Instacart

Beyond the Aisles: Designing a smarter, AI-augmented shopping system that thinks with the shopper — not just for them.

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Design philosophy

This proposed solution isn’t about making things look better—it’s about designing a system that makes every moment work smarter. Imagine a system that thinks with the shopper, adapts to real-world conditions, and takes pressure off at every step. By combining *smart AI, physical logic, and flexible interactions*, the experience becomes **modular, assistive, and human**. It scales with the moment, and never gets in the way.

Pillars

Modality-first thinking — Applying touch, vision, voice, and physical interaction where they solve problems best.
System over surface — A full-stack and real-world-aware workflow redesign that goes beyond a simple UI.
Human-centered AI — A focus on augmentation that builds trust, speed, and clarity.
Flexibility by design — Whether it’s a first-day shopper or a seasoned veteran, this system adapts to fit the user’s approach.

Design approach

Redesign the system — not just the screens.

Blend digital logic, physical flow, and modality-based tools to solve what full-service shoppers actually face in the real world.

How I grounded the system in the real world:

- Used shopper behavior as the North Star
- Built for batching: up to 3 orders, ~90 items max
- Designed for both new (Alex) and experienced (Jamie) users
- Applied modular logic and adaptive modalities to support every moment in the flow

Design goals

- Speed up the shopping process without sacrificing **accuracy**
- Support new and experienced users through **context-aware guidance**
- Improve real-world **organization** (cart → bags → handoff)
- Enable **scalable batching** (up to 3 orders, ~90 items)
- Keep **cognitive load low**, even under pressure

The people we’re building for



Jamie

Jamie moves fast because time equals pay. What slows them down? New store layouts, too many product variations, and a disorganized cart. They need a system that **keeps pace, reduces friction, and lets them batch multiple orders** without missing a beat.



Alex

Alex is still learning the ropes. They get overwhelmed by item confusion, label mismatches, and produce anxiety. They want **more confidence, better guidance, and a way to stay organized** without slowing down.

Grounding the work in reality

To design something truly useful, I had to first understand the real-world constraints shoppers face.

From job types to item loads, I looked for patterns, edges, and pressure points that would shape a smarter system.

👷 Shopper Type:

- Full-Service Shoppers:
  - Responsible for shopping and delivering groceries.
  - Operate as independent contractors with flexible schedules.
- In-Store Shoppers:
  - Shop only, no delivery.
  - Paid hourly as part-time employees.

📦 Batch Size & Structure:

- Shoppers can handle up to 3 orders per batch.
- Each order is paid for separately at checkout.
- The app guides shoppers through keeping orders separate.

🧾 Order Size:

- Average order value: ~$113.
- Average item count:
  - Common range: 15–30 items.
  - Smaller orders: 5–15 items (frequent for quick needs).
- Orders are usually not large or bulk-heavy.

🪶 Item Type:

- Most items are small and lightweight:
  - Fresh produce, dairy, snacks, pantry items.
- Large/bulky items (e.g., bottled water, pet food) are less common due to:
  - Delivery and handling difficulty.
  - Shopper preferences.
  - Customer delivery constraints.

🛑 Why Bulky Orders Are Rare:

- Higher delivery effort and time.
- Risk of item damage or delivery complications.
- Less likely to be impulse/fill-in orders.

Orchestrating every moment

The system doesn’t just handle the flow — it understands it.

It listens to the moment: the order, the aisle, the handoff.

