International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Ezy Eats: Transforming Campus Canteen and Student Dining Experiences

Rahul Prasad[1], Ankit Roshan[2], Junail Siddiqui[3], Tanmay Wakchaure[4] Aditi Nagarkoti[5], Kavita Kushwah[6]

[1,2,3,4,5]B.Tech Computer Engineering Ajeenkya D.Y Patil University Pune, India
[6]Assistant professor Ajeenkya D.Y Patil University Pune, India

Abstract
Eats is a mobile app designed to revolutionize the campus canteen experience by addressing critical challenges faced by students. The application directly targets persistent problems in campus dining, including excessive waiting times, limited payment flexibility, inefficient order processing, and potential transactional security risks. By providing an intuitive mobile interface, Eats empowers students to seamlessly place orders, track their progress in real-time, utilize diverse digital payment options, and complete transactions through convenient QR code checkout. The app's comprehensive approach transforms the traditional canteen experience into a streamlined, user-centric service. Technically, the application leverages a robust architecture featuring a user-friendly frontend developed using Java and Kotlin within Android Studio, complemented by a sophisticated backend infrastructure powered by Node.js, Firebase, and Express.js. This technology stack enables secure user authentication, supports multiple payment methods, and facilitates dynamic, real-time data management, ultimately delivering an efficient and modern dining solution for college campuses.

Keywords: management, inventory management, feedback system, crowd tracking

INTRODUCTION

Campus canteens are a critical service provided by institutions of learning to students, staff, and members of the faculty. These canteens have several challenges that either hinder efficiency or affect customer experience. One of the most common problems is waiting in lines for long periods, which happens during peak hours, like lunch and dinner. Students often have little time between classes, and there is a delay in placing and taking the orders, which irritates them. Most of the canteens are not upgraded to modern payment techniques, such as cash and only a few card-based, which is a big nuisance for users who wish to use digital or contactless payment methods. Moreover, the lack of up-to-date information makes it difficult for customers to follow the status of their orders, resulting in uncertainty and frustration. Moreover, inventory management is difficult, as canteens often end up either running out of the most demanded items or stocking too many, resulting in waste or missed sales. In addition, traditional methods of manual order handling are prone to errors and are time-consuming, especially during busy periods. This adds to the complexity of the counters and seating areas, making it difficult to manage the flow of customers. To solve these problems, a more efficient and user-friendly food ordering system is needed. Since digital platforms are being more and more integrated into the lives of users, especially among

younger ones, there is an increasing demand for fast, seamless, and intuitive service solutions. Ezy Eats is designed to meet those needs by improving campus canteen operations with modern technology. The Ezy Eats app allows users to browse menus, order food, and pay directly from their smartphones, thereby eliminating queues and reducing waiting time. Payment options are also supported by the app, including digital wallets, credit/debit cards, and mobile payments, for a convenient and secure way to pay. Users get real-time updates on their orders, hence reducing uncertainty. An efficient inventory management system allows the canteen staff to track real-time stock levels to avoid overstocking and stockouts. At the same time, customers will have updated menu options. Moreover, Ezy Eats offers a crowd-level tracking system that helps the canteens manage the customer traffic and optimize the service during peak hours. There is also a vendor portal that will be provided to canteen staff so that they can handle orders, track sales, and answer customer feedback that provides insight into operations. To summarize, Ezy Eats aims to transform campus canteen operations through user-friendly, tech-driven solutions for customers and vendors, enhancing efficiency and satisfaction while lowering operational costs [6], [7].

