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Smart Supermarket Billing System

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ABSTRACT

The main aim of this project is to create a billing automation system for supermarket. This project will help the customer of a specific supermarket in which he can able to scan the product through this app using his mobile instead of standing in a big queue. This initiative has been mainly planned for reducing the long waiting time in the billing counter as most of the customers will have a huge number of products in the cart. This application will be a big benefit especially during weekends where crowd will be much higher. Customers can also able to track their shopping history through this application. Moreover, loyalty bonus also can be monitored in this application so that customers can use that benefit also. This application is made using Ionic framework, which is a hybrid mobile application development framework that help us to make app for both android and iOS with single coding. If the supermarket is having multiple branches, we can have the same application for using in all the branches which will make the best shopping experience for the customers.

1. INTRODUCTION

In our daily life, shopping became the most unavoidable thing. In this modern world, people are almost buying everything from outside instead of making it on their own, instead of thinking about money. Though, billing is one of the most painful job for every shopping lovers. Especially in shops selling FMCG products and supermarkets, there will always be much crowd, mainly during weekends and festival times, so waiting for billing our products will take really long time. With a rough estimate, if billing for a customer takes 10 minutes and someone is standing 10th in a queue, he needs to wait for more than 1 hour for checking out his items which will be a real nightmare.

While scanning our products in the billing section itself is taking time, the payment process also will consume sometimes which will again create a headache. Being in a big queue, no one will have that much patience to do all these stuffs, but unfortunately everyone has to face this.

For reducing these efforts, we are creating one system which will be directly connected to the supermarket server when comes live. This application will make the traditional shopping simpler.

Users will login to the app and will scan the unique barcode/QR code of the product through this app. Then, the app will display the item details, and user can able to select the count of the products. In the similar way, user can able to add multiple products into his cart. After adding all the products, user can select any payment method and then he will pay the bill amount. Once bill is paid, user will get unique bill number, while going out of the supermarket, he can verify at the entrance and then will leave. The primary objective of our project is to empower customers with a seamless and efficient means of completing their purchases, mitigating the frustrations associated with extensive waiting times. Through the utilization of this mobile application, customers gain the ability to effortlessly scan and add products

to their virtual carts, eliminating the need to stand in lengthy queues at traditional billing counters. This not only expedites the checkout process but also fosters a more enjoyable and time-efficient shopping experience. The application's functionality extends beyond the immediate transaction, offering users the invaluable capability to track their shopping history. Customers can easily revisit past purchases, facilitating the replenishment of essential items and promoting a sense of order and organization in their shopping routines. A key feature of this billing automation system is the integration of a comprehensive loyalty program. Users can monitor their loyalty bonus points within the application, providing them with tangible incentives for continued patronage. The seamless tracking and utilization of loyalty bonuses further contribute to a personalized and rewarding shopping journey. Designed to be adaptable to the diverse needs of supermarkets with multiple branches, this application promises a standardized and enhanced shopping experience across all locations. The single-coding approach of the Ionic framework ensures that the application is compatible with both Android and iOS platforms, maximizing accessibility for a broad user base.

we envision a future where the checkout process is no longer a bottleneck in the customer's shopping excursion. Instead, it becomes a streamlined and enjoyable interaction, marking a paradigm shift in the way supermarkets engage with their clientele. Join us in this endeavour to redefine convenience, efficiency, and customer satisfaction in the realm of supermarket retail.

2. RESEARCH WORK

The researchers made use of analysis. Conducting analysis supermarkets plays a crucial task for us to complete.

1. **Market Analysis:** Conduct an in-depth analysis of the current supermarket industry, identifying key players, market trends, and customer preferences. Explore regional variations in shopping behaviours and expectations.
2. **Customer Behaviour and Preferences:** Conduct surveys and interviews to understand customer expectations, pain points in traditional billing systems, and preferences for a smart supermarket billing solution. Analyse demographic data to tailor the application to the target audience.
3. **Technology Landscape:** Research emerging technologies in the retail and mobile app development sectors. Evaluate the feasibility and effectiveness of integrating technologies such as IoT, AI, or machine learning to enhance the smart supermarket experience.
4. **Regulatory Compliance:** Investigate and ensure compliance with relevant regulations and standards in the retail and mobile payment industries. Address data protection, privacy, and security concerns.
5. **Mobile App Development Platforms:** Evaluate various mobile app development platforms, considering factors like cross-platform compatibility, ease of development, and community support. Justify the selection of the Ionic framework for its advantages in hybrid app development.
6. **Security Protocols:** Develop a robust security infrastructure, including encryption methods, secure payment gateways, and measures to protect against fraud.

