



SMART SHOPPING USING NI VISION

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Abstract: In this fast-growing era of technological advancement, people are forced to have a fast-moving lifestyle. We are proposing a solution to reduce the time spent by the customers in a supermarket and to know the availability of products in different sections of a supermarket without entering into it. In every supermarket, a lot of time is wasted by standing at the billing counter for scanning and billing purposes. To reduce this we have used NI Vision to scan the products while placing them inside the cart itself. We have designed a smart display to know about the products in a particular section and the list of products placed inside the cart by the customer and its cost will also be displayed

Keywords: Bar code scan, NI Vision, Smart display, Automatic bill generation, LabVIEW Simulation.

I. INTRODUCTION

Shopping is like the activity of purchasing goods and needs, favourite products, and other essential items. Each and every person in the world loves shopping. Especially women love to shop more and this will bring them happiness and pleasure. Generally, the customers prefer to shop during weekends or at the end of the month. Customers enjoy spending a lot of time shopping for their favourite items but the most annoying part in the entire process of shopping is the billing process. If customers wait for a long time; it makes them impatient and irritated. There is a possibility that sometimes the customer gets irritated while standing in the queue and they might leave the store without even buying the products they need. In the case of festive seasons and discount periods, the billing process becomes even more difficult for the customers because they have to wait for a longer time due to the presence of a huge crowd. We have designed a model which contains a smart display which shows the product availability in different sections of the supermarket without entering into it. We have used NI Vision to scan the products needed by the customer, before adding them to the cart. The products available in all the sections of the supermarket have been uploaded to the server of the supermarket. The list of items that the customer purchased will be added to the cart display along with the details of the product. Since the customers themselves can scan the products and place them inside the cart, the time and labour needed for the billing process can be reduced to a greater extent. This will reduce the manpower in supermarkets and enhance the customer experience. Once a product is picked and scanned by the customers, the product details will be added to the list and it will be updated in the cart display and automatically the bill will be generated. Here the process of scanning and bill generation is simpler so that we can easily pay the bill without waiting near the billing counter of the supermarket and we can reduce the time spent in that place.

II. EXISTING METHOD

Nowadays the necessity of supermarkets has rapidly increased. People prefer to purchase in supermarkets and hypermarkets instead of small grocery shops because it is difficult for them to shop for different products in different places and it is time-consuming also. Customers choose supermarkets and hypermarkets over grocery shops because it will be easier for them to purchase all the products in a single shop, it also gives them a wide variety of choices and it consumes less amount of time. Each and every customer enter into the shop has been given a cart to store the products they have purchased. The cart has taken by the customer at the entrance of the shop itself.

There are more sections in the supermarket that holds a variety of products of different brands. Customers can visit any section and they can purchase the goods and essentials of their need, then they can place the products in their cart. After choosing the products they add them to the cart. Once they have selected all the products needed, they rush towards the billing counter of the supermarket. The products will be scanned by the employee of the supermarket at the counter. The customer has to wait until other customers' billing process gets over. It is very difficult to wait in a queue and it is a time-consuming process also. Some Supermarkets have split the billing counters and have placed them on different floors of the supermarket. So that it will consume a comparatively less amount of time. But it involves more labour and the requirement of scanning and billing device gets increased.

By using RFID technology and Zigbee Tran receiver, the process of scanning and billing gets automated. The customers need not wait in a queue. But this method is not that easy to implement and execute. This system is not cost-effective. It is a complicated process and not preferable also. In this method, we know the list of products purchased and their total amount, only after the bill provided by the employee. It is difficult to search in the cart for a specific product. So the customer will not be sure of the products they have purchased until they get the bill from the employee.

III. PROPOSED METHOD

The problems faced by the customers in the supermarket are understood and we have proposed a solution to solve those problems. In this solution, we are using NI Vision, the LabVIEW software.

