

# Developing and Implementing A System for Shipping Companies Comparison

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## ABSTRACT

Information-intensive Web services such as shipping comparison sites have recently been gaining popularity. However, most users including novice shoppers have difficulty in browsing such sites because of the massive amount of information gathered and the uncertainty surrounding Web environments. The aim of this research is to design a system which is called Shohnati to perform all procedures related to the order of shipment, and to store and process all information relating to customers or shipping companies in a database. Through this research, the customers will be able to order the shipment more easily by providing a complete comparison between the shipping companies, request the shipment from the preferred company's site, follow the shipment, and follow the latest offers of companies on our site. The proposed system was developed using the Unified Modeling Language (UML) and Visual Studio-ASP.NET programming language.

**Keywords :** Shipping Companies, Software Engineering and Unified Modeling Language.

## I. INTRODUCTION

The technological development in all fields has led to the development of systems, and the efforts of companies and institutions to computerize their systems in line with the requirements of this era, which has facilitated the work and services provided by these companies and institutions and increased the efficiency of the systems [1]. In addition, new communication technologies have changed the manner in which individuals access and acquire information from various information sources [1, 2]. Many Web sites and Web services are based on the flux of information convergence and Web users enjoy a wide access to abundant information from various sources through [3].

However, the costumers may have some difficulty in combining, transforming, and processing massive

amounts of gathered information, especially when comparing prices which may result in irrelevant search results, fraudulent transactions, and dispersed information [1, 3, 4]. Therefore, many users may become disoriented and face worsening problems of information overload and uncertainty when browsing information-intensive Web sites [5].

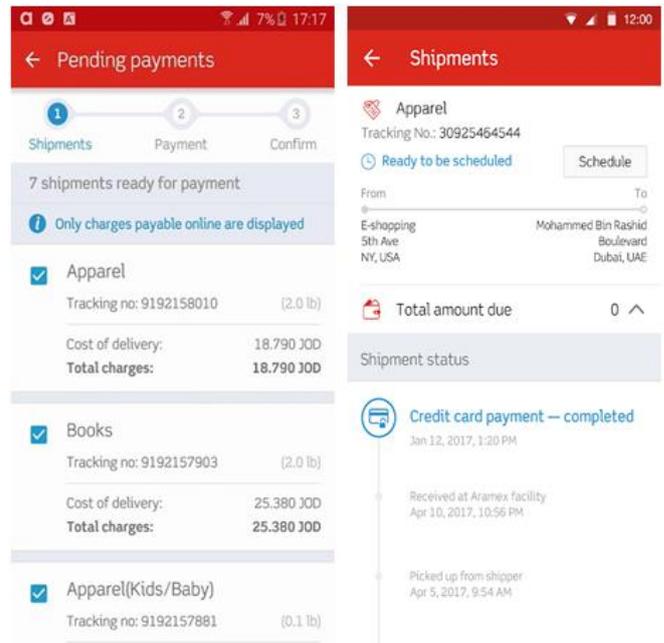
Many shipping customers are complaining about the expensive delivery rate, delays in arrival and lack of insurance, technical difficulties in using shipping companies applications, lack of an urgent and secure shipping manner. Also the emergence of the huge need to search and find the right shipping company to deliver the shipments in less time, less cost and safe way, and to provide multiple options to suit the user and keep pace with technological development and e-operation [1].

This research aims to assist the customers to choose the shipping company, and to provide integrated services and high quality for all their needs as fast as possible. For example when comparing prices comparison site providing online shoppers with opportunities to acquire a wide range of information on various products. It is well known that a price comparison site (PCS) can help online shoppers reduce the amount of time or effort required when searching for products online [1, 6-9]. Shipped is a website that deals with shipping services and serves as the connection between the various shipping companies and customers, allowing the owners of shipments (customers) to get the best price through the trade-off between companies and to choose what suits them with the least effort, and a sure profit for companies when competing to provide the best to the customers.

## II. RELATED WORKS

- **Aramex**

The Aramex App allows all Aramex customers around the world to track delivery, monitor shipment progress and manage their account, addresses and delivery details. With the app customers can manage their entire Aramex delivery experience using their phones [10]. The disadvantages of this application are the high shipping prices, no insurance is available on the shipment, delayed arrival of shipments on time and the application does not support Arabic.



