ISSN: 3107-6513

Web-Based Integrated Restaurant Management System for Enhanced Operational Efficiency

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Abstract

This project looks at developing a restaurant management system because the current approach just isn't working. Right now, Sammies restaurant uses the Hashmicro system alongside old-school manual methods to keep track of everything. But this setup causes all sorts of problems staff waste time chasing down errors instead of actually serving customers, inventory records never seem to add up, and sales sometimes slip through the cracks. Restaurant workers rely on a computerized database to collect, process, and store information for things like product orders, but the process is clunky.To fix this, we built a new system using HTML and CSS for the user interface, with PHP and MySQL running things behind the scenes. We followed a structured approach to analyze and design the system. The new setup lets users and customers order directly from restaurants, and owners can upload daily recommendations. There's no limit to how much a customer can order, either.

General Terms : Restaurant Management System, Information Systems, Fast food.

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

1. INTRODUCTION

The shift from an industrial society to one built on information and knowledge has completely changed our daily lives—socially, economically, and culturally. In the last few years, information systems technology has become essential, shaping the way businesses operate and how the economy works. These days, companies run on technology, and computer-based information systems are at the core of almost everything.

The restaurant and fast-food industry is right in the middle of this change, especially with e-commerce shaking up traditional marketing and management. Since e-commerce came along, businesses have used the internet to cut costs, manage suppliers more easily, streamline logistics and inventory, and even get a leg up on the competition. E-commerce lets companies smooth out communication along the supply chain and offer better service, making it easier to stand out.So, what does an automated restaurant management system do? It uses information technology to help restaurants and fast-food businesses run better. Fast food, by definition, means making lots of food quickly for sale, with speedy service being the main thing customers care about. Usually, this means food that's frozen, preheated, or precooked, packed up to go, and sold in places that need to serve a lot of people fast—travelers, busy workers, that sort of crowd.

In Nigeria, many fast-food restaurants have moved online and let customers order food over the internet. Big names like Genesis, Kilimanjaro, The Promise, and Chicken Republic, even some smaller spots, all let you order online now. But Sammies—one of the most popular fast-food options—still doesn't have an online presence or food ordering. With technology moving so quickly and business operations changing, restaurants in Nigeria need smarter, more efficient systems. An online restaurant management system can cut costs and help these businesses run better.

Right now, Sammies Fast-Food in Choba uses the HashMicro management system, but it only works on Macintosh computers over a LAN. There's no way to order food remotely or access the system from outside the restaurant, which just doesn't cut it anymore. That's why we're proposing a new automated system for Sammies. This solution is more affordable, it grows as the business does, and it opens up online ordering.The main goal of this project: design and build an automated restaurant management system for Sammies Fast-Food.

2.REVIEW OF RELATED WORKS

This system tackles long queues during busy hours, speeds up food prep[4], and brings in more customers. Fast food spots can grab a bigger share of the market with it, and investors see better returns. [11] Khairunnisa and

ISSN: 3107-6513

her team introduced a wireless food ordering system using PDAs. They really dug into how the system works—its architecture, what it can do, where it falls short, and what could make it better .[12]Hashim's group pushed things forward by building a system that uses Bluetooth for communication and a Peripheral Interface Controller (PIC) as the hardware. This made the ordering process even faster .[10]Nazmun and her colleagues came up with an Online Restaurant Management System that makes life easier for customers. It gets rid of the old-fashioned queue problems and actually draws in more walk-ins than phone orders. Their setup speeds things up, keeps orders consistent, and lets customer details get entered electronically, creating a smoother way to communicate .

Ann's team launched [1] cAPPeteria—a food ordering app where customers place orders directly with specific vendors, confirm them, and pay using a barcode. It solves the headaches of unreliable internet connections and gives customers more mobility and control.

Arnelyn [2] presented a digital solution aimed at expanding food service and delivery in South Korea. Their API gives restaurant owners more ways to reach customers and more options for people to order and get their food quickly.

Shakirat's [12] group built an online food ordering and diet monitoring system, especially for universities like the University of Ilorin and Kwara State University. Their system streamlines food orders and makes management easier for campus businesses.

Karan's [5] team rolled out an online food ordering management system with a simple interface. Customers can easily adjust their order quantities, and once confirmed, orders get queued and updated in real-time for both the database and the admin dashboard.

Warlina and Noersidik [9] created a web-based ordering platform for restaurants. They spent time observing ordering routines, talking to clients, and collecting data to build a system that fits real needs. With this system, guests can order food without standing in line, and the cafeteria gets a clearer sense of how customers feel about online ordering.

Maimun [8] and her team, working on "Development of Information Systems Management of Food Order in Web-Based Patients in Hospital Nutrition Installations," found that better nutrition services help patients heal faster and cut hospital costs. The old way—using paper to track orders from different rooms—was messy and slow, especially with the distance between patient rooms and the nutrition office. To fix this, they developed a desktop-based food ordering app for nurses and nutrition staff, making daily patient meal orders smoother. Their research focused on building a web-based system for hospitals, blending theory with hands-on practice using a mixed-method approach.

