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QUICK RESPONSE MECHANISM PAYMENT SYSTEM USING WATERFALL MODEL

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ABSTRACT: *With the rise in living standards, stores are becoming larger and more diverse in their offerings. As a result, both merchants and customers are concerned about developing a simple, quick, and convenient shopping guide system. For the consumer giving credit card information, security has become a big concern. Other payment methods, such as using USSD, have numerous flaws, including lack of reliability, memory, and vulnerability to hackers. As a result, it is critical to develop a system for establishing a secure payment method. Identity theft, merchant-related scams, and customer data security are all addressed by the method. The established system also aids in keeping excellent records and tracking available products in the store, as well as product and account/transaction information. The proposed system is the implementation of a secure operational paradigm for mobile payment based on Service-Oriented architecture and the Quick Response Mechanism.*

KEYWORDS: quick response, mechanism, payment system, waterfall, software development, Life Cycle Model

INTRODUCTION

Mobile Commerce refers to the exchange of goods and services using mobile devices. Personal digital assistants (PDAs) and cellular telephones are two examples of devices to consider. Next-generation E-commerce is another name for it. (http://en.wikipedia.org/wiki/Mobile_commerce). It was first used in 1997 to describe "the delivery of electronic commerce capabilities straight into the hand of the consumer, anyplace, via wireless technology." Mobile devices are as powerful and connected as desktop or laptop computers. The technical capabilities of mobile phones have evolved fast in recent years, and the number of individuals using smart phones has continued to rise. [1].

Individuals shop on weekdays and weekends, although most people have more free time on weekends to acquire groceries and other home things. According to studies [2,] millions of people purchase on the internet on weekends. After spending a lot of time buying stuff, the most difficult part of shopping is waiting in a big queue to pay for the items. People are buying more frequently

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as a result of appealing bargains, coupons, and discount offers, and this is increasing day by day, especially on weekends. Despite the fact that individuals purchase online, the demand for traditional shopping has not diminished. During the holiday season, we often observe a large number of people inside the store, looking for things and their availability, as well as information, and then waiting in a long line to check out. Many programs exist today, such as LINE HERE, atQ, and QLess, to let users know their wait time and where they stand in a lengthy line, Walmart for researching product reviews, and so on. Budget tracker that allows users to upload their bills to the cloud individually and verify whether the item is available online (in online shopping). Despite the fact that these programs assist consumers in a variety of ways, there is still a need to devote a significant amount of time to shopping, bill organization, and purchase tracking. [4].

A user-friendly and convenient mobile payment solution is an important component in enabling mobile users to execute secure and reliable payment transactions. Mobile consumers and merchants both require mobile payment solutions that support QR codes. A QR Code (short for Quick Response) is a two-dimensional matrix barcode that can be read by QRbarcode readers and camera phones. This paper work use an innovative mobile payment system based on QR codes for mobile users to improve mobile experience in conducting mobile payment transactions [5].

Unlike other existing mobile payment systems, the suggested payment solution uses the water fall paradigm to facilitate buy-and-sell products and services with QR codes. This system uses one standard QR code (Data Matrix) as a prototype to demonstrate how to deal with underlying QR code-based mobile payment workflow, mobile transactions and involved security mechanism.

LITERATURE REVIEW

This sections listed reviews of existing application and techniques used as mode of payment for online and offline commerce.

Starbucks Card Mobile Application

Clients insert their Starbucks Card number into the Starbucks Card Mobile application, and their modern mobile phone becomes their Starbucks Card. This application makes use of industry-standard barcode technology. Buyers can pay with the app in a few select stores. When the card number is entered on the smartphone device, it displays a scanning tag that may be used to make transactions in the same manner as a Starbucks Card can. The card can be reloaded and paid for. It's also helped the company maintain its position as the only large-scale mobile payment provider [6]. The starbuck card is only limited to specific stores.

Google Wallet

Google Wallet is a Google-developed mobile payment system. Users can save credit cards, debit cards, and gift cards on the app. On their cell phone, it's also used to redeem sales promotions. It can employ near-field communication (NFC) to make quick and secure payments. It is made convenient by just tapping the phone on any PayPass-enabled terminal at checkout. [8].

