



Dynamic Online Ordering and Data-Driven Inventory Management System with SMS for Security

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ABSTRACT

Modern technology has made the requirement for information flow to be quick and effective. It has improved the general living standards of many people in the last few decades. With this modernization in the online market, ordering from websites are just a few clicks away. Due to the convenience and efficiency provided by technology, our lives have improved significantly. The researchers thought of a system that could solve the problems of the manual process in managing the inventory of a particular company in the region called Ryan & Son's Winery. The researchers developed an online ordering system that was recommended by the business owner. After understanding the process, the researchers reviewed all the problems regarding the usage of the current system. It takes an assessment of the existing system, conduct of interview, gathering information, and documentation of the kinds and types of data processed by the system. The researchers came up with constructing "Dynamic Online Ordering and Data-Driven Inventory Management System with SMS for Security." The researchers have built a method based on the conceptual framework and system architecture defined after the problems in the current situation have been identified. The use of different data-gathering methods, such as interview method, library or documentary analysis, survey method, observation method, and internet method, was carried out by researchers in the design and development of the project to have a dynamic online ordering process and data-driven inventory system. At the end of the study, the proponent gathered a survey concerning the interface and functionalities of the system to come up with an efficient and reliable system.

Key words: Online Ordering, Inventory, SMS, Winery,

1. INTRODUCTION

Conventional systems have placed challenges on people to be comfortable in every endeavor of their jobs. The problem is that individuals are imperfect, no matter how much each of us

wishes we were. In the case of manual methods in our daily living, the quality of service relies on the person, and this provides management to maintain training for employees to keep them motivated and to make sure that they religiously do the correct processes in several businesses. In product purchasing, mainly, it might be too quick to move information unintentionally and may result in inconsistencies in data entry or orders made manually. This has the effect not only of creating issues with customer service but also of preventing information from being used for monitoring or recognizing data discovery patterns. Processing and ensuring that the data is accurate can be timely and costly. This is also an environment where considerable costs can be avoided by technology [1]. The disparity in data input, space for error, lost information, huge ongoing staff training costs, the system relies on the right people, limited exchange of information and customer care, time-consuming and expensive monitoring, lack of protection, and replication of record-keeping [2]. Internet purchasing is a modern emerging industry that allows consumers to access goods on the online platform and vendors to meet buyers. Also, online shopping allows consumers to find more diverse types of items than conventional shopping. It is easy to evaluate items, compare prices, and purchase from various websites at the same time [3].

The authors gathered some information associated with the problems being encountered in one business. The author found issues in the manual system on managing inventory and on processing orders. The manager and employee have difficulties in monitoring the list of products and sales transactions. The conventional method that much of the food and beverage business uses is the classical physical purchasing system, which means that all tasks and operations are conducted by manual labor and comprises of a tremendous volume of paperwork that is not reliable and accurate. A study was designed by Leong to create an automated and mobilized food purchasing method that can be used to transform the conventional ordering system that is currently being applied in the large proportion of the food and wine sector [4]. As the globe is rapidly growing a global community, connectivity, in which telecommunications is the main factor, is a valuable

tool for this phase. The significant innovation is the 2-wireless telecommunications system that comes either in permanent mobile telephone lines or in the Global Mobile Communications System (GSM). The online ordering system is initially developed for operation in college food courts, yet it is just as appropriate in any goods transmission sector [5].

There is a study demonstrating the utilization of a web-based online inventory system to improve human efficiency in the company's work process. From this study, on the web-based online inventory system, it shows that this is an advancement in promoting the processing of products, managing to make things more efficient; this is good news for large corporations to operate their business, no surprise several corporations are using online inventory systems to allow them to succeed [6]. This paper also reviewed the paper about the first initiative to establish a web-based corrosion cost inventory system on a broad scale that could be personalized by any country. Their framework is scalable and can be extended as required [7]. Another paper has developed an inventory system consisting of an online retailer and its buyers, where the average customer arrival rate is a linearly diminishing attribute of the service delivery period [8]. An inventory [9] system has also been introduced with the company's replenishment program, which provides details on the retailer's inventory status and can also provide an accurate overview of the operational measures of that system [10].

