



Original Research Paper

SMART POS AND RESTAURANT MANAGEMENT SYSTEM: STREAMLINING OPERATIONS FOR EFFICIENCY

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ABSTRACT

The primary objective of this manuscript is to develop a POS and Restaurant Management System. The requirements are gathered at the real time and based on that a complete application is developed. The system was developed and tested in the run time environment and the deployment is done. The performance of the system is computationally good in terms of request processing and memory and time management.

Keywords: POS, web application, full-stack development

1 INTRODUCTION

The primary objective of this research is to develop a point of sale for a restaurant automation system. The restaurant management system is built by gathering the real time information as requirements. The need of the complete automation system was significant because of its demand in the market. The system consists of various modules such as user authentication and order placement. The priority scheduling is also imparted in the administrator page and the orders were processed. The payment module was also added to the system, The efficiency and the performance of the system are better than the state-of-the-art methods. The primary need of the automation system in the real time applications are the convenience and the effectiveness in the usage. The efficiency of food-service operations is crucial to service quality and customer satisfaction. Abaya et al. [1] found that the overall satisfaction of food-service users was high, with issues noted on service speed during peak hours and crowd management. The results emphasize the need for operational efficiency and service delivery in food-service settings. Thus, an integrated restaurant management system can assist in the efficient processing of orders and overall operational coordination, which can help restaurants enhance their service delivery and customer experience. The more the demand, the more application products get launched, the efficiency of the application must be measured by the performance and the ease of usage. Many of the applications works similar even with similarity in the modules. But the performance varies in terms of speed and correctness. Another major parameter focused in the research is to ensure the data protection. The sensitive information like the account details is involved in the payment module, and hence the proper security features are included in the application so far, the data security is ensured. The manuscript is

organized as follows. The section II presents the over view of the literature review. The section III presents the methodology of the system, Section III presents the implementation and results. Section V presents the conclusion and the future demand.

2 LITERATURE SURVEY

There are several methods proposed in the literature about the various approaches and mobile and the web applications in the state of the art. Most of the applications in the existing system features the similar modules like login, order placement, report generation etc. Few of the literature study is presents as follows. [2] presents a detailed overview of PIECES methodology is proposed. In this system, the login module followed by the order placement module is there, the edit order feature is not available in this system and hence it was not well received in the market. [3] presents a study of a coffee shop automation system. It was more on the requirement gathering phase and the detailed implementation and deployment was not done. Many researchers provided their concern of the secured data processing in the web applications. [4] presents the various data analytics methods.[5] presents the critical analytics of the data as the data involved are sensitive and high prior information. [6][7] presents the incorporation of the machine learning into the application developers' environment. [8] and [9] presents an over view of how to incorporate the usage of artificial intelligence into the system. The incorporation of Artificial Intelligence into the application is also considered to be the future research. The AI based web application will certainly prove to be a new way of query processing and the research related to the time management in the query processing were commendable.

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Although there are various methods presented in the literature about the various web application development methods, The research gap identified are in the completeness in generation of a POS application right from the requirement gathering to the payment and report generation module.

Most of the existing system used a third-party application for the report generation and the payment module. Hence the complete responsibility of the sensitive and personal information shared to the application is redirected to

other third-party application which may be reliable and trusted, but then that was identified as a potential research gap in the existing system to having been a motivation to build a complete full stack application for restaurant management system.

3 METHODOLOGY

The detailed methodology is presented in the figure 3.1. The purpose and the usage of the various modules are presented in the following section.