NFC is used to send payment information. After a period of time, a transaction containing the merchant's name and dollar amount is recorded on the phone. Google Wallet is a safe and secure way to save information. The software has its own PIN, and you can remotely stop your mobile wallet if you lose your phone. [7].

Credit-Card Mobile Payment Systems

This type of mobile payment systems allow customers to make payments on mobile devices using their credit cards. These payment systems are developed based on the existing credit card-based financial infrastructure by adding wireless payment capability for consumers on mobile devices [10]. The existing SET secure protocol, developed by Visa and MasterCard for secure transfer of credit card transactions, has been extended and known as 3D SET to support mobile payment for mobile device users [11]

EASYCARD

EASYCARD is Taiwan's most standard contactless payment service that has been extensively used for taking the subway or getting a charge out of each day shopping/devouring activities. In 2011, TAISYS Technologies Co., Ltd. reported the world's first Android based near-field payment application at the "Open Platform Value-Added Service Conference" composed by the Committee of Communications Industry Development of Taiwan's Ministry of Economic Affairs. It empowers "EASYCARD" utilize that tricks advanced graphical user interface so clients may adequately perform balance checks, micro-installment trades, e-wallet top-up, et cetera by method for their Android handsets [12]

METHODOLODY

The design methodology employed for this paper is the SDLC technique and n also be denoted as Linear Sequential Life Cycle. This technology is utilized in building, designing and preserving information on industrial systems and computer softwares. It is very common and the oldest software development architecture. The approach was selected for use because is very easy to comprehend and mostly employed for minor projects in which their requirements are well-

recognized. It involves series of phases in which the output of one phase provides the input to the next phase.

In our design, the requirement phase, the end users, students and lecturers are interrogated to discover their aim and objectives, requirements, and expectations from the system. In the second phase (design phase), the system is designed to meet the end user's requirements. This entails the data flow diagram, context diagram and the use case diagrams. In the implementation phase, the graphical user interface of the system was designed with HTML5, Ionic Framework and JavaScript were used as front-end tools, while Angular Javascript were employed as back-end design. The system interconnects with the database located on a remote server. It is to make sure that the software is mobile-responsive so as to make it easier for both the lecturers and students to use the application. In the testing phase, the work of each component of the application designed was tested and is integrated into a system. Finally, the system was developed to accommodate changes for continuing the system after deployment.

SYSTEM ARCHITECTURE

An Architecture is a fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution [9]. The flowchart is shown in figure 1 below

