Improving Courier Service Reservation System: Reliability and Performance

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ABSTRACT

Virtually all businesses, corporations, and organizations today utilize the internet and websites as means to communicate, broadcast and interact with their broad spectrum of users. As computer and internet resources grow larger and larger, the opportunities and possibilities a website brings can prove invaluable. A courier service provides door to door shipping and delivery of letters, packages and other shipments. Courier service range from one location to another as quickly as possible. This research aims to develop and design a courier service reservation and management system of the Kurdistan Region-Iraq. This research is aimed to solve many of the problems that are in the existing system and also provide a hassle free system that is efficient and easy to use. This system helps users to send and receive items from different locations in Kurdistan Region-Iraq with a new security technique to maintain the data when transferring over the network. Till now in our country this system is not available. In our proposed system users can register in Courier Service website from their home and they can pay money with the help of payment gateway. To protect privacy and financial information of clients our proposed system has ability to provide a new online technique security. Online courier service system is a user friendly website developed in ASP.NET with C# programming language as front end and SQL Server database as back end. This system is designed to provide users the best method to book for collecting and delivering items through online which will reduce manual work. According to the results, the method we proposed in this paper has ability to reduce cost for management, increase efficiency and provide better service for users with the new security techniques to maintain their detail information on the website.

Keywords: Online Courier Services Reservation System, Packet Tracking and Security

INTRODUCTION

The evaluation of the World Wide Web has brought us enormous and ever growing amount of data and information. The web technologies are becoming a de facto standard for deployment of many classes of services through the internet. In recent years, The Internet, and more specifically e-Commerce, has impacted the world and giving rise to new business ventures and increased competition. This trend is impacting all countries both small and large. Developing countries contain a major growth in the use of e-commerce [1].

With new trends follows new problems that must be addressed. Recently, people have been oriented to use websites for their searching, purchasing or other services that are offered to them [2].

A web application has important roles to sell a product and to collect general information about particular topic or subject. Over the past decade, the website has a vital role to offer a

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service for users and client to make a communication and exchange information [3]. Nowadays, developing web application becomes very popular among companies all who want to share their information with others. In particular, the web has ability to provide away for markets to get to know the people visiting their sites and start communicating with them as an inexpensive channel.

In addition, the website is also an important sales channel for a myriad of organizations: small or large with over one billion internet users. This research paper consists of two sections. First section describes the important characteristics to make a good website and produce a document outlining a website: design and planned implementation for Courier Services Reservation website. Our Courier Services website is working independently to offer the shipping service in Kurdistan region-Iraq because of the Kurdistan Region is no any online system to collect and delivery items from different locations when someone wants to send or receive an items, it takes a long time to find a way for transferring their items.

In section two, we apply a new security method to encrypt and decrypt the detail information about items, locations and card payment between sender and target receiver. Due to the rise of the internet, the information has been security when transferring over the network. The most important technique that is used for securing the secrecy of transferring data is cryptography. Nowadays, to encrypt and decrypt data many various methods have been developed. However, it is not enough to maintain the contents secret. Therefore, there are many different techniques are used to provide the best secret of a message. One of the techniques is steganography. Steganography is the art and science of invisible communication of messages this is done by hiding information into the information [4].

Cryptography and steganography both are techniques for protecting information from unwanted parties [5]. The difference between cryptography and steganography is that the first one focus on keeping the contents of a message secret whereas the second one focus on keeping the existence of a message secret. The main goals of this section is to encrypt the detail information form on the our Courier Service website and hiding the encrypt data over an image before exchange detail information between the sender and administrator on the website

The rest of the paper is organized as follows: benefits of courier services are discussed in Section 2. Maintenance and management strategy is presented in Section 3. Section 4 is about the audience and creating scenarios of the system. System specifications are explained in section 5. In section 6 testing implementation system is discussed. The implementation of the system and the results of Courier Service website are discussed in Section 7. In section 8 site maps is shown. Finally, in Section 9, conclusions are drawn and recommendations for future work are pointed-out.

