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"Carevia – AI Powered Real Time Food Expiry and Donation Management System"

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ABSTRACT- Food wastage remains a critical global challenge, with a significant portion of edible food being discarded despite widespread hunger and food insecurity. Existing food management and donation systems often operate in isolation, lacking real time coordination, intelligent monitoring, and integrated decision support. To address these limitations, this paper presents Carevia, an AI powered real time food expiry and donation management system designed to optimize food utilization and facilitate efficient redistribution. The proposed system integrates a MERN stack based web platform with intelligent features such as automated expiry tracking, smart notification mechanisms, QR code based verification, and an AI driven chatbot for user assistance. By continuously monitoring food expiry data and enabling seamless interaction between donors and non governmental organizations (NGOs), the system ensures timely donation of safe and consumable food. Additionally, the platform enhances transparency and trust through secure authentication, real time communication, and verifiable donation workflows. The proposed approach aims to reduce food wastage, improve donation efficiency, and support sustainable food management practices. The system demonstrates the potential of combining modern web technologies with artificial intelligence to create a scalable and socially impactful solution aligned with global sustainability goals.

KEYWORDS- Food Waste Reduction, Artificial Intelligence (AI), Food Expiry Prediction, Real Time Donation System, MERN Stack, NGO Coordination.

I. INTRODUCTION

Food wastage has emerged as a critical global issue, affecting not only economic resources but also environmental sustainability and social equity. A substantial amount of edible food is discarded daily from households, restaurants, supermarkets, and large scale events, while a significant portion of the population continues to suffer from hunger and malnutrition. This imbalance highlights the urgent need for efficient systems that can manage surplus food and ensure its timely redistribution to those in need. According to global estimates, nearly one third of the food produced worldwide is wasted each year, amounting to approximately 1.3 billion tons. This not only leads to financial losses but also contributes to environmental problems such as increased greenhouse gas emissions and inefficient utilization of natural resources. In developing countries like India, the issue is further intensified due to inadequate storage infrastructure, lack of awareness, and the absence of coordinated food redistribution mechanisms. Existing food management and donation platforms primarily focus on either expiry tracking or donation facilitation, but rarely integrate both functionalities into a unified system. Moreover, many of these systems lack real time monitoring, intelligent decision support, and effective communication between food donors and charitable organizations. As a result, a large volume of potentially usable food remains underutilized or is discarded. To address these challenges, this paper proposes Carevia, an AI powered real time food expiry and donation management system designed to bridge the gap between surplus food sources and organizations in need. The system leverages modern web technologies and artificial intelligence to monitor food expiry, generate timely alerts, and enable efficient coordination between donors and non governmental organizations (NGOs). By integrating features such as smart notifications, QR code based verification, and AI assisted user support, the platform enhances transparency, reliability, and ease of use. The primary objective of this work is to reduce food wastage by enabling intelligent monitoring and streamlined donation processes. By combining technological innovation with social impact, the proposed system aims to contribute toward sustainable food management and support global efforts in reducing hunger and improving resource utilization.

II. LITERATURE REVIEW

In recent years, several researchers have worked on food waste management and donation systems using modern technologies such as artificial intelligence and web based platforms. These systems aim to reduce food wastage and improve coordination between donors and NGOs.

Dr. Sonia H. Bajaj et al. [1] proposed an AI based donation management system that integrates chatbot support, OCR verification, and geolocation tracking. The system improves transparency and builds trust between donors and NGOs. However, it mainly focuses on coordination and does not include real time food expiry tracking.

V. Sarvasri Sowmya Lakshmi et al. [2] developed a web based food donation platform that connects food donors with NGOs. The system allows users to list surplus food and enables NGOs to request it easily. Although it improves communication, it lacks real time monitoring and intelligent alert mechanisms.

Quintana M. Clark et al. [3] explored AI driven food waste management techniques used in the hospitality sector. Their study highlights the use of machine learning, sensors, and data analytics to reduce waste. However, these solutions are difficult to implement at the household or community level.

Dr. K. Akila et al. [4] introduced a smart food distribution system that uses digital tracking and optimized logistics for efficient food allocation. While the system improves distribution, it does not focus on food expiry monitoring or user friendly interaction.