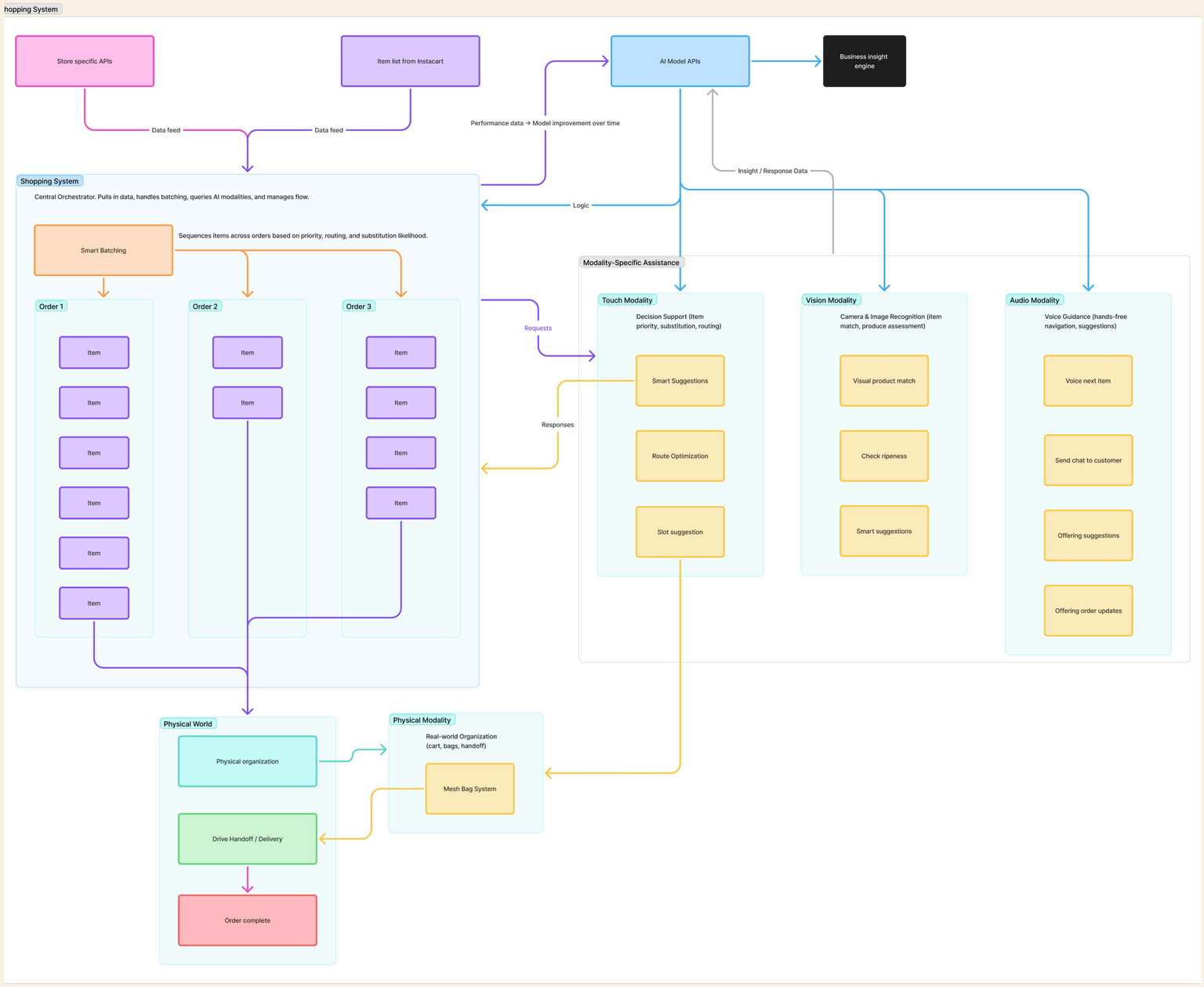
Data powers it.

Modality shapes it.

AI sharpens it.

And at every step, it meets the shopper where they are.

