Smart Canteen Self Checkout Solution



一、 Solution Overview

Our smart catering solutions are designed for diverse group dining scenarios—including campus cafeterias, corporate and institutional dining facilities, and commercial catering establishments. Focusing on the full workflow of "self-service food pickup — rapid settlement — data analytics," we offer three core solutions: RFID-powered intelligent settlement, AI-driven intelligent settlement, and intelligent self-service weighing settlement. By integrating multiple payment methods via smart terminals—such as facial recognition, card swiping, and QR code scanning—we also provide cross-platform interoperability capabilities. These solutions help restaurants reduce costs, enhance operational efficiency, and optimize daily operations, delivering a high-performance, user-friendly, and self-service smart dining experience to end-users.

二、 Customer Pain Points

1 Long queues at service counters and inefficient checkout processes  During peak meal times, when customers collect their meals in large numbers, manual cashier operations require counting the amount for each individual order and then processing card swipes or QR code scans; this approach results in low efficiency, long queues, and encroachment on the dining and rest time of faculty and students.	**2 High labor costs**  Each service counter requires 1–2 staff members for food service and cashier duties; the greater the number of counters, the higher the labor and personnel management costs, while during off-peak periods, a significant portion of the workforce remains underutilized.
3 Fixed allocation leads to significant waste.  It is difficult for servers to precisely control portion sizes according to individual preferences, leading to a coexistence of "unfinished meals" and "insufficient portions." This results in significant food waste, which contradicts the requirements of the "Clean Plate Campaign."	**4 Mental arithmetic errors; settlement disputes**  Manual pricing can easily lead to omissions or errors, which may give rise to reconciliation disputes and financial leakage; during peak periods, heightened impatience among queue members further increases the likelihood of errors.
5 The menu is limited, and the overall experience was poor.	**6 Inadequate operational records make food safety traceability difficult.**

	
The dining counter experience is noisy, prone to ordering errors, offers a limited selection of dishes, lacks the capability for personalized meal combinations, and prevents diners from accessing nutritional information to follow a scientifically balanced diet.	Sales volume, customer traffic, and food preparation primarily rely on experience rather than data-driven support; furthermore, there is a lack of documentation during food procurement and distribution processes, making it difficult to rapidly trace the source of any food safety incidents.

三、 Solution

3.1. Smart Catering Solution

3.1.1. Self-service weighing product

3.1.1.1. Self-service weighing business process flowchart



3.1.1.2. Solution Overview

The self-service weighing system employs a "one dish, one weighing, one billing" self-service dining model. Diners collect a tray at the entrance and link their identity to the tray via facial recognition, card swiping, QR code scanning, or mobile phone scanning. At the buffet station, diners select dishes as needed; the weighing station automatically calculates the weight difference before and after food selection, charges based on grams, and accumulates the total cost dish by dish, while the display screen provides real-time updates on weight, unit price, and total amount. Upon returning the tray at the end of the meal, the system automatically releases the tray linkage, processes the

payment deduction, and pushes the bill to the user's mobile device—ensuring a seamless checkout experience without the need to pause. From the merchant's perspective, a touch screen enables dish ordering and serving, remaining inventory monitoring, dish replenishment switching, and abnormal status alerts (with corresponding audio-visual warnings). The system supports multiple operational modes—including seamless payment with tray linkage, post-payment without tray linkage, and hybrid campus/off-campus usage—allowing flexible adaptation to diverse restaurant environments.

3.1.2. AI Settlement Terminal Product

3.1.2.1. AI Settlement Desk Business Process Diagram



3.1.2.2. Solution Overview

The AI checkout station utilizes image recognition to simultaneously identify, bill, and process payments for multiple dishes. Merchants first take photos of the dishes, input the prices and nutritional data, and then leverage AI deep learning to select dishes, plate them, and prepare meals with a single click. Diners select small portion bowls in the preparation area, place their plates in the checkout zone, and an AI camera with 5 megapixels instantly captures an image. The system then performs batch recognition based on tableware characteristics or dish images, automatically calculates the total cost, and subsequently enables payment via facial recognition, card swiping, or QR code scanning—completing the entire process in just 3–5 seconds per person. The secondary display screen allows merchants to monitor transaction workflows, access transaction records, conduct statistical analyses, and handle refund corrections. This

solution requires no dedicated food preparation equipment; standard tableware suffices. The desktop-based terminal can be directly deployed in traditional food stalls, enabling rapid deployment and minimal infrastructure modification.