LITERATURE REVIEW

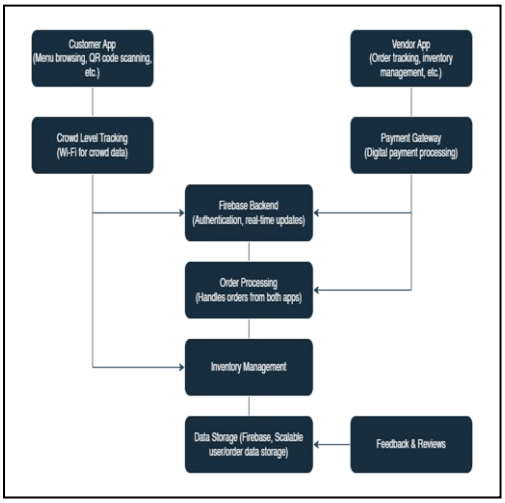
Campus dining experience is an integral part of student life, but the operations are often plagued with inefficiencies, such as long queues, limited payment options, and lack of real-time updates. These challenges have increased the demand for digital solutions such as Ezy Eats, which aims to transform campus canteen operations through technological innovation. The review discusses relevant literature on food ordering systems, mobile applications, and the integration of technology in campus environments [9].

FEATURES OF EZY EATS

Ezy Eats introduces several innovative features designed to address the challenges faced by campus canteens, aiming to streamline the food ordering process, improve operational efficiency, and enhance user satisfaction. The core features of Ezy Eats are detailed below:

A. QR Code Scanning for Ordering

Ezy Eats incorporates a QR code scanning feature, allowing users to quickly access the canteen's digital menu by scanning QR codes placed at various locations within the canteen, such as tables, counters, or menus [10]. Once scanned, the app redirects users to the menu, enabling them to place orders directly



from their smartphones. This feature eliminates the need for physical menus, reducing wait times and enabling users to complete their orders without needing to interact with canteen staff.

B. Real-Time Notification on Orders

The app provides real-time notifications to users regarding the status of their orders. Customers are notified at each stage of the order process, from confirmation to preparation, and when their order is ready for pickup. In case of any delays, users are promptly informed, ensuring greater transparency and reducing customer frustration due to uncertainty [11]. This feature keeps users engaged and informed, enhancing their overall experience.

C. Advance Order Scheduling Capabilities

Ezy Eats allows users to schedule orders in advance, selecting a preferred time window for pickup or delivery. This feature provides flexibility, enabling users to place their orders ahead of time, especially useful for students with tight schedules between classes [12]. By allowing advanced scheduling, this feature also helps the canteen manage peak times more effectively by spreading out order fulfilment.

D. Digital Payment Options

The platform integrates multiple digital payment options, including digital wallets, credit/debit cards, and mobile payment solutions such as Google Pay and Apple Pay. This provides a secure, contactless, and convenient way for users to pay for their orders [13], [14]. Digital payments eliminate the need for cash transactions, offering faster and safer payment processing, which is increasingly important in the current digital age.

E. Customer Feedback System

After completing their orders, customers are encouraged to provide feedback on their experience through the app. This feedback system allows users to rate their satisfaction based on factors such as food quality, service speed, and overall experience. The customer feedback is valuable to canteen vendors, helping them to identify areas of improvement and ensuring continuous service optimization. This system fosters customer engagement and loyalty by making users feel heard and valued [15].

These features combine to offer a streamlined, user-friendly experience that enhances both customer satisfaction and operational efficiency. By leveraging these technological solutions, Ezy Eats aims to address the key pain points of traditional campus canteen operations while providing a seamless, efficient, and modern food ordering experience.

SYSTEM ARCHITECTURE

The Ezy Eats platform is structured on a robust and scalable technology stack to ensure a seamless experience for both students and canteen vendors. The system's core is a modular architecture that integrates multiple components to deliver the key functionalities of the application [16], supporting dedicated apps for both customers and vendors [17].

Fig. 1. Architecture of Ezy Eats . (Modular architecture integrating apps with Firebase backend for real-time updates, authentication, and inventory management.)

TECHNOLOGY STACK

The Ezy Eats system is developed using a modern technology stack, which includes:

F. Frontend

The frontend of the Ezy Eats mobile application is developed using Java and Kotlin in Android Studio. The interface is designed to be user-friendly, responsive.

