



Web-based Integrated Restaurant Management System

Linda Uchenna Oghenekaro
University of Port Harcourt
Department of Computer Science

Jacinta Chielozonam Okafor
University of Port Harcourt
Department of Computer Science

ABSTRACT

This project work studies the development of restaurant management system. It is as a result of problem associated with the existing system which involves the use of Hashmicro system to compliment the manual method in keeping information in Sammies restaurant. The existing system are characterized with many problems which are staff are taking too much time pursuing mistakes instead of tending to customers, inventory doesn't match your tallies, sales going unrecorded, and other. Restaurant personnel use computerized management database information system to gather data, process data and also keep it for future use and product ordering. The proposed system was implemented using HTML/CSS for the user interface, PHP and MYSQL database for the back end. Structured system analysis and design methodology was adopted. The designed system will allow the pliability to the Users/ Customers to order from Restaurants. It will also give recommendations to the users from the owners of the restaurants uploaded daily. In the proposed system, there will be no limitation on the amount of order the customer wants.

General Terms

Restaurant Management System, Information Systems, Fast food.

Keywords

E-commerce, HashMicro System, Webpage, Database, Flowchart.

1. INTRODUCTION

Change from industrial society to information and knowledge society has impacted positively on social, economic and cultural aspect of human life. In recent years, information systems technology has become crucial and is playing a critical role in contemporary society, which is dramatically changing economy and business operations. Business is now conducted in a global environment using technology which is not serve without computer based information systems.

The traditional marketing and management in restaurant and fast-food industry is experiencing a revolution because of the emergence of e-commerce. Since the birth of e-commerce, businesses have been able to make use of the Internet in reducing costs associated with purchasing, managing supplier relationships, streamlining logistics and inventory, and developing strategic advantage and successful implementation of business re-engineering. E-commerce allows companies to improve communications within the supply chain and enhance service offering, thus providing chances for competitive differentiation.

An automated restaurant management system refers to the application of information system towards the enhancement of restaurant and fast food business among others. Fast food refers to food produced in large quantity for commercial resale, emphasizing prompt service as a top priority. This term is

typically associated with food sold in fast food restaurants or stores, where ingredients are often frozen, preheated, or precooked, and the food is packaged for take-out or take-away purposes. The concept of fast food originated as a strategic response to cater to the needs of a high volume of busy customers, travellers, and employees with limited time.

In Nigeria fast food restaurant businesses have taken their businesses online through food ordering. Some of the popular fast food restaurants such as Genesis, Kilimanjaro, The Promise, Chicken Republic and other less popular ones can now boast of an online food ordering presence. However one of the fast food restaurants options that enjoy the high level of popularity "Sammies" has no online presence and thus no online food ordering.

The rapid advancement in technology and changes in the way organizations operate are driving the need for more efficient systems in the restaurant and fast-food industry in Nigeria. One solution is an online restaurant and fast-food management system which can help reduce costs and improve performance. One such system is proposed for Sammies Fast-Food in Choba, who are currently using the HashMicro management system. However, the HashMicro system is limited as it only runs on Macintosh computers on a LAN and does not offer remote access or food ordering capabilities. Therefore, an automated restaurant management system is proposed as a more cost-effective and scalable solution for Sammies Fast-Food.

The primary objective of this research paper is design and implement an automated restaurant management system for Sammies Fast-food.

2. REVIEW OF RELATED WORKS

Gan et al [4], developed an online fast food restaurant ordering system that allows customers to place orders anytime at any place. The system helps to manage order from customer as well as advertise promotion. It allows kitchen staff to view ordering information, management to manage fast food raw materials and staff to search customer delivery and profile information. This system helps to reduce queue issues during peak hours, speed up food preparation and increase customer volumes. As a result, market share of fast food restaurant can be boosted up and increases return of investment for the investor.

Khairunnisa et al [26] proposed the application of wireless food ordering system. This work presented in-depth on the technical operation of PDA based Wireless Ordering System (WOS) including systems architecture, function, limitations, and recommendations.

