

# Application Based Shopping Trolley(S-Mart)

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**ABSTRACT:** S-MART is an android based application which integrates your smartphone to your shopping trolley and can be used by customers while shopping in a supermarket. Our application uses a mobile phone camera to scan the barcodes on different products that a customer wishes to buy. As soon as the product is identified by the application, the name, price and other necessary details of the product are displayed on the screen. This can be done for multiple products and once shopping is done the bill is generated on the application. The application provides electronic payment methods for bill payment.

**KEYWORDS:** Product Detection, Supermarket, Barcode Scanner, customer spending.

## I. INTRODUCTION

Majority of the population in an urban city shops at supermarkets or convenience stores. These stores employ large number of people to work at the billing counter. Moreover, the time required for generating a bill is substantially high when there are more number of shoppers. According to this survey [1] the percentage of people buying groceries on the internet has risen to 34% in 2016 from 21% in 2015. As per the survey [2] held in Australia, more than 74% prefer online shopping over visiting a supermarket citing comfort and time reasons. An effective way to tackle these drawbacks is to make the process more customer friendly and reducing the time spent by a customer at a store. Stores like D-Mart and Big Bazaar have implemented a system where a customer places the order using an app or the phone and picks the order up from the nearest pickup point, where the order is kept ready. These apps also allow online transactions.

Another close match to this is Amazon Go. The concept is that using deep learning and the login of your phone, it will detect all the items bought by the user and automatically generates a receipt and deducts the amount of money for which the products were bought. However, in Amazon Go, the investment is very high and there is high risk of mishandling. That is the reason, it is now open only at one centre and is open only for Amazon employees [3]

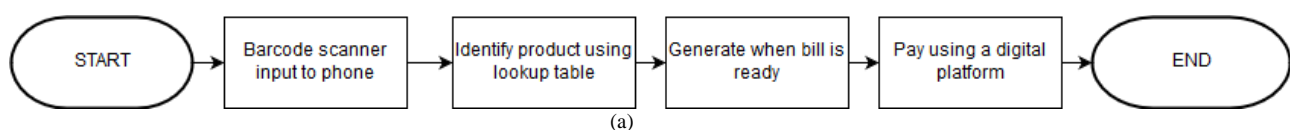


Fig.1 working of the project (a) Flowchart

The work in this paper is divided in three stages. 1) Barcode detection 2) Product identification 3) Receipt generation.

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## I) BARCODE DETECTION

Barcode detection is done by embedding the zebra crossing library into the application. ZXing Library (zebra crossing) library, is an open-source, multi-format 1D/2D barcode image processing library implemented in JAVA, with ports to other languages[4]. The types of barcodes supported by the library are as shown in the table below:

1D PRODUCT	1D INDUSTRIAL	2D
UPC-A	Code 39	QR Code
UPC-E	Code 93	Data Matrix
EAN-8	Code 128	Aztec (beta)
EAN-13	Codabar	PDF 417 (beta)
	ITF	MaxiCode
	RSS-14	
	RSS-Expanded	

## II) PRODUCT IDENTIFICATION

The zebra crossing library embedded in the S-MART android application identifies the barcode on the product; scans it, looks up in the local database of the store and identifies the product. The product once identified is displayed on the bill screen as shown in the figure . For this project a sample database was created on phpMyadmin and a local webserver (XAMPP) hosted this database.

## III) RECEIPT GENERATION

The generation of bill involves a basic algorithm which adds the cost of a particular product as soon as it is scanned. When a product is scanned, variables related to the product like its name, weight, cost are also stored from the lookup table in the database. When a product is scanned, the cost of the product is added to the variable called bill, which is set to zero every time the app is opened. When a product is removed, the cost of the product is subtracted from that variable. When the user clicks the 'Generate Bill' option, the value stored in this variable is shown and this value is stored to another variable, which will further be used for further stages like payment.

## II. TECHNOLOGY USED

Android is an operating system with its first beta version of the Android Software Development Kit(SDK) released in 2002. It incorporates many new technologies as it is open source. This Linux based operating system has an efficacious IDE like Eclipse as well as API libraries which provides users of different android versions to work in an adaptable environment. XAMPP is a free and open source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages. XAMPP stands for Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P). It is a simple, lightweight Apache distribution that makes it extremely easy for developers to create a local web server for testing and deployment purposes. Everything needed to set up a web server – server application (Apache), database (MariaDB), and scripting language (PHP) – is included in an extractable file.

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## III. EXPERIMENTAL RESULTS

The following shows the images of the application at each step of the process and the the observed result. The process is easy to operate and can be used by users who can operate a smartphone.

