IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 11, April 2026
Impact Factor: 8.2

Based Food Ordering System: A Technological Review of Intelligent Architecture, Core Components, and Future Directions

Limbani Shruti Dilipbhai and Mr. Mitul Raj
School of Engineering, P P Savani University, Surat, Gujarat, India

Abstract: *Artificial Intelligence (AI) has made big changes to modern food ordering systems by adding automation, personalization, and smart decision-making [1][2]. Traditional food ordering platforms are often not very efficient, can't adapt to changes in real time, and don't understand what users want, which makes customers unhappy. This paper provides an extensive examination of AI-driven food ordering systems, emphasizing their system architecture, fundamental technologies, operational workflow, and practical implementations. Machine Learning (ML) and Natural Language Processing (NLP) are two advanced technologies that are very important for improving recommendation systems and user interaction by looking at past data and making predictions about how users will act [3][4]. AI-powered chatbots and voice assistants make the ordering process even easier and faster. Cloud computing and database systems also support scalability, safe data management, and processing in real time. The study also looks at the benefits of AI-based systems, such as better efficiency, fewer mistakes made by people, more personalized service, and increased engagement with clients. There are also talks about problems like the high cost of implementation, worries about data privacy, and the complexity of the system. This paper examines upcoming developments, including connection with the Internet of Things, talented kitchens, and automatic delivery services.*

Keywords: Artificial Intelligence, Food Ordering System, Machine Learning, Natural Language Processing, Recommendation System, Cloud Computing

I. INTRODUCTION

The food industry has changed a lot because digital technologies have advanced so quickly. Now, a lot of people use online food ordering systems [8]. Customers now want easy and quick ways to order food because more and more people are using smartphones, the internet, and mobile apps. Traditional food ordering methods that rely on standard procedures and simple digital interfaces often don't allow for personalization, are not very efficient, and don't have the ability to make smart decisions. Because of these limits, people have to wait longer, there are more chances for mistakes, and customers are less happy.

Artificial Intelligence has become a strong way to deal with these problems in recent years. AI-based food ordering systems use advanced algorithms to look at how users act, what they like, and what they have ordered in the past to give them personalized recommendations and make the service better overall [2]. With machine learning, systems can keep learning from how users interact with them and get better at making predictions over time. Natural Language Processing also makes it easy for users and systems to talk to each other by chatbots and audio-based platforms[4].

Businesses that use AI technologies not just make things better for customers, but they also make things run more smoothly. Automated order processing, smart recommendations, and real-time data analysis all help cut down on wait times, mistakes, and the best use of resources[10]. Cloud technology and database management platforms are safe and flexible ways to handle a lot of customer information and activities at once.

The growing need for wireless services has also sped up the use of AI-based food delivery services. These systems can do things like track orders in real time, accept digital payments, and provide digital customer service. As a food

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 11, April 2026
Impact Factor: 8.2

delivery service gets more competitive, companies are putting more money into AI technologies to get ahead of the competition and keep their customers. The goal of this paper is to look at these systems in depth, paying special attention in the architecture, technologies, functions, and future potential.

II. LITERATURE REVIEW

In the last ten years, placing orders for food systems went a long way. They used to be simple digital platforms, but now they use smart AI to work. Food ordering systems used to be generally unchanging, meaning that users had to look through menus and place orders by hand without requiring changes or machines [1]. These systems lacked the capability to analyze user preferences or provide intelligent suggestions, resulting in limited user experience and lower customer engagement.

With the advancement of technology, researchers introduced recommendation systems to enhance the functionality of food ordering platforms. Machine Learning (ML) techniques, particularly collaborative filtering and content-based filtering, were widely adopted to analyze user behavior and predict preferences [6]. These systems utilize historical data such as past orders, ratings, and browsing patterns to generate personalized recommendations, thereby improving customer satisfaction and increasing sales.

In recent years, the integration of Natural Language Processing (NLP) has further transformed food ordering systems by enabling conversational interfaces. NLP-based chatbots allow users to place orders using text or voice commands [4]. Deep learning techniques have also been introduced to improve the accuracy and performance of recommendation systems. Neural networks are capable of identifying complex patterns in user data, leading to more precise and context-aware suggestions [7].