NI VISION SYSTEM: It consists of cameras, which are used to acquire the image and also have controllers useful in image processing methods and I/O operations. It is mainly used to acquire images from various sources and will be modified using image processing techniques according to the applications.

LabVIEW SOFTWARE: Laboratory virtual Instrument Engineering Workbench software is developed by National Instruments Corporation. It is a graphical and visual programming language. It is useful in many applications that require test, measurement, and control. It is a development environment with the front panel, block diagram, and control panel. It can be used to perform various mathematical operations and logical functions. The front panel is the user interface where it contains controls and indicators which are the input and output functions. The block diagram consists of a graphical source code of a particular LabVIEW program. The control panel is used to represent the VI in the block diagrams of another program. The graphical approach will be easier for programmers to connect functions easily by dragging.

IV. SUPERMARKET LOG IN PAGE

We have designed a smart display by using LabVIEW software. The smart display consists of few lists of products available in that specific supermarket. Each list represents the products in the different sections that are located in the supermarket. Customers can see all the products in various sections of the supermarket in the smart display itself. It is not necessary to go to a particular section in search of a specific product. We can see all the products in a single smart display itself so that it reduces the time consumed by the customers to search the products in a supermarket. The smart display has a drop-down menu that consists of all the names of the banks located in India. Initially, we have to select the bank from the drop-down menu where we have an account.

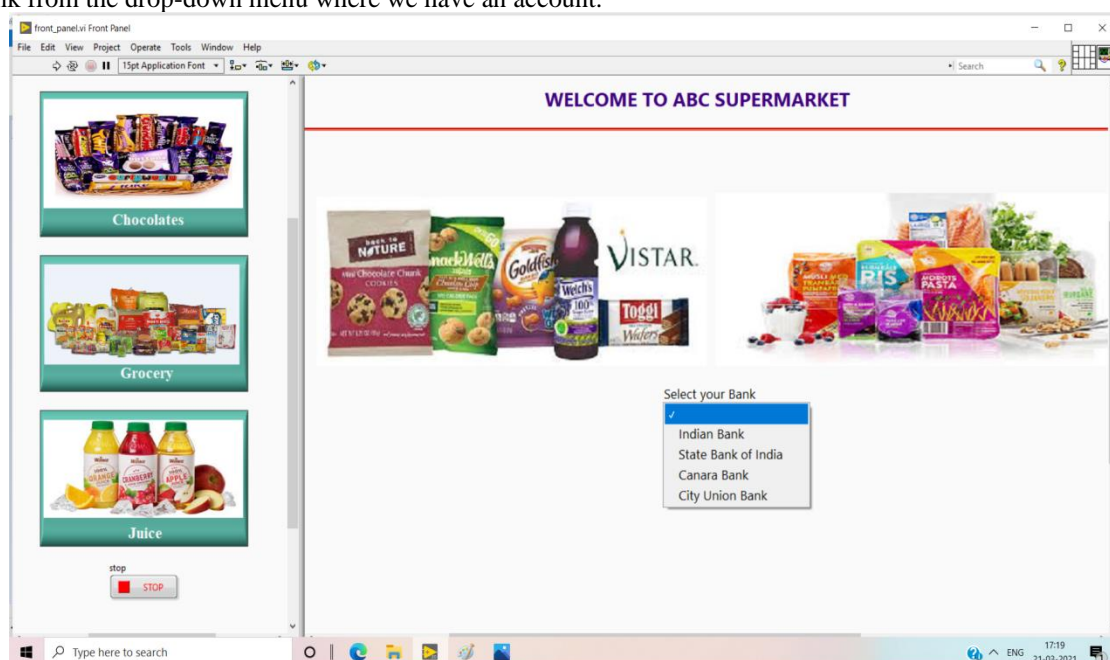


Fig.1. Home page of the smart display

V. BANK LOG IN PAGE

After the bank name is selected, a screen will pop up on the smart display. The pop-up screen consists of a log-in page. The customer has to log in by using their login credentials. Each and every person has a unique username and passcode. The login credentials should not be shared with unknown people.

