# **Agentic AI in food: A closer look at use cases**

*Richardson Morais • March 11, 2025*



Agentic AI is an evolution of AI agents, and they are more common than we might think. Their use cases include voice assistants (such as Amazon’s Alexa and Google Assistant), personal assistants (Rabbit R1), and home automation gadgets (Roomba).

We are seeing a rapid progression from basic AI agents to more sophisticated autonomous and agentic AI systems with increasing levels of independence, adaptability, and goal-oriented behavior. What are they, and how can they be used?

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# **What are AI agents, autonomous AI agents, and agentic AI?**

AI agents, autonomous AI agents, and agentic AI are closely related concepts, each with different characteristics and capabilities.

## **AI agents**

**AI agents** are software entities designed to perceive their environments, make decisions, and take actions to achieve specific goals. They can range from simple reflex-based systems to more complex, goal-oriented entities capable of learning and improving over time.

## **Autonomous AI agents**

**Autonomous AI agents** are a more advanced form of AI agents that can independently understand goals, create tasks to achieve them, execute the tasks, monitor and learn from their results, and adjust priorities until the desired goals are achieved—with minimal human intervention. The catalyst for their development was the use of foundation models, such as large language models (LLMs), which enabled them to perform highly complex tasks and solve problems. They are also capable of continuous improvement through self-learning techniques.

## **Agentic AI**

**Agentic AI** takes this concept further by actively pursuing goals and objectives—making autonomous decisions and taking actions to achieve them. The foundation models act as the agent's brain and are coupled with software that acts as a "decision-making engine" to guide AI models through reasoning skills.

# **Why are autonomous AI agents and agentic AI gaining attention?**

OpenAI CEO Sam Altman [recently](https://shellypalmer.com/2024/11/openai-to-launch-autonomous-ai-agent/) described agents as the next “giant breakthrough,” while senior executives hailed 2025 as “the year of AI agents” and the year in which “agentic systems finally hit the mainstream.”

Recent developments have lent credibility to this vision. In 2024, there were several breakthroughs in the deployment of agents and the underlying GenAI models that power them. As developments in the field continue rapidly, the potential applications of AI agents are multiplying, gaining traction as transformative tools to improve business efficiency and decision-making significantly.

In November 2023, experts interviewed by the [Boston Consulting Group](https://www.bcg.com/publications/2023/gpt-was-only-the-beginning-autonomous-agents-are-coming) estimated that autonomous agents would be ready for mainstream adoption within three to five years. But it could be sooner. [Deloitte](https://www2.deloitte.com/us/en/insights/industry/technology/technology-media-and-telecom-predictions/2025/autonomous-generative-ai-agents-still-under-development.html) predicts that 25% of companies using GenAI will launch agentic AI pilots or proofs of concept in 2025, rising to 50% by 2027. They even expect some cases of actual adoption into existing workflows by the second half of 2025. Meanwhile, [Gartner](https://www.gartner.com/en/newsroom/press-releases/2024-10-21-gartner-identifies-the-top-10-strategic-technology-trends-for-2025) predicts that at least 15% of daily work decisions will be made autonomously by agentic AI by 2028, up from 0% in 2024. So, as predicted, mainstream adoption appears to be on the horizon.

Investors have been active. Deloitte reports that companies developing agentic AI with varying degrees of autonomy have received more than USD 2 billion in funding over the past two years (excluding OpenAI), particularly those targeting the enterprise market.

Many startups have entered the space, and several technology companies and cloud providers are developing their own agentic AI offerings. They are also making strategic acquisitions and licensing agentic AI technology from startups as well as hiring their employees as an alternative to outright acquisition.