BENEFITS OF COURIER SERVICES

Nowadays, a courier service is one of the most important ways to delivers of packages, documents or information in the world. These services typically boast faster delivery times than any alternative way of transporting documents, and many businesses rely on them. In different ways Courier services can help people to provide door to door shipping and delivery of letters, packages and other shipments. Courier service range from one location to another location as quickly as possible. Here are some of the areas to look for benefits in implementing a Courier Services Reservation website system:

Time Reduction

A courier service has established to offer a faster and more secure alternative to the usual mail service that had been the only delivery service for so long. Traditional mail services are known for having slow delivery times and can incur expenses if items are large or heavy; couriers seemed to be the perfect alternative and despite it being slightly more expensive than normal postage it is beneficial for certain deliveries and saving the time to reach and contact to the courier company [6].

Rate Calculator

Through courier service website users can register items for collecting and tracking items to transport. This means that users do not need to contact with the staff of the website for a price and they can check different price for services provides in that cities where the user want or not, rather they can get a quote and precise details for these items that they want to send. In addition to, the functions of courier services are changed according to the size and resource of the items [11].

Packet Tracking

The courier service website are to provide the facility for all client to communicate in a faster manner for managing the courier services within the company and it offers easier way to client for transporting their couriers to another person and otherwise without delay. Moreover, this website is that allows users to request a quote to collect, delivery services and client can be able to book the jobs online. Also, client can identify track jobs from source collection to the destination [10].

Email Tracking

On the courier service website users has ability to send the online request to the administrator directly for his/her query.

Pickup Request

The courier service reservation website can provide effective trading website over the internet. It can help users to send the pickup request to the branch of the courier service company. The packet will be picked by company from the home to transport to the destination. So users can register of courier service system from their home and they can pay money with the help of payment gateway [8].

MAINTENANCE AND MANAGEMENT STRATEGY

A number of methods should be considered to maintenance and management website that should be performing on a scheduled basis monthly the scheduling would be timeline to get started with:

Backup Website

Backup of website is something that owner of website should be done at all time, particularly if owner of the website is the type that utilizes the online interface of his/her store or blog to create changes. Something is happen, although the web hosting company is said it is a backup of the sites on their servers, they can be had their last backup before their last edit. Whether the server will be crashed or hacked by some reasons, owner can be got a website again if the web company hosting restores anything they are backed up at a few minutes to back up the website.

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Monitoring Website

Whether the website is gone down, owner of the site want to be first to know that was not received an email from someone else that they cannot be permitted to access the website. We can run SiteUp program on the computer to check the website on a regular basis. It will let you know if the website is down with popup. Although, it is clear that computer must be on to work [12].

Test the speed of website

The testing of download speed website is significant, particularly if owner of the website adds new features. Web server has a short attention span if the website is slow to load, visitors may be not impatient to wait for a long time to load a page. Therefore, the owner of website has to do something to improve the download speed of the website by using some techniques to optimize the performance of the website such as improving download speed of images, multimedia features by reducing the size of them without impact on the quality, reduce extra coding and tables [13].

Link check

Sometimes, the links on the website will become broken; a number of different tools available can be used to discover broken links on the website. For example, W3C Link Checker can be utilized to find broken like on the website.

Security

The website can be maintained by using SSL encryption (Secure Sockets Layer) that is a protocol used to transmit private documents over the internet. SSL uses two keys for encrypting data, first one is a public key used to everyone, and second one is a private key only used to the message recipient. The SSL protocol is very useful to get confidential users information like credit card number. Furthermore, the website does not permit everyone to access important parts of the website till visitors are become a member on the website by opening account on the website [9].

Update website

The owner of website can be used content management system tools to update his / her website regularly.

Maintain Database of the Website

The database of website should be maintained by using database sharing that is providing a high scalable to improve the throughput and overall the high transaction performance. However, the database of each website is heavily dependent on three basic elements such as CPU, Memory and Disk [14].

AUDIENCE AND CREATE SCENARIOS

In this section, we are going to create a scenario for our courier service website. This website has a number of audiences. Now, we want to create scenarios for each one of them in the website as follows:

Senders (Clients)

Senders are comprised of people who are chosen online courier services to send some significant goods or documents. Also, senders are will need to make sure that their shipments reach to the desired address safely and rapidly. Senders on this website can be selected their locations where the items will be collected and selected the destination place where the

receivers who are taken the items. Furthermore, senders can determined the weight, length, width and high of their items then do click on quote and book button to go to another page that will display the prices of their services to delivery.

