



BULACAN POLYTECHNIC COLLEGE
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Citang's Eatery Kiosk-Based Point-of-Sale System

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CHAPTER I

INTRODUCTION

In today's fast-paced, technology-driven world, manual ordering processes are gradually being replaced by digital Kiosk-Based Point-of-Sale (POS) systems in many restaurants and establishments. This change has several benefits such as improving customer satisfaction, operational effectiveness, and maintaining data accuracy. Establishments that failed to adapt to this change lag behind their peers in performance and service quality.

The food industry is highly competitive, and many large organizations prefer computerized processes for ordering due to their significant performance advantages over traditional methods. The main disadvantage of the manual ordering process is its inefficiency in busy restaurant environments where data integrity is hard to maintain while keeping customers satisfied. A Kiosk-Based POS System precisely demonstrates the superior capability of technology that surpasses human performance.

Project Context

This study aims to explore the use of modern technology and taking advantage of it in an attempt to simplify the process of ordering, sales report making, and staff management in Citang's Eatery. The Citang's Kiosk-Based POS System interface allows the users to familiarize themselves with the system in a short period of time with its simplified user interface and functionalities. This encourages the customer to use the Kiosk and also aids the staff in their work.



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At Citang's Eatery, even trained staff struggle to maintain service standards during peak hours when customers line up to order. Using a kiosk can greatly reduce the pressure on cashiers from the large number of customers. The kiosk, being a self-serve system, can handle some of the workload, such as receiving orders from customers or product queries, by showing customers the list of items the Citang's Eatery can offer along with their price. This, in turn, reduces the wait time for customers and helps them avoid potential hassles.

The system also has a POS that offers a variety of functions that serves a crucial role in operation of the eatery that can greatly benefit both staff and admin. Cahiers can use the system to input customer orders by just tapping the screen, letting the system process the stream of ordered items inside it, ensuring data accuracy. In addition, it enables the owner/admin to oversee staff activity, such as tracking system accounts or log data. The system also generates reports of the sales, providing insight for decision making like lowering the production of such items because it's unpopular or identifying trending products.

This study introduces a positive transformation to the operations of Citang's Eatery by providing a user-friendly platform for data reports management, transaction processing, and a kiosk to replace the conventional ordering practice of Citang's Eatery. With the implementation of the system, there will be less human error and it will increase convenience. The Citang's Kiosk-Based POS System is a response to the competitive food industry and a preparation for the ever-growing era of technology.



Overall, this study aims to develop a kiosk with POS order taking, account management, reports generation, and transaction process that will help Citang's Eatery to gain an edge and become a leading restaurant that represents innovation in the food industry.

Purpose and Description

Status of the Current System

Citang's Eatery is a well-renowned eatery in the area where it stood. It is a long-running store that boasts a difference in the quality of the food it serves. Currently, Citang's Eatery still follows the traditional way of ordering where customers wait in line and can only state their orders when they interact with the cashier. This method often takes a long time, making the customers uneasy by the inconvenience and the staff susceptible to errors.

Replacing the Current System

The implementation of this study aims to digitize the conventional ordering processes by providing customers with a kiosk and the staff with a POS system. Once deployed, the wait times and inconvenience that the customers experience will be decreased by providing a self-serving kiosk where they can directly put their orders. This study also offers a POS system where they can directly input orders, improving the service quality and performance of staff. Both interfaces for customers and staff are designed to enhance efficiency and usability, tailored to be straightforward and simple to navigate.



Objective

The main objective of the system is to create and implement a Kiosk-Based Point-of-Sale (POS) system for Citang's menu that simplifies and automates the process, guarantees successful order management, and facilitates seamless connection with backend operations in a way that is both user-friendly and efficient.

1. **To Improved Customer Experience** - Offer a simple, easy-to-use interface so that clients may peruse the menu, personalize orders, and finish transactions on their own and reduce wait times by allowing customers to place orders self-service.
2. **To Enhanced Operational Efficiency** - Automating typical order-taking procedures can help reduce worker workload. Increase overall service accuracy and speed to raise client satisfaction.
3. **To Assist Data-Driven Insights** - Create sales reports to help Citang's in seeing patterns and making wise business choices and track of consumer preferences for upcoming menu changes and advertising campaigns.

Statement of the Problem

This research desires to solve problems pointing to “the challenges or issues that the staff are facing,” “the gaps in compliance that customers go through,” “the tools available to business owners to effectively manage the operation of the eatery.”



Specific Problems:

- Data accuracy and organization
- Service limitations
- Staff access and permission control
- Sales and employee tracking
- Traditional ordering delays

Scope and Limitations of the Study

The scope of this study encompasses the design, implementation, and functionality of a kiosk-based Point-of-Sale (POS) system tailored to Citang's menu. The study focuses on:

The development of a kiosk-based POS system represents a forward-thinking approach to improving order management, operations, and customer satisfaction. By combining a user-friendly interface, automation, and backend integration with flexible payment options and self-service functionality, this system addresses the evolving needs of businesses and customers alike. While challenges such as initial user adaptation may arise, the benefits of enhanced efficiency, accuracy, and customer empowerment make this a valuable investment for the future.