3.1.3. RFID checkout terminal products

3.1.3.1. RFID Settlement Terminal Business Process Flowchart



3.1.3.2. Solution Overview

Using RFID-enabled meal bowls as the primary medium, the RFID checkout station simultaneously reads the chips on all small bowls to calculate and process payments. Merchants can use a product labeling device to write dish information and pricing into the meal bowls (supporting both fixed and temporary writing modes), then place the prepared dishes in the food preparation area. Diners retrieve their small bowls of food, place their plates in the checkout zone, and the system instantly performs batch reading of the chip data, automatically identifies the dishes, and calculates the total order cost. Subsequently, diners complete payment via facial recognition, card swiping, or QR code scanning, after which consumption data is automatically uploaded to the smart catering management platform. This solution eliminates the need for per-dish pricing and eliminates the need to pause for checkout; it features rapid recognition speeds, high settlement accuracy, offline operation capability, and automatic data upload once connected to the network—thereby effectively reducing queue times and minimizing manual errors.

3.2. Multi-device system interaction

3.2.1. PC backend



3.2.2. Large-screen cockpit (Smart Dining Operations Dashboard)



3.2.3. End instrument



3.2.4. User mobile device

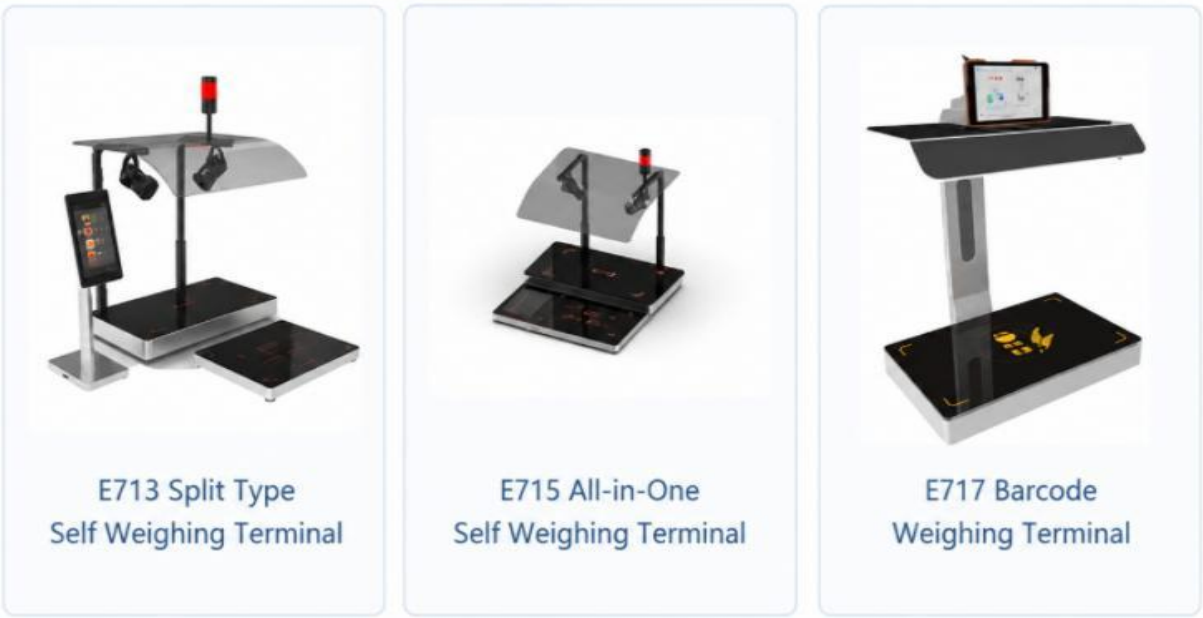


3.2.5. Merchant mobile app



四、 Equipment Overview

4.1.1. Weighting and Meal Selection Terminal



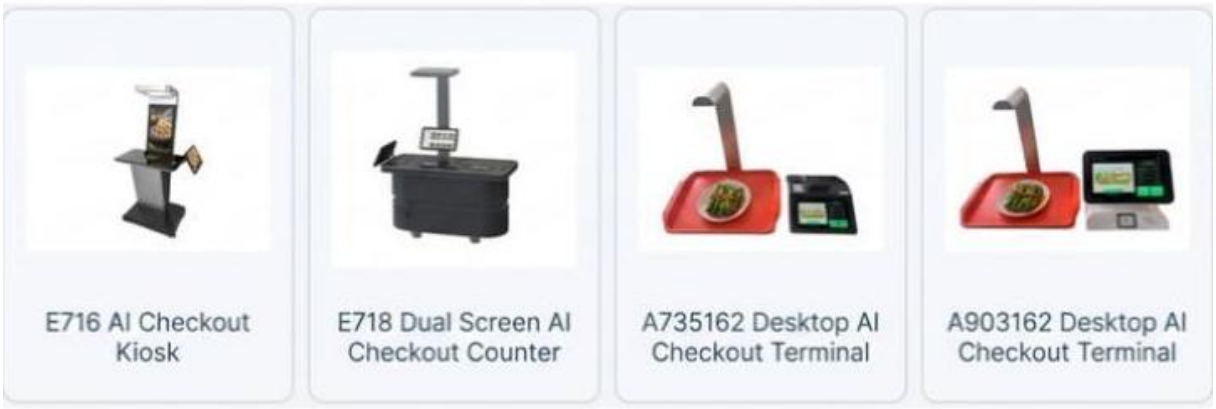
Weighting and Menu Selection Terminal (E713/E715/E717): Equipped with a capacitive touch screen and a high-precision electronic scale, featuring a maximum weighing capacity of 30 kg. The system integrates a tray reading/writing zone and an information display screen, supports automatic weighing and billing, and includes functions for serving/removing dishes, dish replenishment, dish selection switching, nutritional information display, as well as audible and visual alarms for abnormal operations. The E713 model features a split design (separate screen and scale), the E715 model features an integrated design (combined screen and scale), and the E717 model features a top-mounted touch screen and barcode weighing station, allowing for flexible selection based on countertop requirements and workflow needs.

4.1.2. Disk binding machine and supporting equipment (optional display)