Multiple studies have shown that AI-based food ordering systems make the user experience better, make operations more efficient, and help businesses grow [3][9]. But there are still problems with data privacy, system complexity, and high implementation costs that need to be addressed. The literature shows a clear trend toward smart, data-driven systems for ordering food.

TABLE I: COMPARISON OF FOOD ORDERING SYSTEM GENERATIONS

Generation	Technology	Key Feature	Limitation
1st Gen (2010-2015)	Static Web/App	Manual menu browsing	No personalization, no automation
2nd Gen (2015-2018)	ML / Collab Filtering	User preference analysis	Limited NLP, no voice support
3rd Gen (2018-2021)	NLP + Deep Learning	Conversational chatbots	High compute cost, data privacy
4th Gen (2021-Present)	AI + IoT + Cloud	Full automation, real-time AI	System complexity, model retraining

III. METHODOLOGY / SYSTEM OVERVIEW

A. System Architecture

The AI-based food ordering system is built using a structured architecture that combines many parts to make sure it works well and makes smart decisions [5]. The main parts are the user interface, the backend server, the AI engine, and the database management system. Each part is important for making sure that users have a smooth and personalized experience.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 11, April 2026
Impact Factor: 8.2

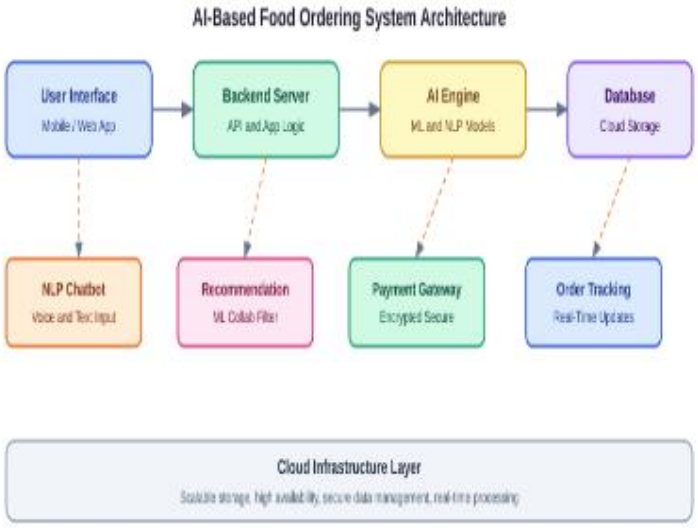

Fig. 1: AI-Based Food Ordering System Architecture

The user interface is the part of the system that the user interacts with. It can be a mobile app or a web platform. The backend server is in charge of the application's logic, handling user requests, and making sure that different parts of the system can talk to each other. The AI engine, which is the most important part, uses Machine Learning algorithms and predictive models to look at how users behave and make personalized suggestions [15]. The database management system keeps user profiles, order history, menu details, and transaction records in the cloud so that it can grow and be reliable.

B. Requirement Gathering

The requirement gathering phase used a number of methods to get a full picture of what users needed. Structured and semi-structured interviews were carried out with important people, such as customers, restaurant managers, and platform administrators. We used online surveys to get quantitative data on desired features, and we looked at how people currently order food to find areas where things could be better.

IV. TECHNOLOGIES USED

TABLE II: TECHNOLOGIES USED IN AI FOOD ORDERING SYSTEMS

Technology	Type	Function	Key Algorithm / Tool
Artificial Intelligence	Core Framework	Decision-making, automation	Neural Networks, Decision Trees
Machine Learning (ML)	Predictive	User preference modeling	Collaborative Filtering, Classification
Natural Language Processing	Interaction	Chatbot, voice order placement	Tokenization, Intent Recognition
Cloud Computing	Infrastructure	Scalable data storage and processing	AWS, Azure, Google Cloud
Database Systems	Storage	User profiles, orders, menus	MySQL, MongoDB, Firebase
Deep Learning	Advanced ML	Complex pattern recognition	CNN, RNN, LSTM

DOI: 10.48175/IJARSCT-33670

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 11, April 2026
Impact Factor: 8.2

