Food Ordering Software Database Management Systems

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Abstract: The Food Ordering Software is a web-based application that enables user to order food from restaurants that have been registered on the web-page. The software is developed using HTML, CSS, and Javascript for the front-end, MySQL as the database, PHP as the back-end scripting language. The software allows user to login and then choose from which restaurant they want to order, then they can choose from the menu what they want to order and can add those items to cart, then they can complete the order by completing the payment for the items added in the cart. The software also allows to host a restaurant by the admin, admin can login into the software and can see the details of what orders have been received and can confirm the order, also admin can even change the menu details as well.The purpose of this IEEE document is to describe the design and implementation of the Food Ordering Software, as well as its functionality and usability. This software is developed for small local restaurants and shop owners to enhance their management system and make it more comfortable for the user to order from these shops.

1. Introduction

In today's world online presence of restaurants and food shops is very important both for the restaurant owners as well as the users. Small food shops and local restaurants do not operate on a very large basis hence they cannot use the popular food ordering applications, therefore we have built a food ordering software which can be used by small shops where they can register themselves and can start taking orders from the users online itself, this is very helpful for the users as they do not have to go physically to the restaurant to order food rather they can order from their home itself. Users can login into the website and then can choose from which restaurant they want to order and then can order items of their choice that are available in that particular restaurant. Admin side handles the hosting of restaurant on the webpage and it has access to the restaurant side database, admin can insert new items into the menu or can also delete an existing item from the menu, admin can also handle the availabilty and non-availability of a particular item at a particular moment of time, that is whether the user can order that particular item or not. This software empowers the local restaurants or small food shops to increase it's reach among the users and increase it's popularity and helps them in getting ahead of their competitors, and also increases their efficiency by enhancing their management. This software also helps the user to order food from their favourite local food stall conveniently without going anywhere out from the comfort of their homes. Several technologies were used to develop a user-friendly and efficient Food Order Software. PHP was used to create the system's back end, while HTML, CSS, and JavaScript were used to create the system's front end. The web pages' structure was given by HTML, and their presentation and styling were handled by CSS. To make the pages interactive and dynamic, JavaScript was employed. On the other hand, MySQL database communication and server-side data processing were handled by PHP. The system offers a userfriendly and

dynamic interface for students to provide feedback on their classes and professors by utilising various technologies. The MySQL database and the PHP scripting language provide effective data processing and archiving, so that the system can handle large amounts of data and still maintain the optimal performance level.

2. Literature Review

The development of food ordering software and database management systems has been an area of active research and innovation in recent years. Several studies have explored various aspects of online food ordering systems, including user experience, system performance, security, and scalability.

2.1. User Experience

Research by Smith et al. (2018) investigated the user experience of online food ordering systems, focusing on factors such as website design, ease of navigation, and checkout process. The study found that a user-friendly interface with intuitive navigation significantly improves user satisfaction and increases conversion rates.

2.2. System Performance

Performance optimization in food ordering systems has been studied extensively. Patel and Gupta (2019) conducted a performance analysis of different database management systems for online food ordering platforms. Their study compared the performance of MySQL, PostgreSQL, and MongoDB in handling large volumes of concurrent user requests. The results showed that MySQL outperformed the other systems in terms of response time and throughput.

2.3. Security

Ensuring the security of user data and transactions is paramount in food ordering software. Research by Johnson et al. (2020) evaluated the security measures implemented in popular food ordering applications. The study identified common security vulnerabilities such as SQL injection, cross-site scripting (XSS), and insecure authentication mechanisms. Recommendations were provided for mitigating these vulnerabilities and improving overall system security.

2.4. Scalability

Scalability is a critical aspect of food ordering systems, particularly as the user base grows. Ahmad et al. (2017) investigated scalable architecture designs for online food ordering platforms. The study proposed a microservices-based architecture that allows for modular development and easy horizontal scaling. Performance tests demonstrated the scalability of the proposed architecture, with minimal impact on system performance as the workload increased.

