanya Gowthami G S, Sushmitha S and R Kumar [3]

Published in: International Conference on Communication and Signal Processing, April 4-6, 2019, India.

The conventional methods of weed removal are time-consuming and require more manual labour work. Hence there is a need to automate this process. The objective of the proposed system is to detect weed from crop using machine learning algorithms. The exhaustive dataset is collected for four different commercial crops and two types of weeds such as Para grass and Nutsedge. The shape features of an image are extracted to provide distinguish properties between weed and crop. The classification of weed and crop has experimented with three different classifiers: Support Vector Machine, Artificial Neural Network and Convolutional Neural Network. The performance comparison of weed detection algorithms is executed on the Open CV and Keras platform using python language.

III. PROPOSED METHODOLOGY

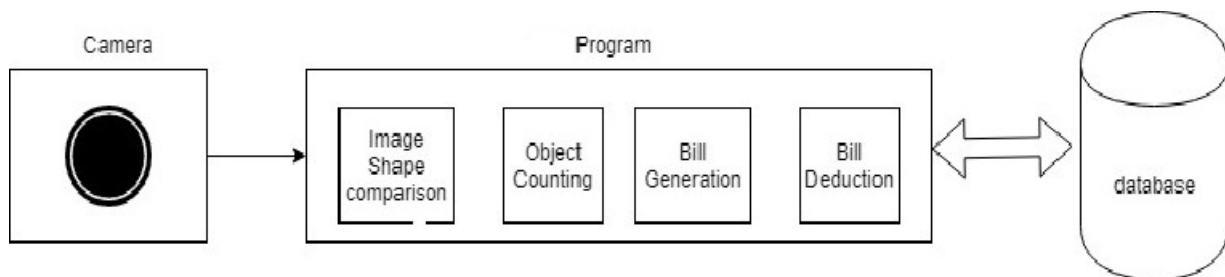


Fig.3.1. Block Diagram of Proposed System

As shown in block diagram, first block is camera which shows that The camera will capture the image, it will detect for the objects which are predefined. It will give input to Image shape comparison block. The shape comparison module will compare the input images with sku data images. Which is in MySQL database? The object counting block will count no. of images & also price of that object & further process is done by bill generation block. The bill generation will be by backend programming by java or python. The software part will calculate the amount of bill. Now if the user is registered then the amount can directly be debited from his account. This system includes technical support of mobile applications, and users will be able to conduct a series of actions like product searching, pre-ordering and online payment on the mobile app.

IV. ALGORITHMS

A. Sequence Diagram

The algorithms can be understood by the Sequence diagram. Sequence diagrams provide a graphical representation of object & their interactions over time. These typically show a user or actor, and the objects and components they interact with in the execution of a use case. One sequence diagram typically represents a single Use Case 'scenario' or own of events. Sequence diagram is a better way of documenting usage scenarios and both capturing required objects early in analysis and verifying the object use later in design. The diagrams show the sequence of messages from one object to another, and as such correspond to the methodology events supported by a class/object.