The design and functionality of the kiosk system are included in the study's scope, with an emphasis on its obvious user possibility for integration and interface.



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The project's primary features are real-time inventory management and sales tracking updates as well as support for a wide range of payment options, such as digital, card, and cash.

Although the system's features can greatly improve the company's management, there are still things the system features are limited to do:

Even with a simple design, kiosks might be difficult for customers to use. Customers who are older, less tech-savvy, or unconfident with digital tools may find it difficult to use menus, customize orders, or finish payments. Technical difficulties or special demands may also make things more difficult, frustrating users and detracting from the smooth experience that these systems are supposed to offer.

The requirement for expert assistance is an additional restriction. Even if self-service kiosks lessen the need for staff, certain users could still need help. Additionally, during busy periods, to deal with technological issues, or to fulfill particular requests, staff assistance could be required.

Significance of the Study

This kind of study on Kiosk and POS systems offers crucial insights into enhancing operational effectiveness for those working in the foodservice sector. The result can influence and establish a benchmark for customer service and internal restaurant operations. The completion of Citang's Kiosk-Based POS System benefits the following stakeholders:



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Citang's Eatery - The implementation of Kiosk-Based POS System reduces inaccuracies and delays experienced in the non-computerized stages of ordering. By providing a platform for ordering, transaction processing, and employee management Citang's Eatery can focus on the operational works of the business.

Admin - The admin can strategically update menu, prices, and add promos that are currently ongoing. The system also allows the admin to monitor employees performance and analyze sales reports generated by the system leading to better decisions for the eatery.

Staffs - The POS system speeds up the process of product inputting and guarantees the accuracy of inputted data with minimal effort exerted. The user-friendly design that the system has allows staff to quickly learn how to navigate the system.

Customers - Customers won't have to wait in line and can directly order in the kiosk while keeping customization of the items they want. This is specifically helpful for customers who want to keep human interaction as little as possible—improving the service experience for different kinds of customers.

Future Researchers - The study not only is suitable in addressing current problems but can also be used as a reference by future researchers. Researchers can directly omit some of the unnecessary steps and directly start a study relating to the Kiosks and POS systems and in turn build a more fool-proof solution for similar studies.



CHAPTER II

REVIEW OF RELATED STUDIES AND TECHNICAL BACKGROUND

In this part, the researchers introduce a diverse compilation of local and other similar literature found across the globe to better assess the gaps or findings that might not be included in either local or foreign studies. This serves as a guide in addressing gaps that need exploration in similar fields. The functionalities of Citang's Kiosk-Based POS System and the tools used to realize the system are also included here.

Foreign Studies

Measuring the Service Quality, Customer Satisfaction, and Customer Loyalty of Selected Fast-Food Restaurants during the COVID-19 Pandemic

According to Villanueva et al.(2023) Returning customers, sometimes referred to as loyal consumers, are clients who feel an emotional connection to your business and are prepared to pick you over your rivals. Customer satisfaction and service quality have a substantial correlation, according to additional research findings, customer happiness and loyalty are significantly correlated with service quality.

According to Davahli et al. (2020) Restaurants must make every effort to better understand and serve customers in the short term while also being fully prepared for the long-term growth of customer demand because customers' needs for great food, a welcoming environment, and high-quality service have never completely disappeared.



A Study on the Effect of Self-Service Technology Environment on the Kiosk Usage Intention of Individuals in COVID-19 Using LGM and SEM

According to Khalufi and Shah (2021) published research, self-service kiosks are not merely a stopgap measure but are instead becoming a crucial component of service delivery models across a range of industries. The revolutionary significance of self-service technology in business and marketing during the pandemic was examined by, who contended that these technologies will continue to develop and grow, requiring more study into their long-term effects. In order to comprehend SSK usage intentions, um, Koo, and Chung (2020) additionally investigated the application of structural equation modeling (SEM) and latent growth modeling (LGM), offering a methodological foundation for next studies on technology adoption in times of crisis.

Determining the Optimal Mode of Ordering in McDonald's Between Kiosk Machines and Traditional Cashiers Using Analytical Hierarchy Process (AHP)

According to Shin and Kang (2020) It is possible to view innovations like self-service technology as a risk-reduction tactic that will aid the service industry in recovering from the losses incurred during the epidemic. Furthermore, because self-service technologies require less human interaction and give customers specific transaction options based on their estimated health risks, the researchers indicated that they may have a greater impact on the restaurant industry's future.



Local Studies

Feasibility study of a food kiosk at university belt of Iloilo Science and Technology University

According to Guirgena and Habunal, (2020) It is a more cautious strategy for breaking into the food industry than going straight up against the larger and more well-known food businesses. Just so you know, even large fast-food chains are increasingly adopting food kiosks as part of their product promotion plan to reach out to customers that their permanent locations are unable to accommodate.

The food kiosk industry is well-liked by people of all ages, from all socioeconomic situations. It is the most popular small business to launch in the Philippines, and most aspiring entrepreneurs choose it. However, there are a lot of rivals because it is simple to enter the food kiosk industry. Therefore, the owner should ensure that his kiosk has a focus concept and a distinctive business strategy in order to succeed and achieve sustainability in this field. To get repeat business, it's also critical to offer high-quality products at competitive prices.