Click here to see full diagram



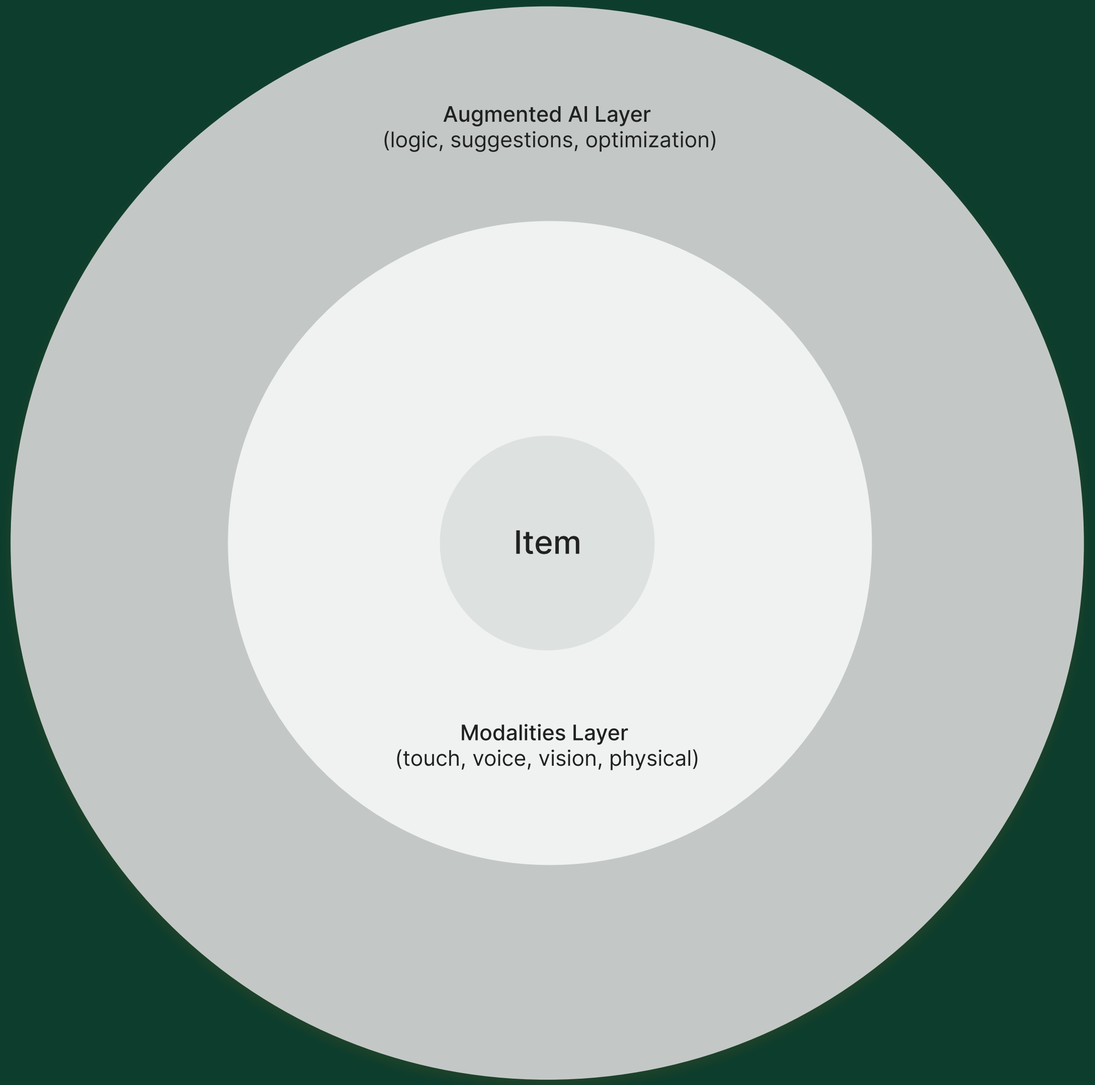
Every item, augmented

Every item exists at the center of the experience — but how it’s picked, processed, and placed is now wrapped in layers of intelligence and adaptability.

AI drives context.

Modalities deliver control.

The shopper only sees clarity.