Visitors

Visitors are consisted of people who are visiting the website temporary only for searching about prices and services of the website. Also, a number of visitors may be trying to learn about who are investors or manager of the website and looking for different types of information that are available on the website.

Receivers

Receivers are people who are received the goods or documents that sent by the specific sender.

Administrator

Administrator is a person who has a responsibility for maintaining the whole of Courier Service website. Administrator has the duties of the website can include making sure that the web server is working properly, generating and revising the web pages on the website. Furthermore, administrator has a responsibility to response the client comments and arrangement the orders of the sender to delivery their items to desired address.

SYSTEM SPECIFICATIONS

To design and creating a new website or editing an existing website there are many different hardware and software need to consider. In our courier service website need to consider which hardware and software tools we may need to work on a website.

Hardware Requirements

- o   Processor: Intel (R) Core (TM) 2 Duo CPU T6600 @ 2.20GHz
- o   Secondary Storage: 80 GB
- o   Network Adapter: Ethernet Adapter
- o   Memory : 2 GB
- o   Backup Hard Drive or USB Stick

Software Requirements

- o   Operating System: Windows 8
- o   Programming language: Microsoft Visual Studio 2012
- o   Web-Technology: ASP.NET, AJAX, JQuery
- o   Scripting Language: HTML5, CSS3
- o   Front-End: C#.NET
- o   Server   Internet Information Server (IIS)
- o   Database: SQL Server 2008
- o   Diagram: XMind 6

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SYSTEM TESTING

Testing is an important stage during the development of project applications. It is to ensure that the all applications of the Courier services website have been created at a high standard and they are working correctly. Also, this testing can help us to fix any faults and any other issues that will be occurred during the implementation of the project work.

The two types of testing have been done during the steps of implementation of the project as follows:

Testing Implementation

This testing has been done during the implementation of the online courier service website. The command of debugging in the Microsoft Visual Studio 2012 has been used to test the applications for detecting an error. This method has a significant role in testing the code error in the courier service website. However, this method cannot correct the error in the website rather it can identify any error or issue in the website.

Testing Procedure

This test is an important test for our online courier service website. In this stage, a number of testing has been done to find any error or issues in the website such as:

Testing Functionality

This testing is the main test of the website to know the functionality of website are worked properly and correctly without any issue because any error of the functionality has a negative impact on the performance of website. To ensure the functionality of website is worked properly without any error, for that each web page in the courier service website has tested one hundred time accuracy.

Testing Interface

This testing is used to ensure the interfaces of each page in the website are clear and easy to use for every user. For that, this courier service website was used by a number of users to ensure our courier service website can interact with users for getting information, filling the application form, creating user account, encoding the detail information in the image before transferring over the network and decoding the encrypt data and image when received by the administrator precisely and easily without any issues [15].

Consequently, these testing have shown the courier service website can provide the best performance to all the functionality of the website at a high speed. Only a small number of errors were found during the creating website and they are required fixing.

RESULTS AND DISCUSSION

Content Decision

This system deals with the online courier service reservation. In comparison to the present system the proposed online courier service system will be more efficient and less time consuming. The proposed system is very secure for maintain the data and system. Furthermore, the administrator has ability to provide the rapid functionality for information

updating and retrieval of data. In our system each user can create account, modify information and view details information about the items that submitted to the administrator at any time. All other users cannot make any disturbance to any user data only administrator has all the control over the website by that administrator can see details of users and give the discounts at different time due to economic reasons. If user need to send goods to another place must be a member in this Website by insert personal information about him/her and can login to the Website. In addition, administrator can send the message to all participate on the system. Also, validation checks are used to reduce incorrect entries of data.

Content Grouping and Labeling

 No website design can be completed until the page structure of the site is established and agreed between the client and the web designer. The structure will dictate the names of the navigation buttons and the linking between the various pages on the website. Getting the structure right will go a long way to ensuring the visitor enjoys a good experience on the site and therefore wants to do business with the site owner.

The structure of the site should make it possible for the designer to create a logical and easy to follow navigation system to permit the visitor to reach the content they want to see quickly and reliably. It should also make it easy to add fresh content, particularly news items or new products/services, without major change to the graphic design of the site.