Customer Satisfaction on Jollibee's Self Ordering Kiosk Over Traditional Ordering System

According to Gyaan, (2020) Customers now find self-ordering kiosks more practical and convenient than traditional ordering systems. Because of COVID-19 restaurants, fast food businesses are able to provide us with as many ordering options as possible, enabling each client to place their order however it is most convenient for them.

Citang's Kiosk-Based Point-of-Sale System - ACT 2A - AY. 2024-2025

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Due to technology and restaurant automation, the way restaurants run and function is changing quickly. Self-ordering kiosks that are connected to the restaurant's point-of-sale system are quickly gaining popularity and transforming the way that customers place orders in busy quick-service restaurants.

Integrating Voice Assistant System to Philippine Fast-food Order Kiosk

According to Wu et al. (2020) However, a study discovered that human service is more comfortable and convenient for older people than self-ordering machines, and that when a self-ordering kiosk is the sole option, both older and younger customers regard it to be equally comfortable and convenient. This research could aid in enhancing the current technology-based self-service systems to better meet the needs of fast-food restaurants and customers.

Technical Background of the Project

The Citang's Kiosk-Based POS System aims to simplify the old process of ordering and improve customer experience and staff workload. The system ignores all the unnecessary steps of Citang's manual operation and provides functions related to order management and transaction processing. The study offers a kiosk for self ordering and a POS system to streamline operations such as order taking, sales report generation, and employee management.



Technical Background of the System

The Citang's Kiosk-Based POS System allows the customers to directly place orders and the staff to easily process transactions. In this project, the following list are tools that are used in the development of the system:

C# Language (Visual Studio - Windows Form Application)

C# language was used in this project to create the system itself within a windows form application. It is a widely used language in the professional industry with its expansive library for making robust systems, data management and connection, and interactive forms. It has ready made tools such as Buttons, Data Grid View, Picture Box, and many similar tools.

The C# Windows form applications provided the researchers with efficiency and ease. It was used in the latter part of the development of the system by comparing with the prototype ui design created from other platforms. The transition from a mockup user interface to the system itself was smooth sailing because of the chosen language.

Overall, C# was chosen to provide scalability for the project in case an upgrade is needed and also for the ease of maintenance. C# is also compatible for the creation of the high-performing systems catered for Citang's Eatery



Canva

Canva is a well known multifunctional designing platform known for its easy to use tools. It is usually used when making media for presentations, poster design, logo making, and other projects of similar content. It can easily be used by both professional and casual users boasting a reputation in its easy to use functionalities.

Aside from the wide expanse of designing tools, icons, and graphics, Canva also has a real-time collaborative function where multiple users can edit one project simultaneously helping with the efficiency of the project. The projects can also be saved in various formats including Scalable Vector Graphic or .svg, allowing the content to be converted into a usable format for Figma.

In this study, Canva was used for the creation of the prototype ui design of Citang's Kiosk-Based POS System. The system was successfully visualized and decorated with designs from the wide range of selections of tools that Canva provided. Canva played a huge part in achieving the consistent element quality included in the system and helping the designer to make a user-friendly interface.



Figma

Figma is commonly used for user interface prototyping and its collaborative use. Figma allows multiple users to view the overall situation of the connected pages providing an insight of the system's flow. It's mostly used for professional projects that require a swift result.

In this project, Figma was used as a means to connect an interactive hyperlink between buttons of different pages. It ensures that the prototype interface will provide testers a smooth navigation experience. The researcher's could also view the process of the project simultaneously with its similar collaborative function.

Reference

Villanueva, M. C. C., Alejandro, A. F., & Ga-an, M. L. L. P. (2023). Measuring the Service Quality, Customer Satisfaction, and Customer Loyalty of Selected Fast-Food Restaurants during the COVID-19 Pandemic. *Open Journal of Business and Management*, 11(3), 1181–1207. <https://doi.org/10.4236/ojbm.2023.113066>

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CHAPTER III

METHODOLOGY OF THE STUDY

This chapter describes the methods and procedure for conducting the research project. It discusses the instruments, design, and procedure.

Design and Development

Research Design (Qualitative/Quantitative/Mixed Method)

The study uses descriptive and developmental research methods to address the possible problems of Citang's Eatery. With its descriptive approach, the research aims to understand and analyze existing issues, such as inefficiencies in the manual ordering process, staff workload, and customer dissatisfaction. Utilizing developmental methods, the study focuses on designing, developing, and evaluating a kiosk-based Point-of-Sale (POS) system.