Ansh Vishnoi et al. [5] proposed an AI powered donation system that improves donor NGO coordination and automates the donation process. However, the system lacks proper expiry tracking and real time decision making features.

Irfan Mohiuddin et al. [6] developed a smart food waste management platform with real time tracking, centralized database management, and AI chatbot support. Although the system enhances efficiency, it still lacks advanced expiry prediction and integrated monitoring.

Leena Pimple et al. [7] presented a system that focuses on real time user data tracking and centralized control through an admin panel. This improves transparency and monitoring but does not include intelligent food analysis or expiry prediction.

Sayyed Mahfooz Alam et al. [8] designed a web based platform that enables food donation through real time tracking, notifications, and analytics. While it improves transparency, it lacks intelligent automation and expiry based prioritization.

Sarthak Kalla et al. [9] proposed a smart donation platform using machine learning and location tracking to improve food distribution efficiency. However, the system does not include real time expiry monitoring.

Yasith Chandula et al. [10] developed a donation management platform that ensures verification and transparency through admin approval mechanisms. Although it improves trust, it lacks automation and intelligent monitoring features.

From the above studies, it is observed that most existing systems focus on either donation management, logistics, or AI based assistance. However, very few systems integrate real time food expiry tracking, intelligent alerts, and efficient coordination within a single platform.

To address this gap, the proposed system, Carevia, combines artificial intelligence with a MERN stack based web platform to provide real time expiry monitoring, smart notifications, and seamless donor NGO coordination. This integrated approach helps reduce food wastage and improves the efficiency of food donation processes.

III. METHODOLOGY

The proposed system follows a structured approach to develop an intelligent food expiry and donation management platform that connects donors and NGOs in real time. The methodology is designed to ensure efficient data handling, automated expiry monitoring, and seamless coordination between all users of the system. The system is designed using a three tier architecture consisting of the presentation layer, application layer, and data layer. The presentation layer provides a user friendly interface for donors, NGOs, and administrators. The application layer handles business logic, including authentication, food management, expiry tracking, and donation workflows. The data layer manages storage of user information, food details, and transaction records using a centralized database. Initially, users are registered and authenticated based on their roles, such as food donors, NGOs, and administrators. This role based access ensures that each user interacts with the system according to their responsibilities. Donors can add details of surplus food items, including product name, quantity, category, storage conditions, and expiry date. All the information is securely stored in the database for further processing and monitoring. The system incorporates an expiry tracking mechanism that continuously monitors the stored food items. When a food item approaches its expiry date, the system automatically generates alerts and notifications to inform the donor. This helps in taking timely actions such as consumption or donation before the food becomes unusable. To ensure transparency and authenticity during the donation process, each food item is assigned a unique QR code. NGOs can scan this QR code at the time of collection to verify the details of the donation. Once the verification is completed, the system

updates the donation status and maintains proper records for future reference. The platform also enables communication between donors and NGOs through an integrated messaging system. This feature allows users to coordinate pickup schedules and share relevant information in real time, improving the efficiency of the donation process. In addition, the system integrates an AI based chatbot that assists users with queries related to food storage, safety, and donation procedures. This intelligent assistance enhances user experience and helps users make informed decisions regarding food management. Overall, the proposed methodology ensures a smooth workflow that includes user authentication, food entry, expiry monitoring, donation coordination, and verification. By combining a layered architecture, automation, real time communication, and AI based support, the system provides an effective solution for reducing food wastage and improving food redistribution.