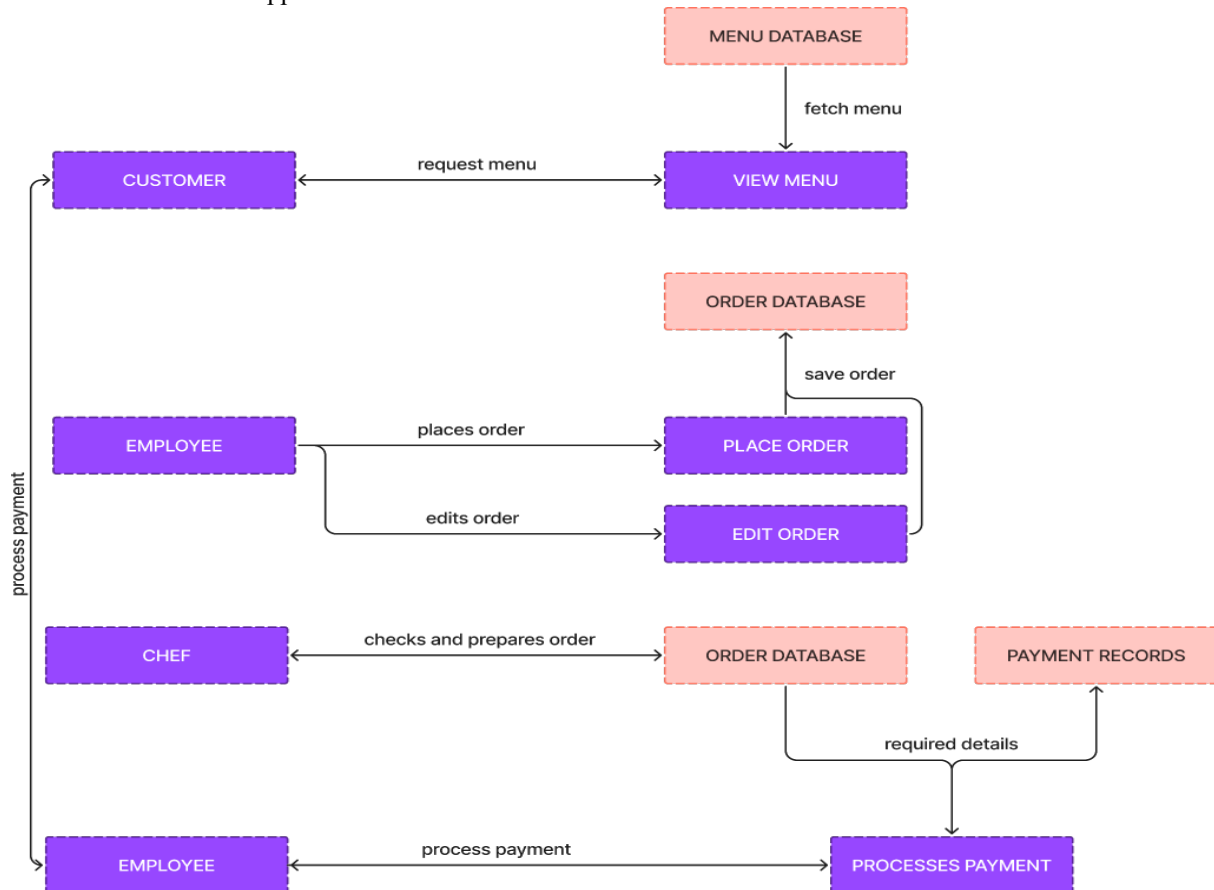


Fig 3.1 Detailed architecture of the proposed system

The various schema included in the web application are Customer, Employee, and Chef. The sub modules are managing the database and the query processing. Apart from that, the security of the data and the integrity of the transactions are ensured and preserved. The most important queries such as the request menu, place order, edit order, checks and prepare order, process for payment

modules are included in the proposed system. This methodology of the system show case its novelty based on the modules such as edit orders, payment processing module and report generation. Also, all the transactions done are maintained with the proper session id and management. The scheduling algorithm is used and the query is processed accordingly.