Hashim et al [27] presented an approach to develop a system by introducing the integration of Bluetooth technology as the communication medium and Peripheral Interface Controller (PIC) as the hardware which implemented faster ordering system.

Nazmun et al [10] develop an Online Restaurant Management System that provides convenience for the customers. It overcomes the disadvantages of the traditional queuing system. Their system increases the walk-in customers than callers. Thus

the system enhanced the speed and standardization of taking the order from the client. It provided a better communication platform, where the customer's details are entered electronically.

Ann et al [1] developed cAPPeteria – a food ordering system where customers can directly order through customized food vendors, confirm their orders and use a one-dimensional barcode to make payment. It perfected the wireless food ordering system, and limited the complications faced while connecting to an internet ground garcon, hence adding mobility and control to the customer.

Amelyn [2] proposed a digital technology to expand current and innovative food service business, and practice of food ordering and food delivery in South Korea. The proposed application programming interface offered a result to these issues. The API was a technological structure for eatery business owners, and it gave them a choices and alternative in reaching out to customers. The strategy offered clients multiple ways to order food and have it delivered in best time.

Shakirat et al [12] developed an online food ordering and diet monitoring system than can be of better use at higher institutions, for instance, university of Ilorin, Kwara State University. This streamlined and actuated food ordering frame intended to help business routine in terms accessibility and management.

Karan et al[5] presented an online food ordering management system which simplified the ordering process. The proposed result presented a user interface and features that handled several activities, hence making it easy for customers to place their orders. Customer made their orders simply by adjusting the quantity of the food item. The confirmed order was put on a queue, and update both on the database and the admin panel, all at real-time.

Warlina and Noersidik [15] developed a web- grounded ordering operation that enabled guests to place an order food in eatery. Their exploration used direct observation to observation in the field of the ordering procedure at the eatery, the interview system was carried out to the client, and data collected through exploration related to the ordering system and manufacturing information systems. Through exploration styles can be created a system of web- grounded food ordering information to be applied in the cafeteria and know the guests' perception of the web- grounded ordering system. Web- grounded ordering operation is handy for guests ordering food without having to line over.

Maimun et al [8] in “Development of Information Systems Management of Food Order in Web-Based Patients in Hospital Nutrition Installations” discovered that quality nutrition services at the hospital will helps speed up the patient's healing process, which means also shortening the length of hospitalization days so as to save on medical costs. The nutrition installation is in charge of receiving patient order data, recapitulating it, and then making recapitulation results based on the order data. This creates a problem because the use of paper to record patient data in each room is of course too much, not to mention the distance between the room and the nutrition office which is far away and the data recapitulation process takes a long time. Based on these problems, a desktop-based food ordering application was created which can be an alternative for nurses and nutrition workers in ordering patient food every day. The general objective of their research is to develop a web-based information system in the hospital. The type of research carried out include the Mix Method, which is a research model that is simultaneously practicing and theorizing, or combining theory as well as implementing

practice. Qualitative research is used to design SI food ordering inpatients. While quantitative research is used to evaluate SI and quality of information using the waterfall method. The method used in this research is a water-fall. The application is made using the Visual Basic programming language. Net Database and SQLS server. The results of their study are an application that features food ordering, order recapitulation, changing the application background, and setting database connections. The results of the questionnaire conducted show that the system is feasible to use with an average of 76% Interpretation Percentage. Suggestions for research, monitoring and evaluation of the system can be carried out periodically, so that problems and obstacles in the system can be immediately known and resolved and system testing is needed based on user acceptance of the new information system.

3. DESIGN METHODOLOGY ADOPTED

The methodology adopted in the analysis and design of the proposed system is Dynamic Systems Development Model Methodology (DSDM) which encompasses both logical and physical design. The Dynamic Systems Development Model was developed in the U.K. in the mid-1990s. It is the evolution of rapid application development (RAD) practices. DSDM boasts the best-supported training and documentation of any of the agile software development techniques. DSDM adopts the philosophy that nothing is built perfectly the first time and looks to software development as an exploratory endeavor.