# **What are its use cases in the food sector?**

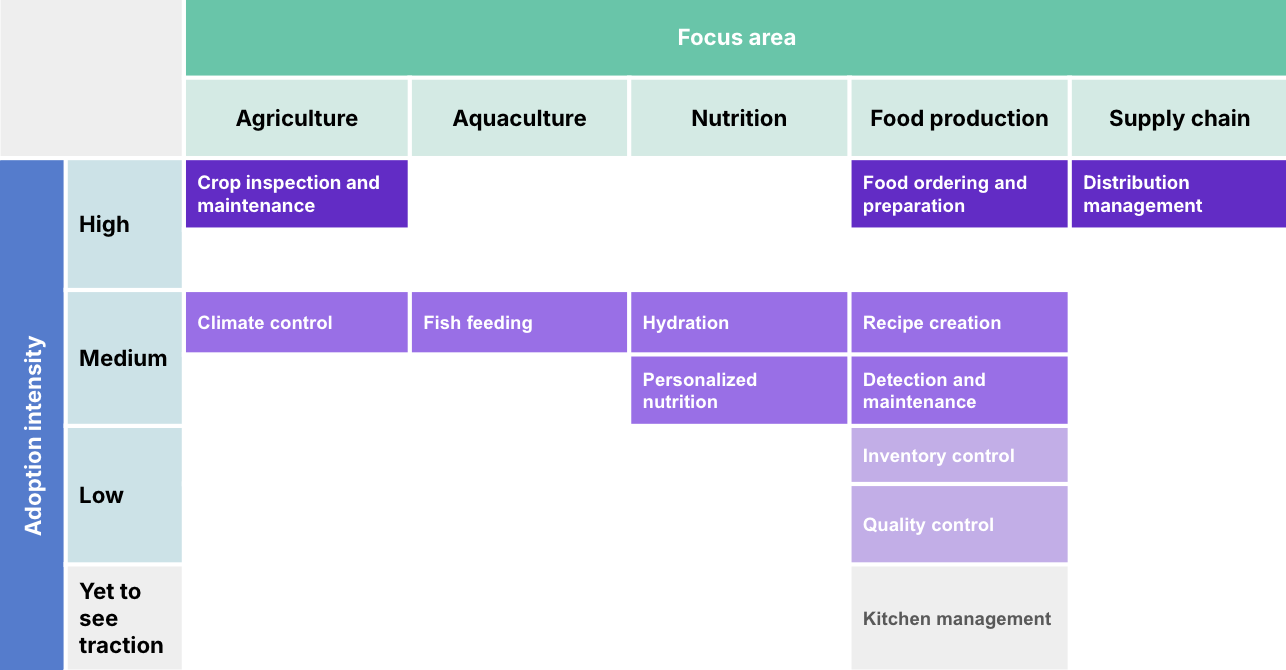
Agentic AI can be applied across multiple industries, and its potential use cases are nearly limitless. In food, agentic AI can accelerate food ordering and inspection, personalized nutrition, supply chain automation, and monitoring crops.

We identified 11 key areas in the food industry where agentic AI could have the greatest impact, spanning food production, agriculture, supply chain, nutrition, and aquaculture. We then reviewed ~20 instances of agentic AI, including a range of autonomous AI systems and virtual assistants being used by food producers, food tech companies, delivery platforms, and agriculture equipment providers, and classified them within the key areas. This analysis revealed that agentic AI is currently most commonly used in agriculture, food production, and supply chain functions. The latest developments in food agentic AI are expected to provide more use cases. For example, [Kraft](https://sp-edge.com/companies/343667)'s “Lighthouse” uses AI to analyze supply chain data and anticipate factors that could impact product delivery. It processes information from suppliers, factories, and distribution centers to predict demand and suggest ways to handle disruptions. The company aims to develop a fully autonomous supply chain. It reports improvements in forecasting accuracy and overall supply chain efficiency. Another example includes [ReelData](https://sp-edge.com/companies/757672)'s AI system that monitors feeding patterns in real time, adjusting feed levels to support fish growth while reducing waste. By providing data on biomass and health indicators, it helps farmers make informed decisions, leading to less feed waste and a reduced environmental impact.

## **Key takeaways**

* The most common applications of agentic AI in the food industry include crop inspection and maintenance, food ordering and preparation, climate control, and distribution management. We expect that these areas will remain key use cases for agentic AI.
* In agriculture, AI agents integrate high-resolution field imagery and environmental data integration to enable precise farming advice, reducing manual labor and allowing farmers to focus on strategic decisions. These systems streamline crop management and climate control, significantly increasing efficiency and productivity in farming operations by assisting in crucial decisions and operations.
* AI agents enhance customer service and kitchen operations by reducing wait times and improving order accuracy through systems that manage orders and suggest meal pairings. These platforms sometimes also offer a personalized cooking assistant that adapts to individual preferences, simplifying home cooking by providing tailored advice and reducing common kitchen errors.
* AI agents are also used to predict equipment failures by analyzing real-time data from sensors, a proactive approach that minimizes downtime and boosts operational efficiency. Additionally, AI algorithms tailor nutrition plans and innovate food products by analyzing consumer preferences and dietary requirements. This adaptability enables businesses to swiftly respond to evolving consumer demands and preferences, enhancing the responsiveness and personalization of their offerings.

