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A Smart Food Delivery Platform with Machine Learning-Driven Intelligent Matching

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Abstract

This study presents the design and implementation of a smart food delivery platform powered by machine learning-driven intelligent matching. The platform is developed in response to the growing need for efficient and personalized food ordering experiences, reducing the time, effort, and costs associated with visiting physical food outlets. Common issues such as long wait times, lack of real-time expense tracking, and inadequate customer data management are also addressed. The Object-Oriented Analysis and Design Methodology (OOADM) guides the system development, utilizing Android and iOS mobile applications alongside a web interface. JavaScript is employed for interactivity, PHP for server-side processing and database integration, HTML for the user interface, and MySQL for data storage. The system incorporates a machine learning component to analyze user preferences and recommend food options accordingly. The resulting platform streamlines the ordering process, enhances customer satisfaction through intelligent food recommendations, enables real-time tracking of expenses, and improves overall order and customer data management.

1. Introduction

The global rise in digital commerce has significantly transformed the way services are accessed and delivered. Among these, food delivery platforms have become a critical part of urban lifestyles, enabling users to order meals conveniently from a range of vendors through their mobile devices (Statista, 2023). However, while food delivery services offer convenience, many still lack intelligent systems capable of understanding user preferences, providing personalized suggestions, and optimizing the ordering experience. Customers often encounter issues such as long wait times, repetitive ordering processes, lack of personalization, inefficient expense tracking, and poor customer data management (Khan & Pathan, 2022).

Recent advancements in machine learning have enabled smarter service delivery across various sectors, including healthcare, finance, and e-commerce, by analyzing user behavior and making intelligent predictions (Zhou et al., 2020). In the context of food delivery, machine learning algorithms can be used to

identify user preferences, recommend meals, and streamline the decision-making process, thereby enhancing customer satisfaction and reducing cognitive load (Gupta et al., 2021). Despite the potential, many food delivery platforms still rely on static menus and manual selection, offering little to no personalization.

This study addresses these challenges by developing a smart food delivery platform that leverages machine learning algorithms to provide intelligent matching between users and available food options. Unlike traditional systems that present users with fixed menus, the proposed platform dynamically recommends meals based on individual preferences, order history, and behavioral patterns. This intelligent recommendation not only improves user experience but also enhances vendor visibility and order accuracy.

To achieve this, the study adopts the Object-Oriented Analysis and Design Methodology (OOADM) for system development, integrating Android and iOS mobile platforms along with a web interface. Core technologies include JavaScript for interactivity, PHP for backend logic and server communication, HTML for content presentation, and MySQL for database management. A machine learning model is embedded to analyze user behavior and support intelligent decision-making in real-time.

The rapid expansion of urban centers and the increasing demand for convenience have fueled the growth of food delivery services. Despite this growth, many existing platforms remain limited in their ability to deliver a personalized and efficient user experience. Customers often face challenges such as repetitive and time-consuming search processes, lack of personalized food suggestions, long wait times, and poor responsiveness from service providers. Additionally, users are generally unable to monitor their spending in real-time, making it difficult to manage budgets effectively. From the service provider's perspective, the inability to maintain accurate customer records and track user preferences reduces the potential for targeted marketing and improved service delivery. Traditional food delivery systems often lack intelligent mechanisms to match users with meals based on their behavior, dietary patterns, or past orders. This results in a generic and impersonal ordering experience, which can affect customer satisfaction and retention. There is therefore a need for a smart, automated food delivery system that not only facilitates efficient ordering and delivery but also leverages machine learning to intelligently recommend food options, track customer expenses in real-time, and manage user data effectively. This study seeks to address these gaps by developing a comprehensive food delivery platform driven by intelligent matching and recommendation capabilities**.**

By combining machine learning with mobile and web technologies, the platform provides an enhanced food ordering experience that is faster, more accurate, and tailored to individual needs, that integrates mobile (Android and iOS) and web platforms for easy accessibility and usability, apply machine learning techniques to analyze user preferences and generate intelligent food recommendations, as well as develop a customer and order management module that efficiently records and processes user transactions. The study contributes to the growing field of intelligent service systems and demonstrates the practical application of machine learning in everyday consumer technology. Hence the aim of this study is to develop a smart food delivery platform with machine learning-driven intelligent matching.