**Figure 1** : an example of shipment monitor interface via Aramex application

- **Naqel Express**

Naqel focuses its services on providing logistics solutions for all individual customers or companies and provides internal and international shipping services. Naqel application is tailored to the meet the customer's needs:

- Track shipment status
- Schedule a pickup
- Shop on-line using our e-com partners
- Share feedback with our Customer Service Center
- Know about our products, tariffs and delivery times



**Figure 2 :** An example of shipment monitor interface via Naqel Express application [11]

• **SMSA Express**

SMSA Express is a market leader in the courier industry. It boasts a solid business platform through which it have provided services to tens of thousands of businesses and individuals in the Saudi market since 1994. Since commencing business, SMSA Express has developed a range of services, including international and domestic express transportation, road, sea and airfreight, customs clearance, e-commerce solutions, special services for the health care sector, special delivery channel, mailroom management and many other services that qualify SMSA Express as the ideal logistics partner for prominent Saudi companies.



**Figure 3:** SMSA Express interface [12].

The technological revolution influenced everything [13-33], even the methods that aim to improve the shipping companies comparison through an electronic system. Today, the use of Artificial Intelligence (AI) algorithms is expansive, particularly in providing solutions to challenging problems including patterns recognition and retrieval of information [28, 34-50], image segmentation [13, 14, 24, 51-56], analysis of medical images [57-61], Learning Management System [62-87], nurse rostering problem [88], Healthcare Monitoring system [27, 89], as well as prediction of river flow [90-92]. Accordingly, many researchers have used the Artificial Intelligence as an effective tool for shipping companies' comparison systems [93, 94].

**III. SYSTEM ANALYSIS**

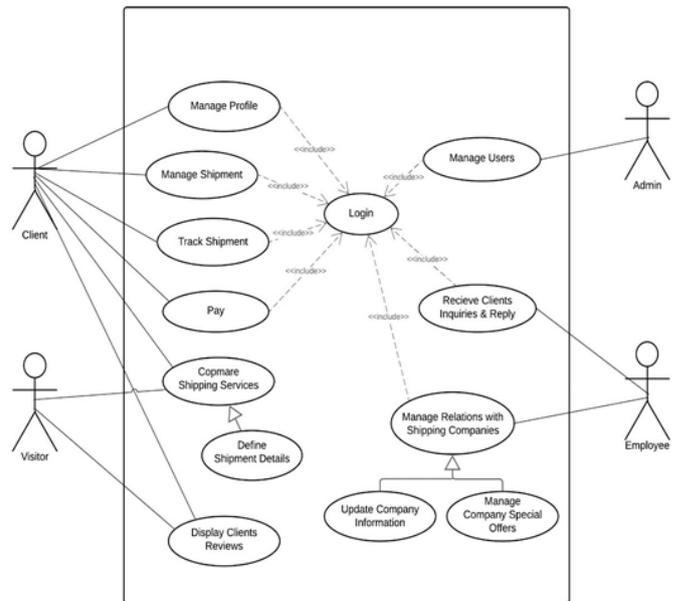
The UML has been developed to offer a standardized notation to define Object Oriented Models. However, to effectively apply the UML notation, it must be employed with an Object-Oriented Analysis and Design method [95-99]. Object-Oriented analysis and design (OOAD) refers to a group of methodologies to produce business component based software. The

methodology summaries the life cycle of system development identifying the deliverables and tasks in an object-oriented project [100]. Using a combination of UML notation and process, the life cycle of system development can be reduced, the system can be easily maintained, and the modules reusability can be improved.

The UML is a language used to specify, visually model [101], and document the artifacts of an Object-Oriented system under development. It denotes a number of ideas unification from various methods. UML is used in the system design to improve its reusability and maintainability. Object-oriented analysis methods offer class, use case, state chart, sequence and other diagrammatic notations for modeling [102]. UML has been employed effectively in many projects for modeling different requirements and architectures [101].

### 3.1 Use Case Diagram

According to the Bhuiyan et al., [103], a use case is “the specification of a set of actions performed by a system, which yields an observable result that is typically, of value for one or more actors or other stakeholders of the system”. The Use Case diagram provides a visual view of sequence of steps to achieve a task and describes the use of a system by the actors related to it [21, 22, 25, 26, 31, 104]. These actors are any external elements that interact with the system. The interactions between the system and various actors provide a way for the developers to come to a common understanding with the systems’ end users and domain experts [84, 98, 101, 105, 106]. Use Cases also help to validate the proposed system architecture and to verify the system as it evolves during development. Figure 4 shows the use case diagram for the proposed system.



### 3.2 Context Diagram

The Context Diagram (CD) is used to establish the boundaries and context of the system to be modeled; which things are outside and inside of the system being modeled, and what are the relationships of these external entities with the system. CD sometimes called a level 0 data-flow diagram is drawn in order to clarify and define the boundaries of the software system. It identifies the information flows between the external entities and system [107]. Figure 5 shows the Context Diagram for the proposed system.