**Agentic AI adoption intensity**

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Source: SPEEDA Edge research

## **Crop inspection, maintenance, and climate control**

Recent developments in agriculture have introduced AI-enhanced tools that integrate high-resolution field imagery with environmental data to provide tailored recommendations for optimal farming practices, such as precise fungicide application and irrigation adjustments. This reduces the need for manual field inspections, especially during crucial growth periods. Additionally, AI agents now exist that can optimize greenhouse climates and irrigation based on specific grower targets. By integrating seamlessly with existing infrastructure, these systems not only streamline operations but also reduce the managerial workload, enabling growers to focus more on decision-making. Overall, benefits include agricultural efficiency and productivity by delivering precise, actionable insights and managing complex processes.

* [Taranis](https://sp-edge.com/companies/302662) introduced an AI agent, “Ag Assistant," that combines high-resolution field imagery with additional data such as weather, soil, and equipment conditions, enhanced by AI. This tool provides farmers and agronomists with tailored recommendations specific to each field and evaluates various factors, including seed type, soil conditions, and weather patterns. It offers actionable advice in natural language, like where to apply fungicide or how to adjust irrigation. This resulted in reduced time spent on manual field inspections, particularly during the critical growing season.
* [Blue Raddix](https://sp-edge.com/companies/2773953)’s autonomous climate & irrigation control system employs AI to optimize the climate and irrigation within greenhouses, aligning with the grower's specific targets. It integrates seamlessly with existing greenhouse equipment, enhancing daily operations by translating detailed crop strategies into precise actions. This system reduces the workload associated with managing climate computers by 80%, freeing up growers to focus more on strategic decision-making and crop care.

## **Food ordering, recipe creation, and preparation**

In the food industry, AI is especially used to enhance the food ordering and recipe creation process. AI assistants are improving order accuracy and reducing service times through real-time replies instead of relying on fixed responses. In home cooking, interactive AI tools personalize recipe recommendations, digitize family recipes, and offer real-time solutions to cooking challenges. AI is also accelerating food innovation by analyzing the qualities of animal products to develop precise plant-based alternatives while addressing dietary requirements. Overall, these applications reduce inefficiencies, improve user experience, and streamline complex decision-making.

* Fast food chain [Wendy’s](https://sp-edge.com/companies/3177274) launched Wendy’s Fresh AI assistant in their drive-thrus that uses GenAI to respond and adapt in real-time instead of using preset scripts. This technology has cut service times by 22 seconds, achieved a 99% success rate in handling orders, and recorded an 86% accuracy rate for orders completed without the need for staff intervention.
* [BakeSpace](https://www.bakespace.com/) launched BakeBot, an AI-based interactive recipe tool that enhances personal cooking experiences by intelligently adapting to individual preferences and needs. It offers real-time problem-solving and can digitize family recipes, benefiting from insights gathered from over 1.5 million users. This tool provides user-specific recommendations, focusing on practical cooking tips to prevent common kitchen errors and manage cooking techniques. Its agentic AI capabilities ensure that each interaction is tailored, making it a personal assistant in the kitchen to improve cooking confidence and skill.
* [NotCo](https://sp-edge.com/companies/492971)’s AI platform Giuseppe studies the composition, taste, texture, and appearance of animal products to develop plant-based alternatives. It generates and refines recipes based on testing and feedback. The system adapts to specific requirements like allergens and clean-label standards. It helps reduce R&D challenges by streamlining ingredient selection.

## **Distribution management**

Recent advancements in supply chain management have seen the integration of AI-powered software capable of monitoring supply chains and predicting variables affecting product delivery. These tools use specialized algorithms and comprehensive data analytics, covering suppliers to distribution centers in order to forecast product demand and recommend strategies for handling disruptions. The result is a significant improvement in the accuracy of demand and production predictions, assisting supply chain performance by enabling real-time operational adjustments and more efficient access to sales and operational data.