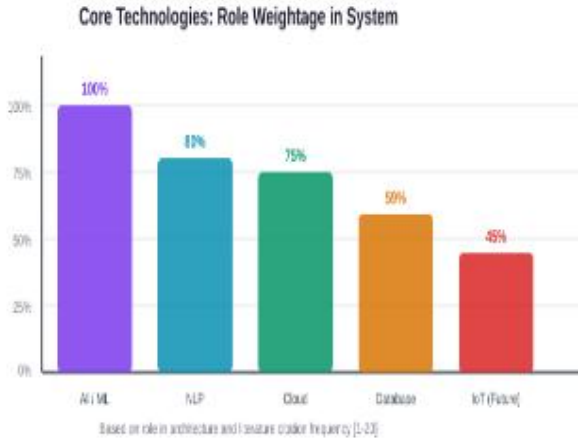

Fig. 2: Core Technologies — Role Weightage in System

Artificial Intelligence (AI) plays a big role in all this. It handles smart choices and takes over routine stuff, which saves time. I think what stands out is how it digs through tons of user info to pull out patterns. Those patterns then turn into suggestions that feel personal, like recommending food based on what you've liked before. And yeah, the whole system just runs smoother as a result.

Machine Learning (ML) comes in here too. It's the part that lets things improve on their own from all that data, without someone coding every little change. Models for collaborative filtering or classifying stuff, they predict tastes pretty well. Suggesting items that match, you know. The accuracy builds up as more data piles in, which makes sense but it feels like it could take a while sometimes.

Natural Language Processing (NLP) With natural language processing, users can just type or talk to it. Chatbots pick up on questions, figure out the language, and give back replies that actually fit. This way, ordering through a chat works without hassle. Some people might find voice inputs tricky, but it seems helpful for quick interactions. Overall, these tech bits tie together to make the recommendations sharper over time.

Cloud Computing basically provides all these tools for handling big amounts of data, you know, storing it and processing without too much hassle. It is scalable and flexible, so it can manage a bunch of users at the same time, and reliable enough that performance does not drop or anything.

Database Systems keep track of stuff like user profiles, what people have ordered before, menu items, and transaction records. Using cloud-based ones makes sense because they stay available, secure, and can expand as needed. I think that is key for modern setups.

V. SYSTEM WORKING / IMPLEMENTATION

The way this AI food ordering system runs involves a few steps to let users interact smoothly, get smart suggestions, and handle orders fast. It starts with the user logging in via a web page or app. Once in, they can browse the menu or chat with an AI bot. The system pulls in the users input and grabs relevant data from the database right then.

From there, the AI part digs into things like past orders, preferences, or even browsing history. Machine learning helps spot patterns and predict interests, leading to personalized food recommendations that match tastes pretty well. This cuts down decision time and improves the whole experience, it seems.

After selecting items, the user places the order. Payments go through a secure gateway, all encrypted to keep things safe from outsiders. The backend then forwards details to the restaurant, who starts preparing the food. Meanwhile, the system sends updates on confirmation or delivery status in real time.

Delivery happens, and then it prompts for a rating or feedback. That input gets stored in the database, and the AI uses it to refine suggestions and overall service. Not everything is perfect, but it helps keep improving. Sometimes the patterns in data are not straightforward.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 11, April 2026
Impact Factor: 8.2