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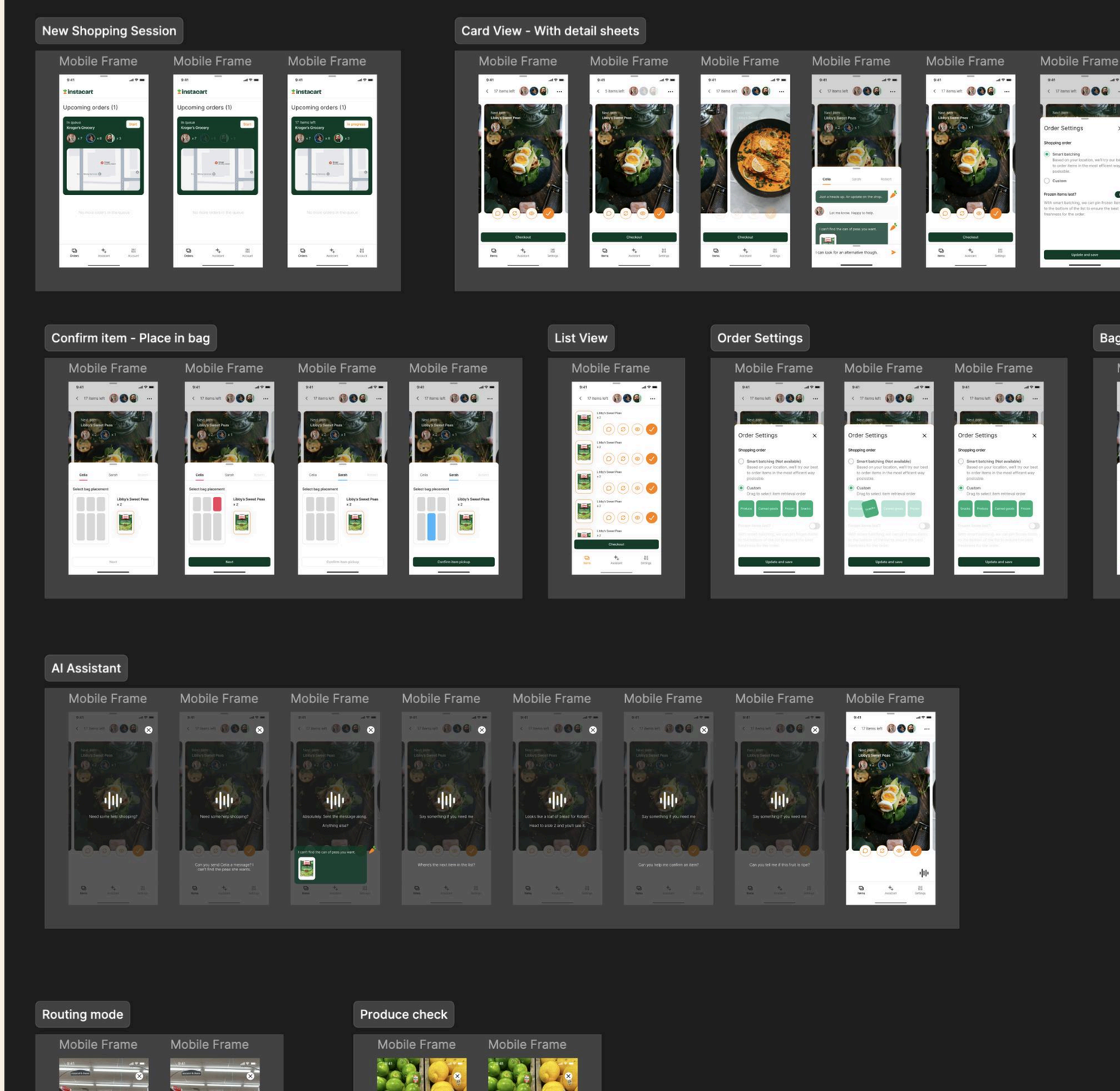
More designs, ideas, and screens.

I’ve put together a few more screens that didn’t make it into this presentation. But if you’re curious and want to explore further, feel free to check them out below.

I see these designs as a living, breathing system — meant to spark discussion, explore edge cases, and push the possibilities a little further.

View more here.



Item Card Carousel (Smart Batching)