* [Kraft Heinz](https://sp-edge.com/companies/343667) has implemented an AI-powered software called Lighthouse that manages its entire supply chain and predicts factors that could impact product delivery. Using a specialized algorithm and data from suppliers, factories, and distribution centers, Lighthouse forecasts product demand and offers recommendations for navigating supply chain disruptions. It claims to enhance the accuracy of demand and production forecasts, significantly improving overall supply chain performance.

**Machine learning-based AI agents that have the potential to leverage LLM-based models**

* **Kitchen management platform**: [Precitaste](https://sp-edge.com/companies/615646) introduced an AI-powered kitchen management platform that acts as a digital manager, monitors kitchen operations, and dynamically adjusts food preparation and inventory. This platform continuously analyzes data and provides clear instructions, allowing restaurant teams to focus on execution rather than decision-making. It automates preparation and inventory management processes, aims to decrease food waste, and optimizes labor by minimizing the time spent on manual tracking and enhancing efficiency in customer service.
* **Crop monitoring systems**: [John Deere](https://sp-edge.com/companies/513081) launched an AI-driven crop monitoring system equipped with computer vision and machine learning to detect weeds and optimize herbicide application. Operating in corn, soybean, and cotton fields during the growing season, this system employs a dual-tank setup for precise spraying and tailored herbicide mixes. By focusing on targeted spraying of weeds, it cuts non-residential herbicide usage by over 67%, leading to significant reductions in operational costs.
* **Food quality control**: An example of AI agents used for food quality control is [Omdena](https://sp-edge.com/companies/878629)’s AI-powered solution that employs machine learning to process data from diverse sources, such as product images, production line sensors, and customer feedback. This approach helps identify and predict quality issues, allowing manufacturers to take proactive measures. Implementing this technology has led to a 20% reduction in defects, enhancing product quality and customer satisfaction. Additionally, it has significantly cut annual costs by minimizing scrap and waste.

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# **Appendix: Some use cases of agentic AI in food (LLM-Based)**