Manual System Framework

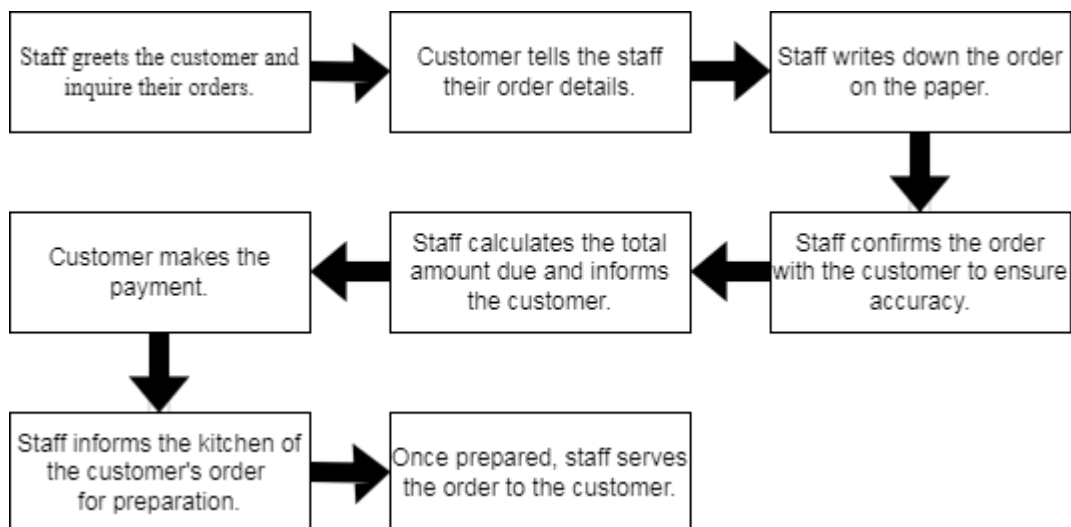




Figure 1. Theoretical Framework of the Current Process

The figure above shows the traditional method of Citang's Eatery where Staff had to oversee all the ordering process from taking orders to delivering the food. It shows the solid difference between a normal process with a process that has a system's assistance.

Conceptual Framework

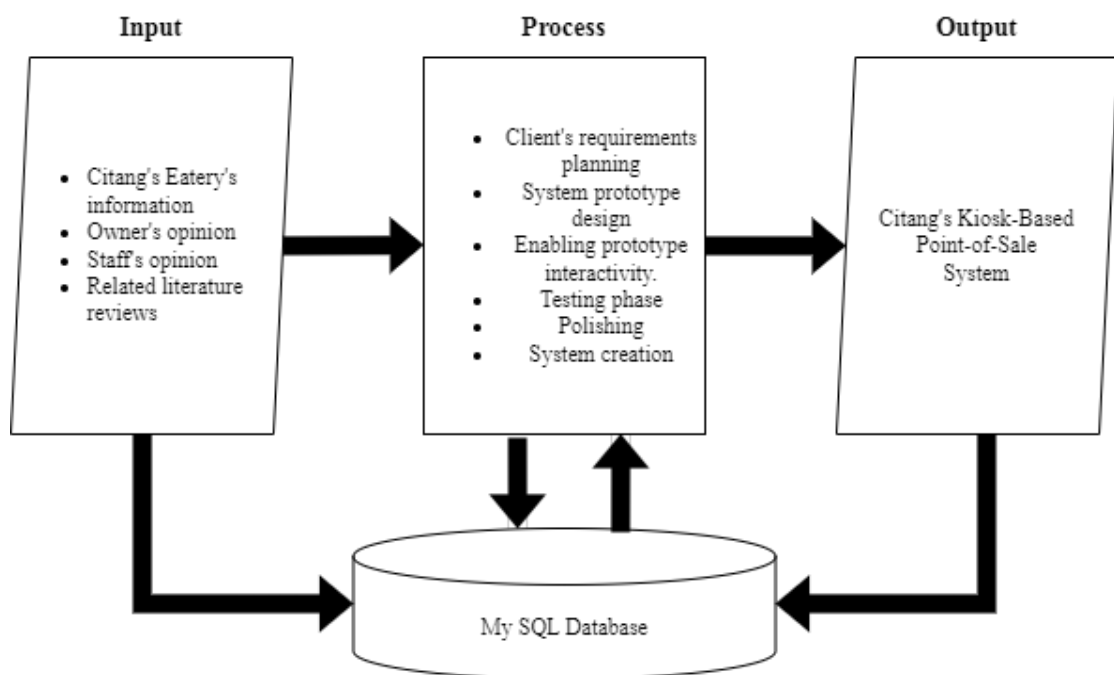


Figure 2. Conceptual Framework of the Proposed System

This figure shows the structured process that the researchers had conducted in order to find and analyze the said problem that the clients are currently facing. It includes steps from input, then processing, and the output.



Relational Model

Relational Model is a structured framework that represents the types and attributes of data included in the system's database. It allows the data to be organized and secures its accuracy and integrity.