Researchers used qualitative methods to design the SI food ordering system for inpatients. For evaluating the system and checking the quality of information, they turned to quantitative research and followed the waterfall method. They built the application using Visual Basic .NET and set it up with a SQL Server database. The end result? An app that lets users order food, view orders, change backgrounds, and manage database connections. When they ran a questionnaire, the system scored an average of 76% on the interpretation scale, showing it's ready for real use. They suggest regular monitoring and evaluation going forward. That way, any problems pop up on the radar quickly, and the team can fix them right away. They also say it's important to test the system based on how users actually accept and use it.

3. DESIGN METHODOLOGY ADOPTED

For analysis and design, the team went with the Dynamic Systems Development Method (DSDM). This approach covers both logical and physical design. DSDM started in the UK back in the mid-1990s, building on rapid application development (RAD) ideas. It stands out for having strong training and documentation among agile software development methods. At its core, DSDM believes you never get things perfect on the first try. The whole process is about exploring and improving as you go.

3.1 Proposed System Architecture

System architecture gives you the big picture—the conceptual model laying out how everything's structured and how it all behaves. A good architecture description organizes the system so you can really reason about how the pieces fit and work together. This matters a lot, especially in cloud systems, where smooth information exchange is key. In this setup, the database server connects to the internet, so anyone can access the whole system anytime.

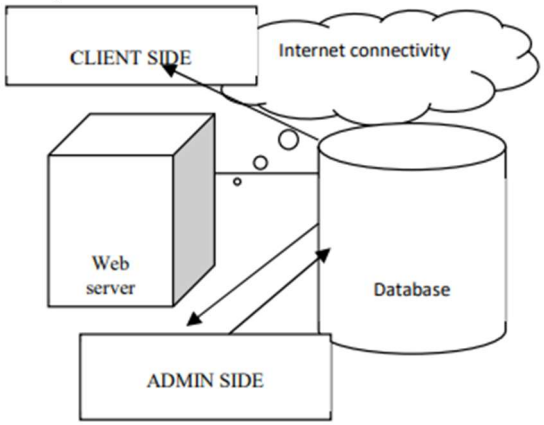

Fig. 1. System Architecture

3.2 Database Design

Here's where we lay out the basic structure for tables 1 and 2—the backbone of the project's database. We'll

ISSN: 3107-6513

show you what each table looks like and point out the primary and foreign keys that link everything together.

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_descr iption	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

Think of this as a map of how everything moves through the system. The flow chart breaks down every step: from the moment data comes in, all the way to when it reaches the user. The next figures walk you through our system's flow chart.

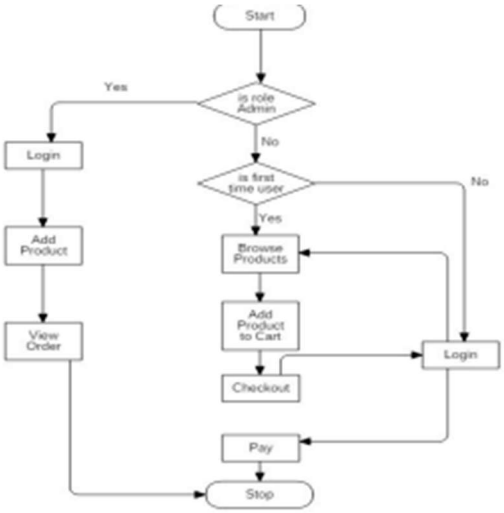

Fig. 2. System Flow Chart

4. IMPLEMENTATION

Now comes the part where we take the system out of testing and put it to work in the real world. Implementation isn't just about making things live—it also covers a few other big pieces: nailing down system specs, getting the web app hosted, and putting together all the documentation.

This section covers each of those steps during the rollout.

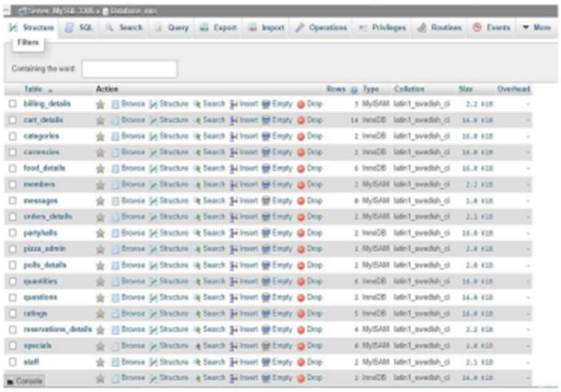

Fig. 3. MYSQL System Database

4.1 Interfaces of the Design

The home page (see fig. 4) is where users land first. It's simple: you get options to register or log in. New users can sign up, and returning users just log in to get started or head off to other parts of the application.