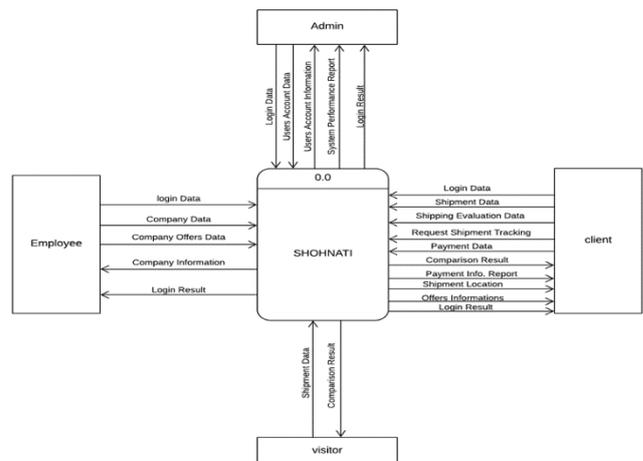


Figure 5 : Context Diagram for the proposed system.

### 3.3 Entity Relationship Diagram (ERD)

The ERD provides a way of graphically representing the logical relationships between entities in order to create a database schema to persist those entities [21, 22, 25, 26, 30]. The ER Model was first proposed by

Peter Chen of Massachusetts Institute of Technology (MIT) in the 1970s. The ERD of the system is involved seven entities (tables) which are customer, consult, adviser and system administrator. Figure 6 shows the ERD for the proposed system.

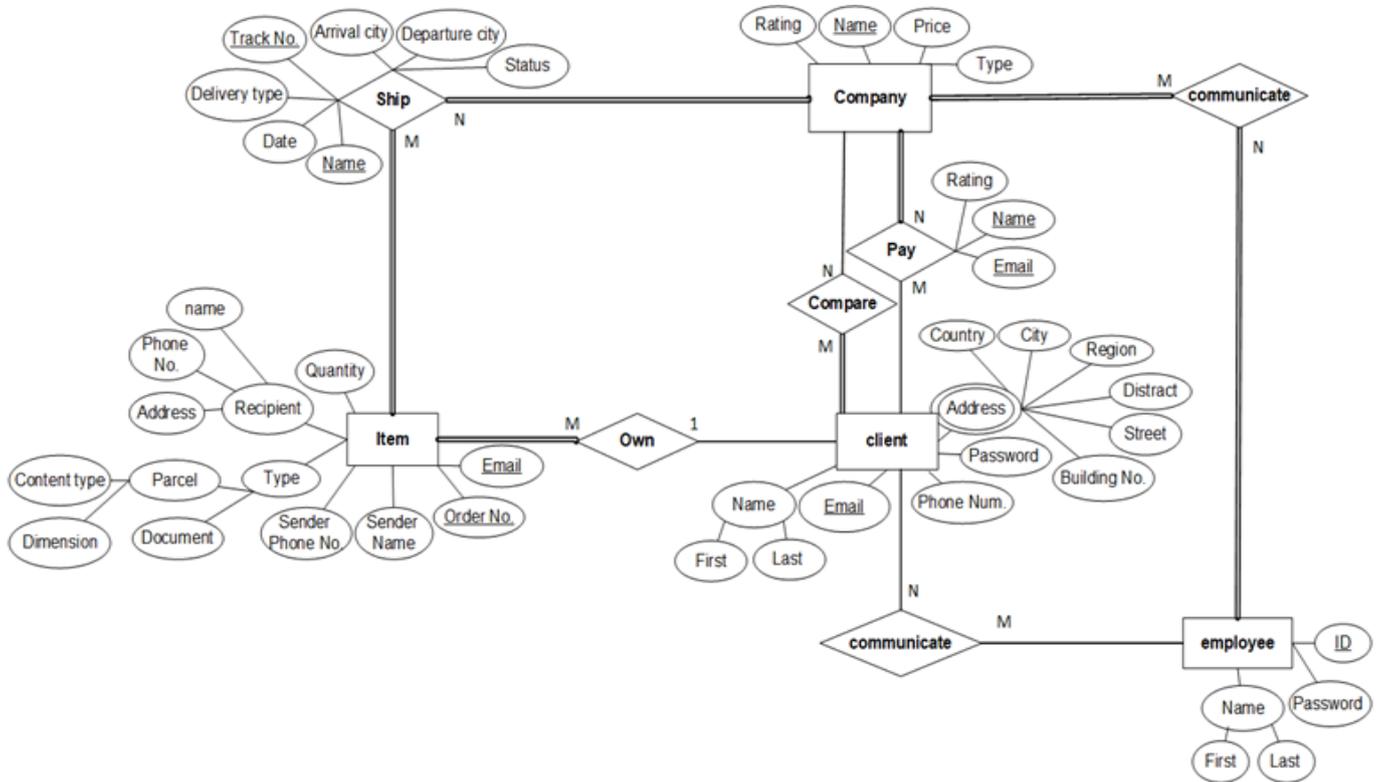


Figure 6: ERD for the proposed system

### IV. DATABASE TESTING AND CONSTRUCTION

The database testing is essential for finding errors that can affect the consistency, security, performance and reliability of the system, and it is important for