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| **Focus area** | **Use case** | **Year** | **Company** | **HQ** | **Primary business activity** | **Startup/incumbent product used** | **Use case description** | **Benefits realized/claimed** |
| LLM-based agentic AI use cases |  |  |  |  |  |  |  |  |
| Food production | Food ordering and preparation | 2024 | [Wendy's](https://sp-edge.com/companies/3177274) | US | Fast food chain | FreshAI by Google Cloud | Wendy's Fresh AI is an AI assistant that automates the drive-thru process by using GenAI to generate responses and adapt in real-time, rather than relying on predefined scripts | Reports a 22-second reduction in service times, a 99% success rate, and an 86% accuracy rate for orders completed without staff involvement |
| Nutrition | Personalized nutrition | 2024 | [Starbucks](https://sp-edge.com/companies/3625) | US | Coffeehouse chain | Developed in-house | Starbucks' proprietary AI platform, Deep Brew, processes extensive data to enhance the customer experience by providing personalized menu suggestions and marketing messages. Central to its strategy, Deep Brew helps refine customer interactions, optimize store staffing, and manage inventory effectively | Achieved improvement in quarterly earnings and an increase in active rewards program |
| Aquaculture | Fish Feeding | 2024 | [ReelData](https://sp-edge.com/companies/757672) | Norway | AI-based solutions for aquaculture | Developed in-house | ReelData's fully automated AI system identifies real-time population appetite and adjusts feed levels to maximize biomass and minimize waste. This AI suite converts information scarcity into actionable insights, facilitating precise feeding, accurate biomass monitoring, and proactive health management | Achieves lower feed waste and lower environmental impact |
| Supply chain | Distribution Management | 2024 | [Kraft Heinz](https://sp-edge.com/companies/343667) | US | Food producer | Developed in-house | Its AI-powered software Lighthouse makes autonomous supply chain decisions and forecast factors that may affect product delivery. It employs a unique algorithm and data from suppliers, factories, and distribution centers to forecast product demand and provide recommendations for managing supply chain disruptions. Kaft's north star vision is working to create a self-driving, fully autonomous supply chain | Claims to improve demand and production forecast accuracy, including enhanced end-to-end supply chain performance |
| Food production | Recipe creation | 2024 | [Notco](https://sp-edge.com/companies/492971) | Chile | Food producer | Developed in-house | Its AI platform "Giuseppe" accelerates the development of plant-based alternatives by analyzing data on the composition, taste, texture, and appearance of animal products. It generates various plant-based recipes to mimic these qualities. These recipes undergo testing and the feedback is used to enhance Giuseppe's accuracy in creating increasingly precise alternatives while meeting specific brief requirements like allergens and clean-label standards | It claims to resolve 80%+ of R&D challenges and reduces the time developers spend searching for optimal ingredients from vendors |
| Agriculture | Crop inspection and maintenance | 2024 | [Taranis](https://sp-edge.com/companies/302662) | US | Digital agronomy solutions provider | Developed in-house | Its "Ag Assistant" is an AI agent that integrates high resolution field imagery to other data (weather, soil, equipment) and even GenAI to provide farmers and agronomists with field-specific recommendations​. The AI assistant analyzes factors affecting a field (seed type, soil, weather, prior issues) and can suggest optimal actions, like where to spray fungicide or adjust irrigation in natural language​ | Claims to save days and hours of manual inspection, especially during the growing season |
| Food production | Recipe creation | 2024 | [Bakespace.com](http://bakespace.com/) | US | Recipe platform | Developed in-house | Its BakeBot functions as an interactive AI-based recipe tool, offering users a personalized cooking experience. It can solve issues in real time and even digitize family recipes. With input from 1.5 million+ members, BakeBot provides recommendations that mimic advice from a knowledgeable friend, rather than the output of a typical algorithm. Its agentic AI adapts intelligently to each user’s individual cooking preferences and needs, enhancing its ability to assist effectively in the kitchen | Claims to provide practical cooking tips, helping users avoid common kitchen mistakes and offering advice on handling complex cooking techniques |
| Agriculture | Climate control | 2024 | [Blue Raddix](https://sp-edge.com/companies/2773953) | Netherlands | Autonomous growing solutions provider | In collaboration with Priva | The Autonomous Climate & Irrigation Control system uses advanced AI to manage and optimize greenhouse climate and irrigation. The Crop Controller directs climate and irrigation systems with precision through a climate computer, adhering to the grower's specified targets. This system integrates smoothly with existing equipment, enhancing daily operations by converting specific crop strategies into exact actions | Brings down the tasks related to climate computers for growers by 80%, allowing them more time to concentrate on strategic decisions and crop care. It also boosts profits by 5% and increases yields by 7% |
| Nutrition | Hydration | 2024 | [PepsiCo](https://sp-edge.com/companies/87913) | USA | Beverages and snacks | Developed in-house | Gatorade’s AI Hydration Coach uses AI to provide personalized hydration guidance, leveraging decades of data from the brand’s research institute. The assistant analyzes user inputs and historical insights to recommend optimal hydration strategies | Claims to offer personalized advice to improve customers everyday performance |