Based from the challenges and literature gathered and to improve the current system, the researchers conceptualized a system entitled "Dynamic Online Ordering and Data-Driven Inventory Management System with SMS for Security" for the winery business. Ordering Online System has become a market leader in today's industry, allowing many people, from small shop owners to famous entrepreneurs, to get their on-demand business online. It supports you with high-tech purchasing technology assisted by modern innovations. This will allow your company not only to make a posting on today's online marketplace but also to overcome other competitors [11]. Nearly 90% of SMS [12], [13],[14], [15] is read within the first three minutes of transmission. This communications platform can be used to convey business-critical information and provide the customers with a superior user experience. Transferring an SMS when materials arrive or when your order is ready for pick-up helps consumers in the process and allows them to feel more comfortable [16]. The proposed system is web-based; it can be accessed anywhere provided with a stable internet connection. The server side of the system is in a website form that can be accessed by the customers. The system keeps all information organized for reliable record monitoring and security for data integrity.

2. METHODS

2.1 Conceptual Framework

Figure 1 shows the conceptual framework of the system. The administrator or employee user will log in to the system; both can manage the product quantity- add or deduct, view orders,

and approve orders. The administrator will have privileges that are restricted to the user – viewing of sales and user management. The customer shall visit the website and create an account; then, the customer shall view and add products to the shopping cart, place orders, and submit. The system will receive the orders and will be approved or canceled by the user or admin; then, the system will send an SMS notification to the customer.

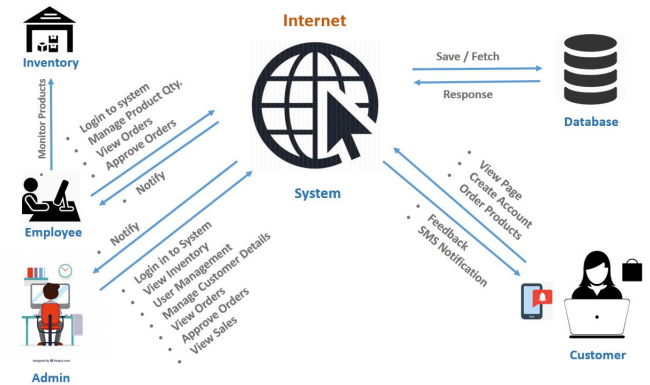


Figure 1: Conceptual Framework

2.2 System Architecture

Figure 2 shows the system architecture of the system. It shows how the system works, on the client-side, the customer creates an account, and the data is registered to the database. The customer will log in into the system to view and choose products of the business once the customer has submitted the order, the system will save the order in the database that will be ready for confirmation. On the server-side, the admin or user will log in into the system and will receive the order which the admin or user will confirm or cancel the order, after which, the system will update the inventory's quantity of the selected product/s, saves the transaction to the database, and also sends an SMS notification to the customer.

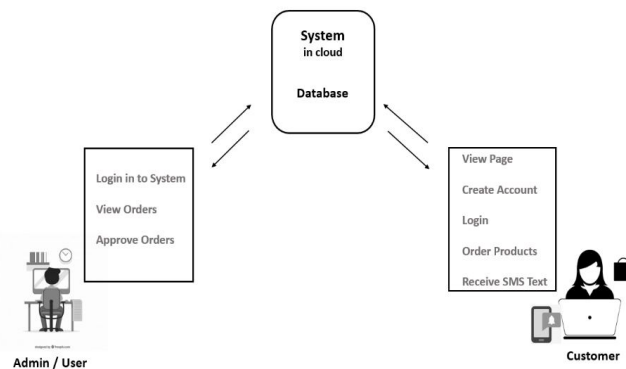


Figure 2: System Architecture

3. RESULTS AND DISCUSSION

3.1 Software Development

Figure 3 is the actual interface of the system administrator. The system administrator has more permissions than the regular user used by employees. The interface displays several functions of the system, such as the administrator account settings and logout located at the top right, and the main tasks on the left menu bar. The Dashboard function allows the administrator or user to view and confirm the orders arranged from the latest ruling. The sales feature helps the administrator to access sales transactions from the database. The product feature allows the administrator to access the products, add or update products, and deactivate or activate products. The Inventory function will show the quantity of each product and will also allow the administrator to add or deduct product items. The User Management function will enable the administrator to add, update, or delete user accounts. The SMS function will allow the admin or user to send customized texts to customers.