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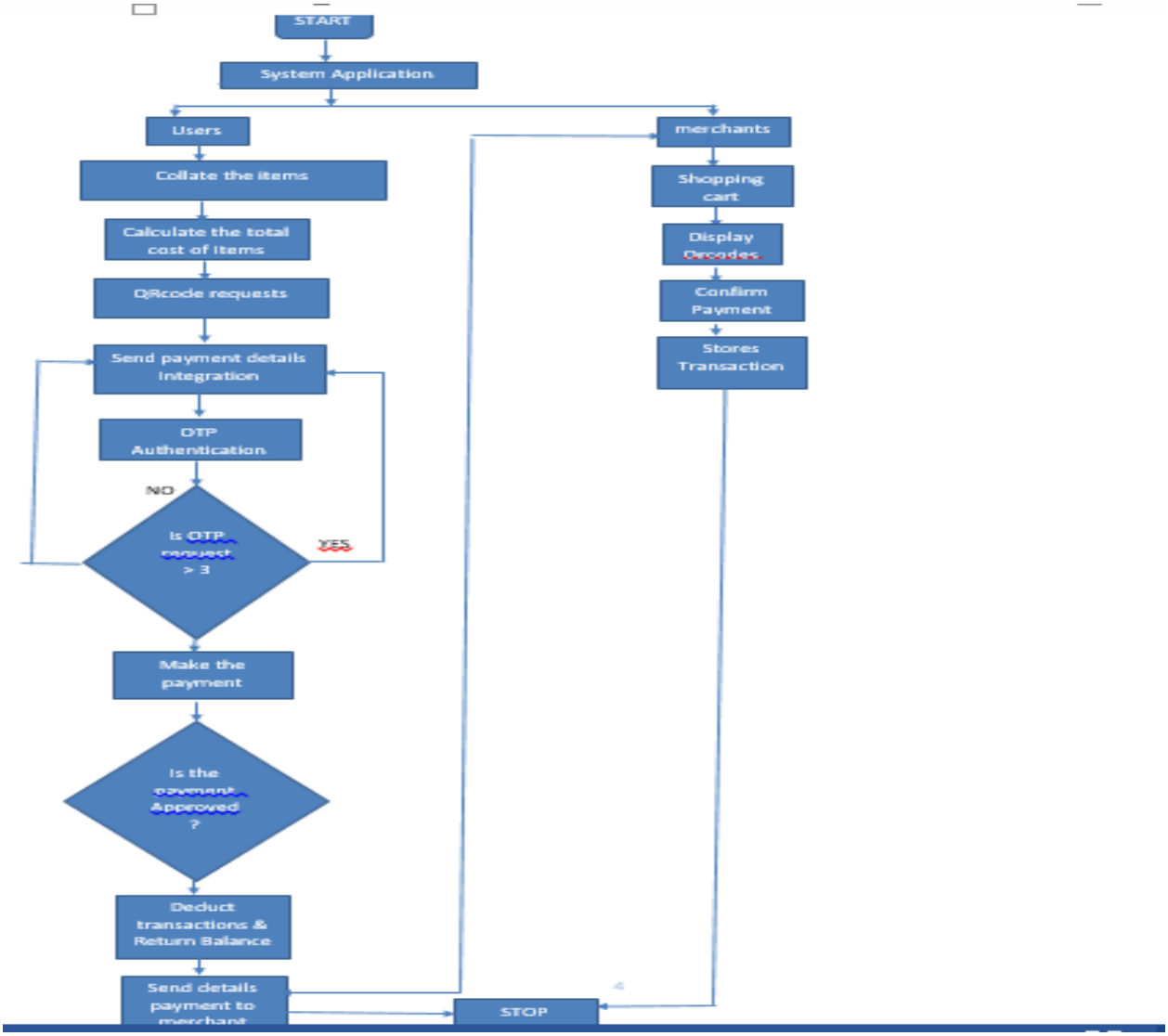

Figure 1: System Flow Chart

USE CASE DIAGRAMS OF THE SYSTEM

The use case diagram is a representation of a user's interaction with the system i.e. it identifies all possible actions that can be performed on the system by the user. The User use case diagram as

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shown in figures below indicates the process of registering into the system, logging into the system using system to scan and pay for transactions, the operation of the merchants as well as the administrator.

User use case

The user which performs his operation via the mobile App performs the following actions, Purchasing of Item, Collate and cost calculation of all items bought by from the merchants, Quick Response Code Scan for payment, Payment Request, OTP Authentication and Making of Payments.