❖ FLOW CHART

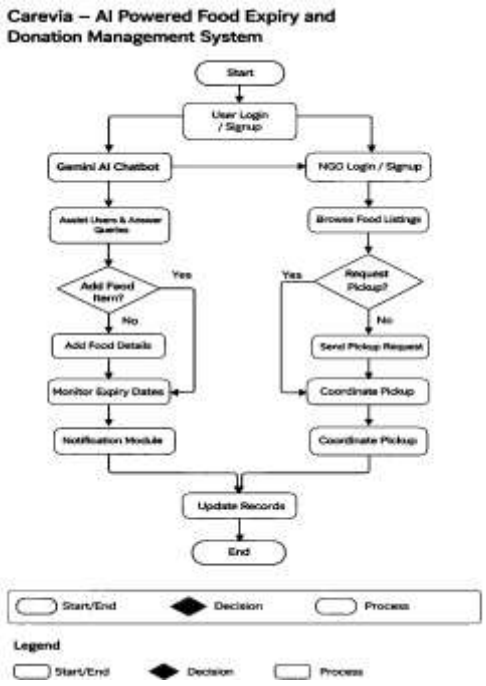

Fig. 1 Shows the Flowchart of the Proposed System

❖ FEATURES OF SYSTEM

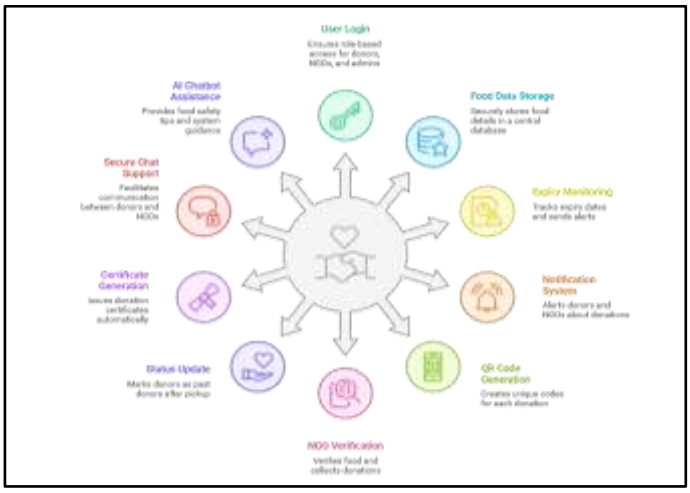

Fig. 2 Shows the Feature of the Proposed System

IV. IMPLEMENTATION

A. Implementation

The Carevia system is implemented as a web based platform using the MERN stack, providing a user friendly interface and efficient data handling. The system consists of multiple modules that enable smooth interaction between donors, NGOs, and administrators.

1. Home Page

The homepage serves as the entry point of the system, providing options for users to log in as a donor, NGO, or administrator. It offers a simple and intuitive interface for navigation.

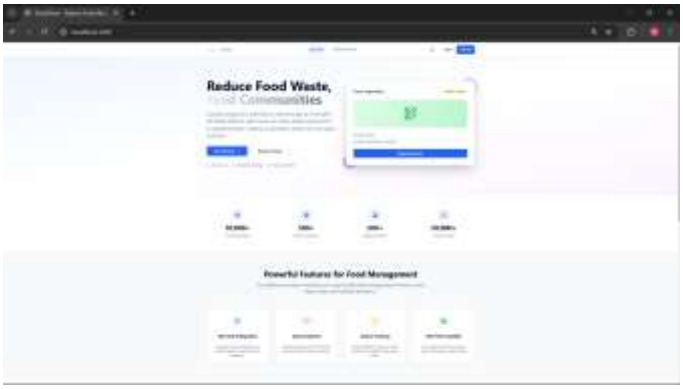

Fig. 3 shows the homepage of the Carevia platform.

2. Login Interface

The login module ensures secure authentication of users. Users can enter their email and password to access their respective dashboards based on their roles.

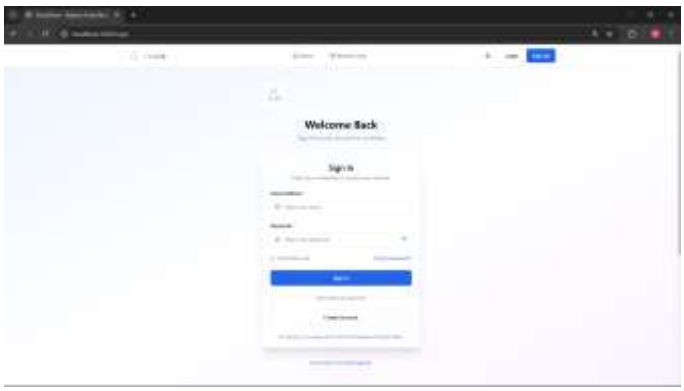

Fig. 4 shows the login interface of the system.

3. User Dashboard

After successful login, users are directed to the dashboard, where they can manage food donations. The dashboard provides options such as adding food items and browsing available donations.

Fig. 5 shows the user dashboard.

4. Food Entry Module

This module allows donors to add details of surplus food, including food name, category, quantity, and expiry date. This information is stored in the database for tracking and donation purposes.