2. Methodology

The proposed methodology will outline the various methods to be used in all the stages of system analysis and design for the realization of an effective food delivery platform. However, the methodology adopted in this work is the Object-Oriented Analysis and Design Methodology (OOADM), the programming languages used in the development of Food Ordering System software are PHP (Hypertext Preprocessor), JavaScript, HTML (Hypertext Markup Language), and MySQL (Structured Query Language). Object-oriented analysis and design methodology (OOADM) which is adopted in this research work is a set of standards for system analysis and application design. It uses a formal methodical approach to the analysis and design of information system. Object-oriented design (OOD) elaborates the analysis models to produce implementation specifications. The main difference between object-oriented analysis and other forms of

analysis is that by the object-oriented approach the requirements around objects is organized, which integrate both behaviors (processes) and states (data) modeled after real world objects that the system interacts with. In order to achieve the aim and objectives of this study, an international accepted system development life cycle called the waterfall model is used. The pure waterfall lifecycle consists of several non-overlapping stages, as shown in the figure below. The model begins with establishing system requirements and software requirements and continues with architectural design, detailed design, coding, testing, and maintenance. The waterfall model serves as a baseline for many other lifecycle models.

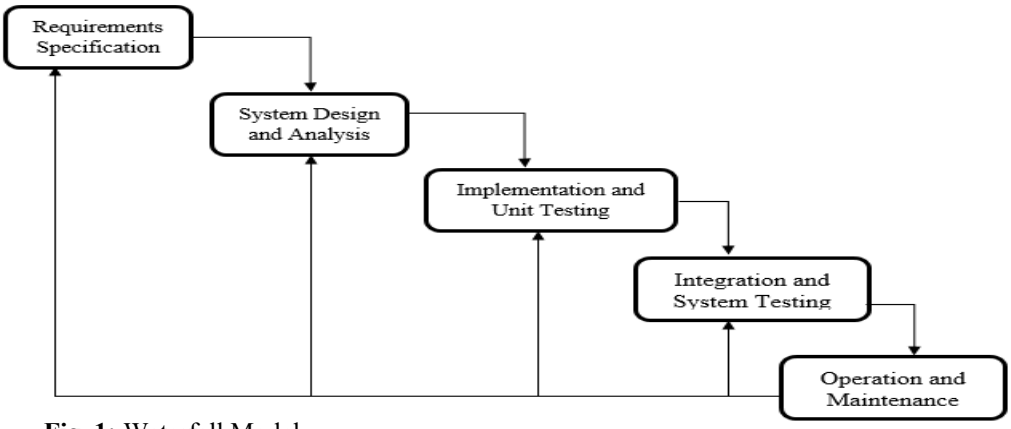

Fig. 1: Waterfall Model

2.1 Control Flow Diagram

A control flow diagram helps us understand the detail process. it shows us where control starts and ends and where it may branch off in another direction, given certain situations.

2.2 Use Case

A use case diagram is used to depict the interaction between the users and the system. It shows the functionalities of the system from a users' point of view and the different activities a user can perform.