G. Backend

Firebase is used as the primary backend service, offering real-time database management, authentication, and cloud functions to power serverless architecture.

H. Authentication & Database

Firebase Authentication and Database is integrated to securely handle both customer and vendor logins and storing the users information and to manage application.

I. Infrastructure

The system employs Docker for containerization, enabling consistent environments across deployments, with Firebase's serverless infrastructure and AWS for additional scalability and high availability.

KEY SYSTEM COMPONENTS

J. Customer and Vendor Application

The mobile applications serve as the primary user interfaces for students (customers) and vendors, allowing them to interact with the Ezy Eats platform.

1. Customer App features include menu browsing, order placement, order status tracking, and real-time crowd level updates. QR code scanning through the device's camera initiates orders, and digital payments are enabled via integration with popular payment gateways.
2. Vendor App provides a dedicated interface for canteen vendors to manage operations, including updating menus, tracking order statuses, and accessing sales analytics. Inventory management tools allow vendors to monitor stock levels and reduce fraud or theft risks.

K. Backend Services

1. The backend services are powered by Firebase functions, facilitating serverless API endpoints consumed by both the customer and vendor apps.
2. Key functionalities managed by the backend include user authentication (via Firebase Authentication), order processing, and real-time data updates. Specific feature integrations include:

2.1. Crowd Level Tracking: Utilizes crowd detection algorithms and Wi-Fi/Bluetooth sensors installed in the canteen to provide real-time crowd density information.

2.2. Inventory Management: Synchronizes vendor inventory data to enable accurate stock monitoring and demand forecasting.

2.3. Feedback and Review: Collects and processes customer feedback, allowing vendors to improve their services based on customer insights.

L. Data and Integration Layer

1. This layer is responsible for storing and managing all the data generated by the Ezy Eats system.
2. Firebase stores flexible schema supports scalable storage of user profiles, orders, menu items, and other essential data.
3. External systems, such as payment gateways and campus directories, are integrated with Firebase to streamline user authentication and support financial transactions.

The modular design of the Ezy Eats architecture allows for easy integration of new features and expansion as needed, ensuring that the platform can adapt to meet the evolving demands of the campus community.

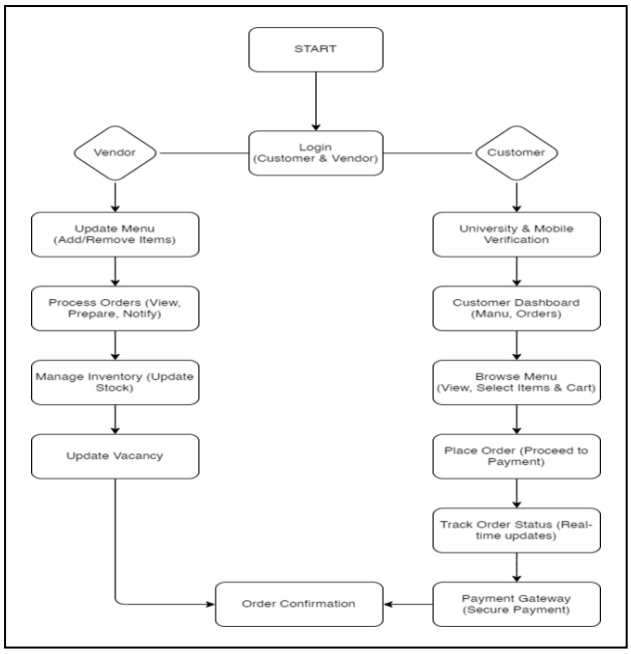


Fig. 2. Components of Ezy Eats. (Key system modules for login, orders, inventory, and payments with real-time Firebase synchronization.)

OUTCOME

The Ezy Eats platform is structured on a robust and scalable technology stack to ensure a seamless experience for both students and canteen vendors. The system's core is a modular architecture that integrates multiple components to deliver the key functionalities of the application [19], supporting dedicated apps for both customers and vendors [20].