system validation against the user specified requirements [108, 109]. Structured Query Language (SQL) was used for database implementation. The tables below are examples of the created tables.

Table 1: Shipping table

shipping: Query(hessa-laptop\905b3d0-971b-4b.C:\USERS\HESSA\DOCUMENTS\VISUAL STUDIO 2010\WEBSITES\SHOHNATI - نسخة\APP\_DATA\DATABASE

	trackno	depart	arrival	delivery_type	date	weight	status
	234567892345678	khuber	ryiadh	express	06-04-2019	0.5	Deliverd
	345678934567899	dammam	Ryadh	Regular	07-04-2019	2	Deliverd
	768905432167548	khuber	jeddah	Regular	14-04-2019	4	Deliverd
	457348901237659	dammam	makkah	regular	14-04-2019	2	Deliverd
	324567890123456	khuber	jeddah	express	20-04-2019	1.5	Deliverd
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Table 2: Item table

item: Query(hessa-laptop\905b3d0-971b-4b.C:\USERS\HESSA\DOCUMENTS\VISUAL STUDIO 2010\WEBSITES\SHOHNATI - نسخة\APP\_DATA\DATABASE\_SHOHNATI.MDF)

order_no	quantity	type	content_type	dimension	sender_name	recipient_name	recipient_pho...	recipient_address	sender_phone
1111	1	parcel	TV	55X44	hessa	Arwa	0565759319	Riyadh,Olya-street10,building 34	0546778083
1114	1	parcel		33X50	hadeel	khaled	0522222222	jeddah,street20,7896	0543114450
1115	3	document			rawan	norah	0533333333	makkah-street10	0503652254
1116	1	parcel	clothes		hessa	osamah	0522222222	jeddah-street7b	0546778083
1124	2	document			hadeel	Reem	0511111111	Riyadh-street20	0543114450
»	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Table 3: Shipping Companies table

company: Query(hessa-laptop\905b3d0-971b-4b.C:\USERS\HESSA\DOCUMENTS\VISUAL STUDIO 2010\WEBSITES\SHOHNATI - نسخة\APP\_DATA\DATABASE\_SHOHNATI.MDF)

name	weight	price	type	image	rating
Aramex	0.5	38 SR	Express		4 star
Aramex	0.5	18 SR	Regular	NULL	4 star
Aramex	2	45 SR	Express	NULL	4 star
Aramex	2	25 SR	Regular	NULL	4 star
Aramex	5	52 SR	Express	NULL	4 star
Aramex	5	32 SR	Regular	NULL	4 star
Aramex	10	59 SR	Express	NULL	4 star
Aramex	10	39 SR	Regular	NULL	4 star
Aramex	15	66 SR	Express	NULL	4 star
Aramex	15	46 SR	Regular	NULL	4 star
Aramex	> 15	71.75 SR	Express	NULL	4 star
Aramex	> 15	51.75 SR	Regular	NULL	4 star
DHL	0.5	42 SR	Express	NULL	5 star
DHL	0.5	16 SR	Regular	NULL	5 star
DHL	2	52.50 SR	Express	NULL	5 star
DHL	2	26.50 SR	Regular	NULL	5 star
DHL	5	73.50 SR	Express	NULL	5 star

V. Interface Design

The goal of user interface design is to make the user's interaction as simple and efficient as possible, in terms of accomplishing user goals. The programming language utilized in this work is Visual Studio-ASP.NET programming language. The programming language is chosen relying on the languages features which make them more suitable for this work. The figures 7, 8 and 9 below are examples of the proposed system interfaces.