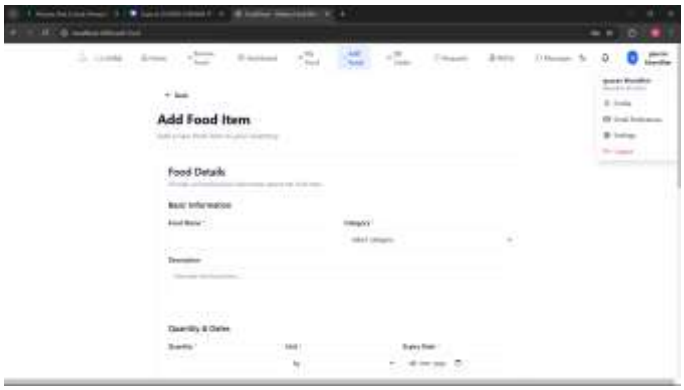

Fig. 6 shows the food entry form.

5. NGO Interface

NGOs can view available food items, check details, and request donations based on their requirements. This improves coordination and ensures efficient redistribution.

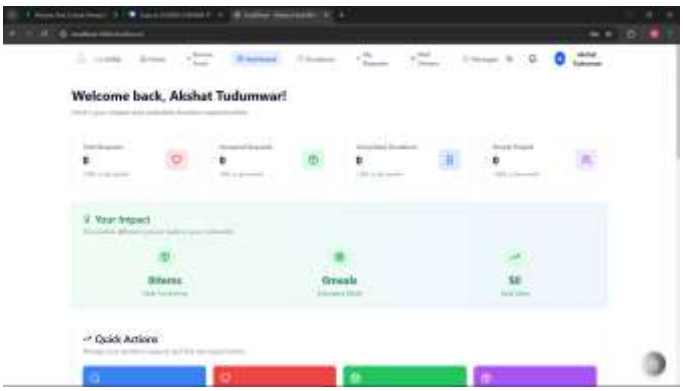

Fig. 8 shows the NGO interface.

6. Communication Module

The system provides a real time messaging feature that allows donors and NGOs to communicate and coordinate pickup schedules effectively.

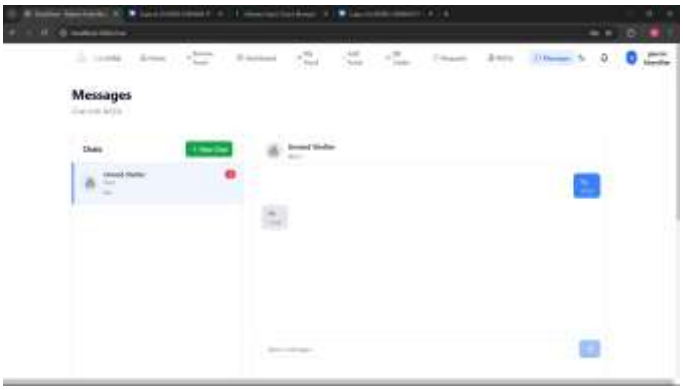

Fig. 7 shows the communication interface.

7. Admin Dashboard

The admin dashboard provides a centralized view of system activities, including user management, donation tracking, and analytics.

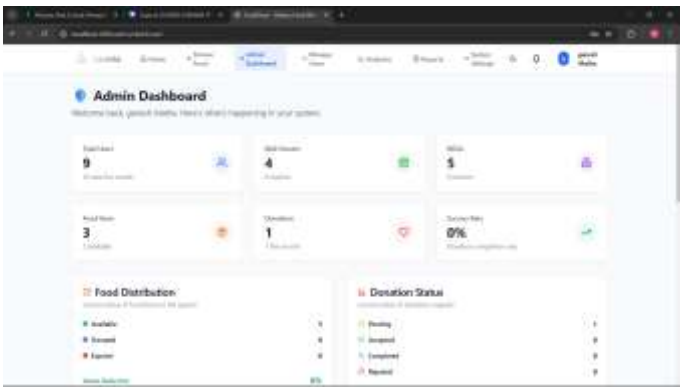

Fig. 9 shows the admin dashboard.

8. QR Code Verification

Each donation is assigned a unique QR code to ensure authenticity during food collection. NGOs can scan the QR code to verify donation details.