3.1 Proposed System Architecture

System architecture is the conceptual model that defines the structure, behaviour, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviours of the system it buttress the exchange of information within the cloud systems which is organized in such a way to function together as a system. The database server connect to the internet, this makes the entire system accessible to all at any given time.

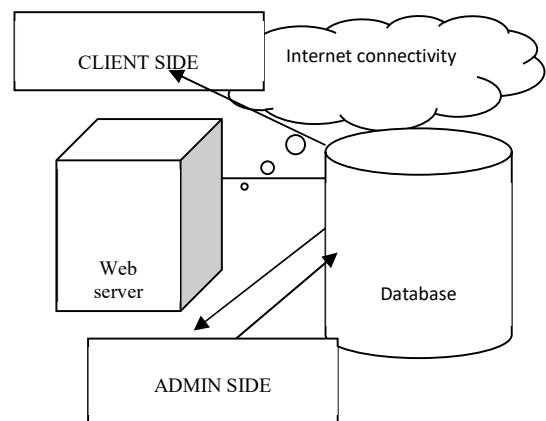


Fig. 1. System Architecture

3.2 Database Design

In this section, the basic structure of the tables 1 and 2 composing the database for the project are shown along with information about primary and foreign keys.

Table 1: Users

Field	Type	Null	Key	Default	Extra
user_id	Int (10)	NO	PRI	NULL	
first_name	Varchar (50)	YES		NULL	
last_name	Varchar (50)	YES		NULL	
email	Varchar (50)	YES		NULL	
Pass word	Varchar (50)	YES		NULL	
role	Varchar (50)	YES		NULL	

Table 2: Menu

Field	Type	Null	Key	Default	Extra
menu_id	Int (10)	NO	PRI	NULL	
menu_name	Varchar (50)	YES		NULL	
Menu_description	Varchar (50)	YES		NULL	
Menu_price	Varchar (50)	YES		NULL	
No_of_pers ons	Varchar (50)	YES		NULL	
Date	Varchar (50)	YES		NULL	
Time	Varchar (50)	YES		NULL	

3.3 System Flow Chart

This is a graphical representation of the sequence of operations in an information system or program. Information system flowcharts show how data flows from source documents through the computer to final distribution to users. The following figures are the system flow chart for our system.

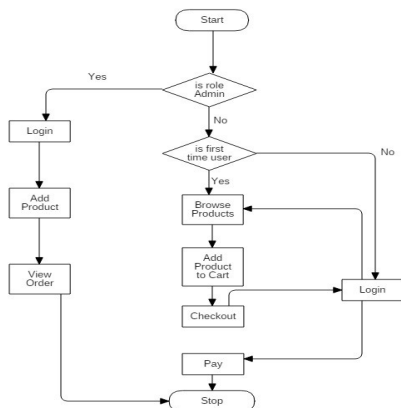


Fig. 2. System Flow Chart

4. IMPLEMENTATION

System implementation centers on migrating the developed system from test environment to production environment. Application usage occurs in the software life cycle covers other tasks such as:

- 1) System Specifications
- 2) Web hosting procedure for web application
- 3) Detailed documentation

The section discusses all these sub activates within implementation phase

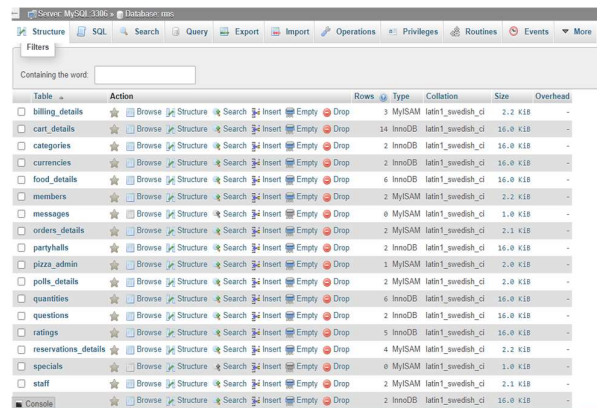


Fig. 3. MYSQL System Database

4.1 Interfaces of the Design

The home page as shown in fig. 4, is the landing page of the application (user interface), this interface comes with a register and login form display through which users can sign-in for new customers or login and navigate to other modules or use the application.