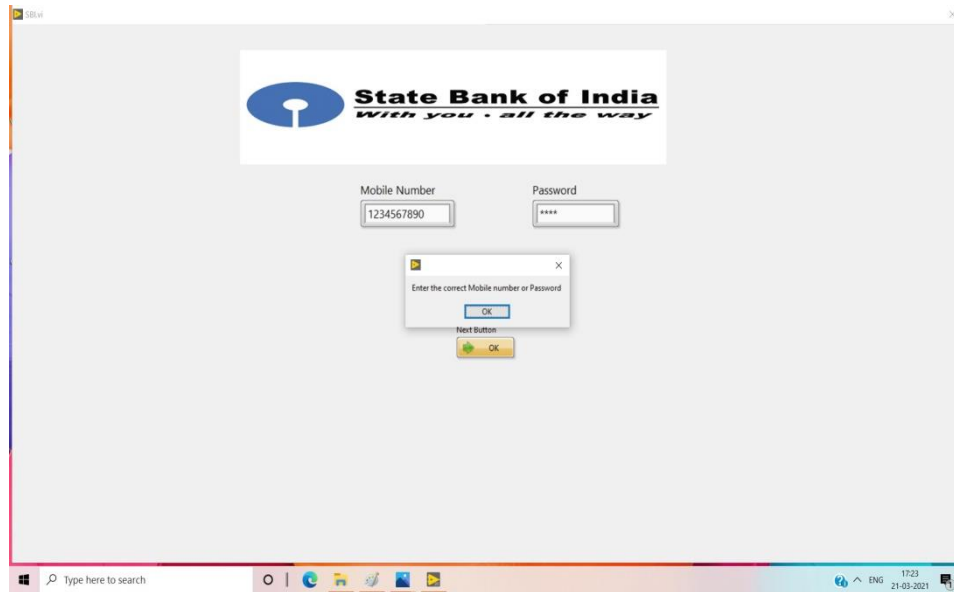


Fig.2. Bank server main page

The username used is the customer's mobile number which is registered and linked to their bank account. The passcode is a four-digit unique number set by the customers. The username and passcode entered by the customers while login into the page must be correct. If either username or passcode is wrong then it will show the error "Please enter correct username or passcode". So the customers should enter the correct credentials on the login page. If the customer has entered the correct credentials, then the message will be sent to the registered mobile number as "You are logged into your shopping account" along with the link and OTP.

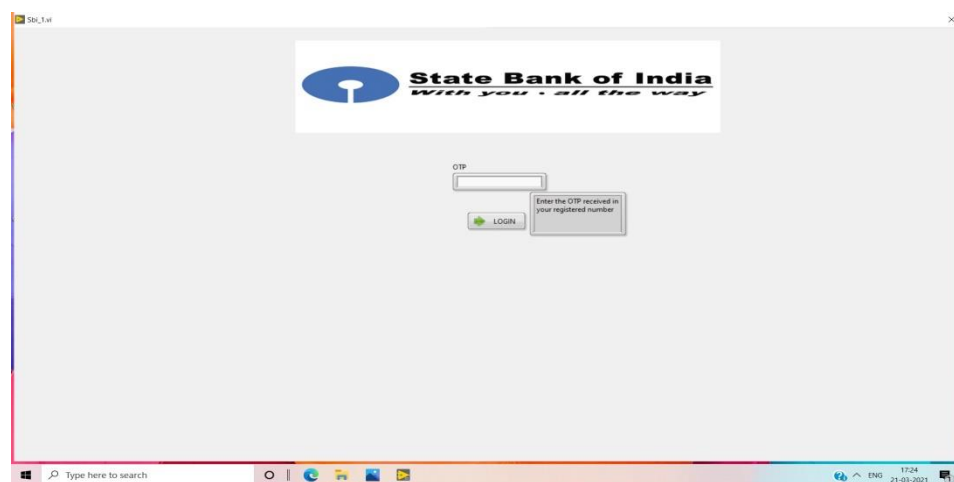


Fig.3. OTP verification tab

The link is used to find the location of the supermarket where the customer is purchasing. If the customer clicks the link then the customer will be redirected to another page that shows the map of the location where our shopping accounts is inactive state. Each and every time we log in to the page it will intimate us by sending a notification to mobile. It will enter into the supermarket server only if we enter the correct OTP or else it shows an error.