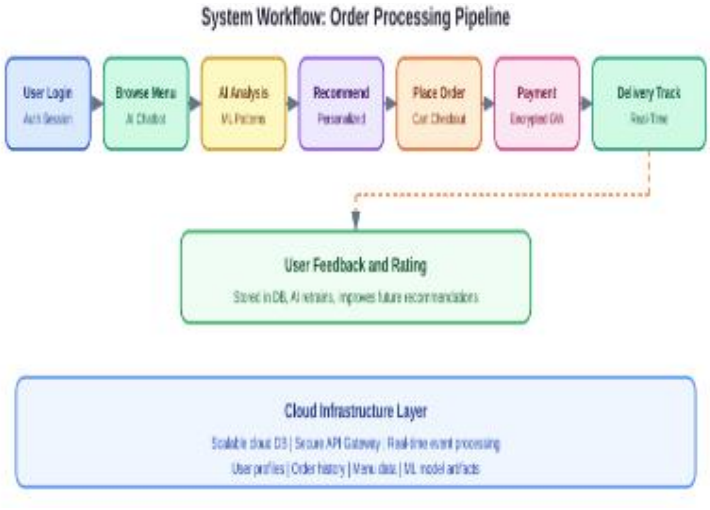

Fig. 3: System Workflow — Order Processing Pipeline

VI. FEATURES AND MODULES

TABLE III: KEY MODULES AND FEATURES

Module	Technology	Description
Recommendation System	Collaborative + Content-Based ML	Analyzes user behavior and past orders to generate personalized food suggestions, reducing decision time
AI Chatbot	NLP (Text and Voice)	Allows users to search menu, place orders, and get real-time support via conversational interface
Secure Payment System	Encryption / Payment Gateway	Supports multiple payment methods with advanced encryption to protect sensitive user data
Real-Time Tracking	GPS / API Integration	Enables users to monitor order status from preparation to delivery, improving transparency
Feedback System	Sentiment Analysis / ML	Collects ratings and reviews; AI analyzes feedback to improve service quality and accuracy
Admin Dashboard	Analytics / Reporting	Provides businesses with insights on sales, inventory, customer behavior, and operational metrics

VII. RESULTS AND DISCUSSION

A. Advantages

AI based food ordering has really changed things in the food industry lately. It makes everything smarter and more focused on what users want. They use stuff like machine learning and natural language processing to fix the old problems with just regular ordering apps.

Improved Efficiency: Efficiency stands out because AI handles orders and chats with customers[10] without needing as many people around. It speeds up the whole process, so service gets faster. I think that cuts down on wait times a lot. Recommendations come from looking at what you've ordered before and how you act on the app. That personal touch makes picking food easier and keeps customers coming back more often.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 11, April 2026 Impact Factor: 8.2

Personalization: But not everything is perfect. The cost to set this up is huge, with all the tech and experts needed. Smaller places might not afford it at all. It seems like the systems are complicated too, with models and databases that always need updates to work right [3]. Data privacy worries me because they collect so much personal info, like what you buy and your details. A hack could ruin trust and cause legal issues.

Error Reduction and Analytics: Analytics help businesses though, by checking data live to manage stock or prices better. It reduces errors in billing and orders since humans aren't messing it up as much. Still, solving the privacy part is key if these are going to stick around.

B. Limitations

High Implementation Cost: Building and using AI models can get really pricey. There's a lot of money involved for tech, infrastructure, and skilled workers. This makes it tough for small and medium-sized businesses to use these systems since they might not have the budget for it.

System Complexity: AI systems aren't exactly easy to design or maintain. They have many components, like machine learning models, databases, cloud setups, and APIs. To keep things running smoothly, you have to keep updating and training the model.

Data Privacy and Security: These systems collect and handle a ton of user data, including personal info and transaction details. Keeping that data safe from unauthorized access and cyber threats is a big challenge. If there's a breach, it can really hurt user trust and lead to legal issues.

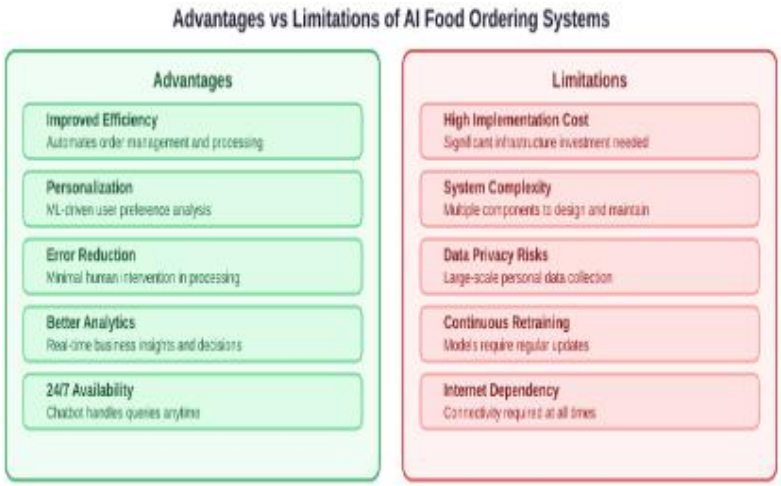

Fig. 4: Advantages vs Limitations of AI Food Ordering Systems

TABLE IV: ADVANTAGES VS LIMITATIONS SUMMARY

#	Advantages	Limitations
1	Improved efficiency and automation	High implementation and infrastructure cost
2	Personalized user recommendations	System complexity and multi-component maintenance
3	Reduction in human errors	Data privacy and security challenges
4	Real-time analytics and insights	Continuous model retraining required
5	24/7 chatbot customer support	Dependency on stable internet connection