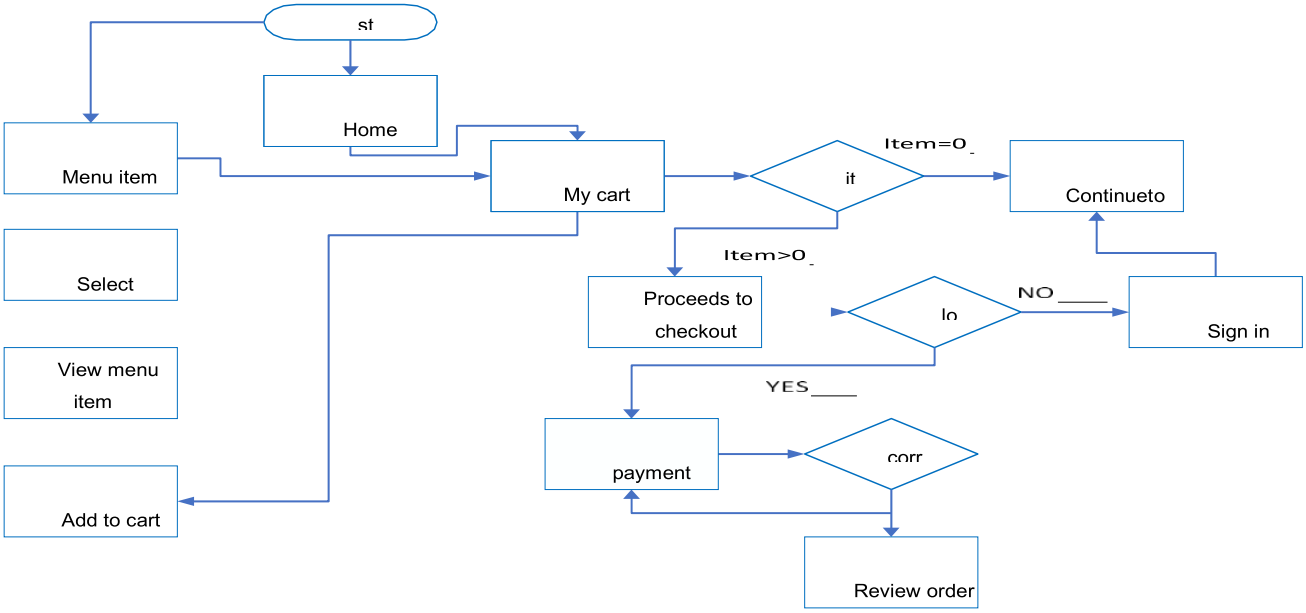

Fig.2 Control Flow

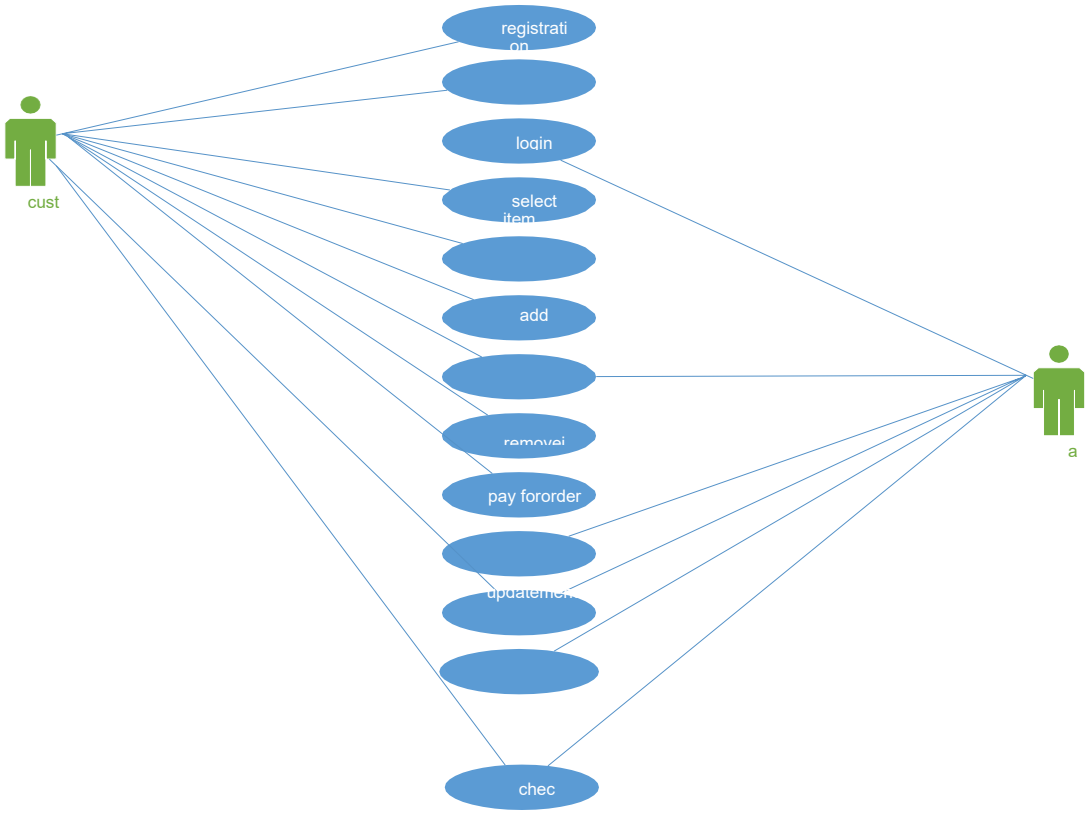

Fig. 3 Use Case Diagram

2.3 User Interface Design

This sections the user interface which is the front-end design which the user will use to interact with the web application.

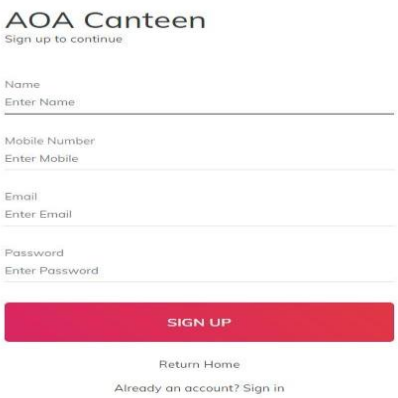

Fig. 4 Sign Up Page

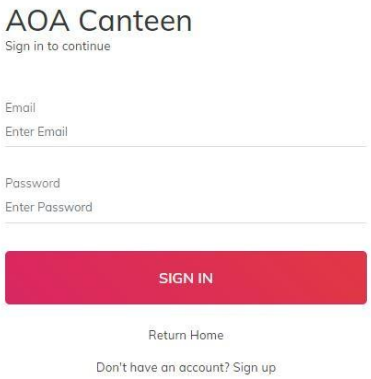

Fig. 5 Login Page

3. Results and Discussion

The system is designed with several interaction cues on each web page that makes up the web application (krispy). These cues are well-defined such as to make several functionalities that the application exposes to collect, process and output data. Access to these functionalities is made possible by the well-designed user interface which embodies several technologies such as AJAX (Asynchronous JavaScript and XML) to process data. The application is built in a modular form where these functionalities are built into modules. Some of the modules are as follows: Cart.php, Check_login.php, Inventory_details.php, and Payments.php. The system is designed in such a way that it efficiently provides output to the user promptly and in a well-organized manner. The format for the several outputs is make available on the output web pages. Output can be relayed using the following page modules: Product_list.php: This display output information for the list of food delicacies which are currently available, Search_result.php: This displays output information for the order report and Aboutus.php: This displays output information that talks about the ordering outfit (krispy). With the proposed system, users can now place orders through a seamless web and mobile interface, eliminating the need for physical presence and reducing waiting time. The integration of machine learning-driven intelligent matching allows the platform to analyze user preferences and suggest personalized food options, thereby improving decision-making and user satisfaction.

Furthermore, the system supports real-time expense tracking, effective customer and order management, and secure data handling. By automating the ordering process and incorporating intelligent recommendation features, the platform delivers a faster, more convenient, and user-centered dining experience. This innovation not only benefits customers but also supports vendors in managing orders and understanding consumer behavior more effectively. In summary, the platform represents a significant step toward modernizing food services through technology, addressing key issues in traditional food ordering systems, and paving the way for smarter, data-driven service delivery.

4. Conclusion

An automated canteen ordering system is developed where the customers can make an order for the food and avoid the hassles of waiting for the order to be taken by the waiter. Using the application, the end users register online, read the e-menu card, and select the food from the e- menu card to order food online. Once

the customer selects the required food item the chef will be able to see the results on the screen and start processing the order. This application nullifies the need of a waiter or reduces the workload of the waiter. The advantage is that in a crowded canteen there will be chances that the waiters are overloaded with orders and they are unable to meet the requirement of the customer in a satisfactory manner. Therefore, by using this application, the users can directly place order for food and get it delivered. It is therefore, recommended that integration of real-time order tracking using GPS should be considered to improve transparency and user trust. Furthermore, Machine learning models should be regularly updated with new user data to maintain and improve recommendation accuracy.

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