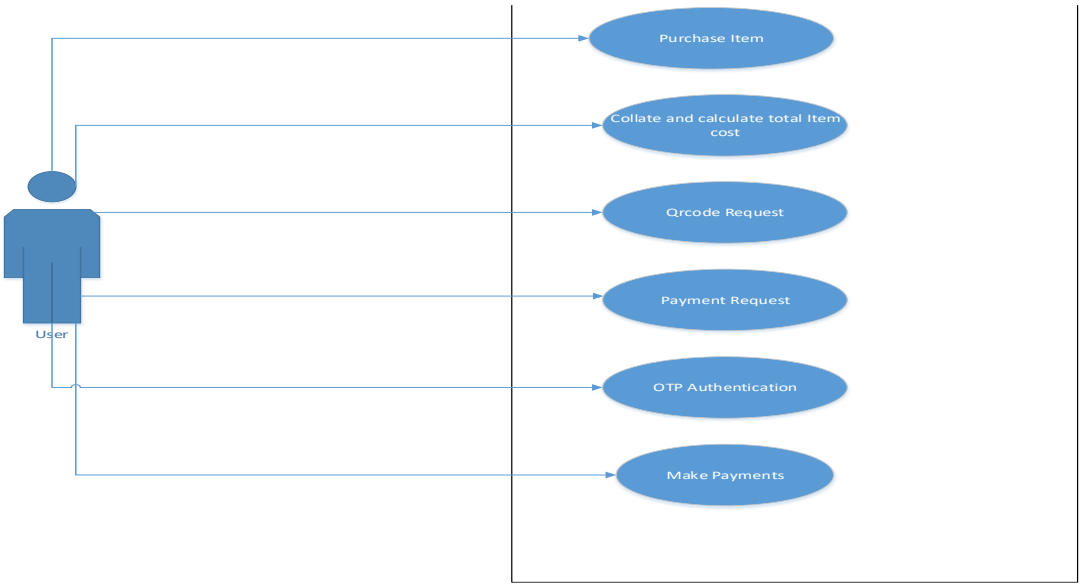

Figure 2 User Use Case

Merchant use case

The merchant acts a middle man between the customers/users and the system. The merchants helps to display all items available, display the QRCODE mechanism to the user, confirms customers payment and stores transaction for retrieval and record purposes.

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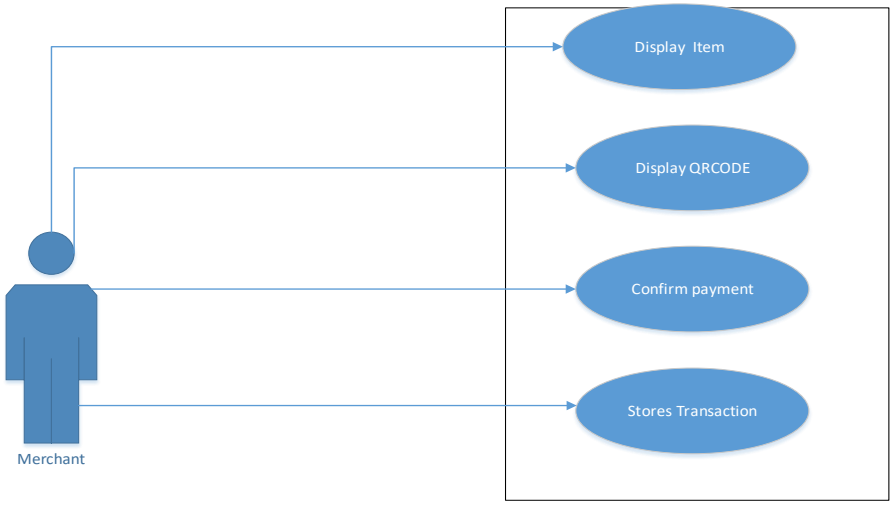

Figure 3 Merchant Use Case

Admin use case

The Admin helps to moderate over the whole system by granting roles and privileges, moderating items and transactions.

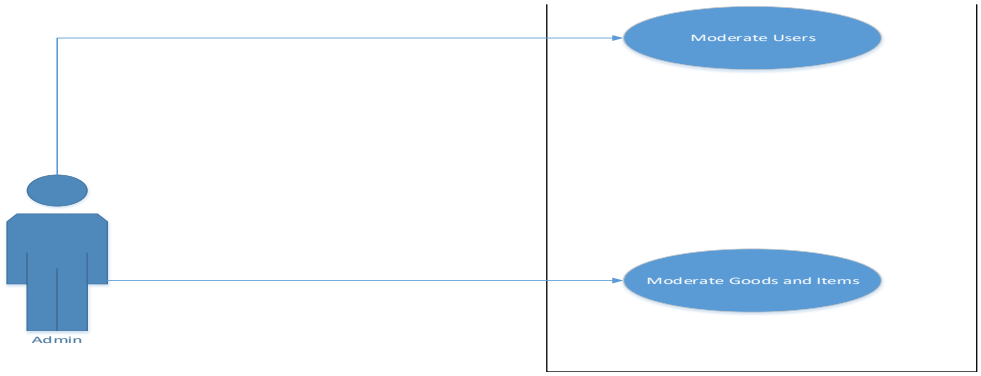

Figure 4 Admin Use Case

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PRESENTATION OF RESULTS

The implementation was simulated on a local host using Apache server for testing the correctness and consistency of the system on the computer. The screen shots below show various interfaces from the system.