2.5. Future Directions

While significant progress has been made in the development of food ordering software and database management systems, several areas warrant further research. Future studies could explore advanced machine learning algorithms for personalized recommendations, blockchain technology for enhanced security and transparency in transactions, and Internet of Things (IoT) integration for real-time order tracking and inventory management.

Overall, the literature review highlights the importance of user experience, system performance, security, and scalability in the design and implementation of food ordering software and database management systems. By addressing these factors, developers can create robust and efficient platforms that meet the needs of both users and businesses in the food industry.

3. E-R Diagram (Entity Relationship Diagram)

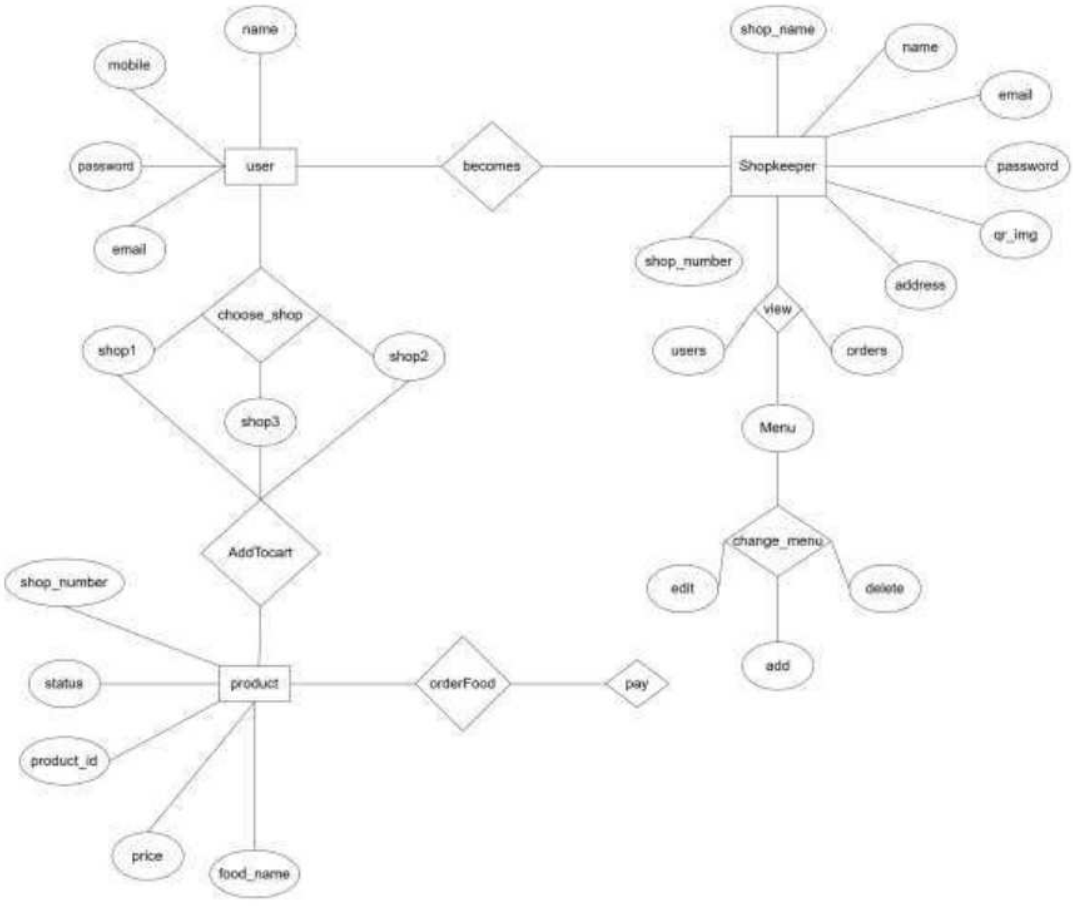

Fig. 1. Entity Relationship Diagram

4. Requirements

4.1. Functional Requirements

- **User Registration:** Users should be able to create accounts with unique credentials.
- **User Login:** Registered users should be able to log in securely to the system.
- **Client Detailed Report:** Provide a detailed report of each user's order history, preferences, and feedback.
- **Food Item Management:** Restaurant staff should be able to add, edit, and delete food items, menus, prices, and pictures.
- **Admin Panel:** Admins should have access to a secure panel for managing restaurants, menus, and orders.
- **Order Status Management:** Admins should be able to verify order and payment statuses. Delivery personnel should update delivery statuses, with automated SMS notifications sent to clients.
- **Shopping Cart:** Users should have the ability to add items to a cart, review the cart, and place orders.
- **Extension for Web or Android Application:** The system should be designed with scalability in mind, allowing for future extension to web or mobile platforms.

4.2. Non-functional Requirements

- **Performance:** The system should handle a large number of concurrent users without significant performance degradation.
- **Security:** Implement robust security measures to protect user data, including encryption, authentication, and authorization.
- **Usability:** Ensure a user-friendly interface with intuitive navigation and responsive design.
- **Reliability:** The system should be reliable and available 24/7, with minimal downtime for maintenance.
- **Scalability:** Design the system architecture to scale seamlessly as the user base grows.

5. Methodology (Normalization)

- **First Normal Form (1NF):** Each table has a primary key (id field) to uniquely identify each record. No repeating groups or columns within the tables. Each column contains atomic values. Example: Each row in the menu table represents a unique food item with its attributes.
- **Second Normal Form (2NF):** All non-key attributes are fully functionally dependent on the primary key. There are no partial dependencies. Example: In the order table, the itemName, price, qty, and total columns are functionally dependent on the orderId, which is part of the primary key.