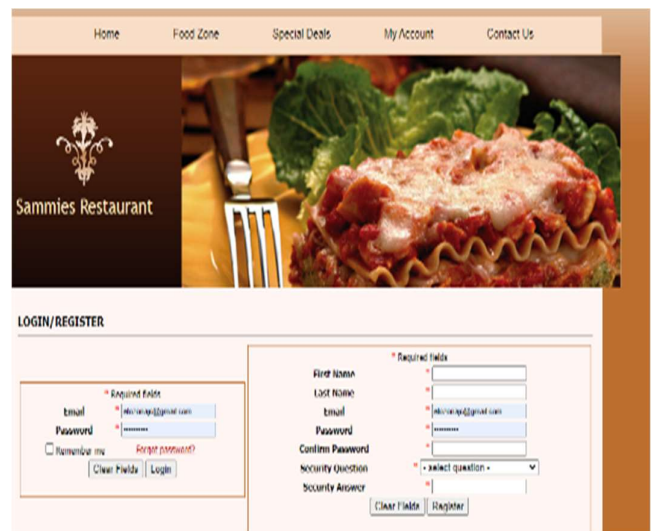


Fig. 4. System Homepage

Fig. 5 shows the shopping cart where customers can order food. Here, the ordering details presented to the customer in a sensible way for confirmation.

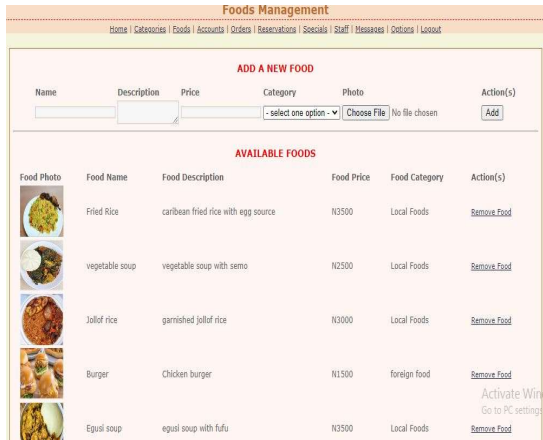


Fig. 5. Shopping Cart

Fig. 6 shows the admin page where the customer’s detail is displayed to the admin including the orders by the customer. Admin can also add or remove items and manage other activities in the restaurant from this page.



Fig. 6. Admin page

Fig. 7 shows the type of foods, price and also the description of each food available in the restaurant. Customers can view and add food to their cart from this page.



Fig. 7. List of foods

Fig. 8 shows the number of persons that are registered with the restaurant which includes their username, first and last name.

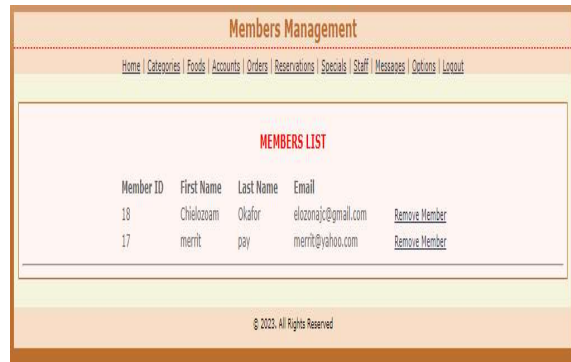


Fig. 8. List of registered members

Fig. 9 shows the details of employees which includes their username, first and last name. This feature allowed for allocation of orders and reservation to staff.



Fig. 9. List of Staffs

Fig. 10 shows a form where customers have to add their delivery address where the food will be delivery to them.