LOGIN PAGE

Fig. 5 Authentication and Login page

REGISTRATION PAGE

The Registration page displays a form field where the user can register with his/her basic information

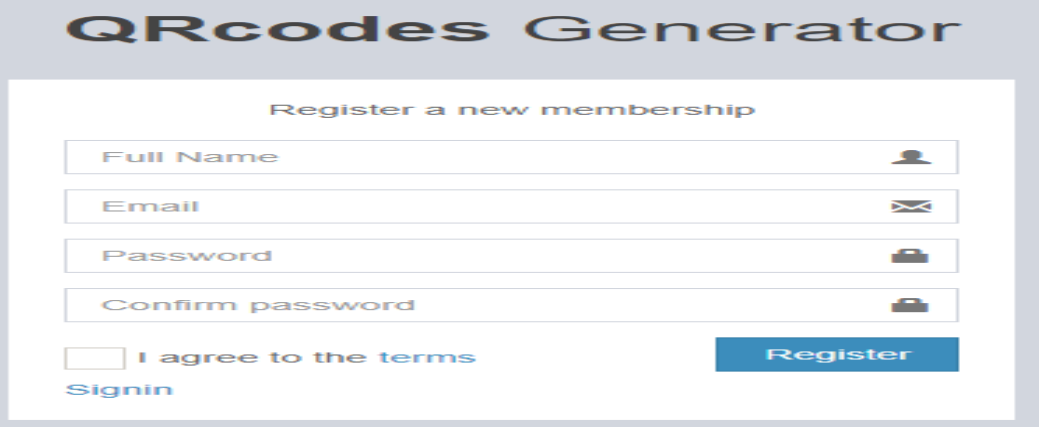

Fig. 6 Registration page

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NEW PRODUCT

The New product page is displays a form field where the user can input new information of a new product will input with product name, product url, product image, amount, company name, product quantity and the active check box.

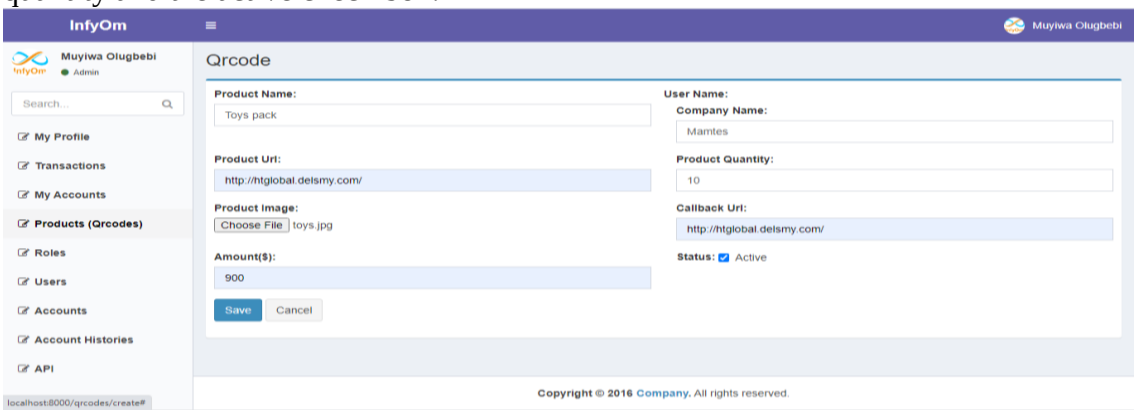

Fig. 7: Adding new product

PRODUCT LIST PAGE

The screen bellows shows the interface for the product listing page, which list all the products that has been inserted.

