



PHYSICAL AI: THE CHEF POWERING RETAIL'S MISSING INGREDIENT

Most Retail Stores Behave Like a Kitchen Without a Chef

A customer receives a notification, “Your item is back in stock!”, and rushes to the store. There, the associate has no context about their visit, their intent, or the three weeks they spent waiting. Isn't it ironic that the retailer's digital avatar knows the customer's shoe size, favorite color, and her last three birthdays, whereas the physical store she visits doesn't even know she is there?

This disconnect isn't new, but it's getting harder to ignore. Retail has more data than ever—algorithms forecast demand, dynamic pricing responds in real-time and recommendation engines curate personalized feeds. The analytical infrastructure is sophisticated. The digital layer knows everything. The physical environment knows nothing.

Think of the difference between fast food and a Michelin-starred restaurant. Both serve food. But only one creates an experience worth the journey. Here's why - a Michelin chef orchestrates timing, ingredients, presentation and service into cohesive excellence, making it a memorable experience.

The key reason retailers should aim for Michelin-level experiences is that, with everything a click away and increasingly commoditized, physical stores must become destination-worthy. It must create moments for the customer to experience. That is what will help build loyalty and create a competitive advantage.

That's why collecting more data will not help; retail stores already have that in surplus. The game-changer will be **MasterChef of Retail - Physical AI**, signalling a transition from a store that “knows” to a store that “does.”

Retail stands at an inflection point. While digital AI boosted efficiency, it's time to integrate digital precision and physical presence into experiences customers remember.

This is the Michelin-star challenge: elevating retail from transactional efficiency to experiential excellence. And Physical AI is the master orchestrator—the bridge between thinking systems and acting systems.

The Mise-en-Place

In Michelin kitchens, mise-en-place or preparing beforehand is key - everything is in place and ready to deploy at the exact moment needed. Physical AI operates on much the same principle.

Recall our opening scenario in which a customer arrives at a store to collect a long-awaited item. Here's what happens behind the scenes.

Digital AI sent the notification. It knows their waiting history, preferences and purchase intent. It's one useful ingredient, but disconnected from the physical moment.

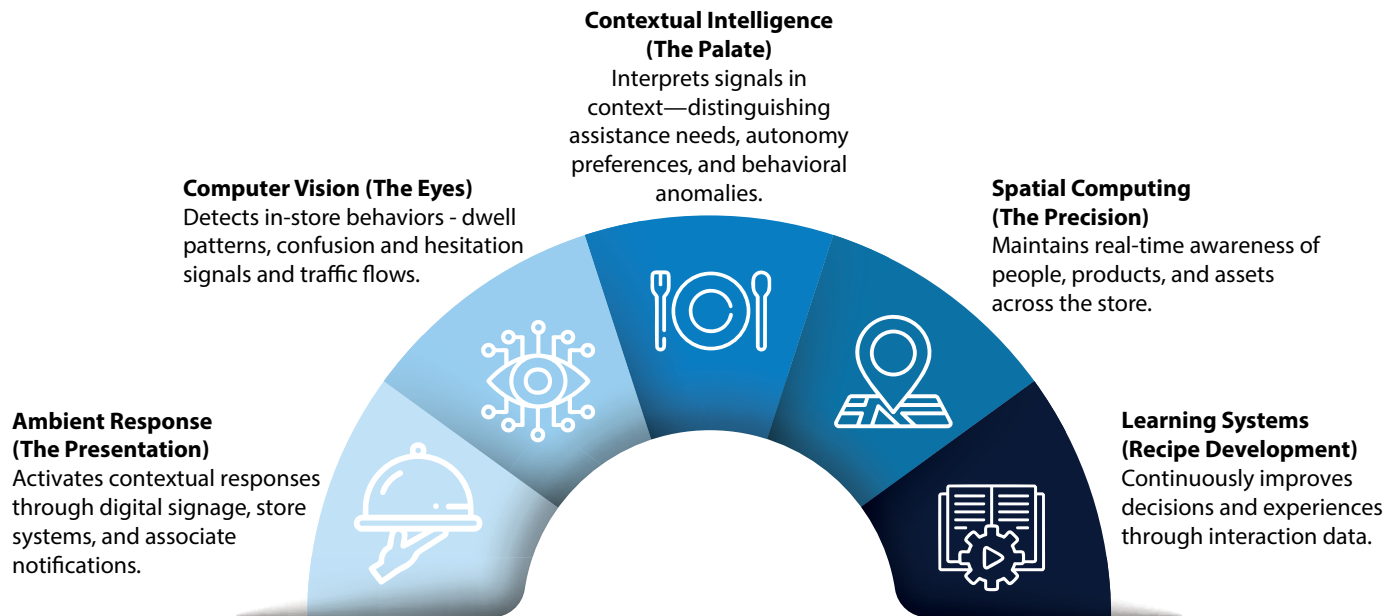
In contrast, **Physical AI** delivers the full experience in real-time.