Fig 3: Mobile Application Interface-1

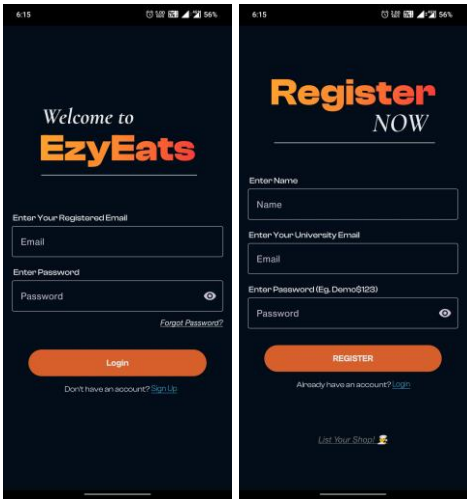


Fig 4: Mobile Application Interface-1(Login & Signup page)

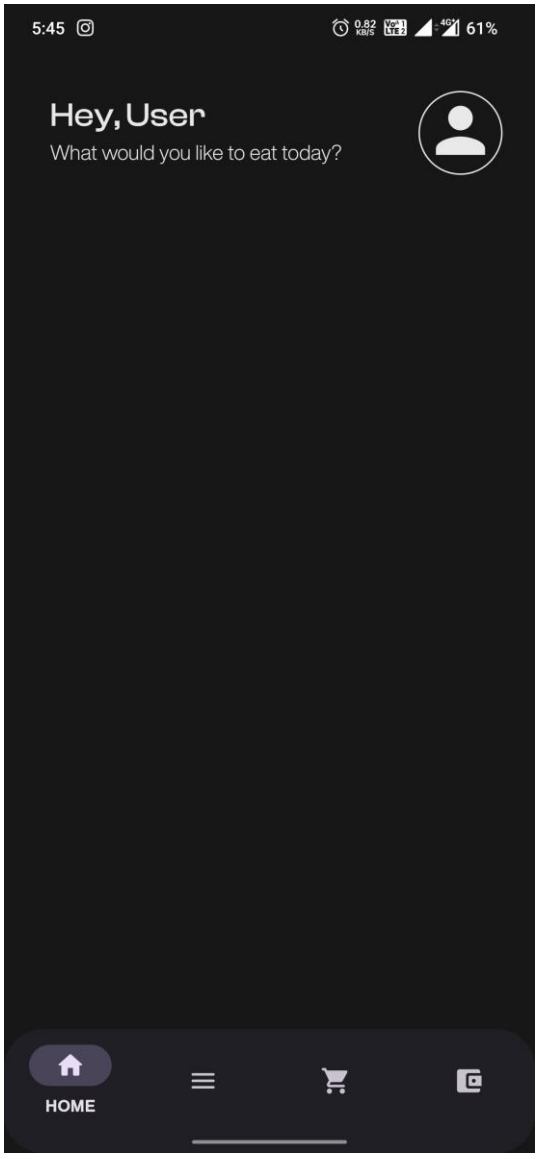


Fig 5: Mobile Application Interface-2 (Home Screen)

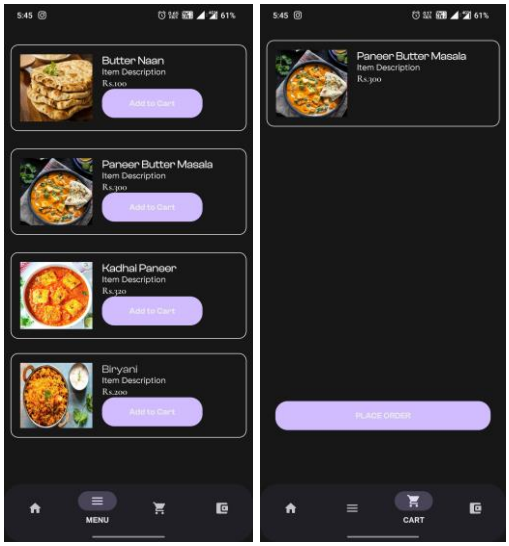


Fig 6: Mobile Application Interface-3 (Menu)

ACKNOWLEDGMENT

We sincerely thank **Ajeenkya D.Y. Patil University** for providing the resources and platform to undertake this project. Our deepest gratitude goes to our mentor, **Ms. Kavita Kushwah**, for her invaluable guidance, support, and insights that were instrumental in the success of Ezy Eats. We also appreciate the encouragement and constructive feedback from our peers and faculty members, which played a significant role in refining our work.