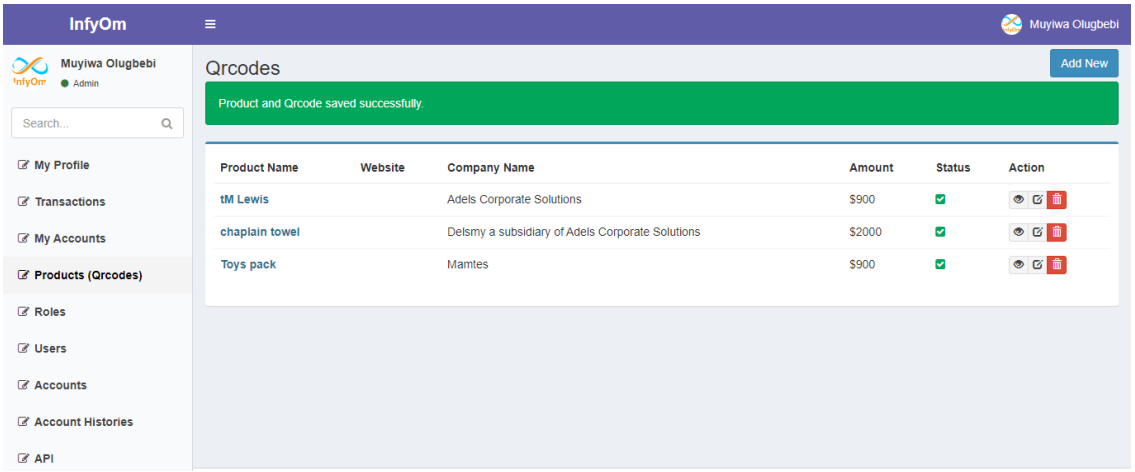

Fig. 8: Product listing page

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PURCHASE PAGE

The Purchase page the product information so as to continue payment with Quick Response Code of the product.

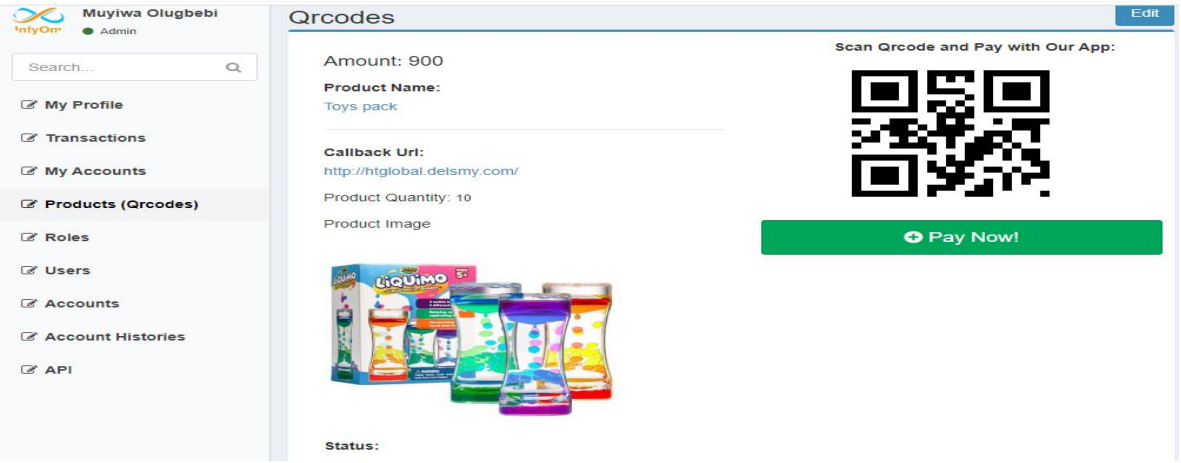

Fig. 9: Purchase product page

PAYMENT CONFIRMATION PAGE

The page bellows shows the payment confirmation page after scan of the Quick Response Code, it prompts the product name and the price.

