SOFTWARE BASED SMART TROLLEY WITH ADVANCED BILLING SYSTEM USING SIFT ALGORITHM

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ABSTRACT - Individuals visit the store to shop their daily essentials. Shopping malls have spawned a new market for bill paying convenience. Customers are occasionally frustrated with their ability to locate items on their shopping list without assistance while shopping. We developed a smart trolley with a smartphone app to overcome these issues. This article offers a user interface to help customers find the product. It also uses the SIFT algorithm in its consolidated and computerized billing system. To recognize its type in supermarkets, each shopping mall item will be given a barcode. A product identification system, a dataset, and a camera scan product (PID). The purchasing product data on the shopping cart can be read using the product image in the mobile app that is attached to the device. The complete bill is sent to the PC by the billing counter processor.

KEYWORDS: SIFT algorithm, intelligent trolley, and system.

1. INTRODUCTION

Since the dawn of civilization, people have been inventing to suit their needs. More independence may be the underlying reason for creativity's success, and this helps to improve assignments and make them smaller and easier on a daily basis. Shopping is an important activity for people who want to burn the most calories. The shopping Centre is a place where people go to acquire their daily necessities such as food, clothing, and electrical equipment. The majority of the time, clients has issues with vague facts about the marked-down item and the abuse of the counters' idle time. In this innovative society, shopping trolleys are used in every grocery store and supermarket to assist customers in selecting and storing the items they intend to buy. Customers often purchase the essential things, place them in their trolleys, and then wait for bill payment at the counter. Paying bills at the counter is a time-consuming and inconvenient process that increases the number of individuals at the counter. A big number of consumers will choose to leave the line if it is too long. There are two types of classifications. Individual shopping the new shopping environment can be defined as shopping in absentia. Shopping in absentia can take several forms, including web shopping, internet shopping, and other methods that do not require the customer to be physically present at the counters. A personal call to the store is required for in-person shopping, as is the selection of products based on a range of variables such as need, convenience, brand, and so on. The clever shopping basket layout that has been suggested is intended to assist individuals save time while shopping. During the course of a typical day at the registers,To improve the nature of the customer's purchasing history, ongoing development is required. We have created a shopping basket to address the aforementioned issues and improve the current structure. This is accomplished by placing barcode labels on the products in the shopping cart as well as the reader. Customers will submit information from this system about the cost of each item in their cart, including the total cost of the item. In terms of the object's cost, this construction would save shoppers time and reduce the amount of labor required in the shopping Centre. SIFT (Scale Invariant Feature Transform) is a feature detection approach for computer vision. Image is identified by the SIFT aids. Local

features, often known as the 'key points.' In a variety of computer vision applications, these scale and rotation invariant key points can be used for image matching, object detection, and scene detection.

2. LITERATURE SURVEY

1] Paper Name - A Smart Trolley for Smart Shopping.

Author name – Tapan Kumar das,asis kumar tripathy. Shopping is both exciting and seductive; nevertheless, it also involves becoming exhausted as a result of standing in a long line for the bill and payment procedure. As a result, it is proposed that a smart trolley be designed that can handle both shopping and billing. This allows the customer to stroll into the store, purchase products using the smart trolley, and then walk out.

2] Paper Name - Smart Shopping Trolley Using IOT.

Author Name – Jaishree m, Laxmi prabha, jayaprbha, Mohan there are several domains in which we can use wi-fi generation, and the use of wi-fi generation is advantageous right now. We present our ideas for an automatic purchasing cart using a Raspberry Pi tool along with a bar code scanner and an LCD display in this article. As we all know, we see a rush at supermarkets during the holidays and on weekends, and as a result, the billing process takes longer, and clients cannot stand in a billing line for too long, so we can use the automatic purchasing trolley, which includes a barcode reader, raspberry pi device, and LCD display.

3] Paper Name - Iot based Smart Shopping Trolley with Mobile Cart Application.

Author name - Kowshika, Madhu mitha S., Madhu Varshini, Megha Lakshmi K5,

Despite the rapid growth of e-commerce and other internet applications, the popularity of traditional shopping has never waned. One challenge is keeping track of the charging process in a queue. There is a demand for simple and speedy bill payment. The Smart Cart suggested in this study is capable of producing bills utilizing IoT and a mobile cart application.