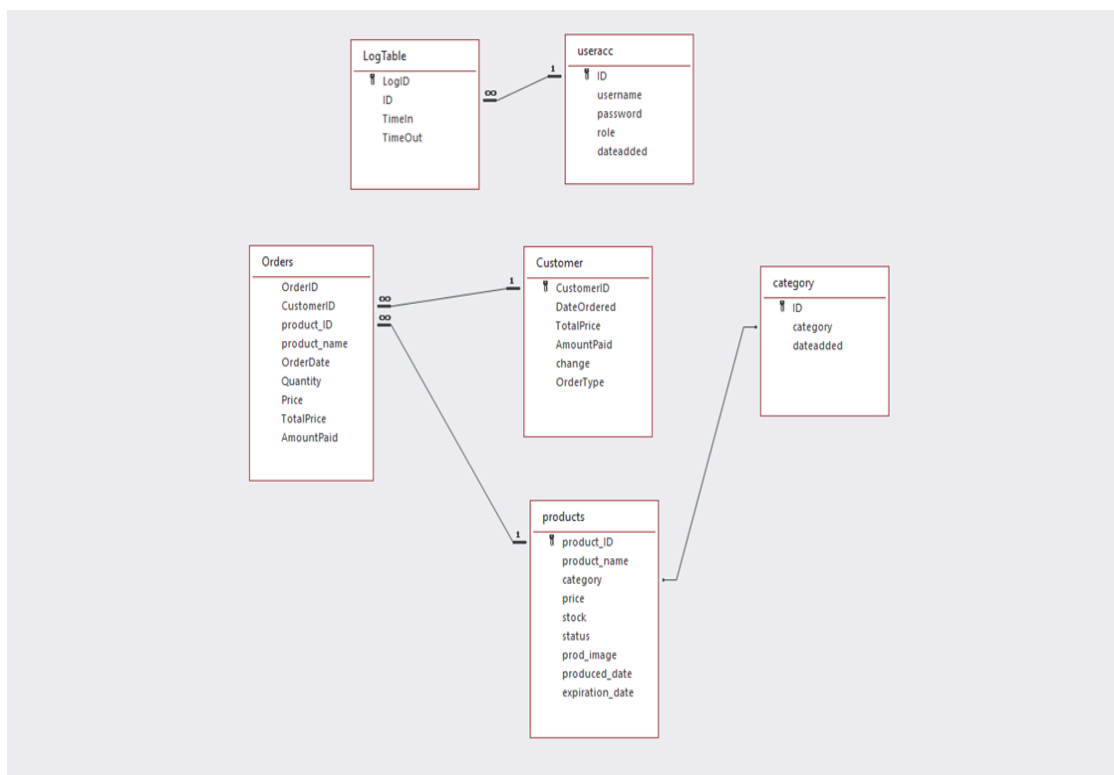


Figure 3. Relational Model

Figure 3 illustrates each of the table's name and all of its fields, showcasing the relationships between them. Each field represents the type of data that will be recorded in it, this guarantees the consistency of data.



Data Flow Diagram

Data Flow Diagram is an illustration of the flow of data within the system alongside the database, end users, and procedures. It shows what kind of data enters the system and how it flows until recorded in the database. It is an essential tool to analyse and understand the system.

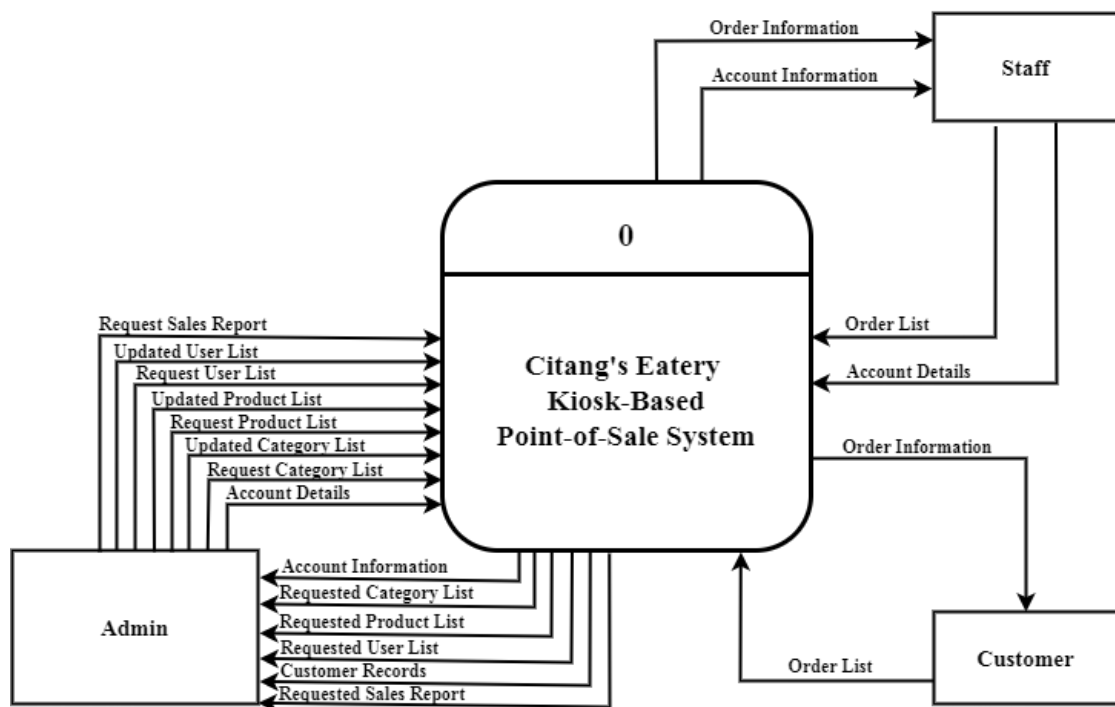


Figure 4. Context Diagram (Level 0 DFD)

Figure 4 provides the overall view of the data that enters and leaves the system. It shows the interaction of the data with the system and end users such as the admin, staff, and customer.