3. PROPOSED SYSTEM

The proposed system will reduce the effort in traditional purchasing by simplifying the billing system. Customers will login and will scan the products which they are going to buy. All the items added to their cart will be displayed in the app, and customer can able to add, delete or modify any products, any time

before making the payment. Customers can also add their desired payment methods inside their app which will be helpful for cardless payment method also.

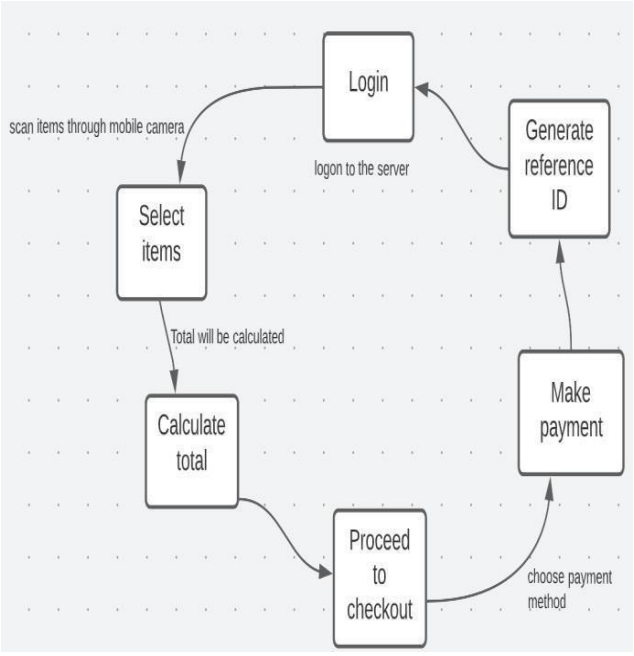
1. **Mobile Application:** Develop a user-friendly mobile application using the Ionic framework, ensuring compatibility with both Android and iOS devices. Implement an intuitive interface for customers to easily navigate, scan products, and manage their shopping carts.
2. **Barcode Scanning and Product Recognition:** Utilize advanced barcode scanning technologies to enable users to scan product barcodes or QR codes effortlessly. Implement product recognition features for scenarios where barcodes are damaged or unavailable.
3. **Real-time Cart Updates:** Provide real-time updates on the mobile app as users scan products, displaying the total cost, applied discounts, and loyalty points earned. Ensure a seamless and responsive user experience during the shopping process.
4. **Loyalty Program Integration:** Integrate a robust loyalty program into the system, allowing customers to accumulate and redeem points directly through the app, display loyalty points, bonuses, and available rewards within the user's profile.
5. **Shopping History and Reorder Functionality:** Implement a feature that allows users to view their purchase history, making it convenient to reorder frequently purchased items. Enhance user engagement by providing personalized recommendations based on past purchases.

4. EXISTING SYSTEM

In existing system, supermarkets will have multiple billing counters where customers will stand in queue and will complete their purchase. Customers will take all their desired products, then the biller will scan the products using barcode reader and then customer has to make the payment.

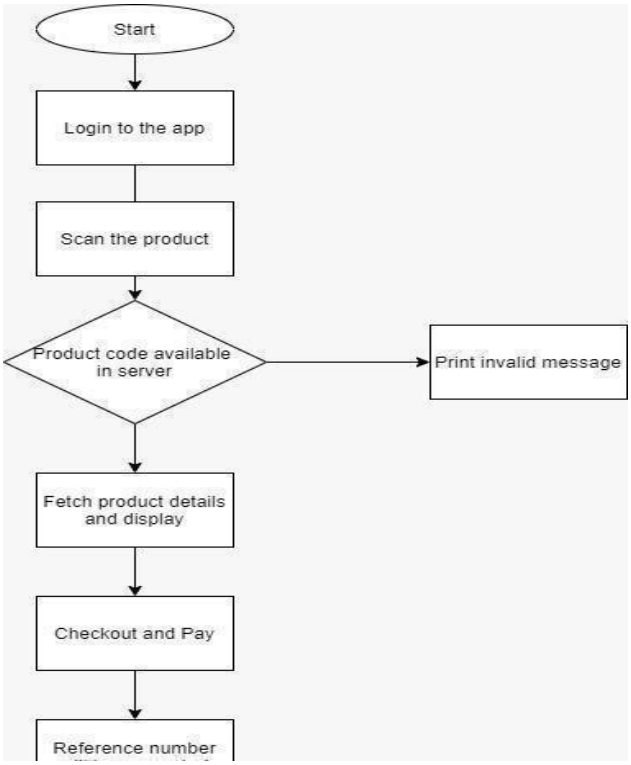
5. DATA FLOW

A data-flow chart could be a way of speaking to a stream of information through a prepare or a framework.The DFD moreover gives data approximately the outputs and inputs of each substance and the method itself.