Modality: Touch

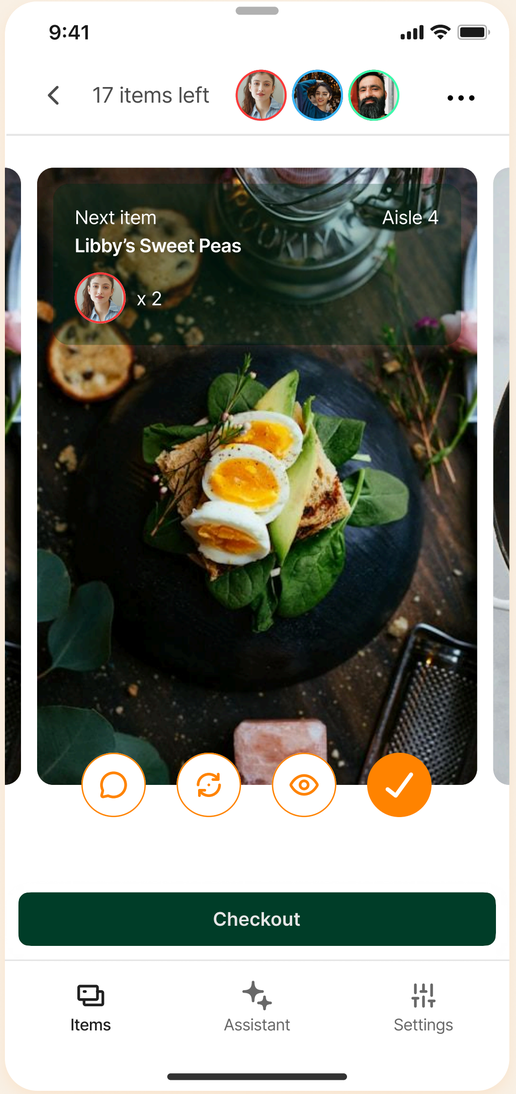
Purpose: Drive the item-by-item flow with clarity, control, and optional complexity.

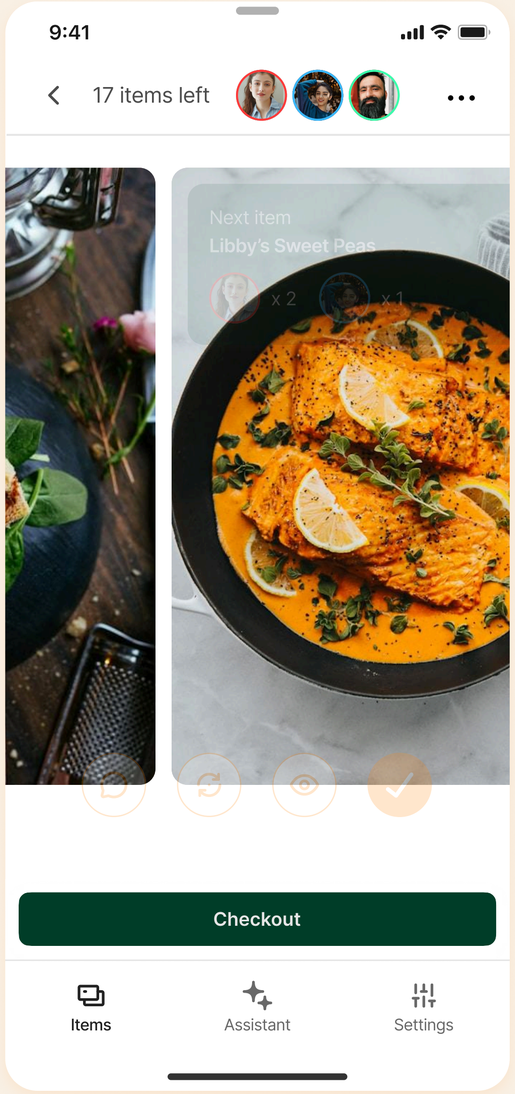
Key interactions

Swipe for next item to retrieve
Marking and checking off items
Tap to choose alternate products
Trigger quick-chat messages to customers
Frozen items are pinned to the bottom (auto-sorted)
Toggle batch mode on and off for more efficiency

Solves

Task overload and confusion under pressure
Poor substitution flow
Lack of frozen item prioritization
Cluttered order visualization in multi-order batching