- Computer vision recognizes the customer as they enter.
- Contextual intelligence cross-references the notification with the customer's arrival.
- Spatial computing identifies the product's exact location.
- Ambient response coordinates: The welcome screen displays where the item is located, and an associate receives an alert on the customer's arrival with the full context.
- AI takes it further. The associate, armed with the customer's buying history, can transform a pickup into a moment and make customized recommendations on items or upcoming offers. Physical AI surfaces the insight while the human delivers the connection.



Physical AI: The Master Chef of Retail

Mixing Phygital Flavors for a Michelin-Star Customer Experience



C – Computer Vision **H** – Holistic Context (Contextual Intelligence) **E** – Environmental/Ambient Response
F – Formation (Learning Systems) **S** – Spatial Computing

There are five ingredients, but a single coordinated response that delivers a fulfilling customer experience. This is mise-en-place in action, which makes it a standout experience.

Digital-Only AI – A Single-Ingredient Fallacy

A Michelin meal is the perfect mix of composition, balance and interplay. However, digital-only AI suffers from the single-ingredient fallacy—brilliant in isolation, incomplete in execution.

The experience gap: Digital channels deliver personalization while physical stores offer generic layouts and static signage. It's like having a tasting menu with exquisite appetizers, only to receive a mass-produced entrée.

Associates without context: Store associates operate without knowledge of customer preferences, purchase history or recent searches. Their attempt at personalized experiences fails with half the ingredients missing.

Static stores, dynamic customers: Store layouts remain constant—one recipe for every palate and occasion. However, customer expectations and needs are dynamic.

Wrong plating: Retail invested in digital personalization but failed to extend it to the physical space.

The fundamental issue: Retail AI optimized individual ingredients skilfully but never composed them into a coherent dish. It's like serving ingredients separately and expecting diners to assemble their own meal.

Retail doesn't need more data. It needs orchestration at the moment of experience.








Enter Physical AI: The MasterChef of Retail

Physical AI orchestrates technology with a cohesive vision. This approach is what will help a store intervene when it observes a customer struggling and convert it into a premium experience.

What Physical AI Requires to Succeed

- Reliable, near real-time inventory and store data
- Associate enablement and thoughtful change management
- Strong privacy, consent, and transparency guardrails

Here's what that orchestration looks like in practice—the difference between digital promises, physical reality and the "MasterChef" fix:

	The Digital Promise	On the Ground Reality	The "MasterChef" Fix
	Personalized Feeds: "Recommended for you" based on 5 years of history.	Static Aisles: The store looks exactly the same for a marathon runner as it does for a toddler's parent.	Dynamic Plating: Physical AI adjusts digital signage and end-caps based on who is standing in front of them.
	Instant Support: Chatbots answer in milliseconds.	The Search: Customer wanders Aisle 7 for 10 minutes, looking for a size 32, while associates are busy stocking.	Proactive Service: The system "sees" the linger time and triggers an associate to intervene <i>before</i> the customer asks.
	Real-Time Inventory: "In Stock" glows green on the product page.	The Ingredient Hunt: Customer arrived to find the last item buried in storage or misplaced in a different aisle.	The Smart Pantry: Computer vision and weight-sensing shelves verify stock levels in real-time, correcting the "phantom inventory" error.
	Seamless Flow: One-click checkout and saved "Express" preferences.	The Bottleneck: A sudden rush at 5:00 PM creates a 10-minute queue, and self-checkouts display "Out of Order."	Kitchen Heat Sensing: Thermal sensors detect queue buildup and automatically re-route staff or open "invisible" checkout lanes.
	Total Transparency: Deep specs, reviews and "how-to" videos at your fingertips.	The Information Void: Customer conducts a Google search independently because the store provides no context.	The Interactive Garnish: Smart mirrors or projection-mapping "plate" digital data onto the physical product as the customer picks it up.
	Virtual Try-On: A mobile app helps you visualize how the dress looks on you.	The Trial Room Hassle: Customers must endure long queues to try on clothes and spend considerable time and effort to find the right fit.	The Tasting Station: The S.T.Y.L.E. Kiosk from Infosys, an in-store touchscreen, enables AI-powered virtual try-on, personalized recommendations and size matching at the physical touchpoint where purchase decisions are made.
	Loyalty Rewards: Points and status are tracked digitally in the app.	The Disconnect: Customer shops in-store, unaware of points balance, available rewards, or exclusive offers they could redeem right now.	The Rewards Counter: Infosys' S.T.Y.L.E screens display real-time points, achievement leaderboards, and rewards. Loyalty is no longer a background app feature; instead, it transforms into an engaging in-store gamified experience.

