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An Innovative Kot Ordering System for Restaurants

Arshiyanaz Saiyad[1], Disha Aher[2], Punam Rajguru[3], Manasi Mahajan[4], Kishor Mahale[5]
[1, 2, 3, 4]*Student Of Information Technology, Department Of Information Technology, MET's Institute of Engineering, Nashik, India*
[5]*Guide, Professor, Department Of Information Technology, MET's Institute of Engineering, Nashik, India*

Abstract: ***This study proposes a digital menu ordering system to address challenges in the restaurant industry's digital transformation. Traditional paper-based methods lead to losses and inefficiencies. The system, using QR codes, enables customers to register, log in, and order online, with features like suggesting popular dishes and online payments. Managers gain real-time oversight of orders, tables, and payments, supported by sales data visualization. By automating tasks, the system reduces errors, enhances service, and streamlines operations, offering a transformative solution to industry challenges in the digital era.***

Keywords: KOT, QR Codes, Digital Menu Ordering System, Restaurant Industry Digital Transformation, Online Payments, Customer Experience, Efficiency Improvement, Order Tracking, Payment Processing.

I. INTRODUCTION

In the midst of a sweeping digital transformation within the restaurant industry, this study delves into the challenges faced by dining establishments, particularly the substantial losses attributed to traditional paper-based ordering methods.n response, this research proposes a digital menu ordering system designed to revolutionize traditional processes. By harnessing the power of QR codes, the system enables customers to seamlessly register, log in, and place orders online.

II. LITERATURE SURVEY

The paper [1] "Relationships among Hedonic and Utilitarian Values, Satisfaction, and Behavioral Intentions in the Fast- Casual Restaurant Industry" by K. Ryu and H. Han exploresthe interplay between hedonic and utilitarian values in thefast-casual restaurant industry, investigating their influence on customer satisfaction and subsequent behavioral intentions. This study sheds light on the intricate dynamics shaping the dining experience.

The paper [2] "Computer Implemented Method and System for Ordering Food from a Restaurant" by J. E. Crawford, the paper introduces an innovative computer-based method andsystem designed to streamline the food ordering process from restaurants. Crawford's work highlights the potential for technological advancements to enhance and simplify the way customers order food.

The paper [3] "Self-Service Technologies: Understanding Customer Satisfaction with Technology-Based Service Encounters" by M.L. Meuter, A. L. Ostrom, R. I. Roundtree, and

M. J. Bitner: This article, featured in the Journal of Marketing, scrutinizes customer satisfactionwithin technology-based service encounters, with a specific focus on self-service technologies, offering valuable insights into the evolving landscape of customer service.

The paper [4] "What is Self Service" by J. Spacey: J. Spacey's business guide provides a comprehensive explanation of the concept of self-service in various business contexts, helpingreaders grasp the significance and applications of self- service strategies.

The paper [5] "Self-Service Technology for Restaurants" by E. Lord: Lightspeed's article introduces an affordable and user-friendly self-service ordering system tailored for small and medium-sized restaurants, highlighting its potential to enhance operational efficiency and customer experiences.

The paper [6] "Most Common Restaurant Complaints Include Dirty Forks, Wrong Checks" by

H. Kristin: This article underscores the prevalent restaurant complaints concerning unclean utensils and inaccurate bills, emphasizing the importance of addressing these issues in the foodservice industry.

The paper [7] "Restaurant Guest Service System and Method" by P. C. Ramini: Ramini's document outlines an innovative system and method aimed at enhancing restaurant guest service, offering a glimpse into the future of dining experiences.

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III. AIM & OBJECTIVE

The aim of proposed system is creating a user-friendly, secure, a seamless food ordering solution utilizing Quick Response (QR) codes. This cutting-edge technology promises to revolutionize the way patrons interact with restaurants, ensuring a hassle-free and delightful dining experience.