Smart Cards

Modality: Touch

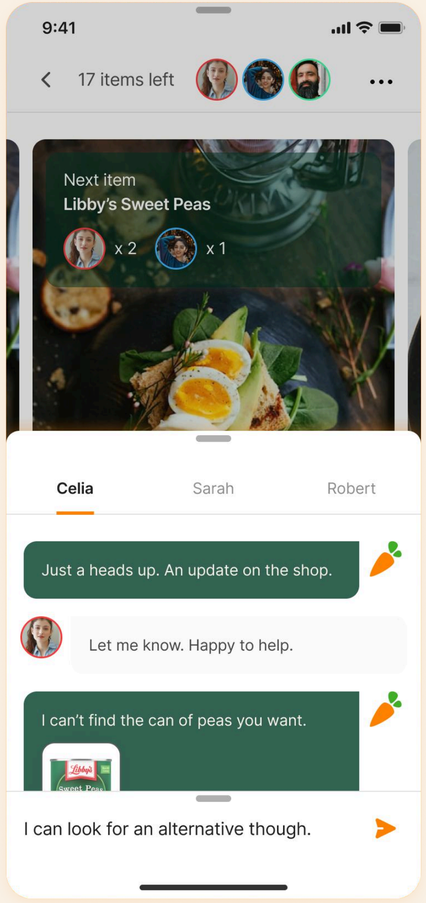
Purpose: Provide additional functionality when needed to complete tasks or create an experience that works best for the user.

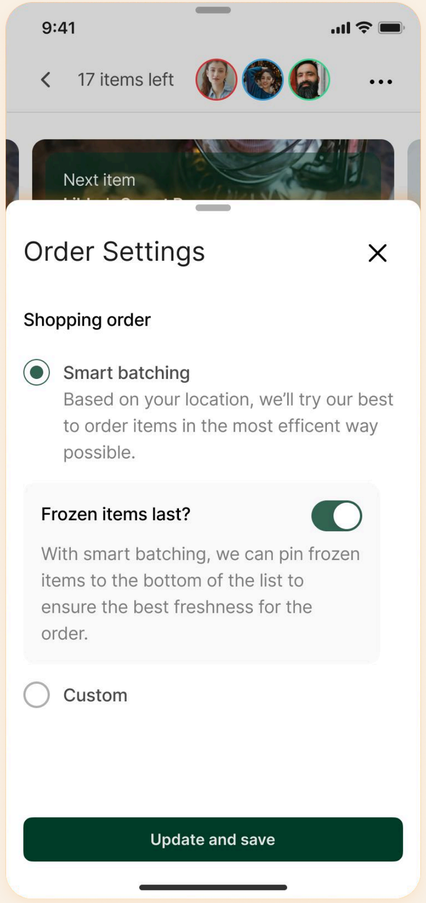
Key interactions

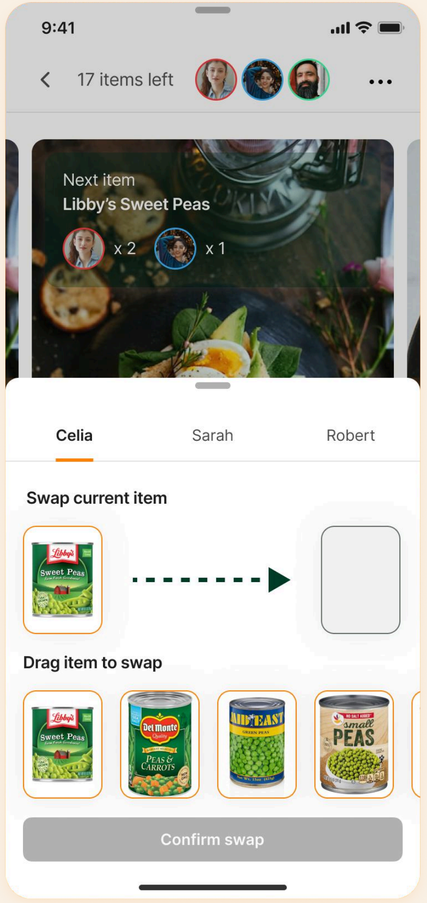
Quick customer chat
Order settings
Swapping items
Marking item as found
Placing item in specific cart location

Solves

Decision fatigue during substitutions
Backtracking due to missed frozen or priority items
Poor shopper–customer communication
Cart disorganization at checkout or handoff
Inefficiencies in batch workflows across multiple orders
Uncertainty about item placement for better handoff flow