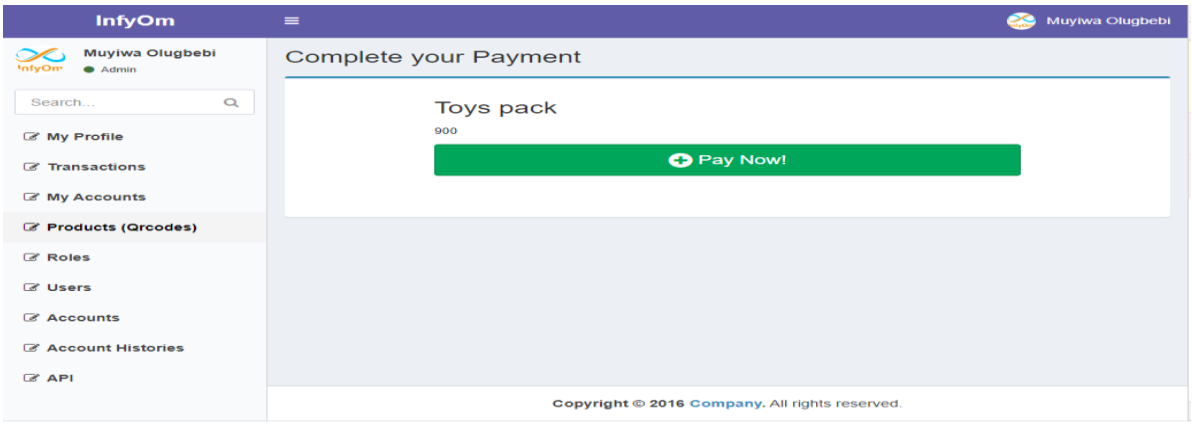

Fig 10: Payment Confirmation page

TRANSACTION PAGE

After the payment confirmation, the product payment information is tracked as a completed transaction with the track record of the amount paid and date paid.

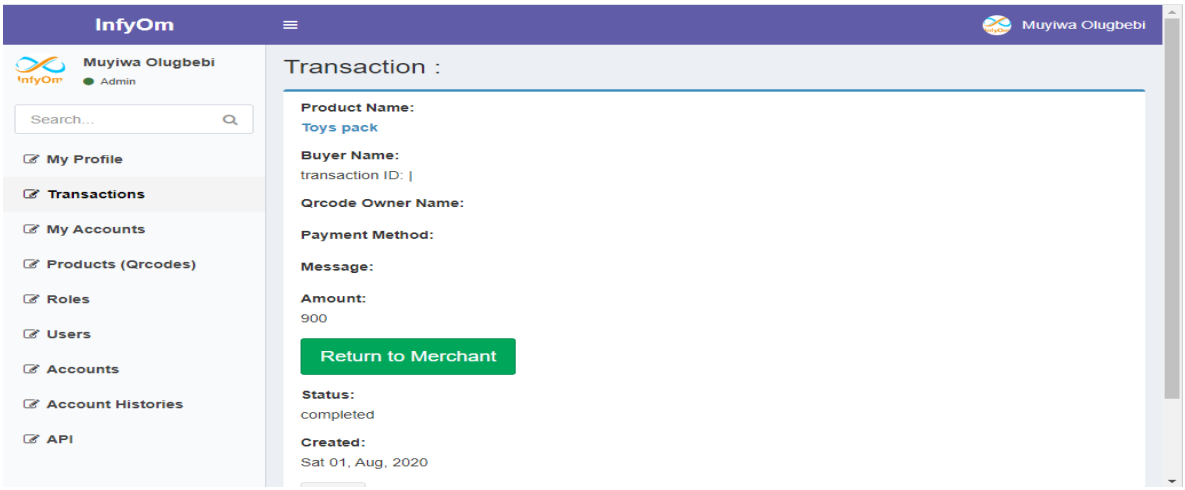

Fig 11: Transaction Confirmation

CONCLUSION

The research work provides all the users a platform by implementing a secured payment system for shopping applications making use of QR code technique. Such a payment system working on proposed techniques can provide consumer data privacy and prevents customer related frauds. The method is concerned with prevention of identity theft, merchant related frauds, and customer data security. The developed system also helps to maintain a very good record keeping and tracking products available in the store as well as product and account/transaction information. With the use of REST Web Service, performance of the system is improved on mobile for user scalability.

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