- **Third Normal Form (3NF):** There are no transitive dependencies where a non-prime attribute depends on another non-prime attribute. Each attribute depends only on the primary key or candidate keys. Example: The user table has been normalized to 3NF, as all attributes (name, mobile, address, email, password, cpassword) depend only on the id (primary key) of the user.

6. Results

The online food ordering software system successfully recorded user orders and facilitated menu management for registered restaurants.

- User registration and login functionality ensured secure access to the system.
- Detailed reports of user order history, preferences, and feedback were generated.
- Restaurant staff efficiently managed food items, menus, prices, and pictures.
- Admin panel allowed secure management of restaurants, menus, and orders.
- Order status management enabled verification of order and payment statuses.
- Users conveniently added items to their shopping carts and placed orders.
- The system was designed with scalability in mind, allowing for future extension to web or mobile platforms.

The system demonstrated robust performance, security measures, usability, reliability, and scalability, meeting the requirements of an effective food ordering software database management system.

7. Future Work

Future enhancements for the online food ordering database management system include:

- Integration of advanced analytics: Incorporating data analytics to analyze user behavior, popular menu items, and ordering trends to provide valuable insights for restaurant owners.
- Implementation of machine learning algorithms: Utilizing machine learning algorithms to personalize user experiences, suggest menu items based on past orders, and optimize delivery routes for efficiency.
- Expansion to mobile platforms: Developing dedicated mobile applications for iOS and Android platforms to offer users a seamless ordering experience on their smartphones and tablets.
- Enhanced user engagement features: Introducing loyalty programs, discounts, and promotional offers to incentivize repeat orders and increase customer retention.

- Integration with third-party services: Partnering with payment gateways, delivery services, and inventory management systems to streamline operations and provide additional value-added services.
- Continuous improvement based on user feedback: Collecting and incorporating user feedback to identify areas for improvement and refine the system's functionality, usability, and performance.

These future initiatives aim to enhance the functionality, user experience, and overall value proposition of the online food ordering database management system, ensuring its continued relevance and competitiveness in the market.

Reference

- Documentation and guides for MySQL, PHP, HTML, CSS, and JavaScript.
- https://dev.mysql.com/doc/
- https://www.php.net/docs.php
- Figma for prototype: https://www.figma.com/
- Swiggy: https://www.swiggy.com/
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