A. Objective

1) To achieve order accuracy
2) To enhance the dining experience
3) Reducing miscommunication and delays
4) A user-friendly interface, precise orders, and attentive service
5) Transparent and precise billing and handling special requests

IV. MOTIVATION

The Kitchen Order Ticket (KOT) project is motivated by the urgent need for modernization in the restaurant industry. Facing challenges like manual order-taking, communication bottlenecks, order inaccuracies, and paper-based management, we aim to revolutionize operations. Our primary goal is to enhance operational efficiency by automating order processes, eliminating delays, and ensuring swift, accurate kitchen deliveries. Moreover, we prioritize customer satisfaction by minimizing order errors, reducing wait times, and simplifying billing. In alignment with industry trends, the project embraces sustainability by reducing paper waste and harnesses data analytics to inform data-driven decisions. Ultimately, KOT envisions a dining experience where technology and culinary artistry seamlessly blend to create memorable occasions.

V. METHODOLOGY

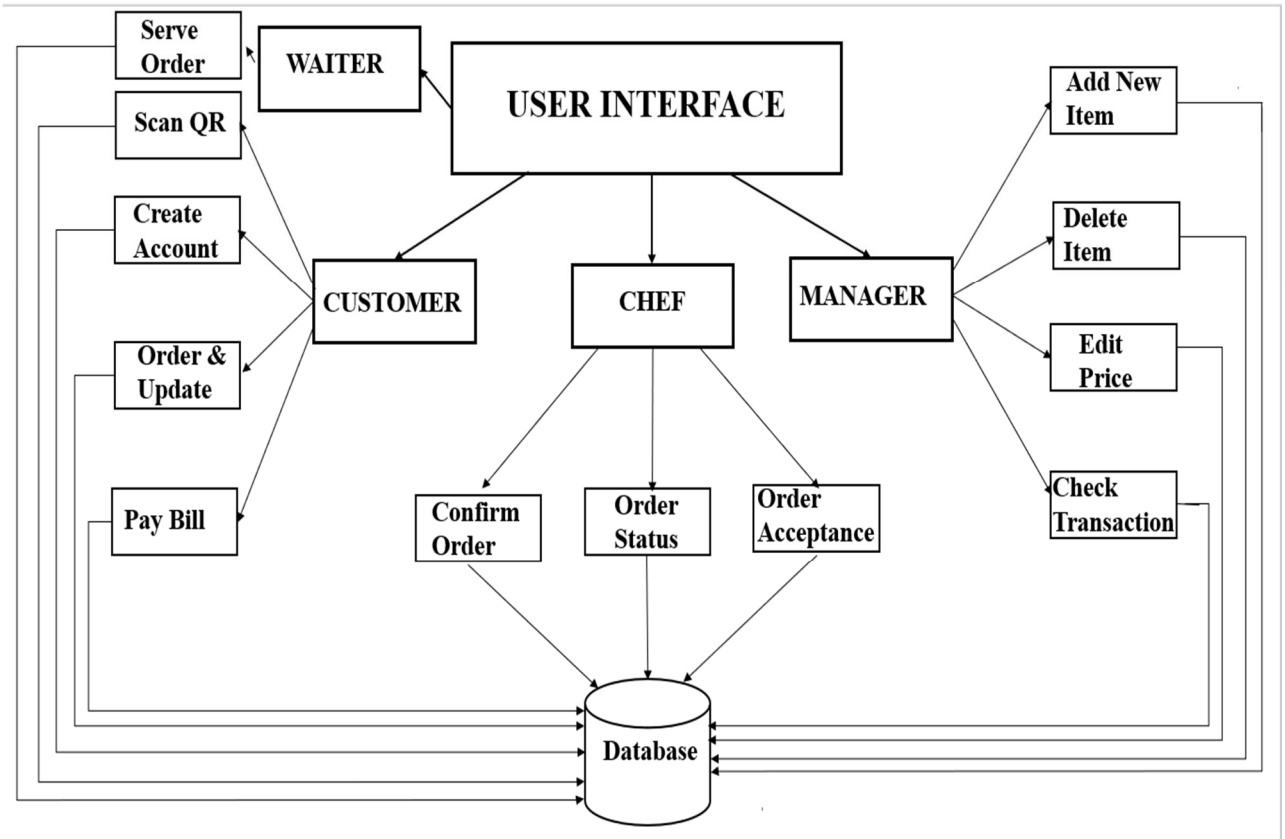


Fig 1: Block Diagram

VI. ALGORITHM

A. QR Code Detection and Information Extraction Algorithm

1) *Image Preprocessing:* Convert the input image to grayscale andapply techniques likeGaussian blurring to reduce noise.
2) *QR Code Detection:* Utilize a library like OpenCV to detectpotential QR code regions in thepreprocessed image.