Home Page

Every website has a home page. It is the first page most visitors will see and is also the most important page for attaining good search engine rankings, as search engines give more weight to its content than to any other page. It should confirm to the visitor unambiguously what your site is about, what your products or services are and how to use the facilities on the site. It should link to every page on the site wherever possible and every page should link back to the home page.

Special offers

This system has ability to provide various discount offers about ordering for collecting and delivery client items from different locations for clients and they can see when visiting the website.

Search

Users can search for the locations to confirm that the locations are available in the system to send their parcels before filling the application.

Online Enquiry Form

A top level page should generally be included to lay out the various methods of making contact with us. The internet is an impersonal medium so it makes visitors comfortable if they can see a way to phone administrator office or fax office. In most instances websites should include an online enquiry form at the top level of the navigation system. This makes it easy for visitors to ask questions. In this system when users click on contact in the navigation of the website they can see a form to make a communication with the administrator by writing the name, last name, Telephone number and email after that they can write their comments or questions and sending to the administrator of the website as shown in Figure1.

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Figure 1. Contact Form& Office Address

Register Form

In proposed system each user must be register on the system to collect and delivery his/her items from different locations by inserting personal information of the user and receive an email to confirm the registration process have been done successfully after that user can login to the system as shown in Figure 2.

Figure2. Registering Form

Login

To order for pick up items from different locations users must have a username and password as shown in Figure 3. We provide type attribute to difference between users and admin. When the users try to login, the system check it via user type if this user is (admin or user). If the use is admin, then open the admin page. The administrator can view the username and password of the client who register on the system. The administrator also has the option to add, edit and delete the information of the client. In proposed system only users can register as a user on the system.

Figure3. Login Page

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Quick Quote

Figure 4-10 displays the process of making reservations when the Quick Quote item on the main page is clicked. In order to make the reservation, the user need to fill up the necessary information about collection and destination address, weight, length, width and height items after registering on the system as shown in Figure4 .

Figure4. Quote and Send Parcel

At second step, users can see another form about the service to booking that provide by the system to determine which day client will be chosen the type of delivery for instance same day, next day, three day or more than three day as display in Figure 5 .

Figure5. Service to Book

Collection and Delivery Address

After the above step client needs to fill another form in this step, the entire field should fill completely. Different text boxes has available there is divided into two parts one for collecting address of the items that we want to pick up items another one for delivering address as the both parts client need to fill the text boxes completely to delivery items. Each fill has a validation checks therefore client must fill completely form without entering incorrect data during data entry as shown in Figure 6.

Figure6. Collection and Delivery Address

Collection Date and Time

In this form client need to identify which date and time wants to pick up his/her items. After the date and time is selected it can been seen from the system that specified date and time is available for pick up items by the staff of courier service through showing a message as shown in Figure 7 and 8 if the date and items is not available for pick up items the system show another message that the client need to select another date and time for pick up his/her items.

Figure7. Identify Date and Time for Pickup Items

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Figure8. Collection Date and Time Available

Package Contents

After the date and time is selected by the client another form can be seen about the type of parcel and a short description of the parcel that clients are sending to the destination, approach value of contents and get insurance if the parcel is lost or damaged as displayed in Figure 9.

Figure9. Package Contents

Payment Method

Figure10 shows the payment scheme to be made by the client in order to confirm the reservation. The system will compute first the total reservation fee based on the rate of the items and the location of the items, weight, length, width and height items that have to collect and delivery to the destination. Also, the user can check the payment details before sending the booking to the system. To confirm the booking process, the user needs to pay through credit or debit cards.

Figure10. Payment Method

Order Summary

In our system each client has ability to check the details of the items before sending to the next step for encrypting. Figure11 shows the order summary page of the client. Furthermore, each users when register on the system they are able to get detail information about items booking at any time. This form is consisted of copy of order summery form before encrypting in order to protect and keep that information of the items to not lose.