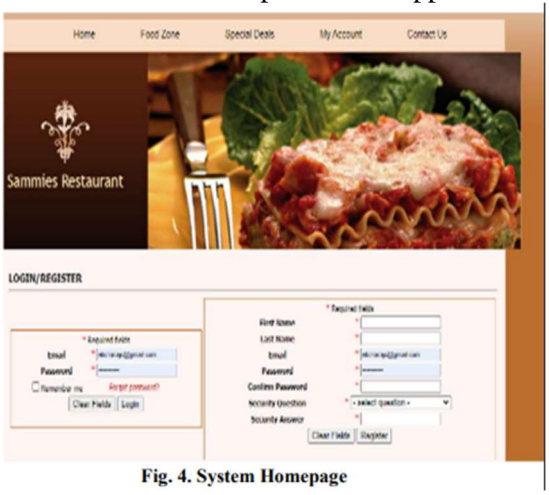

Fig. 4. System Homepage

Fig. 5 shows the shopping cart where customers place their food orders. Everything's laid out clearly, so people can double-check their order before confirming.

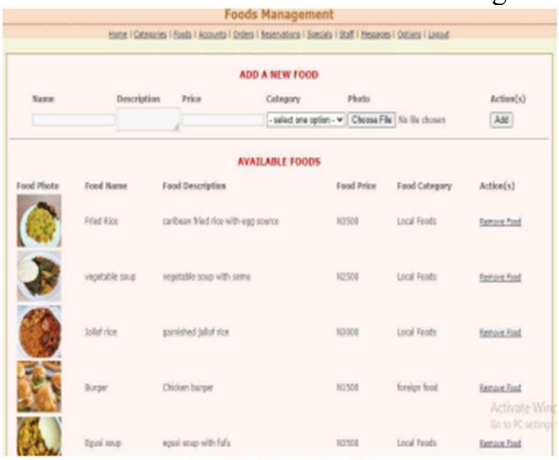

Fig. 5. Shopping Cart

ISSN: 3107-6513

Fig. 6 takes you to the admin page. Here, the admin sees all the customer details, including their orders. From this page, admins add or remove items and handle other tasks to keep the restaurant running smoothly.

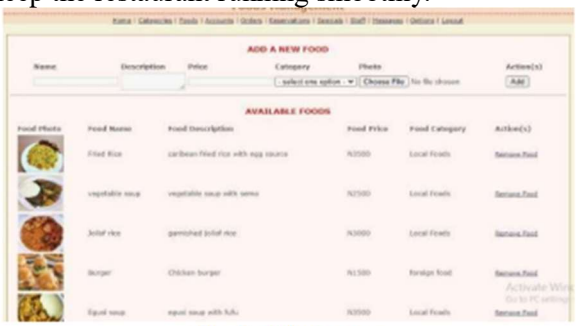

Fig. 6. Admin page

Fig. 7 lists all the foods on the menu, showing the type, price, and a short description for each one. Customers can check out what's available and add whatever they want to their cart.

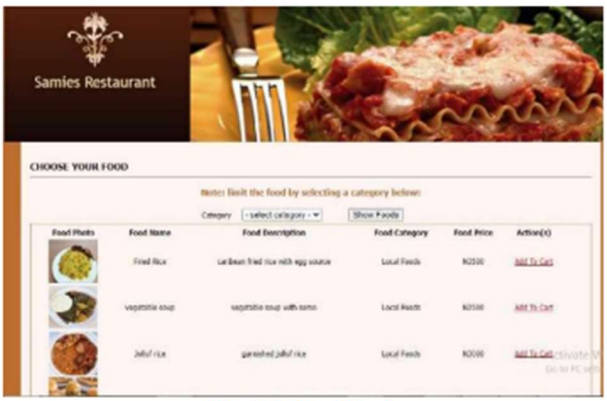

Fig. 7. List of foods

Fig. 8 displays a list of everyone registered with the restaurant, showing their username and full name.

Fig. 8. List of registered members

Fig. 9 is for staff details. You get the usernames and names of all employees. This feature helps the admin assign orders and reservations to the right staff members.

Fig. 9. List of Staffs

Fig. 10 shows the form where customers enter their delivery address, so the food gets to the right place.

Fig. 10. Delivery address

4.2 Result Analysis

The old HashMicro system only ran on Macintosh computers within a LAN, so people couldn't order food remotely. The new web-based restaurant management system works better for Sammies Fast-Food. It's cheaper, easier to scale, and lets users do everything online—like shopping, placing orders, and making payments. Admins get full control, so they can manage the restaurant's activities right from the admin page.

You can find all the available meals right on the food list page, and it's easy to update that info whenever the menu changes. Over on the staff management page, you can see who's working and quickly assign orders or reservations to different team members. Customer addresses live on the billing page, which really comes in handy for home deliveries. All these features work together to create a solid app that helps run the restaurant smoothly. It's cut down those long lines and made building better relationships with customers a whole lot easier.

5. Conclusion

This web-based restaurant management system was built for a local spot, and it's already up and running on the HashMicro platform. The team used HTML, PHP, and MySQL to pull everything together, so it's interactive and works just about anywhere. With this system, everyone involved can keep an eye on every

ISSN: **3107-6513**

aspect of the business, from the food orders and POS to the kitchen, cashier, and table setups. The system is flexible, so restaurants can tweak it to fit their needs. The end result? Better inventory management, higher profits, happier customers, and a smoother workflow that keeps costs down.

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