4 IMPLEMENTATION AND DEPLOYMENT

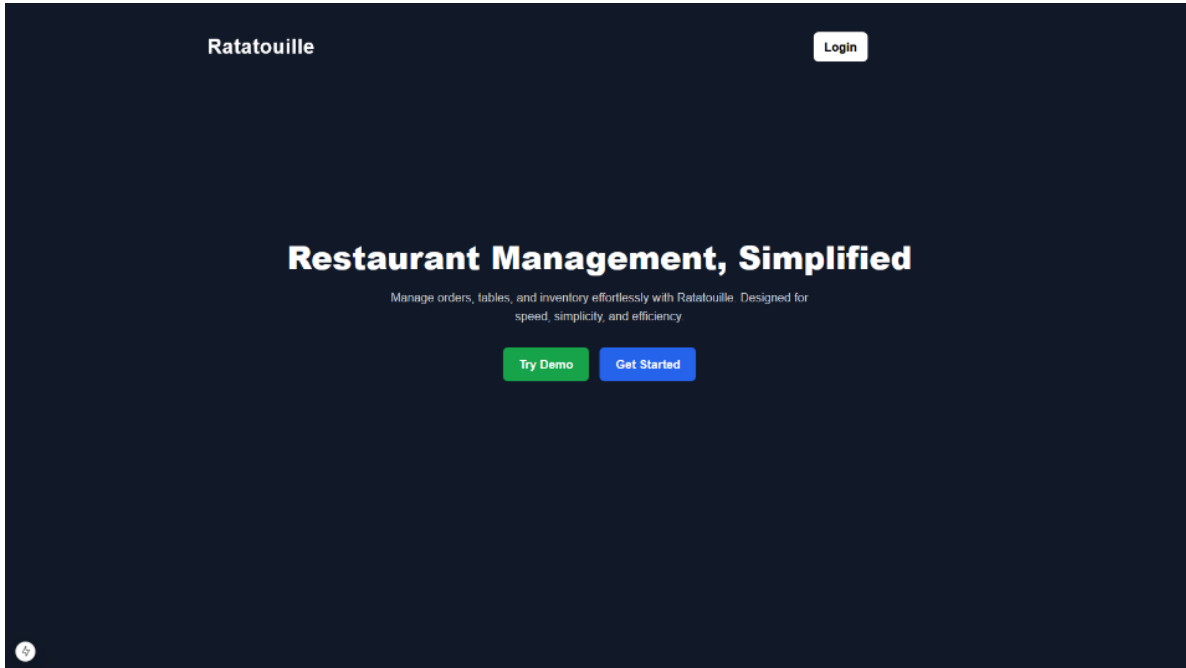


Fig 4.1 – Landing Page

Figure 1.1 presents the landing page of the restaurant management system. It includes a login module to get registered and create the user account. The registered

user's unique login credentials are the first secured information transaction which will be stored with the unique reference id for each user.

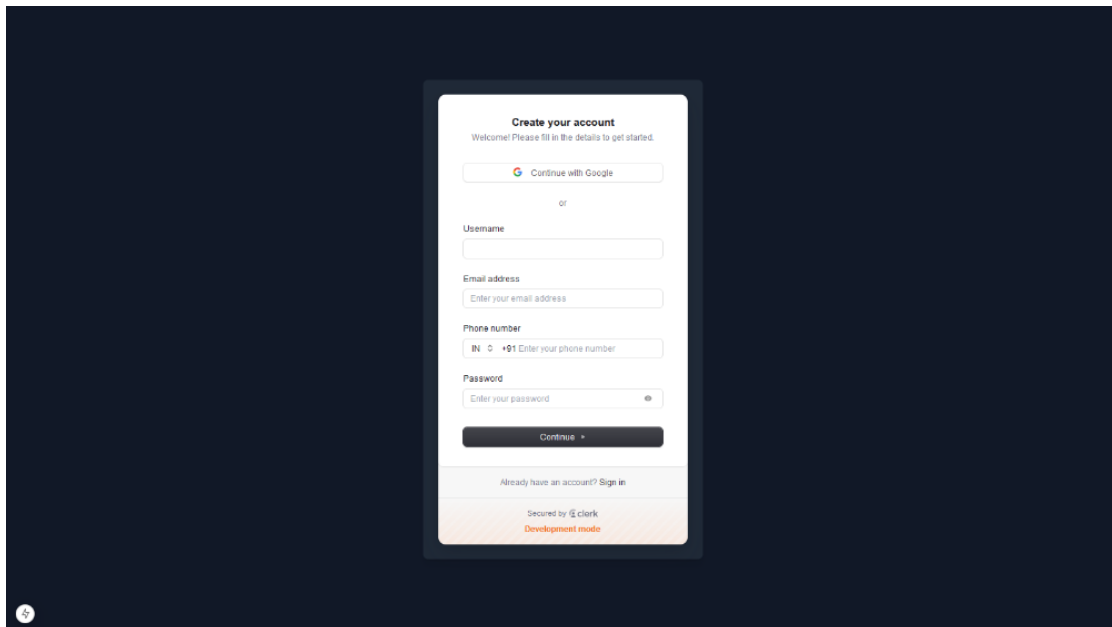


Fig 4.2 – Authentication

Figure 4.2 illustrates the authentication module. This module enables the users to create the account, the features like form validation is done. The prevention of

duplicate account creation is carried out here and hence the account creation are linked with the email id of the customers.

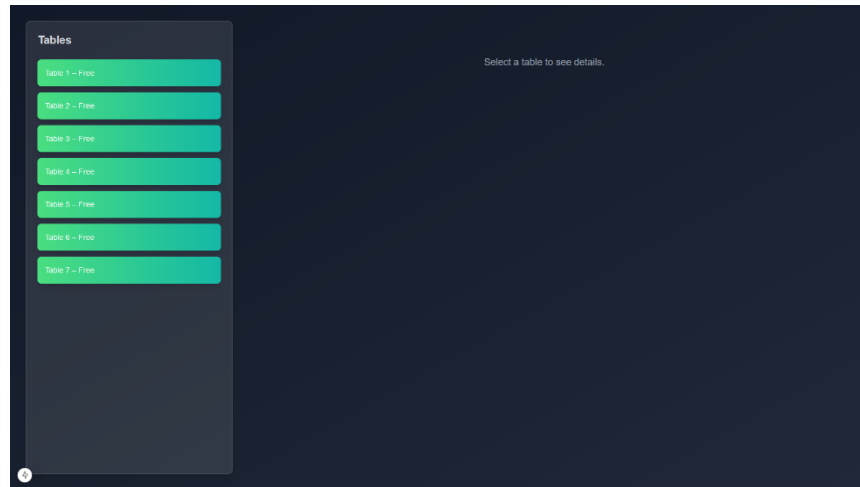
**Fig 4.3 – Order and Table Management**

Figure 5.3 presents the order and table management. This is the most important phase in the development cycle of this application. The significance of this module is high

because the important query processing like placing the order, editing the order, cancels the order is done in this module.