Smart Map & Routing

Modality: Vision

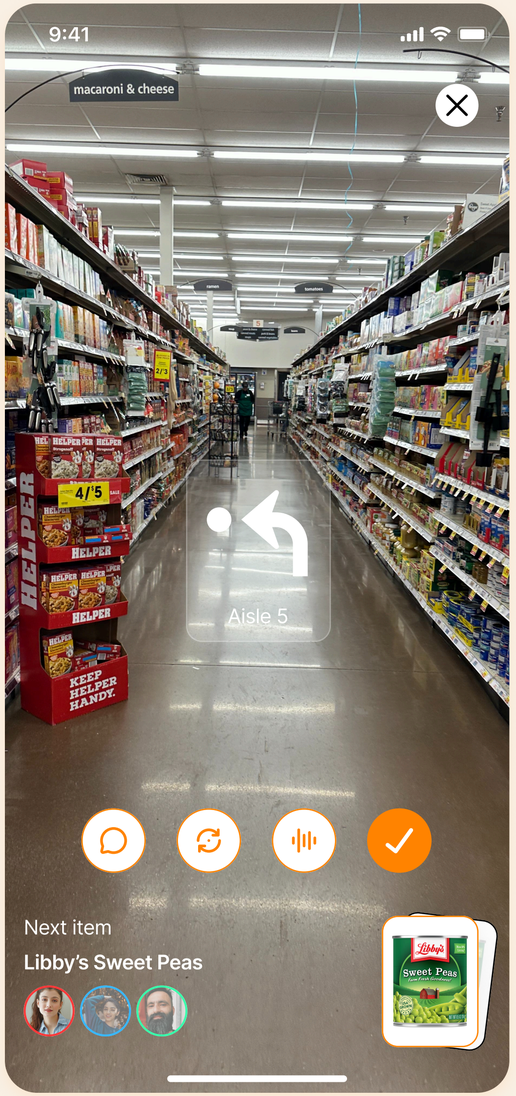
Purpose: Optimize in-store movement and reduce friction in unfamiliar layouts.

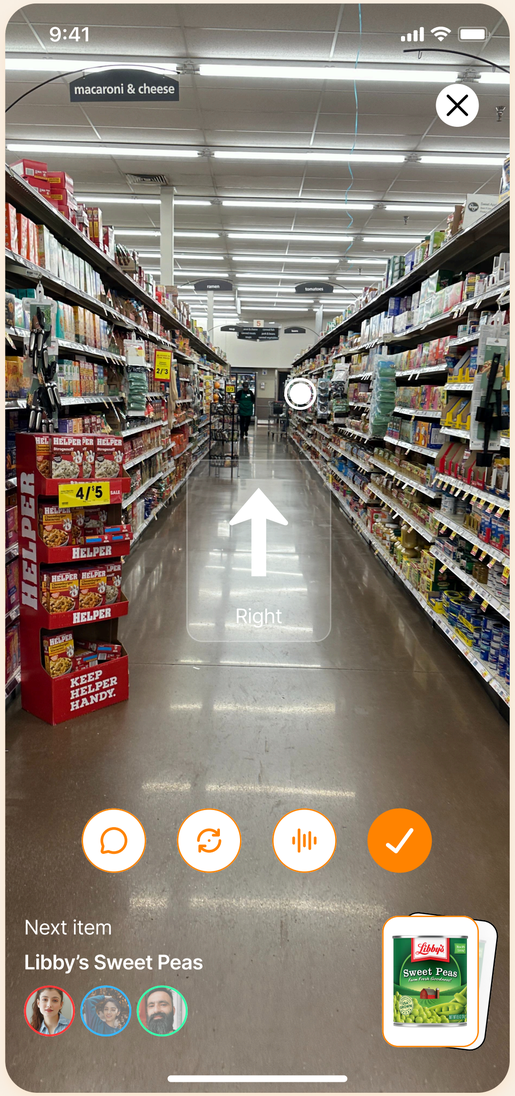
Key interactions

Auto-batched items by aisle/zone
Direction overlays as confidence indicators
Haptic feedback if phone goes into pocket

Solves

Inefficient movement through store
Slowdowns in unfamiliar stores
Missed items or backtracking
Order confusion when managing multiple at once