REFERENCES

1. Smith, J., and Brown, A., "Improving Campus Dining with Technology," Journal of Higher Education Systems, vol. 25, no. 3, pp. 145–157, 2020.
2. Kumar, R., "Application of QR Code Systems in Canteen Management," International Journal of Software Solutions, vol. 34, no. 4, pp. 98–110, 2021.
3. Zhang, W., Lee, T., and Gao, R., "Real-Time Order Management Using Firebase," in Proceedings of the IEEE Cloud Conference, 2022, pp. 245–250.
4. Johnson, P., "Role of Mobile Payments in Modern Retail," Journal of FinTech Innovations, vol. 7, no. 2, pp. 52–60, 2021.
5. Roy, T., and Sharma, V., "Feedback Systems in Food Delivery Apps," International Journal of Customer Experience, vol. 3, no. 1, pp. 32–40, 2020.
6. Bansal, K., and Mehta, S., "Digital Wallets in Campus Ecosystems," Journal of Emerging Financial Technologies, vol. 15, no. 1, pp. 74–86, 2022.
7. Chen, L., and Gao, R., "Inventory Management Techniques in Small Businesses," Journal of Supply Chain and Logistics, vol. 9, no. 3, pp. 112–125, 2021.
8. Gupta, A., "User-Centric Mobile App Design for Beginners," Tech Trends Weekly, vol. 2, pp. 20–25, 2020.
9. Martin, K., and Singh, J., "Crowd Management in Real-Time Systems," International Journal of Public Administration Technologies, vol. 12, no. 4, pp. 183–199, 2021.
10. Patel, V., "The Impact of Digital Transformation in University Cafeterias," University Tech Review, vol. 16, no. 2, pp. 90–95, 2020.

11. Jones, H., “Firebase for Mobile Applications: A Review,” Software Engineering Today, vol. 18, pp. 42–50, 2021.
12. Lee, D., “Order Scheduling Algorithms in Food Services,” Journal of Computational Services, vol. 7, no. 4, pp. 213–218, 2020.
13. Das, P., and Kapoor, R., “Analyzing User Feedback for Continuous Improvement in Services,” Customer Insight Quarterly, vol. 6, no. 3, pp. 110–125, 2021.
14. Watson, R., “Integration of IoT in Smart Dining,” IEEE Transactions on IoT Systems, vol. 9, no. 1, pp. 155–160, 2022.
15. Kim, Y., “Case Study: Improving UX in Food Ordering Apps,” Journal of Interaction Design, vol. 5, pp. 37–43, 2021.
16. George, P., and Hanks, L., “Cloud-Based Solutions for Food Services,” International Cloud Applications Journal, vol. 3, pp. 72–88, 2020.
17. Smith, A., and Parker, T., “Real-Time Analytics in Campus Dining,” in Proceedings of the Annual Tech Summit, 2021, pp. 300–310.
18. Brown, L., “Mobile Payment Gateways and Their Role in Food Services,” FinTech Applications Quarterly, vol. 10, no. 3, pp. 15–22, 2022.
19. Williams, T., “Advances in Crowd-Level Tracking Algorithms,” IEEE Systems Science Journal, vol. 8, no. 4, pp. 212–222, 2021.
20. Hassan, R., “Exploring Secure Payment Systems in Apps,” Journal of Cybersecurity Trends, vol. 6, pp. 98–105, 2020.