- Pallet Binding Machine (E712): Equipped with dual 11.6-inch front and rear touchscreens, integrated facial recognition camera, contactless card reader, and QR code scanning module; supports verification via student cards, teacher cards, employee cards, QR codes, and facial recognition; enables binding of user accounts to pallet barcodes or chips; supports automatic account de-binding upon timeout and manual de-binding during operation; features early intervention when insufficient balance is detected; also includes a built-in self-service weighing management backend, eliminating the need for dedicated server deployment.
- Supporting equipment: The side barcode trays are made of melamine resin, with optional chips, colors, and customizable logos; the supporting electric heating insulated buffet warmer (providing constant-temperature display for dishes, with one serving dish per weighing device) and dedicated serving tongs (the system automatically processes billing once the serving tongs are returned to the buffet warmer) are also included, together forming a complete self-service dining line.
- Deployment and Payment Models: The system can be deeply integrated with the Newcapec All-in-One Card, with consumption data incorporated into the All-in-One Card reporting dashboard; alternatively, it can be deployed independently of the All-in-One Card. It supports four operational modes—seamless payment for on-campus personnel only, fully post-payment, password-free registration and signing for off-campus personnel, and a hybrid on-campus/off-campus mode—covering faculty, students, employees, and external visitors.

4.1.3. Introduction to AI Checkout Terminal



- Vertical E716 / E718 (including NPU version): features a 15.6-inch or 21.5-inch main display paired with a 15.6-inch secondary display, equipped with a waiting area and a checkout area; it enables batch recognition of food trays entering the checkout area and rapid checkout processing. The NPU version integrates 6 TOPS of computing power, eliminating the need for an additional algorithmic host unit, allowing it to independently perform dish learning and recognition—delivering faster processing speeds.
- Desktop models A735162 / A903162: Equipped with either an 8+5-inch or dual 11.6-inch touchscreens, these devices feature a built-in NPU, eliminating the need for an algorithmic host unit. They enable autonomous learning and food item recognition, offering a compact and flexible design. These units can be deployed without requiring extensive modifications to existing food stalls, making them ideal for serving small bowls of dishes and adapting to multiple scenarios within traditional food stall operations.