4] Paper Name - Smart Trolley for Smart Shopping with an Advance Billing System using iot

Author Name S.K. Shankar1, Balasubramani S, S Akbar Basha, Sd Ariz Ashamed, N Sunil Kumar Reddy. People are more likely to buy groceries from a supermarket or hypermarket under the current situation. In this scenario, locating a client's vital need in a supermarket takes longer, and once located, the consumer must wait in the billing line to finish the billing procedure for the selected goods. Customers are currently being encouraged to keep social distance owing to the covid-19 epidemic, but this is impossible in practice, particularly during the payment process. To address this critical difficulty, this study suggests a smart trolley based on the Internet of Things [IoT] with an innovative invoicing system that simplifies and secures purchasing while also avoiding long lines.

3. BLOCK DIAGRAM & METHODOLOGY

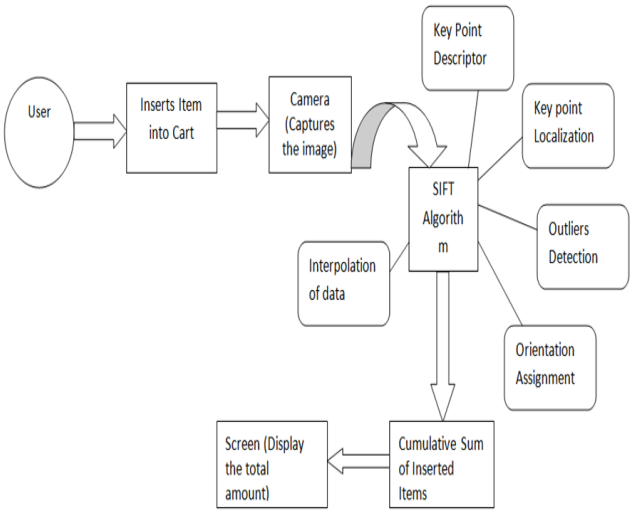

Fig .1.1

Whenever user puts a product into the cart, the camera will capture the images. These images are compared with the images present in the database using SIFT algorithm.

Once the images are matched, the correct product will be recognized and the corresponding amount will be displayed on the screen.

If the user removes any product, images are captured again and compared with the database images.

After product recognition the respective amount is reduced from the total amount. The camera will not capture images of the products present in the vicinity of the cart.

The payment mode depends on the grocery store or shopping mall authorities

Working flow chat model is as shown in fig.1.2

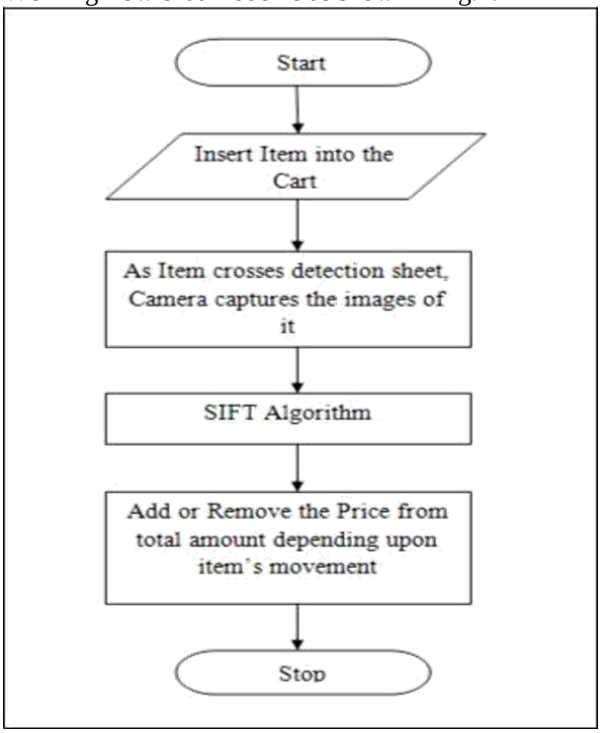

Fig.1.2

SIFT (Scale Invariant Feature Transform)

SIFT, or Scale Invariant Feature Transform, in computer vision it is a feature which has feature detection algorithm. SIFT helps locate the local features in an image, commonly known as the 'key points 'of the image. These key points are rotation & scale unchanging that will be used for very computer vision applications, like to match image, to detect object, to detect smell, etc. We can also use the key points generated using SIFT as features for the image during model training. The major advantage of SIFT algorithm features, over edge features is that they will not affected with the size or orientation of the image**.** The key points of the object in the first image are matched with the key points found in the second image.