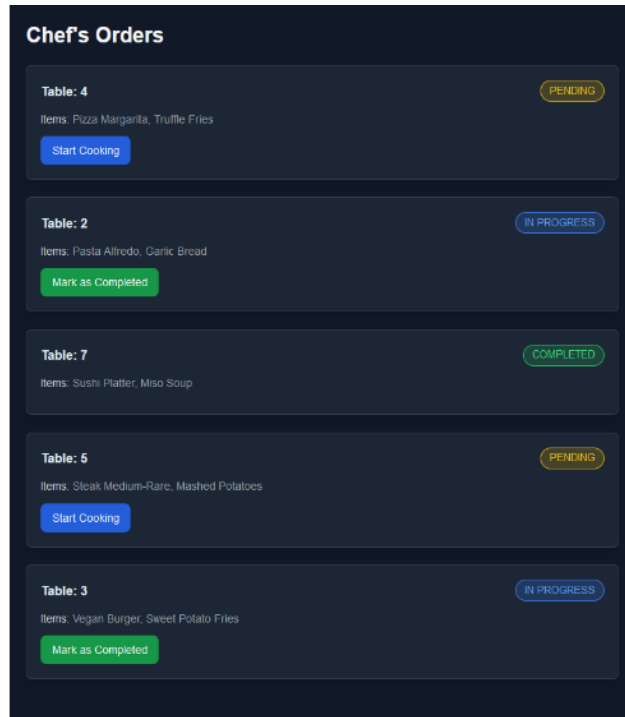
**Fig 4.5 – Chef's View of Orders**

Figure 4.5 presents the detailed summary of the chef's interface where the process status is noted. A multi-threaded approach is implemented for query processing

and the completeness of each process is also recorded at the chef's interface.

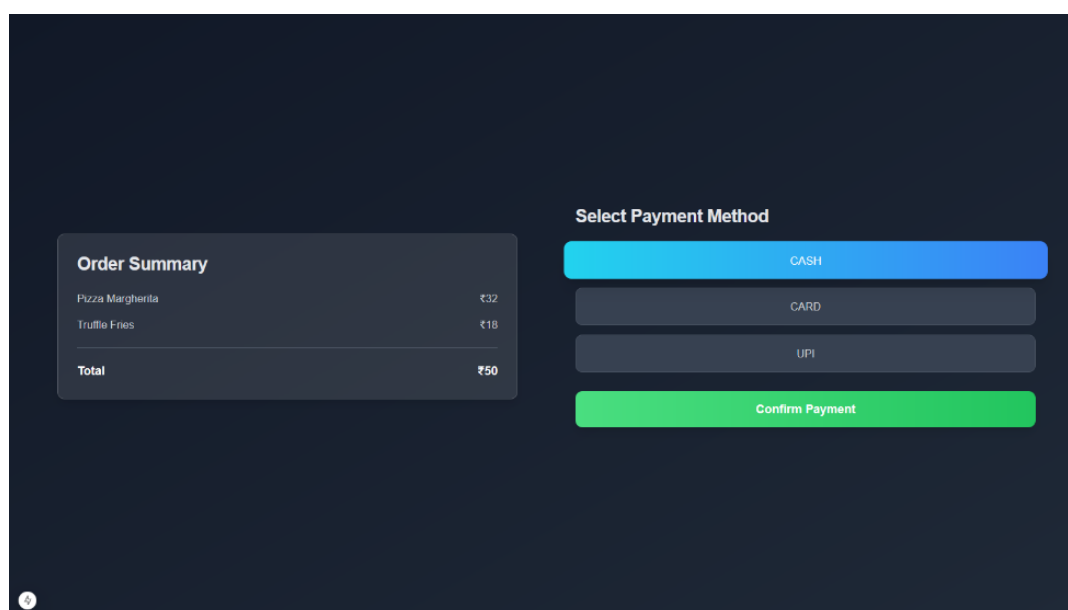


Fig 4.6 – Payment Module

Figure 4.6 presents the payment module. The payment module is enabled only when all the other process has been successfully processed. The payment module includes the sensitive information of the users. This proposed system is developed by abiding with all the guidelines of a secured web standard application development.

5 CONCLUSION AND FUTURE ENHANCEMENTS

The restaurant automation system with the POS was successfully implemented and tested in the real time environment. The requirements are gathered in the real time and according to the stake holders' point of view. A unified approach is ensured in this system. The implemented system has likely to gain the positive response based on the work efficiency and performance. The system is launched online and currently in use. The future enhancement of this system will be towards enhancing the security features of the system and enable the data security.

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