3) *QR Code Localization:* Use edge detection algorithms (e.g., Cannyedge detection) to identify the corners of the QR code.
4) *QR Code Decoding:* Decode the QR code using a QR codedecoding library like ZBar orzxing.
5) *Information Extraction:* Extract relevant information from the decoded QR code, such astable number or menu details. Use error correction algorithms such as Reed-Solomon codes toensure accurate decoding.
6) *Voice Recognition and Direction Parsing Algorithm*
7) *Voice Input Processing:* Capture and preprocess the voice inputusing signal processingtechniques to remove noise.
8) *Speech-to-Text Conversion:* Utilize a speech recognition librarylike Google SpeechRecognition or CMU Sphinx to convert the voice input into text.
9) *Direction Parsing:* Parse the text input to identify direction commands and associated distance

VII. SYSTEM ARCHITECTURE

Below figure shows how the customers, manager, cashier, kitchen, and waiter are connected. The proposed system would have its server running in a cloud (Microsoft Azure) and employees of the restaurant can access the website in their mobile phones via internet while customers can access the website by scanning a QR code which will redirect them to the website. Employees can access the system as long as they are authorized. Any menu changes made by the manager will be seen by the others. Customers account orders will not be deleted as long as the cashier does not clear their table orders, allowing the customers to connect and disconnect.

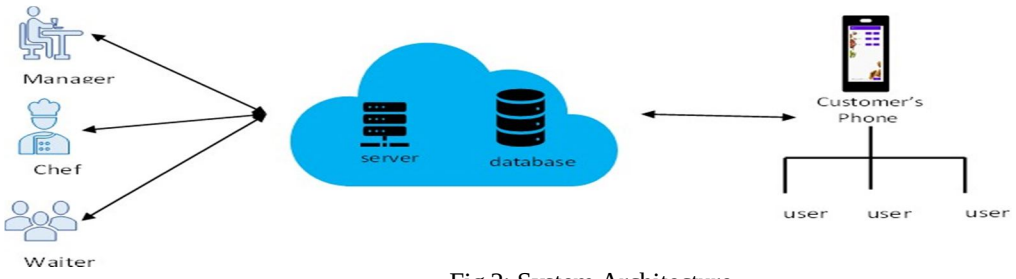
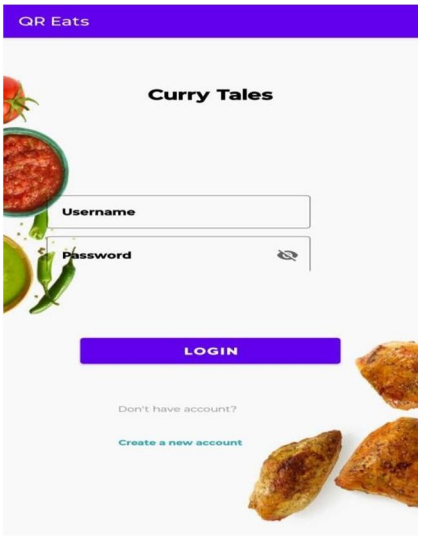