Figure11. Order Summary

Encrypt and Decrypt Detail Information

Based on the proposed system as shown in Figure 3, we have developed online courier reservation with a new security technique for encrypt detail information. In our system before submitting the detail information to the server side of the system we can see the framework for encrypt data into image in Figure12. The proposed methods provide better security while transferring the data from the client side to the server side. The main goals of the methods are

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to hide the client data into an image which acts as carrier file having a secret data to transmit to the website server securely without any modification. To provide the best security of the data we have used two types of files for encryption purpose. One is embedded data into the image as known is called steganography by using Least Significant Bit (LSB) algorithm due to this algorithm faster and reliable and compression ratio is moderate compared to the other algorithm. Furthermore, we have used another technique to encrypt an image before sending to the server side website this method is called cryptography.

Cryptography secures information by protecting its confidentiality. It can also be used to protect information about the integrity of data stored on a machine that may be infected or under attack. So far cryptography is used in many forms but using it with image is another stronger techniques. The process of cryptography happens with image file for transferring more secure sensitive image. In our system the sensitive image that contained information client for collecting and delivering address with payment card information etc.   is encoded with an image file and passed over insecure channels to server side of the website. Hence we are using any file format for encryption and decryption of images. At the first step, to hide data into an image we have two main boxes one box for the loading image from any location and another box for the detail information about collecting and delivering address and card payment etc. that the user must hid inside the image as display in Figure12.

Figure12. Encrypt Detail Information into Image

In next step as shown in Figure13, we can see a new interface on our system.

Figure13. Encrypt Image before Submitting

This interface contains one box for getting the image from previous form directly and two main buttons, one button for the encrypt image that contain detail information about items and another button for submit encrypting image on the system. This new encrypt image can be used by client to send it via submit button to the server side of the system without revealing the secret data inside the image.