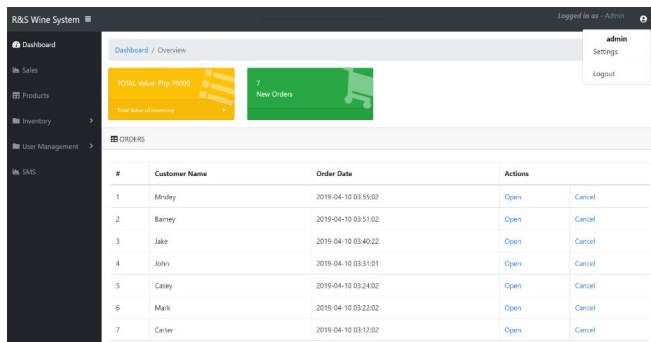


Figure 3: System user interface

3.2 Results of Testing

Administrator's account registration test

The account creation tests were conducted for accounts of administrators and users, as illustrated in Table 1. The table shows two examples of the system administrator's account and two examples of users that were successfully created in the system's database. The ID column pertains to the database account ID per record stored in the database. The LNAME, FNAME, and EMAIL columns are the personal information of the account owner. The UNAME and PASSWORD columns are about the registered security credentials to be utilized by the system administrators and users when entering or accessing the system. The table is a detailed summary of the administrators and users' accounts wherein tests were done to verify its reliability.

Table 1: Account creation test for system users

TRIAL	ID	FNAME	LNAME	USERSNAME	EMAIL	PASSWORD	USER - TYPE	EXPECTED RESULT	ACTUAL RESULT
1	6	MICHAEL	RYAN	MIKE98	Michaelan98@gmail.com	ENCRYPTED	ADMIN	SUCCESSFUL	SUCCESSFUL
2	18	DENNIS	RYAN	DENNIS	dennisryan@gmail.com	ENCRYPTED	ADMIN	SUCCESSFUL	SUCCESSFUL
3	19	LILYA	SEGUNDO	LILYA	lilyasegundo@gmail.com	ENCRYPTED	USER	SUCCESSFUL	SUCCESSFUL
4	20	BILLY	WALLEY	BILLY06	billywalley23@gmail.com	ENCRYPTED	USER	SUCCESSFUL	SUCCESSFUL

Saving of customer's orders to the System's Database

For saving the orders of customers, table 2 shows sample 10 instances that were successfully stored in the database. The TRIAL column refers to the number of tries conducted. The ORDER_NO column is the unique identity of the order. The PRODUCT_NAME, PRODUCT_QTY, PRODUCT_PRICE, PRODUCT_CODE, CUSTOMER_NAME are other information on the order.

Table 2: Orders table

TRIAL	ORDER_NO	PRODUCT_NAME	PRODUCT_QTY	PRODUCT_PRICE	PRODUCT_CODE	CUSTOMER_NAME	EXPECTED RESULT	ACTUAL RESULT
1	RNSW-0010	MEDIUM SWEET WINE	2	760	WN001	STEVENSON	SUCCESSFUL	SUCCESSFUL
2	RNSW-0011	MEDIUM DRY WINE	4	1520	WN003	ED	SUCCESSFUL	SUCCESSFUL
3	RNSW-0012	MEDIUM SWEET WINE	3	1140	WN002	RODNI	SUCCESSFUL	SUCCESSFUL
4	RNSW-0013	DRY WINE	1	200	WN004	MIKE	SUCCESSFUL	SUCCESSFUL
5	RNSW-0014	WHITE WINE	6	2280	WN005	AR.EY	SUCCESSFUL	SUCCESSFUL

3.3 Final Prototype

Figure 4 is the prototype result of the study. The figure includes the system hardware components used. The router for the computer to access the internet. The antenna receives a signal from the ISP tower. The computer for the primary hardware. The administrator's home screen of the web application that is displayed on the computer's screen.