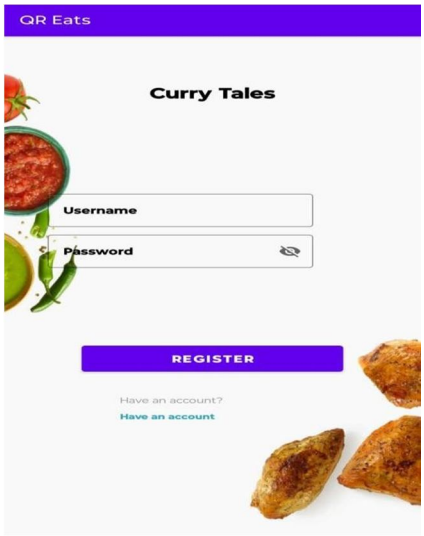
Fig 2: System Architecture

VIII. RESULTS

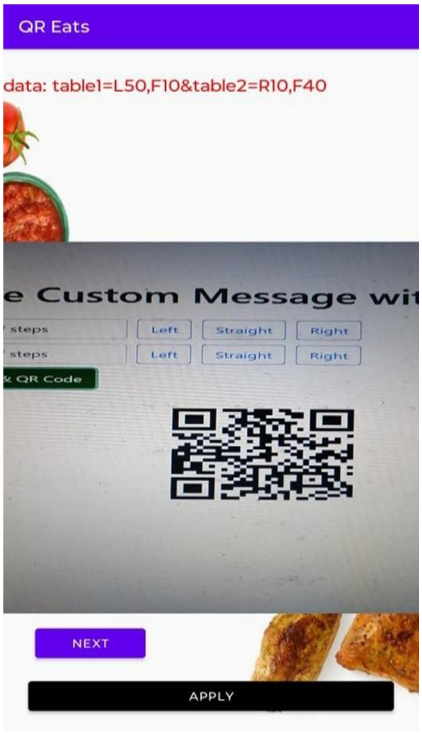
A. UI OF APP



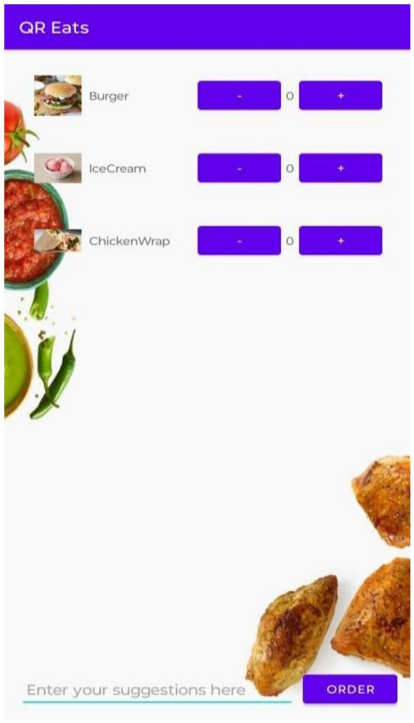
1.Login Page



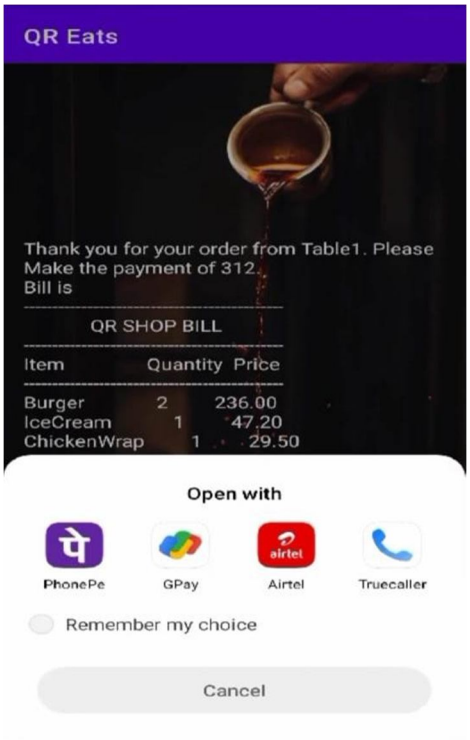
2.Register Page



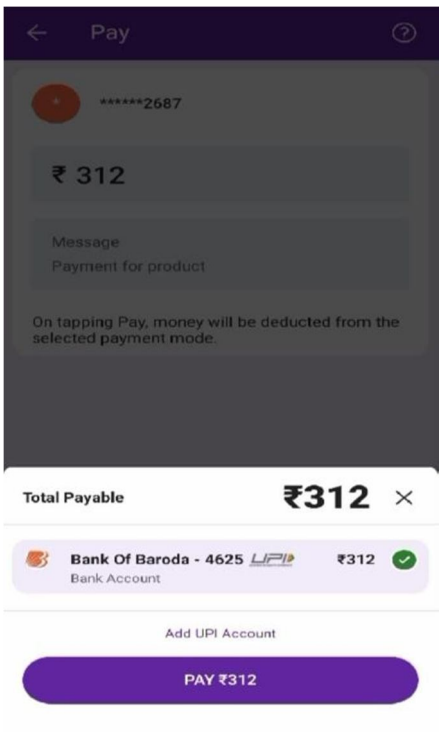