Like a well-oiled kitchen during service, it looks effortless to the customer. Behind the scenes, it's multiple systems working in perfect synchronization.



BRINGING S.T.Y.L.E TO LIFE



Figure 2 Infosys S.T.Y.L.E Touchpoint Kiosk

The Road Ahead: Earning Your Stars

The Michelin Guide awards stars to those establishments that create experiences—where technique, ingredients, service, and environment combine into something truly extraordinary.

Retail has been accumulating ingredients for years—computer vision, spatial computing, analytics platforms, automation systems and plenty of data. The pantry is well-stocked, and the equipment is professional-grade. Physical AI represents the culinary discipline that retail has been missing.

Physical AI will enable a store to sense hesitation, detect queues before customers complain, and alert an associate before a product search turns into frustration—driving measurable improvements in conversion, associate productivity, and customer satisfaction.

Naturally, it has generated much-needed interest in the technology industry.

For example, Microsoft is advancing physical AI through initiatives such as Rho Alpha—robotic models that enable systems to interact with shelves, products, and dynamic store environments in real-time. Combined with Microsoft Dynamics 365 Commerce and Copilot-powered agents, these capabilities move retail beyond digital analytics toward adaptive, experience-led operations.

From Kitchen Theory to Service Reality

Physical AI is already creating measurable value in retail through focused, in-store deployments of computer vision, queue intelligence, shelf monitoring, and virtual try-on, not as future concepts, but as operating systems in live environments.

- **In-store computer vision and people analytics**
Retailers using computer-vision-based people analytics report 2–3% absolute conversion uplift, with some formats seeing up to 20% higher conversion through optimized layouts, staffing, and assisted selling. Industry studies further show that a 1% increase in dwell time drives ~1.3% sales uplift, directly linking physical engagement to revenue performance.^[i]
- **Queue sensing and proactive staff orchestration**
A large U.S. grocery chain deploying predictive queue management reduced average checkout waits by 4 minutes and recovered approximately \$400 per store per day in otherwise lost sales. A major European retailer achieved a 57.6% reduction in cashier idle time, preventing over 200 queue incidents during pilot deployments.^[ii]
- **Phantom inventory and shelf intelligence**
Retailers lose nearly \$1 trillion annually due to out-of-stocks and phantom inventory. Leaders such as Walmart are using computer vision and shelf-scanning systems to detect misplaced or missing items in near real-time, materially improving on-shelf availability and reducing lost sales.^[iii]

- **Virtual try-on at the moment of decision**

Virtual try-on is one of the most mature Physical AI use cases today. Shopify reports products with AR or try-on experiences achieve up to 94% higher conversion rates, while brands in beauty and fashion have seen 20–35% conversion uplift and, in some cases, a 2.5× increase in conversion after deploying virtual try-on in live retail environments.^[iv]

These examples represent capabilities live today—delivering ROI through targeted interventions rather than full-store autonomy. What remains emerging is the end-to-end orchestration layer, where sensing, reasoning, and physical action operate as a unified system across the store.

These early deployments set the foundation for how technology providers are now translating Physical AI from proof into platform.

From Vision to Execution: How Infosys and Microsoft Are Applying Physical AI

Infosys exemplifies this through S.T.Y.L.E a physical AI platform that turns in-store kiosks into intelligent touchpoints. These systems integrate virtual try-on technology, personalized styling recommendations, and contextual AI—delivering digital intelligence at the physical moment of purchase decision rather than through a separate mobile app.

More examples are set to follow. Because retail has never been about selling products, it's about serving experiences. Physical AI gives us the ingredients and techniques to excel—but the recipe is still for retailers to write.

The question is whether you'll master the craft of experience composition or continue serving disconnected ingredients on separate plates.



ⁱ<https://www.sensors.com/post/case-study-grocery-chain-predictive-queue-management>

ⁱⁱ<https://kodytechnolab.com/blog/people-analytics-for-retail/>

ⁱⁱⁱ<https://agmis.com/case-study/ai-powered-queue-management-solutions-for-retail/>

^{iv}<https://kpmg.com/kpmg-us/content/dam/kpmg/pdf/2025/intelligent-retail.pdf>

^v<https://www.forbes.com/sites/janakirammsv/2026/01/29/microsoft-extends-its-phi-models-to-physical-ai-with-rho-alpha/>

^{vi}<https://www.brandxr.io/2025-augmented-reality-in-retail-e-commerce-research-report>



About the Author



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With over 15 years of experience in Retail Operations, Product Merchandising, and Category Management, Deepika Khare, a Lead Consultant at Infosys, is driving innovation in the Retail domain. She specializes in providing strategic domain insights to address client needs and is currently focused on leveraging AI and Microsoft products to create cutting-edge retail solutions that optimize operations and elevate customer and employee experiences.

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