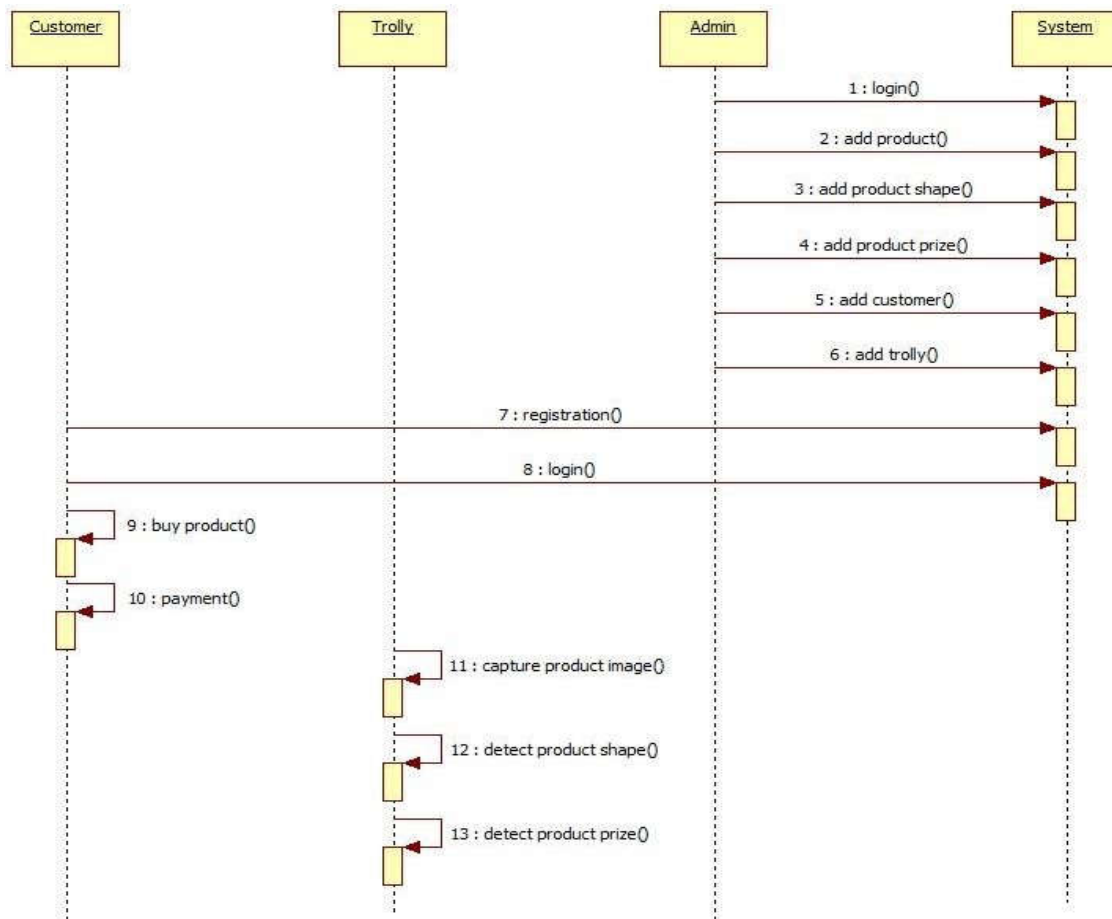
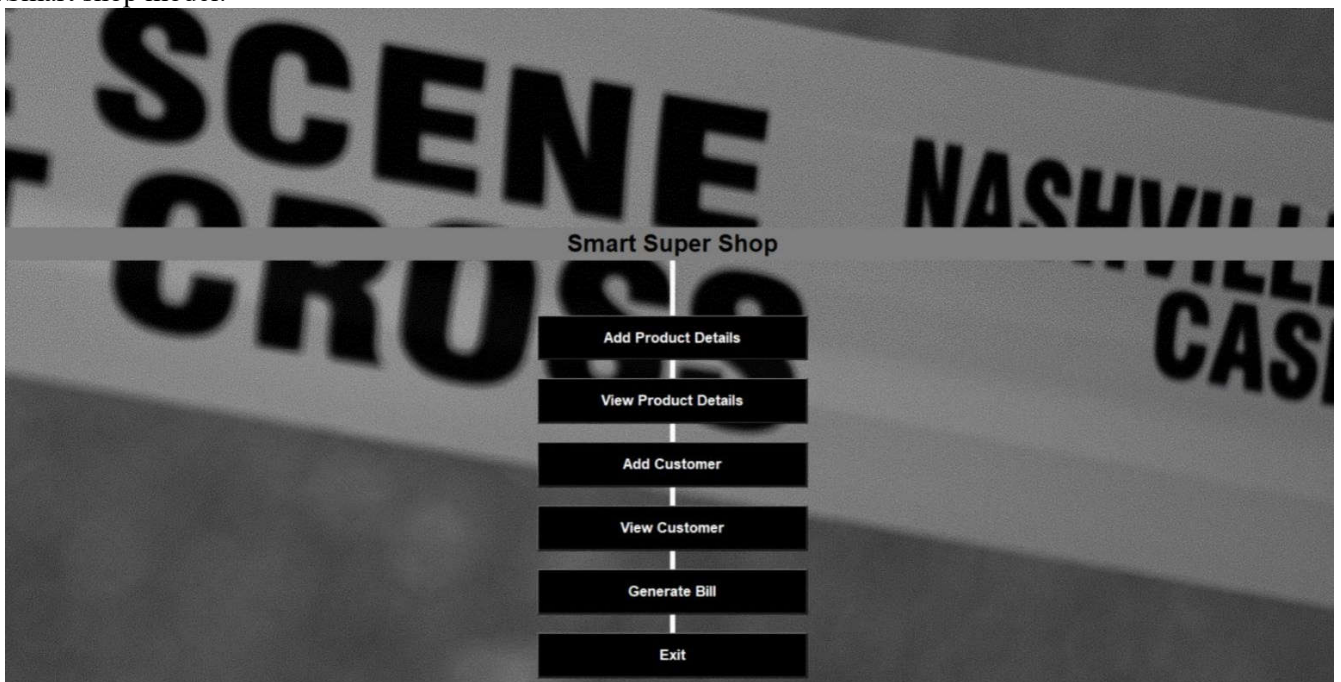