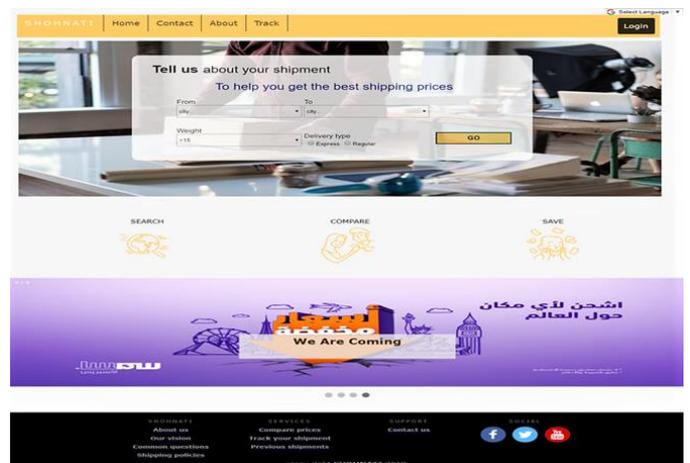


Figure 7: Main interface.

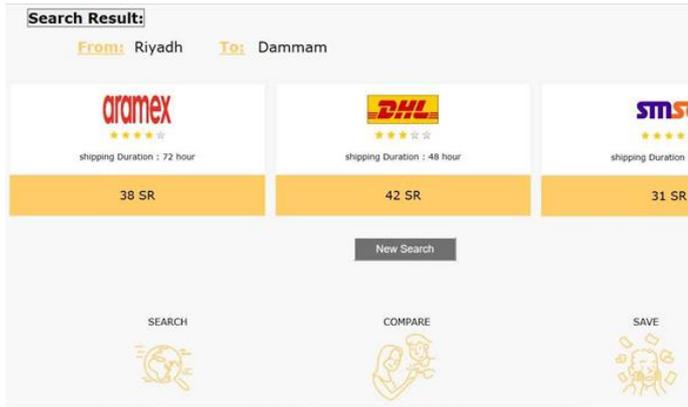


Figure 8: Comparison interface

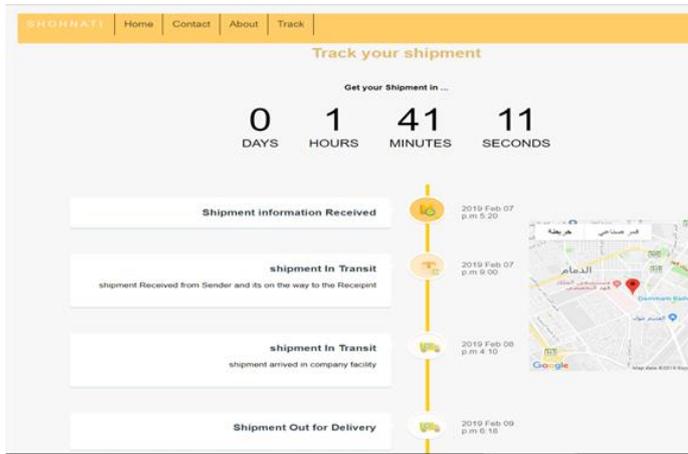


Figure 9: Shipment tracking interface

## VI. Discussion

This stage highlights the usability of the proposed system. During this stage, the system is evaluated while user satisfaction is ensured. Test was executed on the proposed system by running it on Mozilla Firefox and Internet Explorer using the local host server. For evaluation purpose, 20 students from College of Applied Studies and Community Service at Imam Abdurrahman Bin Faisal University (IAU) were invited to use the prototype. The students were first briefed on the prototype's usage and the user interface. Then, the students tested the system, and answered the survey questionnaire consisting of 10 items formulated to gauge the level of user satisfaction. The usability of the proposed system was also determined. The result as well as the level of

usability of the system according to the feedback provided by 20 students can be referred in figure 10. As can be construed by the result, a significant amount of users agrees that system is practical, useful and fulfill the project's primary objective.

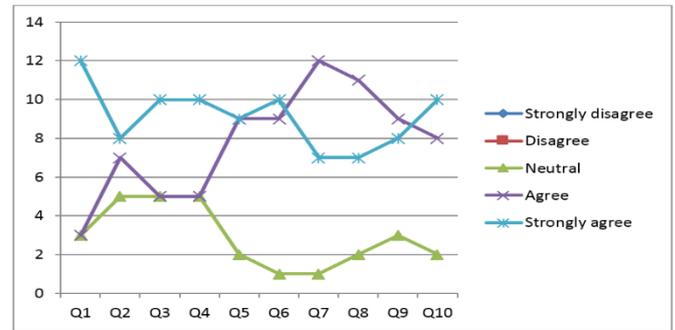


Figure 10: collected data results from the 20 students

## VII. Conclusion

In this research, Shohnati system was designed and developed to improve the shipping services of various shipping companies. The proposed helps the user to assist the customers to choose the shipping company, and to provide integrated services and high quality for all their needs as fast as possible system can be developed to include local and international areas. The proposed system was developed using the Unified Modeling Language (UML) and Visual Studio-ASP.NET programming language.

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