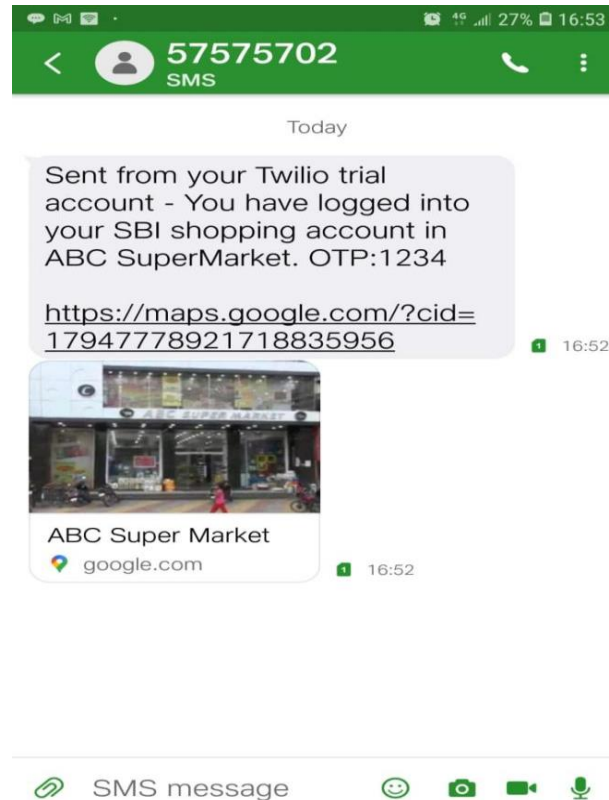


Fig.4.Mobile Notification to the customer's number

VI. SMART SHOPPING USING VISION

Once the customers enter the shopping page of the supermarket there will be a table which will be updated after each product is being scanned, the table contains the name of the product added along with its quantity and price, two buttons 'ADD' and 'REMOVE' are provided which allows the customer to add and remove particular products from the cart, the total amount to be paid and bill generation button is provided to automatically generate the bill for the products that the customers have chosen. The names of the products available in the supermarket from different sections have been stored in the cloud of the supermarket along with its description like brand name, product name, quantity, and price. The customers can pick any product and scan it by using NI Vision, which scans the bar code of the particular item. Every single product has a different bar code. For example, if the customer has taken two salt packets of the same brand but with different quantities, they too have different bar codes. Every product has a bar code that will be printed by the manufacturer itself. It will be easier for the customers to scan the products themselves rather than waiting in a queue in the bill section for a long duration. The main advantage of this process is it doesn't consume more time for the scan and billing process. The process of scanning is very simple and it also makes the customer feel comfortable during the entire process of shopping.

The first step of the process is to pick the products from the rack of the store and show the picked product to the NI Vision camera to scan the product. The scanner is used to scan the bar code of the product. After the scanning is done the bar code will be displayed on the screen. There is an option called ADD which will be used to add the product to the cart. Once the product is added to the cart then it will be displayed in the table along with the price of the particular product. If the customer wants to remove any product from the cart, there is a REMOVE option that will be used to remove the product from the cart. The table shows the price of the individual products and there is a small display on the screen which will show the total price of the products in the cart so that we can know the total amount of bill to be paid. There is a BILL option in the display which is used to generate the bill at the end of the process. If the process of shopping is over, then we can pay the bill by clicking the bill option for the amount to be paid. We need not wait in a queue for a long time for scanning and billing purposes. This system will reduce the time spent by the customers in the bill section and made the process simpler.