4. RESULT

System is converted into web server using XAMPP software. Run the python script in IDLE 3.9 version which image capturing, Image processing and matching key point's algorithm of image as shown in fig.1.

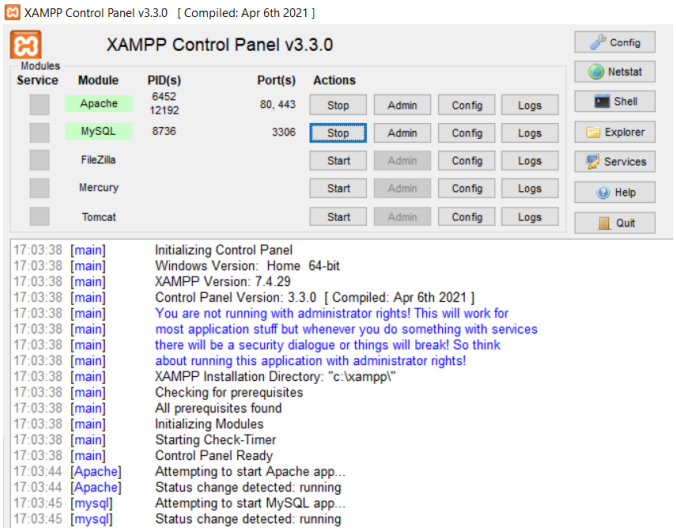

Fig .2

When we place a product in front of camera, camera starts matching all the key points of that product, the product which image has already stored into the backend.
With this webserver will connect to SQL server where the images which has been captured in front of camera as shown in fig.3

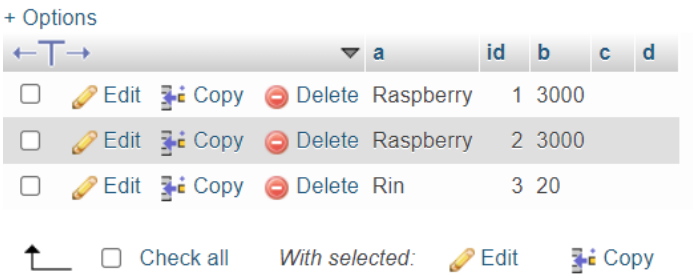

Fig.3

It has been showed unknown if the product does not match its key points as shown in fig.4. This will happen in backend.

```
Taking image...
0
4 / 4  inliers/matched
0
0 / 5  inliers/matched
0
5 / 10  inliers/matched
0
unknown
Taking image...
0
0
0
0
unknown
```

Fig.3

In the *filter_matches* the function in which kp1, kp2 will store the images and when the key points get matches, variable match gets updated.
Variable kp2 will store the image of product which will place in front of camera.

Kp1 variable will be in loop in which one by one images will store and kept matching with the product image which is in kp2.

def explore_match Two key points are get, match, and win variable stores all the key points.

As soon as all or required key points are matched with the product which is stored in the data base, product item will update in the customer cart.

The products which image has been stored and that matched with maximum key points feature that will selected and will add to your card with its MRP.

In that card this product is added and total amount is updated with MRP of recent product as shown in fig .4.

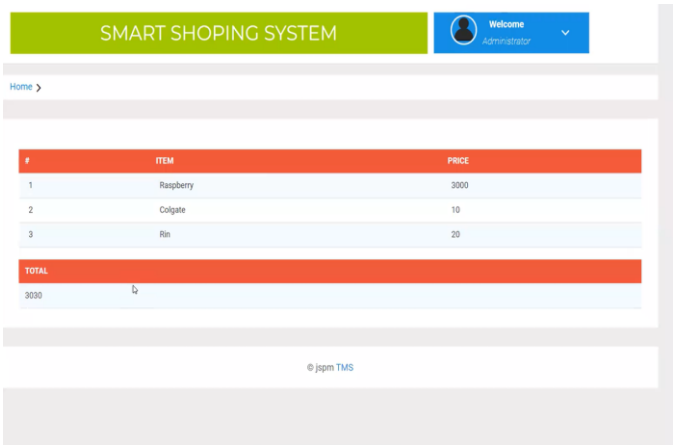

Fig.4

With this system at point only we have our shopping bill. It will also save our previous cart details
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5. CONCLUSIONS

Customers that use a smart shopping cart can check out immediately on the cart, which means they can avoid the cash register and long lines forever. Customers might save time and money by using the smart shopping cart, according to the researchers.

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