3. QR Scan



4.Menu

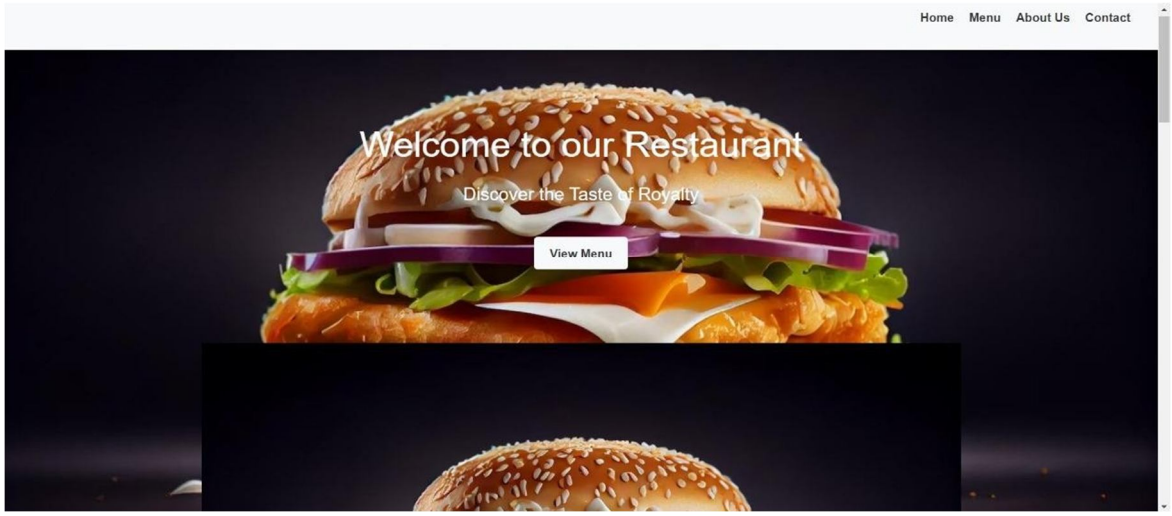


5.Bill & Payment Options

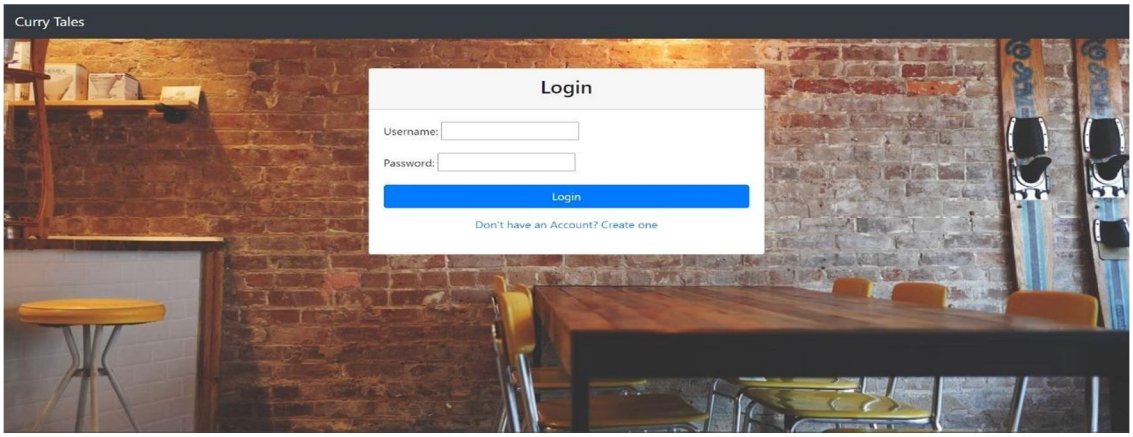


6.Pay

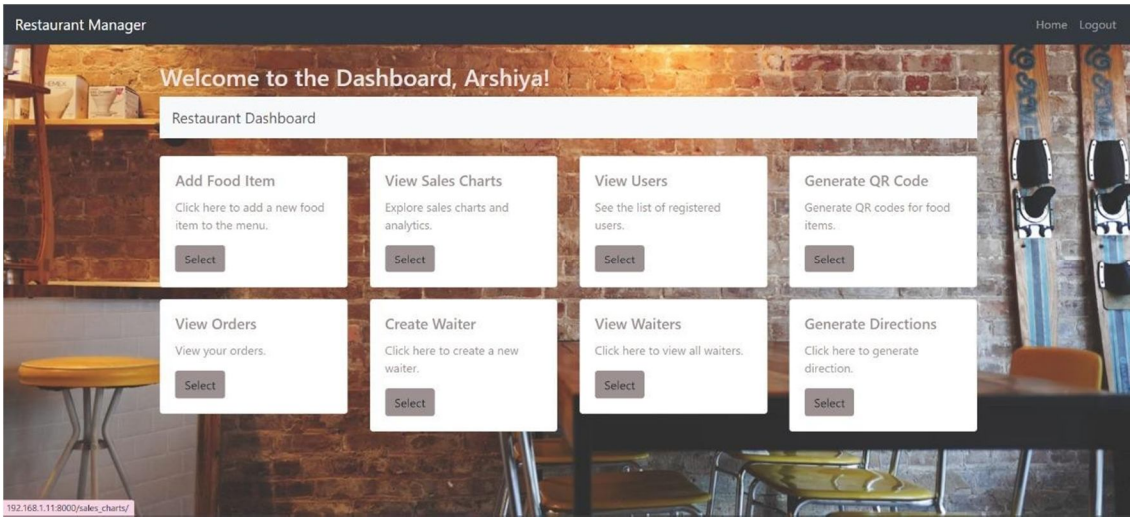
A. Website1.Website



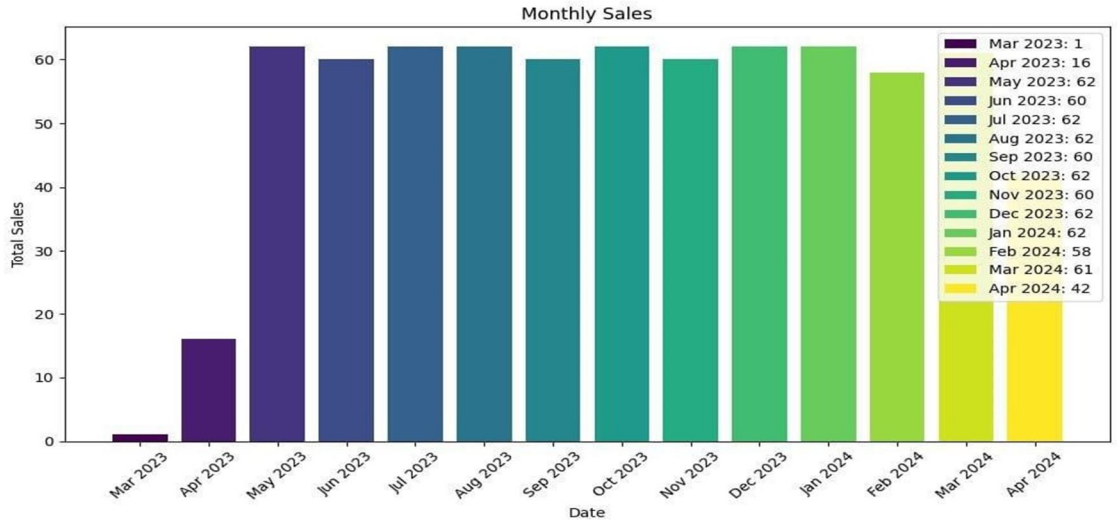
B. Login