To evaluate the performance of proposed system we has tested this system for many times between the original image before the detail information is stored inside the image and encrypting with the detail information is stored inside the image by using the **Peak Signal-to-Noise Ratio (PSNR)**. PSNR is most commonly method used to measure the quality of stego image. The higher PSNR value means that the stego image has more quality image [7]. According to the PSNR value of each image, we found that our system has a higher PSNR value for stego image. Hence this new proposed system to hide the detail information items and card payment inside the image and encrypt the image before submitting is very efficient and accuracy. Furthermore, administrator on the system can easily decrypt the image and retrieve data inside the image without destroying any data. The proposed approaches provide higher security and can protect the detail information about client, items and card payment from website and stego attacks.
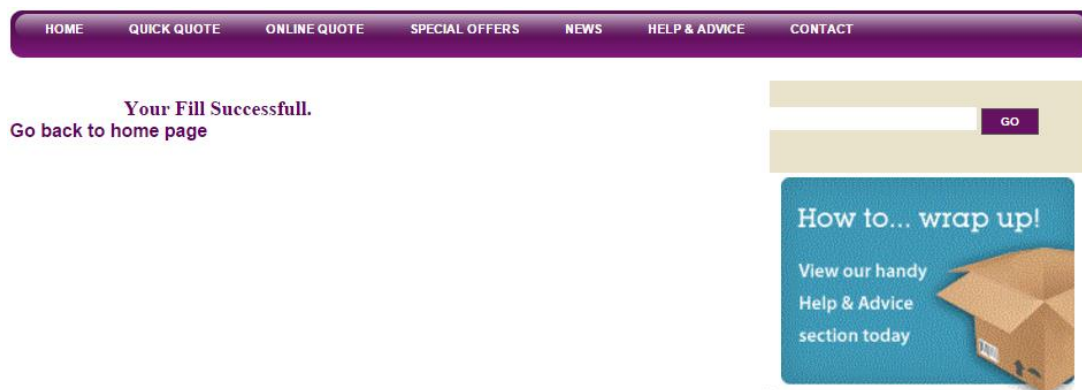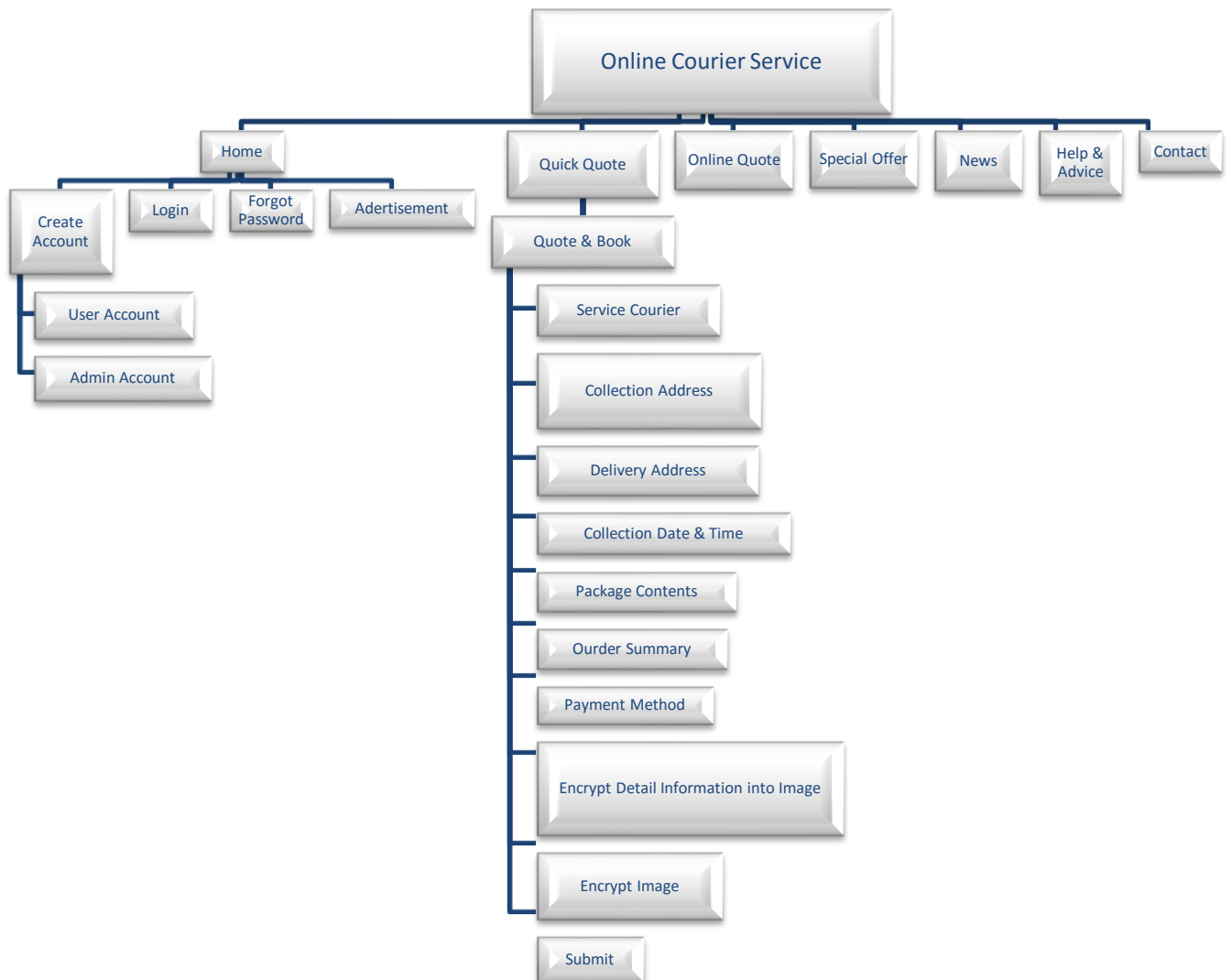

Figure 14. Fill Successful Form

CONCLUSION

Nowadays, website is efficient tool of communication with society. Online courier service reservation system is becoming a very popular method for collecting and delivering items from different locations. Courier service reservation system has been designed to simplify the task at online for collecting and delivering items. In this research paper, we designed and developed an online courier service reservation website with new security techniques. Users on the website can fill the application form for collecting and delivering address items. In this study, we have used new techniques for protecting detail information about collect, delivery address and card payment. Each client on the system has ability to create an account to see her/his orders on the website at any time. Moreover, in our courier service website users can encrypt detail information about collection and delivery address with detail card payment then hiding these data in the image and the image is encrypted before sending to the administrator on the website. Based on the finding of the our system, the online courier service reservation system helped users to delivery items from different locations in Kurdistan Region and reduces cost for management, increase efficiency and provide better service for users with the best security techniques for transferring the data or messages from one end to the other end.

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SITE MAP

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