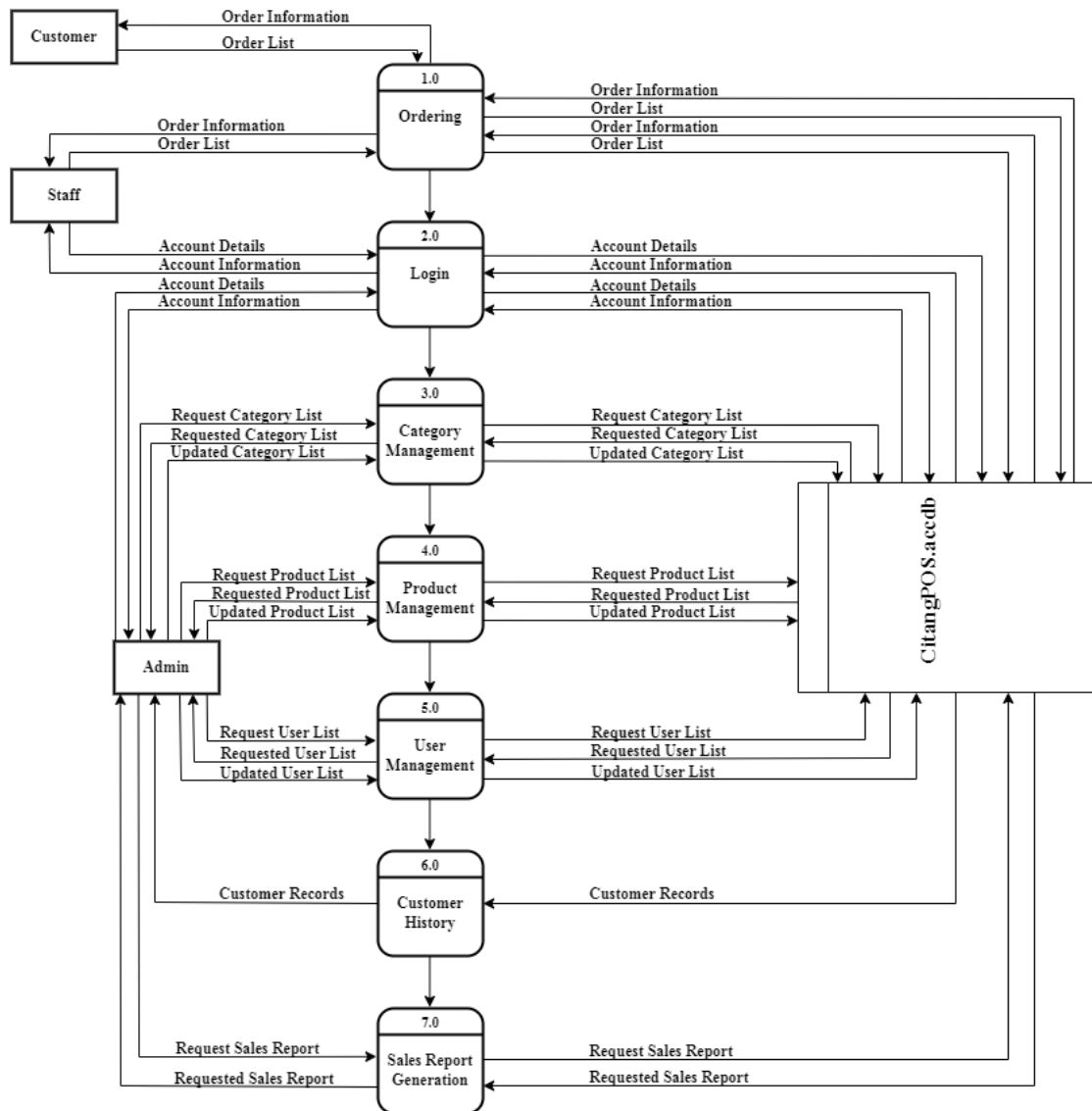


Figure 5. Level 1 Data Flow Diagram

Figure 5 is very much like Figure 4 but it breaks down a single process into multiple sub-processes. Figure 5 shows a more detailed view of the system's internal process and how these data are transferred inside and out.



Flow Chart

A flowchart is a diagram that represents the workflow of the proposed system. It uses symbols and shapes that have specific functions and an arrow that represents how these shapes and symbols flow. Flowchart helps determine inefficiencies and improvements.