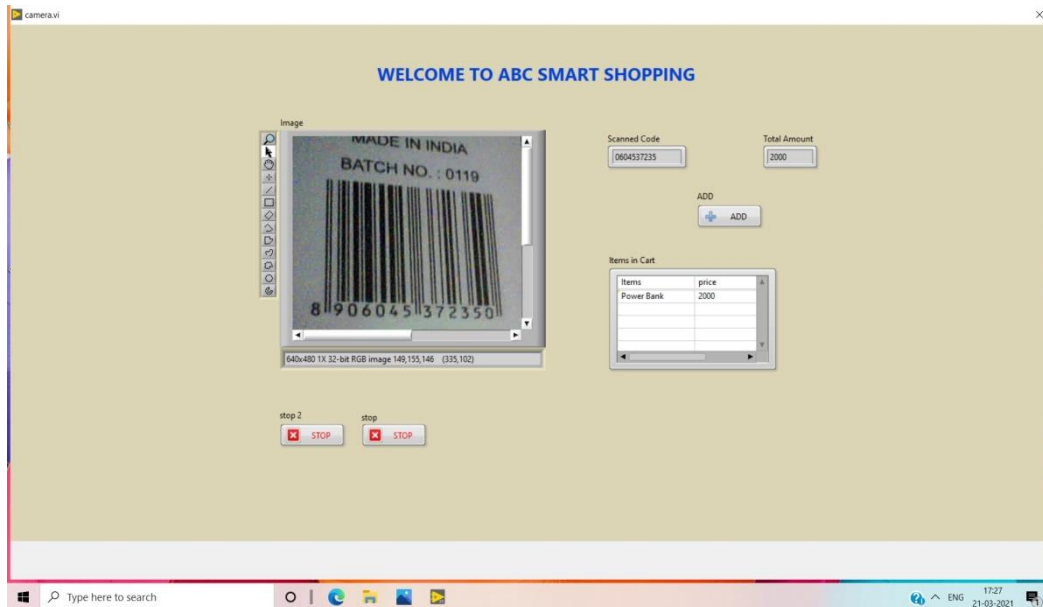


Fig.5.Bar code Scanning using NI Vision

VII. ADVANTAGES AND APPLICATIONS

The advantages of this proposed solution are listed below:

- It saves more time for the customer by avoiding standing in a queue for a long period of time near the billing section.
- It is not necessary for customers to visit every section of the supermarket to know the product availability; instead they can check the smart display which shows every product in different sections of the supermarket.
- This solution is not only applicable for supermarkets alone, but also for hypermarkets, retail shops, and grocery shops and also applicable for malls.
- It reduces the manpower at the billing counter of supermarkets.

VIII. CONCLUSION

Shopping is also an activity which is loved by most of the people to spend their time to purchase the goods, needs and other essentials. Many customers get irritated while standing in a queue for billing purposes. But in the case of the smart shopping process, it will be solved by automated these processes. Our smart display will be very useful for the customers to check the availability of products. In most proposed solutions RFID technology is used which is more complicated to establish and the cost of implementation is also very high. But we have used NI Vision which is simpler to execute and cost-effective process.

IX. FUTURE WORK

In the future, we are going to design a smart trolley that will be more efficient and user-friendly. In this trolley, the NI Vision camera is fixed at one end. Once the customer picks the product he can show the product to the camera which will scan and add the item to the list of products. We have planned to design mobile-based shopping. We can use mobile phones to log in to the supermarket server instead of using the smart display. The purchased product list is viewed by using mobile itself along with its price and quantity. The total amount of bill to be paid is calculated simultaneously. The customer need not go to the billing counter, because we are going to automate the billing process by directly connecting the supermarket server to the bank server and the amount will be deducted from the account automatically without using third-party applications or ATM cards. So the customer can purchase even without carrying money or ATM cards while visiting supermarkets.



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