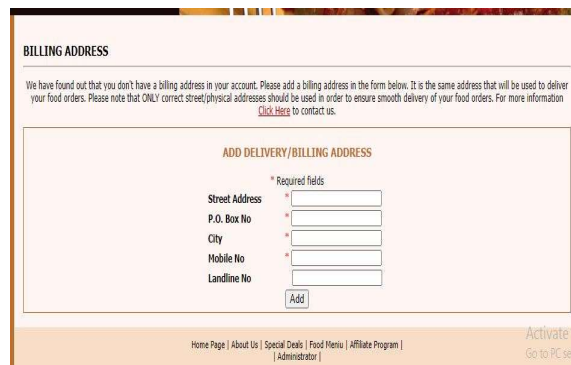


Fig. 10. Delivery address

4.2 Result Analysis

While the HashMicro system was limited to running only on Macintosh computers on a LAN, and did not offer remote access to food ordering capabilities. The web-based integrated restaurant management system, has proven to be a more cost-effective and scalable solution for Sammies Fast-Food. It maintained features that allow users gain access to the application such as the shopping cart; which creates the platform for the pacing orders and make payments. The admin rights gives the administrator the privilege of managing the activities of the restaurant. All available meals were also



maintained in the food list page, and the information could be updated depending on the meals available at every given moment. Staffing was also maintained on the staff management page, where orders and reservation were easily allocated to staff. Address of customers are maintained on the billing page, to aid home delivery of orders. All features put together have produced a robust application to optimally manage restaurant operations. This application has reduced long queues, and improved customer relationship.

5. CONCLUSION

The web-based restaurant management information system is an integrated system developed for a local restaurant, currently running on HashMicro system. The proposed system adopted the HTML, PHP and MySQL to develop an interactive and portable restaurant management system that makes it easier for stakeholders to control every report on the restaurant business operations. This restaurant management information system offers a web-based food ordering system with POS, cashier, kitchen, tables that can be adjusted to meet the requirements of restaurant businesses to increase inventory positions, increase profits, and better customer service by optimizing workforce needs and reduce operating costs.

5.1 Recommendation

After the full implementation of the system, it is therefore recommended that;

1. Restaurants, fast foods and cafeterias in teaching hospitals should adopt the system.
2. Restaurants staffs, waiters, chefs, and cashiers should be trained on how to use the system.
3. The system can be hosted online on a Tomcat server, so that all users can access it from their respective locations (details of this can be found in chapter four).
4. Install Secure Socket Layer on the domain that hosts the application to ensure secure data exchange.
5. Hardware and software necessary to deploy the system should be put in place.