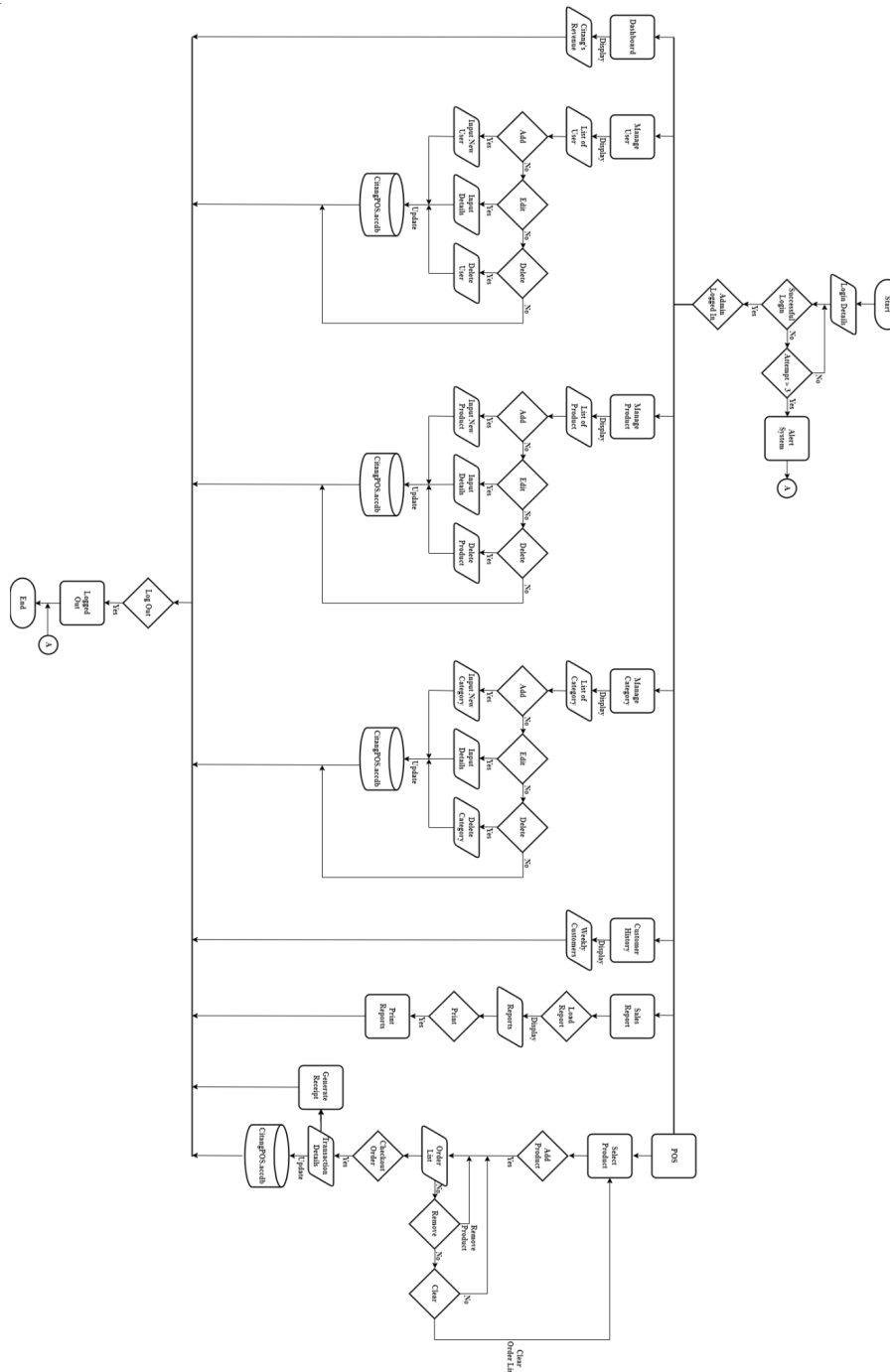




Figure 6. Flow Chart

Figure 6 presents the flow of the process of the system in sequential manner, ensuring that when presented, the client can understand how the system works. It is very helpful to present before the client tests the proposed system.

Visual Table Of Contents

A Visual Table of Contents (VTOC) is a graphical representation that outlines the content of the system. It helps with understanding of the system by providing a visual in a hierarchical manner.

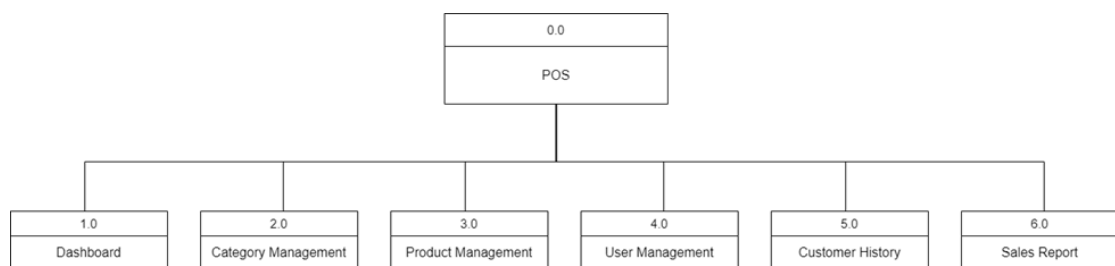


Figure 7. Menu

Figure 7 shows the main features of the proposed system that the client can expect. The Menu includes Dashboard, Category Management, Product Management, User Management, Customer History, and Sales Report.