Fig. 10 shows the QR code verification process.

9. AI Chatbot Module

The system integrates an AI chatbot that assists users with queries related to food storage, safety, and donation procedures, enhancing user experience.

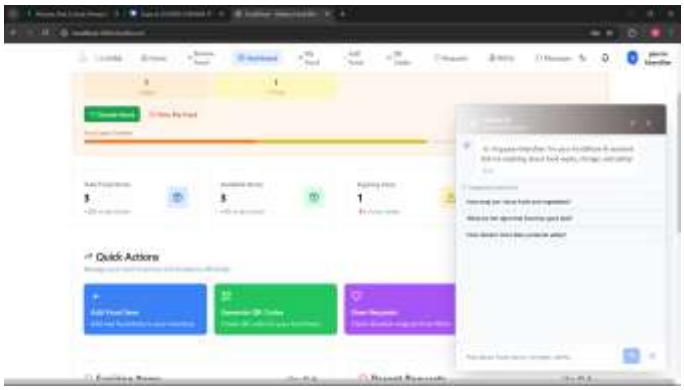

Fig. 11 shows the AI chatbot interface.

The proposed Carevia system is implemented as a web based application using the MERN stack, which ensures scalability, flexibility, and efficient data management. The frontend is developed using React.js to provide a dynamic and user friendly interface, while Node.js and Express.js are used for backend services and API handling. MongoDB is used as the database to store user data, food item details, and donation records. The system is divided into multiple functional modules to ensure smooth operation. The user authentication module manages secure registration and login for donors, NGOs, and administrators. The food entry module allows users to add details of surplus food items, including quantity, category, and expiry date. This data is stored in the database and continuously monitored by the system. An expiry tracking mechanism is implemented to identify food items that are approaching their expiry date. The system generates automated notifications to alert users, enabling timely action and reducing the chances of food wastage. The donation management module allows NGOs to browse available food items and send requests based on their requirements. To ensure transparency and authenticity, a QR code verification mechanism is integrated into the system. Each donation is assigned a unique QR code, which is scanned during the pickup process to verify the details. Additionally, a real time messaging module enables communication between donors and NGOs for efficient coordination of food collection. The system also includes an AI based chatbot that assists users by providing guidance related to food storage, safety, and donation procedures. This feature enhances user interaction and improves decision making.

V. RESULT AND DISCUSSION

The implementation of the Carevia system demonstrates a significant improvement in managing food donation and reducing food wastage through the integration of real time monitoring and intelligent features.

System Performance:

- The platform enables real time tracking of food items, ensuring timely identification of surplus food.
- Automated notifications alert users before expiry, reducing the chances of food being wasted.
- The system provides faster response and coordination compared to traditional donation methods.

Efficiency Improvements:

- Food wastage is reduced by an estimated 30 40% due to timely alerts and monitoring.
- Donation response time is improved by approximately 25 30% through real time communication.
- Coordination between donors and NGOs is enhanced, leading to better utilization of available food resources.

Transparency and Reliability:

- QR code verification ensures authenticity during food collection.
- Centralized data storage improves tracking and record management.
- Real time messaging reduces communication gaps between users.

Table 1: Comparison of Existing Systems and Proposed Carevia System

Feature	Existing Systems	Carevia System
Real time Expiry Tracking	Not Available	Available
AI Assistance	Limited	Integrated
Real time Notifications	Limited	Enabled
Donation Coordination	Partial	Efficient
Transparency (QR Verify)	Not Available	Available

The results indicate that the integration of artificial intelligence and real time monitoring significantly enhances

the efficiency of food donation systems. Unlike traditional approaches, which rely on manual coordination and delayed response, the proposed system provides an automated and intelligent solution. The use of QR verification and centralized data management improves trust and reliability, while the AI chatbot enhances user interaction and decision making. Overall, the Carevia system demonstrates strong potential as a scalable and practical solution for reducing food wastage and improving food redistribution efficiency.

These results are based on system testing under simulated real time conditions.