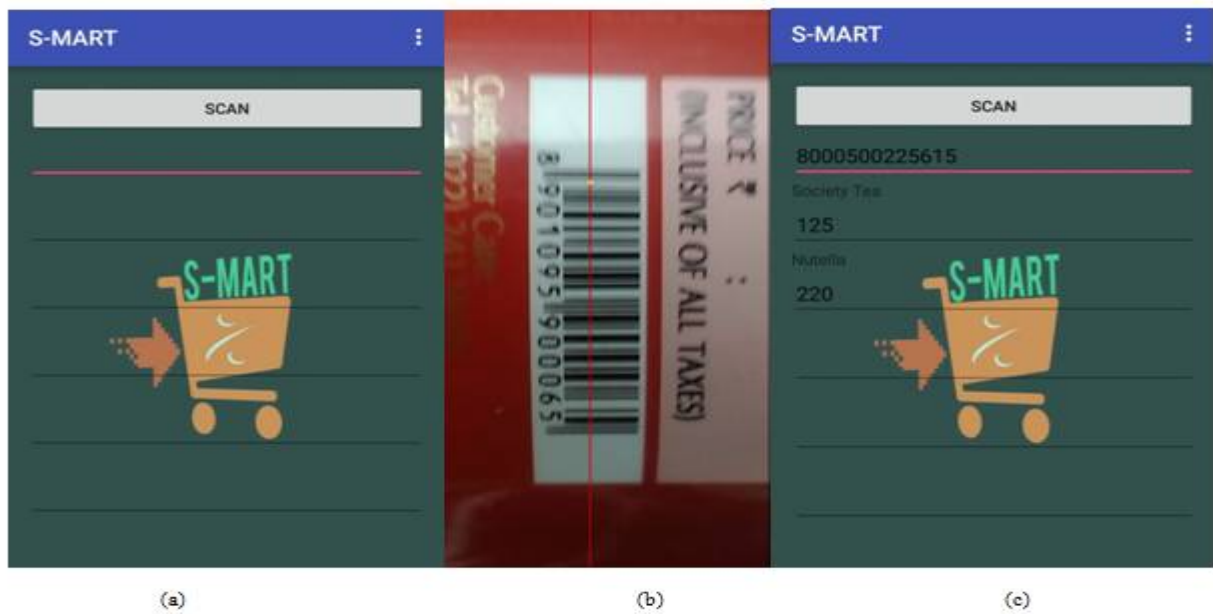


Fig.2 Results (a) Application Interface (b) Barcode Scanning (c) Application with product details

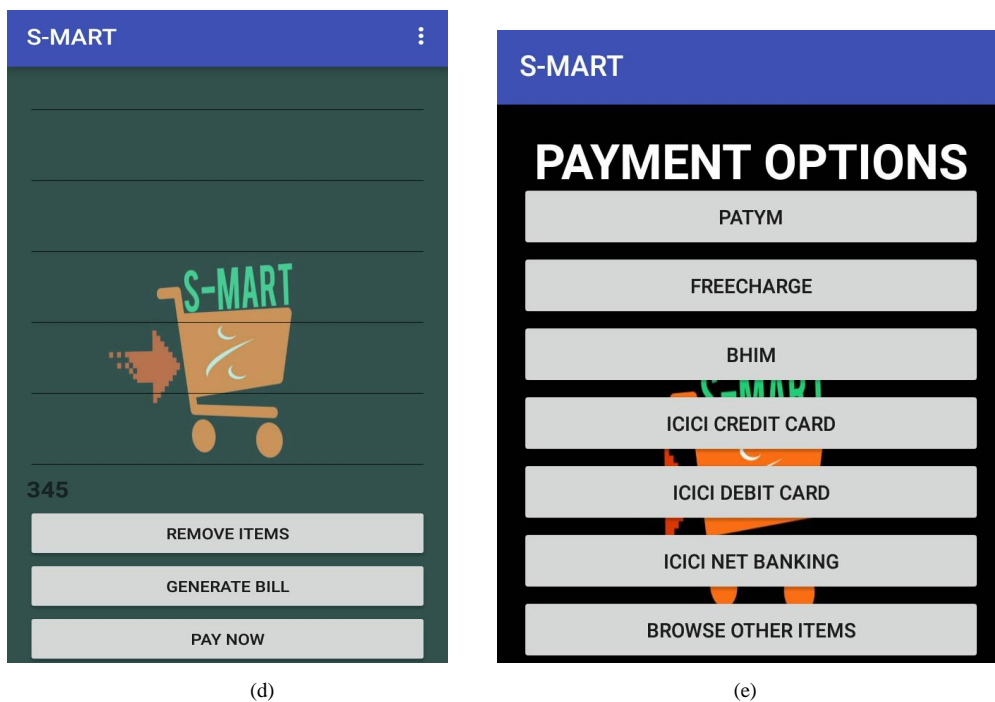


Fig.2 Results (d) Final receipt value generation (e) Payment options

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## IV. ADDITIONAL FEATURES

Our application also helps the supermarket to track spending patterns of each customer. Using this feature the supermarket can predict the product requirement and alter the supply chain accordingly. This feature enhances the shopper's experience as the store can give periodical discounts and offers on their most bought products.

## V. ADVANTAGES

As stated in the surveys, the major disadvantage of shopping in supermarkets is the queue factor. By scanning the item as soon as it is picked up and online payment, a lot of time is saved. It also encourages digitisation with features like online payment which is in support of cashless economy. After implementing our application supermarkets can employ less number of people to work at the counter thereby saving money on infrastructure and workforce.

## VI. FUTURE SCOPE

Smartphones run on a battery which can discharge while a customer shops. We plan on integrating each shopping trolley with a portable charging dock for the customer's phone. These docks can be charged when the trolley is not in use.

## VII. CONCLUSION

We have implemented a system for pacing the shoppers shopping experience with the help of a simple smartphone and an Android application. Our technique of implementation requires less resources and improves the overall shopping experience.

## REFERENCES

- [1] Morgan Stanley Survey  
URL: [ <http://www.morganstanley.com/ideas/online-groceries-could-be-next-big-ecommerce-driver> ]
- [2] Australian Bureau of Statistics  
URL: [ <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features50Jun+2011> ]
- [3] AmazonGO  
URL: [ <https://www.amazon.com/b?node=16008589011> ]
- [4] Zebra Crossing Library  
URL: [ <https://github.com/zxing/zxing> ]