4.1.4. Introduction to RFID Checkout Counter



- Vertical E716 (available in left-channel, right-channel, or dual-channel configurations): features a 15.6-inch main display and a 15.6-inch secondary display (1080P multi-touch capacitive screen), a 64-bit octa-core processor, a waiting area and a checkout area, and a smart tableware recognition zone measuring no less than 40.5×28.5 cm, enabling rapid and batch recognition of chip-enabled dining bowls entering the checkout area; supports multiple payment methods including facial recognition, card swiping, and forward/backward QR code scanning; includes built-in checkout software with functions such as cashier operations, business statistics, refunds, and recent transaction queries; supports automated settlement, self-service payments, batch price redefinition, unpaid transaction alerts, and order-separation settings to prevent duplicate charge deductions within the same order; integrates with a smart catering management platform via embedded terminals—requiring minimal platform deployment without the need for a separate server—while enabling seamless integration with the Newcapec All-in-One Card System, with transaction data consolidated into the unified card reporting dashboard.

4.1.5. RFID-enabled devices (optional display)



1. Integrated Design: The serving system is integrated into the food display area, offering user-friendly operation and seamless serving; includes a thermal maintenance base, top panel, and glass protective cover.
2. The top insulation layer and the base are constructed from food-grade 304 stainless steel; the top is equipped with a glass protective cover and an insulation heating filament.
3. The countertop is constructed from 1.2 mm thick 304 stainless steel sheet, the cabinet body from 1.0 mm thick 304 stainless steel sheet, and the inner liner from 1.2 mm thick 304 stainless steel sheet; it is equipped with two 1.5 kW heating elements and an intelligent appliance control device.
4. Total power: 220V/6kW;
5. Supported Features: meal preparation, temperature retention, seamless integration of dish presentation, dish pricing, and nutritional information;
6. Overall dimensions: 4-compartment dining table: 1500*750*1590; 5-compartment dining table: 1800*750*1590
7. Built-in LED lighting on the second floor;
8. Integrated installation of the contactless rapid dispensing machine;
9. The output terminal features indicator lights and a buzzer for status indication;

五、 Customer Value



Reduce Costs & Increase Efficiency · Reduce Labor Requirements

The entire process—from order pickup, weighing, billing, to payment—is completed autonomously by diners. The weighing solution eliminates the need for dedicated cashiers, while the AI-powered solution enables a small number of personnel to oversee multiple devices, significantly reducing peak-hour staffing requirements as well as overall labor and management costs.



Sub-second settlement · Seamless payment

AI-powered settlement requires only 3–5 seconds per person, and a single machine can support rapid access for 200 people over 20 minutes; the weighing solution enables billing upon pickup and deduction upon return, with multiple access options—including facial recognition, card swiping, and QR code scanning—allowing users to choose their preferred method, thereby significantly reducing queuing time.



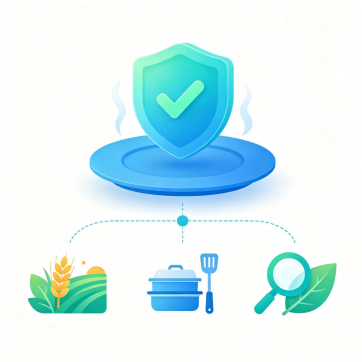
Order on demand · Say no to waste

By allowing customers to select whatever they wish to eat and in whatever quantity they prefer, and by charging by weight, the goal of "emptying the plate" can be quantified; in the case study at China Agricultural University, the daily amount of food waste collected in the weighing area decreased from approximately 2 bins under the traditional counter-based model to just 0.3 bins, demonstrating tangible conservation results.



Data-Driven · Precision Operations

By comprehensively collecting order data, sales volume, foot traffic, and nutritional data, as well as operational reports, dish sales figures, and average order value, you can gain clear insights to guide ingredient procurement, optimize dish offerings and stall layouts, reduce food waste, and increase both average order value and overall revenue.



Safe Traceability · Peace of Mind When Dining

Trays/dishes are fully linked to personnel, dishes, weight, and timing throughout the entire process, ensuring comprehensive traceability; this enables rapid identification and tracing of food safety issues. Consumption and nutritional data are synchronized via mobile devices, supporting the implementation of science-based dietary plans and transparent kitchen management initiatives.

六、 Our Clients



C&U Group — E715 All-in-One Weighing Terminal



Shandong Airlines — E717 Barcode Weighing Terminal



China National Nuclear Corporation — E718 AI Checkout Counter



Dongfeng Motor Corporation — E716 AI Checkout Kiosk



China Southern Airlines — E716 RFID Checkout Counter



WEGO Medical — E716 RFID Checkout Counter