DOI: 10.48175/IJARSCT-33670

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 11, April 2026
Impact Factor: 8.2

VIII. APPLICATIONS

TABLE V: APPLICATION DOMAINS OF AI FOOD ORDERING SYSTEMS

Domain	AI Application	Key Benefit
Online Food Delivery	Route optimization, personalized recommendations	Faster delivery, improved UX
Restaurants and Cafes	Automated ordering, kiosks, sales analysis	Reduced wait time, higher efficiency
Cloud Kitchens	Demand prediction, inventory control	Resource optimization, profitability
Smart Kiosks	Voice/touch interface, AI menu suggestion	No human assistance needed
Voice Assistant Platforms	NLP voice ordering (Alexa, Google)	Hands-free, accessible ordering

IX. CONCLUSION

Food ordering powered by AI are shaking things up in the food service industry. They provide smart, efficient, and user-friendly services that make ordering food a lot easier. These systems are using some pretty advanced tech like Machine Learning, Natural Language Processing, and cloud computing to tackle the issues that come with ordering food the old-fashioned way.

Basically, computers analyze how people behave to figure out what they might like, giving them personalized suggestions that really enhance the customer experience. They also speed things up by managing key tasks like taking orders, processing payments, and assisting customers.

But it's not all smooth sailing. There are challenges that need addressing if we want these systems to be widely adopted and stick around for the long haul. Issues like the high costs of getting everything up and running, worries about data privacy, and just the overall complexity of the systems. To deal with these challenges, we need continuous improvements in AI technology and better ways to safeguard data. Also, bringing in new tech like the Internet of Things (IoT), automation, and smart delivery systems can really improve AI-based food ordering platforms.

X. FUTURE SCOPE

When devices connect to the internet, they can communicate with the food ordering websites. This means our fridges could actually tell us what to order based on what we have at home, making everything work together smoothly. If we have kitchens with robots that can cook, that would speed up food prep, cut down on labor costs, and ensure the food is consistently good. Some folks are even looking into using drones for food delivery. Plus, being able to talk to computers that understand us would make ordering food so much simpler. If we can keep our personal information secure, people will trust the food ordering websites more, and that could lead to more users.

ACKNOWLEDGMENT

The person who wrote this wants to say thank you to Mr. Mitul Raj, who's an Assistant Professor at the School of Engineering at P P Savani University for helping them so much. They also want to thank the teachers, in the Department of Computer Applications and the Dean of the School of Engineering for always encouraging them and helping them with their studies.

REFERENCES

[1] Smith, J., "AI in Food Ordering Systems," IEEE, 2022.
[2] Kumar, R., "Machine Learning for Recommendation Systems," Springer, 2021.
[3] Patel, A., "Smart Food Delivery Systems," IEEE, 2023.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 11, April 2026 Impact Factor: 8.2

[4] Lee, K., "NLP-Based Chatbots," Elsevier, 2020.
[5] Sharma, P., "Cloud Computing in Food Apps," IEEE, 2022.
[6] Gupta, S., "AI Recommendation Systems," Springer, 2021.
[7] Wang, T., "Deep Learning in E-commerce," IEEE, 2023.
[8] Singh, M., "Online Food Delivery Trends," Journal of Technology, 2022.
[9] Brown, L., "User Behavior Analysis using AI," IEEE, 2021.
[10] Mehta, R., "AI in Customer Experience," Springer, 2020.
[13] Joshi, D., "Secure Payment Systems," IEEE, 2021.
[14] Miller, J., "Automation in Restaurants," Springer, 2022.
[15] Chen, X., "AI-Based Predictive Systems," IEEE, 2023.
[17] Davis, P., "IoT in Smart Kitchens," IEEE, 2022.
[18] Ali, H., "Data Privacy in AI Systems," Springer, 2023.
[20] Thomas, G., "Future of AI in Food Industry," Elsevier, 2023.