Fig:4.1 Sequence Diagram

V. RESULTS

1. Smart shop model:



2. Customer Identification:

Super Shop

Name

Mobile

Email

Address

Password

Add Record

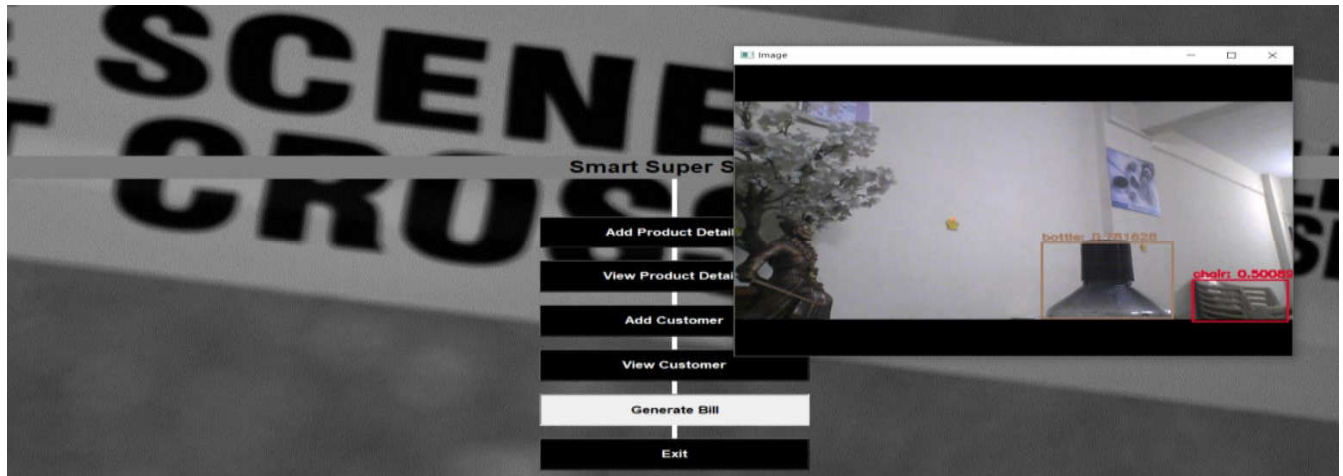
3. Product Details(DATASET):

Product Details									
ID	Product Name	Description	MFG	Expire	Price	D. Price	Category	Quantity	
2	I	I	I	I	II	I	I	;!	
3	person	nice	19/10/2018	19/10/2019	100	80	Food	2	
4	bottle	drink	19/10/2018	19/10/2019	300	150	Food	2	
5	cell phone	nokia 1100	12/12/2018	12/12/2019	1500	1200	Product	12	
6	banana	healthy to eat	12/12/2010	12/12/2019	20	15	food	15	
7	charger	charger	apple	25/02/2025	4500	4000	Electronic	1	
8	book	book	book	2/2/2020	500	250	book	1	
9	mouse	mouse	dell	2/2/2022	500	450	electronic	1	

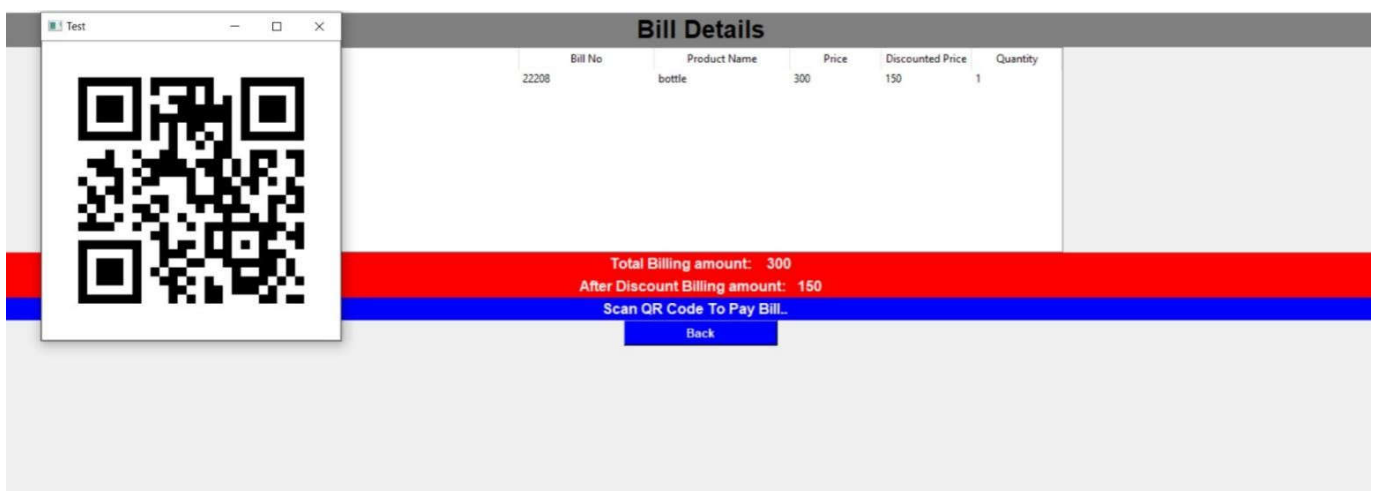
Back

Click on a data to delete

4. Object Detection:



5. Bill Generation



VI. CONCLUSIONS

Thus we are going to implement a system using python to automate the billing process in the supermarkets. This system will support digital India. Using this system both costumers and management will get a better shopping experience. We are going to use Open CV library of python programming language, MySQL database for the system. These systems will helpful and time saving.

In the future work, we will focus on improving algorithm efficiency and recognition rate with reduction in false alarming rate. Setting up a larger image data set for more SKU. As it doesn't need workers i.e. employees so man work will be reduced and as result un-employability will be increased. But as this system is time saving so lot of work will be done very fast. The experiment results show that the system can achieve high precision counting and high recognition accuracy. In future work, we will focus on improving algorithm efficiency.

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