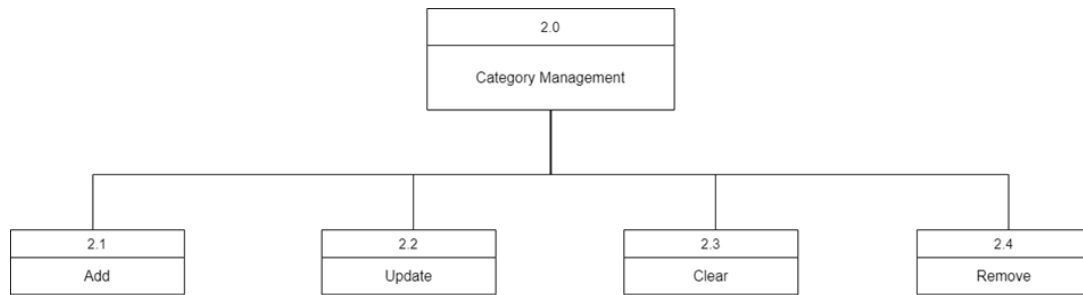


Figure 8. Category Management

Figure 8 is where the management of food categories in Citang's Eatery happens. The admin can add, update, and remove a certain food category.

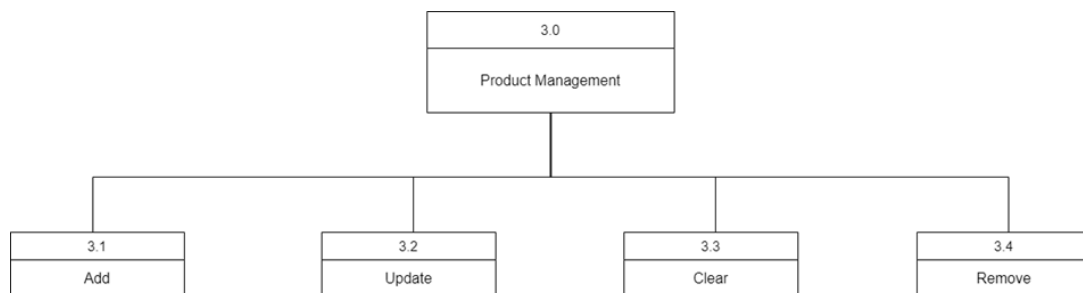


Figure 9. Product Management

Figure 9 is where the management of products in Citang's Eatery happens. The admin can add, update, and remove a certain product.

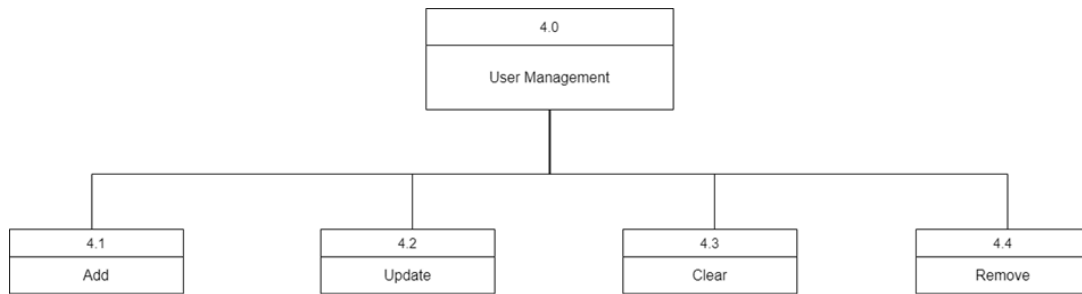


Figure 10. User Management

Figure 10 is where the admin can manage the employees by adding, updating, and removing accounts. This is also where the admin can assign the user's role such as staff or admin to guarantee that a certain employee can only access certain parts of the system.

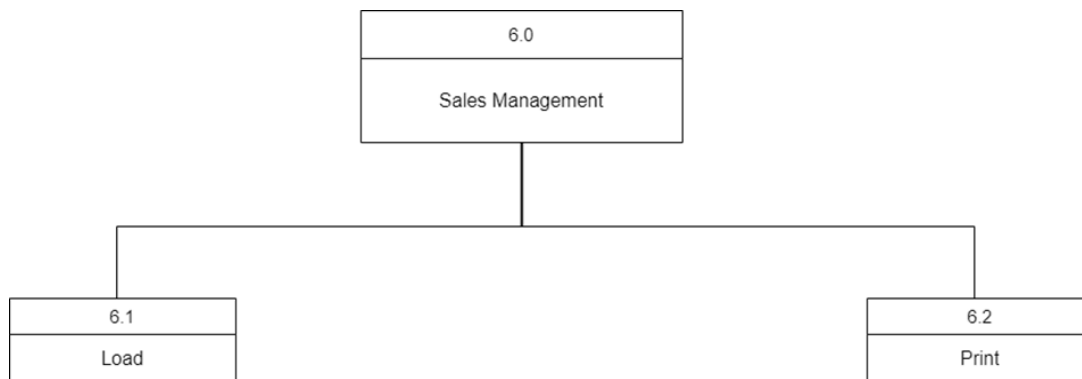


Figure 10. Sales Management

Figure 10 is where the admin can view the sales report and also decide whether to print the report or not. It's easy to understand with minimal procedures.