C. Dashboard



D. Sales



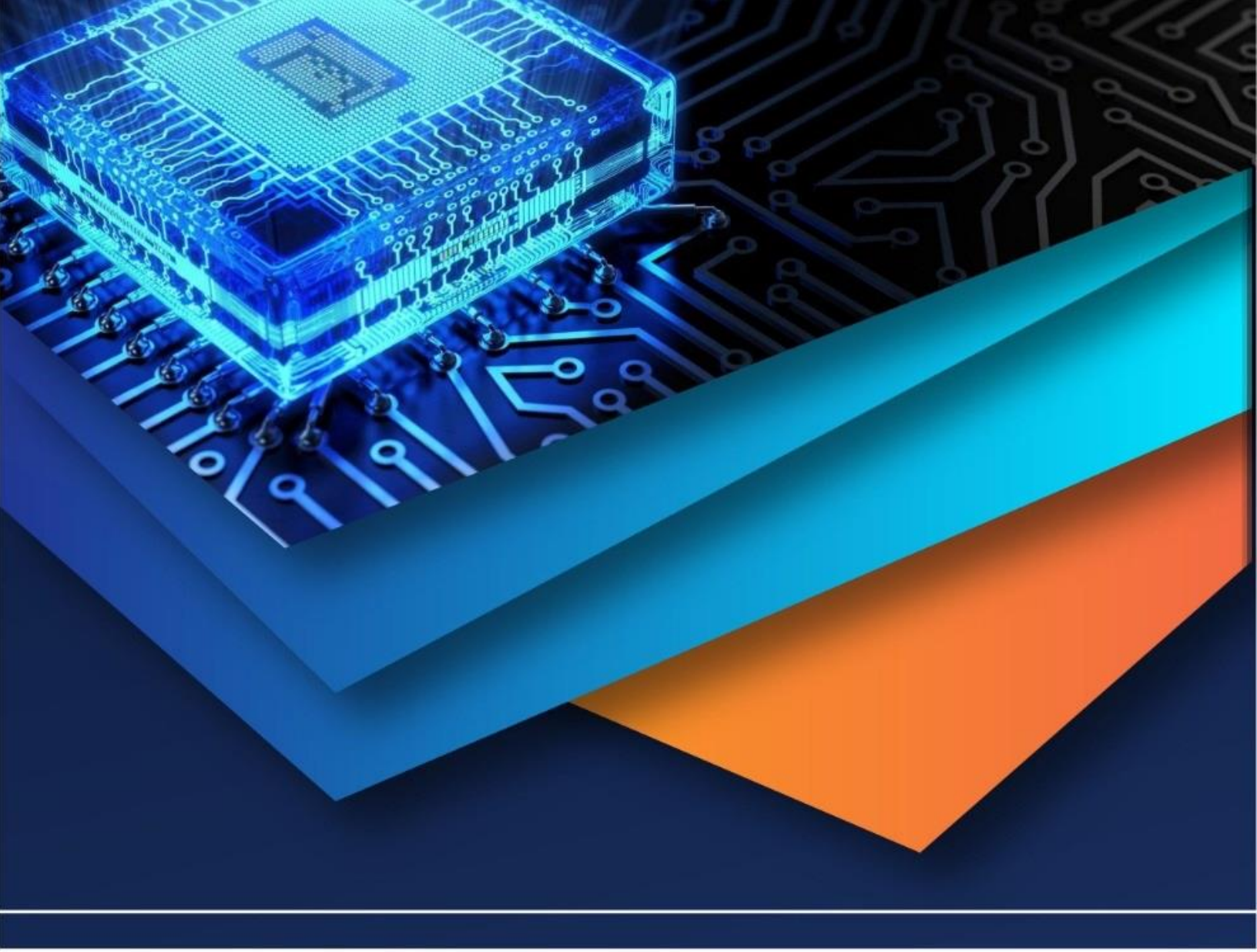
IX. CONCLUSION

The researchers were able to develop an innovative KOT ordering system for restaurants to improve the servicequality of a casual fine dining restaurant in terms of fast ordering and payment. Issues on Responsiveness will therefore be addressed. Errors in order taking maybe prevented. The reports that the system will generate will also aid the management in decision making as and plan for sales and marketing strategies.

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