This DFD provides a high- level visual representation of the proposed smart supermarket billing system.

6. ARCHITECTURE DIAGRAM



7. MODULES DESCRIPTION

1. Establishment of connection with general store server

This stage is obligatory to urge the genuine stocks from the grocery store which makes a difference the client for getting the upgraded items with upgraded cost. In the event that grocery store is giving any offers in a specific item, client can effortlessly purchase the item with the most recent cost irrespective of the cost printed within the item as the item data we are taking from the supermarket server specifically. Also the payment will be followed within the live time which can cease all the further confusions. Arrange history can moreover be followed live once the client completes the checkout prepare.

2. Adding products to cart

After effective enlistment and login, client can able to see the list of items accessible within the grocery store fair by scanning its standardized identification or QR code and they can able to upgrade the product number. The products will show with the most recent cost accessible within the general store server. The minute clients add the item in cart, it'll calculate the overall cost based on the units client chosen and it'll show as a list within the cart screen. The entire sum of the item will be right away be calculated within the backend and it'll be shown to the client when he clicks “Make Payment”.

3. Modifying items and evaluating add up to price

Once the item got included, it'll be put away in a brief cluster, so that some time recently the installment prepare, customer can able to erase or alter the tally of any particular item on the off chance that they do not need it. The system will update the subtle elements immediately and it'll calculate the overall admission. The add up to admission will be shown to the client once the client is prepared to create payment.

4. Payment Phase

Client can able to include their craved installment stage in this application. As of presently we arranged to

coordinated as it were card based exchange, and in future, other installment choices like online keeping money, UPI kind of things can also be incorporated with the application. In this stage, client will enter the payment related inputs and the system will inquire for the OTP to proceed. Once client submits OTP, at that point the arrange will be put. One interesting installment reference ID will be produced for each buy of the client.

5. History Tracking and Loyalty Tracking

Client can able to track their shopping history in the history menu. It'll incorporate the full cost, reference ID and date of buy. It'll be supportive for encourage following and item returns moreover. Clients can too see the dependability focuses which they've earned. The dependability bonus will get updated on each orders and it will be tracked within the profiles page. Customer can too able to see their profile information in the profile menu.

8. RESULT ANALYSIS

System analysis for the Smart Supermarket Billing System involves a thorough examination of the project's requirements, objectives, and functionalities. Initially, the analysis involves understanding the existing supermarket processes and identifying areas for improvement. The analysis encompasses customer needs, such as the desire for faster checkout experiences and the ability to track purchase history. It also considers supermarket staff requirements for efficient inventory management and exception handling. The chosen Ionic framework for mobile app development is scrutinized for its compatibility, usability, and scalability. Barcode scanning technologies are assessed for accuracy and speed in product recognition. Security protocols are analysed to ensure the protection of customer data and compliance with regulatory standards. Furthermore, the loyalty program integration is examined for its effectiveness in promoting customer retention. The system analysis dives into the technical aspects, evaluating database management systems for secure and efficient data storage. Continuous monitoring mechanisms are designed to address potential issues promptly. Throughout the system analysis, a user-centric approach is maintained, emphasizing a seamless and enjoyable shopping experience. The result is a comprehensive understanding of the project's requirements, paving the way for a well-informed and successful development process.

9. CONCLUSION

In conclusion, the Smart Supermarket Billing System represents a
transformative solution designed to enhance the overall shopping experience. By seamlessly integrating technology into traditional supermarket processes, our project addresses customer pain points, streamlines operations, and fosters customer loyalty. The adoption of the Ionic framework ensures cross-platform accessibility, while features like barcode scanning and a robust loyalty program contribute to a modern and efficient retail environment. The project not only meets its primary objectives of reducing waiting times but also sets the stage for continued innovation in the dynamic landscape of supermarket retail, ensuring a lasting positive impact on both customers and the supermarket business.

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