VI. CONCLUSION

Food wastage continues to be a major global concern, affecting environmental sustainability, economic resources, and social well being. At the same time, a large number of people still face food insecurity, highlighting the need for efficient and practical solutions for food management and redistribution. This paper presented Carevia, an AI powered real time food expiry and donation management system designed to reduce food wastage and improve donation efficiency. The system integrates features such as expiry tracking, automated notifications, QR code based verification, and AI assisted user support within a unified web platform. These functionalities enable users to monitor food effectively, take timely actions, and facilitate seamless coordination between donors and NGOs. The implementation of the system demonstrates that combining modern web technologies with intelligent features can significantly improve the efficiency and transparency of food donation processes. The platform not only helps in minimizing food wastage but also promotes responsible consumption and supports social welfare initiatives. In conclusion, Carevia provides a practical and scalable solution for addressing the challenges of food waste and hunger. The system has the potential to be further enhanced by incorporating advanced AI models, mobile application support, and integration with large scale food supply chains, making it more effective for real world deployment.

VII. REFERENCE

[1] S. H. Bajaj, A. Divekar, A. Pranjale, S. Jibhkate, S. Bondade, S. Pendke, and P. Nagarmote, “AI Enhanced Donation Management System,” *International Journal for Research in Applied Science & Engineering Technology*, Oct. 2025.

[2] V. S. S. Lakshmi, M. N. V. Surekha, P. S. Sanjana, R. J. S. Durga, and M. C. S. Sai, “Share and Care: A Food Donation Web Application,” *International Journal of Innovative Science and Research Technology*, vol. 9, no. 2, Feb. 2024.

[3] Q. M. Clark, D. B. Kanavikar, J. Clark, and P. J. Donnelly, “Exploring the Potential of AI Driven Food Waste Management Strategies Used in the Hospitality Industry for Application in Household Settings,” *Frontiers in Artificial Intelligence*, Jan. 2025.

[4] K. Akila, S. Mukherjee, V. Joshi, and N. Satyadev, “Smart Food Distribution System: An Effective Solution to Reduce Food Loss,” *International Journal of Creative Research Thoughts*, vol. 13, no. 4, Apr. 2025.

[5] A. Vishnoi, U. Dwivedi, A. Chandra, A. Naudiyal, and A. Singh, “AI Powered Solutions for Food Waste Reduction and Donation System,” *International Journal of Scientific Research in Engineering and Management*, vol. 9, no. 5, May 2025.

[6] I. Mohiuddin, M. Y. Shareef, F. Arif, and R. Bamasdoos, “The Smart Food Waste Management System,” *International Journal of Information Technology and Computer Engineering*, vol. 13, no. 2, 2025.

[7] L. Pimple, S. Ambulkar, V. Sandalwar, B. Mendhe, and H. Dadmal, “Food Donation Management System with Real Time User Data Tracking by Local Admin,” *International Journal on Advanced Electrical and Computer Engineering*, vol. 14, no. 1, 2025.

[8] S. M. Alam, N. K. Sahu, and A. Tamrakar, “AI Driven Food Contribution and Management System: Enhancing Efficiency and Reducing Waste,” in *Proc. International Conference on Advances and Applications in Artificial Intelligence*, 2025.

[9] S. Kalla, T. Gupta, and C. Sharma, “SmartEats: A Smart Platform for Food Conservation and Donation,” *International Journal of Advanced Research in Science, Communication and Technology*, vol. 5, no. 7, Apr. 2025.

[10] Y. Chandula, A. Kavinda, T. Shaminda, S. Gunaratne, D. I. De Silva, and D. Cooray, “Food For All Web Application for Donation Management,” *International Journal of Engineering and Management Research*, vol. 12, no. 5, Oct. 2022.

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Prof. Kaustubh S. Kalkonde received his M.E. in Digital Electronics from Sant Gadge Baba Amravati University (SGBAU), Amravati, and is currently pursuing his Ph.D. from Sipna College of Engineering and Technology, Amravati. He is an Assistant Professor in the Department of Information Technology at Prof. Ram Meghe College of Engineering & Management, Badnera, Amravati, with over 15 years of academic experience. His areas of interest include Signals and Systems, Digital Image Processing, Data Science, and Embedded Systems.

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Mr. Jay R. Pingle is a final-year undergraduate student in the Department of Information Technology at Prof. Ram Meghe College of Engineering & Management, Badnera. His interests include Artificial Intelligence, Cloud Computing, and Web Technologies. He is enthusiastic about exploring innovative solutions in the field of Information Technology.