6. REFERENCES

- [1] Ann J. G., Danielle J. A. and Wansu L. (2018), Android Application In Food Ordering System. *ARPN Journal of Engineering and Applied Sciences*, 13(12).
- [2] Arnelyn M. T. (2021), Converging Digital Technologies Using Api: Expanding The Landscape Of Food ordering And Delivery In South Korea. *International Journal of Future Generation Communication and Networking*, 14(1), 37-44. <http://dx.doi.org/10.33832/ijfgcn.2021.14.1.04>.
- [3] Fanny D., C., Hilda G. and Jurike V. M. (2020), "Food Ordering Application in Restaurant Using Loyalty Program Based on Android", *IJNMT*, 7(1).
- [4] Gan, C.C. (2002). Online Fast Food Restaurant Ordering Systems.
- [5] Karan D. Mayuresh P. (2021), Online Food Ordering Management System. *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, 9(8).
- [6] Kasavana, Michael L. (2002). eMarketing: Restaurant websites that click. *Journal of Hospitality & Leisure Marketing* 9 (3/4): 161-78.
- [7] Kimes, S. E. (2008). The role of technology in restaurant revenue management. *Cornell Hospitality Quarterly*, 49(3), 297-309.
- [8] Maimun B., Apoina K., Ratih S. W. (2020), Development of Information Systems Management of Food Order in Web-Based Patients in Hospital Nutrition Installations, *International Journal of English Literature and Social Sciences*, 5(6).
- [9] Nambisan S., Baron R. A. (2009). Virtual customer environments: testing a model of voluntary participation in value co-creation activities. *Journal of product innovation management*, 26(4), 388-406.
- [10] Nazmun N., Humaira A. J. R. (2016), "Online Restaurant Management System", Department Of Computer Science & Engineering, Stamford University Bangladesh.
- [11] Pantelidis I. S. (2010). Electronic meal experience: A content analysis of online restaurant comments. *Cornell Hospitality Quarterly*.
- [12] Shakirat O. Haroon-S. and Abdulfatah A. T. (2020), E-Food Ordering And Diet Monitoring System,
- [13] Stringam B. B., Gerdes Jr J. (2010). An analysis of word-of-mouth ratings and guest comments of online hotel distribution sites. *Journal of Hospitality Marketing & Management*, 19(7), 773-796.
- [14] Tofik A., Muhammad D. F., Muhammad T. N. (2015), A Geographical Information System of a Web-Based Food Delivery Services. *International Journal on Informatics for Development*, 4(2), 12-17
- [15] Warlina L and Noersidik S M (2018), Designing Web-based Food Ordering Information System in Restaurant, *IOP Conf. Series: Materials Science and Engineering* 407, 012029 doi:10.1088/1757-899X/407/1/012029.
- [16] Yang, Z., Fang, X. (2004). Online service quality dimensions and their relationships with satisfaction: A content analysis of customer reviews of securities brokerage services. *International Journal of Service Industry Management*, 15(3), 302-326.
- [17] Ye, Q., Law, R., Gu, B., Chen, W. (2011). The influence of user-generated content on traveler behavior: An empirical investigation on the effects of e-word-of-mouth to hotel online bookings. *Computers in Human Behavior*, 27(2), 634-639.
- [18] Yoo, K. H., Sigala, M., Gretzel, U. (2016). Exploring TripAdvisor. In *Open Tourism*. Springer Berlin Heidelberg, 239-255.
- [19] Dorr, J. A. (1985). U.S. Patent No. 4,530,067. Washington, DC: U.S. Patent and Trademark Office.
- [20] Coleman, J. H., Davis, I. J. C., & Morgan, R. L. (2000). U.S. Patent No. 6,088,681. Washington, DC: U.S. Patent and Trademark Office.
- [21] Livingston, J., Blink, R. P., & Lovegreen, K. J. (2004). U.S. Patent No. 6,712,278. Washington, DC: U.S. Patent and Trademark Office.



- [22] Bazzotti, C., & Garcia, E. (2006). A importância do sistema de informação gerencial na gestão empresarial para tomada de decisões. *Ciências Sociais Aplicadas em Revista*, 6(11).
- [23] Oronsky, C. R., & Chathoth, P. K. (2007). An exploratory study examining information technology adoption and implementation in full service restaurant firms. *International Journal of Hospitality Management*, 26(4), 941-956.
- [24] Kearns, G. S., & Lederer, A. L. (2003). A resource-based view of strategic IT alignment: how knowledge sharing creates competitive advantage. *Decision sciences*, 34(1), 1-29.
- [25] Utkarsh R., Shashank S. (2019), “Data Centric Smart Restaurant Management System”, *International Research Journal of Engineering and Technology (IRJET)*, 6 (7).
- [26] Khairunnisa K., “The Application of Wireless Food Ordering System”, *MASAUM Journal of Computing*, 1(2).
- [27] Hashim N. M. Z., (2013) “Smart Ordering System via Bluetooth”, *International Journal of Computer Trends and Technology (IJCTT)*, 4(7).
- [28] Wadile K. A., (2015) “E- restaurant management system using robot”, *International Journal of Informative & Futuristic Research (IJIFR)*; 2(6).
- [29] Ashwini B., (2015) “Review paper on - Design of Intelligent Restaurant with a Touch Screen Based Menu”, *IOSR Journal of Electrical and Electronics Engineering (IOSRJEEE)* e-ISSN: 2278-1676, p-ISSN: 2320-3331, 10(3).
- [30] Kiran K. R., Naresh B., (2014) “Intelligent E-Restaurant using android OS”, *International Journal of Scientific Engineering and Technology Research*; 3(22). 4383-4385.
- [31] Asan, N. B., (2014) “Zigbee-Based Smart Ordering System (S.O.S)” *International Journal of Computer Trends and Technology (IJCTT)*; 11(5).