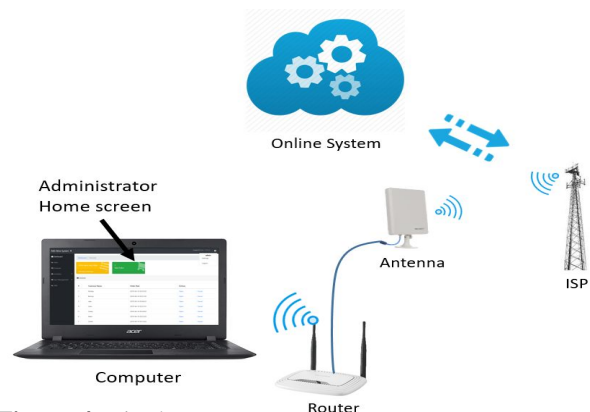


Figure 4: Final prototype

Software Evaluation

An evaluation form was given to the respondents to weigh in the system's functionality, usability, and reliability. The questionnaire was constructed in accordance with the International Standard for the Evaluation of Software Quality ISO/IEC 25010:2011. The number of respondents was ten, composed of random customers and including the manager and employee, and the statistical analysis used is the 5-point Likert Scale. Table 3 illustrates the average perception of the respondents based on the functionality of the system. The results showed that most of the respondents answered Very Good on the questions related to the criteria "functionality" with an overall weighted average of 4.16. On the other hand, table 4 is a tabulated perception of the respondents about its reliability. The summarized result showed a general weighted average of 3.76, which indicates that the respondents describe the usability of the system as "very good." Table 5 is the tabulation about the perception of the respondents in terms of the usability of the system, got a result of 3.76. Table 7 showed that it has a maintainability performance average of 4.12, while Table 8 resulted in a weighted average of 3.85 in terms of its portability. All evaluation results were perceived by the respondents to have a very good performance.

Table 3: Functionality Evaluation Result

Criteria	Weighted Average	Description
Functions required for the system are implemented.	4.5	Very Good
Functions provide correct information.	3.9	Very Good
Ease of connecting with other systems is provided.	3.8	Very Good
Functions meet specifications	4.3	Very Good
Important security is provided.	4.3	Very Good
Overall Weighted Average	4.16	Very Good

Table 4: Reliability Evaluation Result

Criteria	Weighted Average	Description
The software includes no errors.	3.7	Very Good
The system continues to operate at the slightest disturbance.	3.8	Very Good
System operations are restored quickly when a failure occurs.	3.8	Very Good
Overall Weighted Average	3.76	Very Good

Table 5: Usability Evaluation Result

Criteria	Weighted Average	Description
Easy to operate or navigate.	4.1	Very Good
Easy to remember system procedure.	4.0	Very Good
Allow easy operation management.	4.6	Excellent
Overall Weighted Average	4.23	Very Good

Table 6: Efficiency Evaluation Result

Criteria	Weighted Average	Description
Provides good responses with minimal time.	4.0	Very Good
Allows effective use of system resources.	4.1	Very Good
Overall Weighted Average	4.05	Very Good

Table 7: Maintainability Evaluation Result

Criteria	Weighted Average	Description
It allows easy analysis of design documents and programs when an error is found.	3.9	Very Good
It allows for easy modification of the system.	4.1	Very Good
The modification does not affect the whole system.	4.1	Very Good
Strenuous tests are not required after modification is made.	4.1	Very Good
Overall Weighted Average	4.12	Very Good

Table 8: Portability Evaluation Result

Criteria	Weighted Average	Description
Accessible in a different environment	4.1	Very Good
Provide easy installation.	3.9	Very Good
Meets design specifications.	3.5	Very Good
Allows replacement with other software quickly.	3.9	Very Good
Overall Weighted Average	3.85	Very Good

4 CONCLUSION

"Dynamic Online Ordering and Data-Driven Inventory Management System with SMS for Security" is a system primarily to manage inventory and to provide an online ordering system for clients. The main innovation of the system is the use of an automated inventory management system for more efficient and reliable monitoring and recording of products and an online ordering system for the convenience of customers. Thus, having an SMS feature to notify customers and to provide security to both clients and business owner.

Based on the tasks engaged in establishing the system, which includes problem identification, formulation of objectives, development, tests, and evaluations conducted, it was proven that the system performs its intended functions. It was also established that the system software is easy to use and understandable, presents accurate and complete data, and is very useful to business management.

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