# **Appendix: Some use cases of agentic AI in food (ML-Based)**

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| **Focus area** | **Use case** | **Year** | **Company** | **HQ** | **Primary business activity** | **Startup/incumbent product used** | **Use case description** | **Benefits realized/claimed** |
| Agriculture | Crop inspection and maintenance | 2024 | [John Deere](https://sp-edge.com/companies/513081) | USA | Agricultural equipment | Developed in-house | Its See and Spray AI-driven crop monitoring system detects weeds and optimizes herbicide use. By leveraging computer vision and machine learning, the system identifies weeds during the growing season in corn, soybean, and cotton fields. Its dual-tank setup allows for precise herbicide application and the use of specialized tank mixes as needed | Reduced non-residential herbicide use by 67%+ by target spraying weeds, decreasing operational costs |
| Food production | Food ordering and preparation | 2024 | [Starbucks](https://sp-edge.com/companies/3625) | USA | Coffeehouse chain | Developed in-house | My Starbucks Barista AI technology allows users to order their drinks and food through messaging and voice recognition on the application, without having to be in stores | Faster order processing with 13%+ YoY sales increase and 4% of total sales coming from the service. Also achieved improved customer engagement and experience |
| Food production | Inventory control | 2023 | [OneThird](https://sp-edge.com/companies/1353379) | Netherlands | Food tech | Developed in-house | OneThird’s system combines a near-infrared scanner with AI algorithms to predict the remaining shelf-life of fruits and vegetables in real time. Supply chain stakeholders get instant freshness readings (e.g., for strawberries, tomatoes) to guide routing and sales. It assists in optimizing customer allocation, shipping routes, best-before dates, and the repurposing of surplus produce | It reportedly reduces fresh produce waste by about 25% and cuts costs by up to 50% through automated data collection and analysis |
| Agriculture | Crop inspection and maintenance | 2024 | [Corteva Agriscience](https://sp-edge.com/companies/780825) | US | Agricultural chemical and seed company | Developed in-house | Aspen Hybrid Models integrate plant data with AI within an Aspen Plus model to enhance heat transfer and duty predictions, offering insights to refine maintenance strategies | Achieves USD 1.2 million in annual maintenance cost reductions and prevents nearly USD 10 million in yearly product sales losses. Additionally, it helps optimize the maintenance shutdown schedule for better efficiency |
| Food production | Food ordering and preparation | 2025 | [Impossible Foods](https://sp-edge.com/companies/238405) | USA | Food producer | Developed in-house | Uses AI-driven algorithms to develop plant-based meat alternatives that replicate the taste and texture of real meat. "Gusto" analyzes flavor, texture, and nutrition data to refine these alternatives for an optimal match | Claims to achieve a more realistic texture and taste in plant-based meat |
| Food production | Detection and maintenance | 2022 | [Tyson Foods](https://sp-edge.com/companies/106607) | US | Protein food company | In partnership with AWS | Uses "Amazon Lookout for Vision" to create a custom ML model to analyze images and detect anomalies in its food production facilities to avoid manual intervention. The model identifies anomalies for necessary maintenance | Claims to save 15,000 hours of skilled labor annually in a single facility |
| Agriculture | Crop inspection and maintenance | 2022 | [BASF](https://sp-edge.com/companies/25187) | Germany | Chemical supplier | Developed in-house | Its ONE Smart Spray technology uses AI-based algorithms to equips sprayers with cameras and sensors. As the sprayer moves over a field, it swiftly identifies weeds using image analysis and algorithms. It precisely targets these areas with the necessary amount of herbicide, guided by xarvio's recommendations | Achieves improved accuracy to maintain the necessary crop demand |
| Agriculture | Climate control | 2024 | [Plenty](https://sp-edge.com/companies/335057) | USA | Indoor vertical farming | Developed in-house | AI-powered autonomous indoor farms producing leafy greens with minimal resource use. It helps strawberries grow with the help of AI, running software that keeps the temperature suitable for it. It also controls how much light they receive using artificial lighting that mimics sunlight | Higher yield, reduced water usage, and no use of pesticides |
| Food production | Kitchen management | NA | [PreciTaste](https://sp-edge.com/companies/615646) | US | Food software platform | Developed in-house | Precitaste's AI-powered kitchen management platform functions as a digital manager and monitors kitchen operations and adjusts food preparation and inventory in real time. By continuously analyzing data and providing clear instructions, it allows teams to concentrate on execution rather than decision-making, helping restaurants automate preparation and inventory management | Claims to reduce food waste and optimize labor by reducing time spent on manual tracking and improving efficiency in customer service |
| Food production | Quality control | 2023 | [Omdena](https://sp-edge.com/companies/878629) | US | AI solutions provider | Developed in-house | Omdena’s AI-powered solution uses machine learning to analyze data from a variety of sources, including product images, sensor data from production lines, and customer feedback. The solutions identify and predict potential quality problems, and recommend corrective actions to manufacturers | Claims to reduce defects by 20% with an improvement in product quality and customer satisfaction. Saved millions of dollars in annual costs by reducing the amount of scrap and waste |
| Food production | Food ordering and preparation | 2023 | [DoorDash](https://sp-edge.com/companies/131185) | USA | Food delivery platform | Developed in-house | DoorDash's AI voice ordering system handles incoming calls, reducing wait times and helping restaurants manage demand. It also suggests meal pairings and works with live agents to ensure seamless customer service | Reduced food ordering time especially during peak demand and improved revenue for restaurants and drivers |

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