Product Verification

Modality: Vision

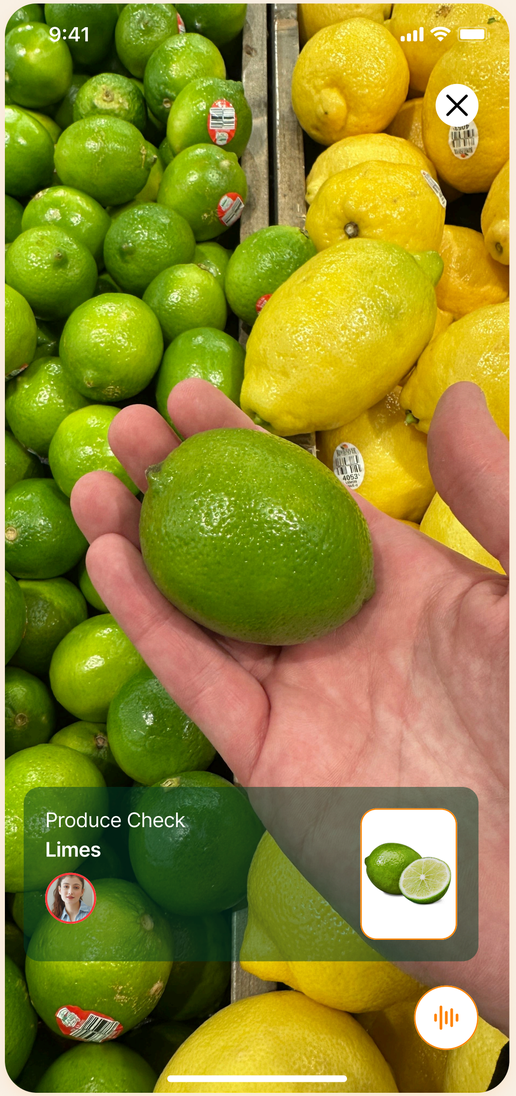
Purpose: Instantly verify that the correct product is selected and provide produce guidance with image recognition models.

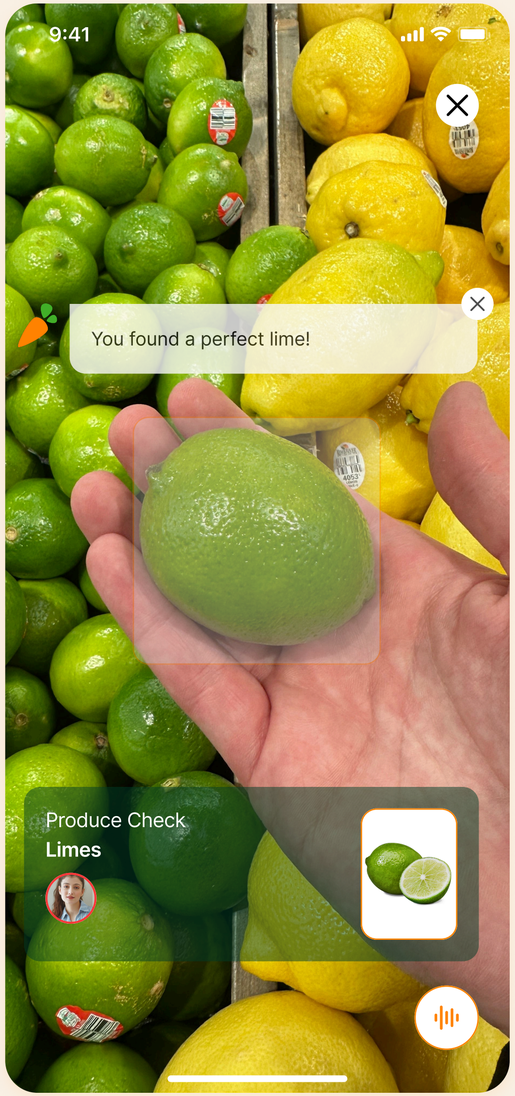
Key interactions

Scan item with phone camera
Compare label/brand visually with app listing
AI guides on produce ripeness and condition with overlays that communicate with the user

Solves

Incorrect items due to label confusion
Anxiety over picking the wrong produce
Time wasted searching for visual matches
Low confidence in new shoppers





Voice Assistant

Modality: Audio

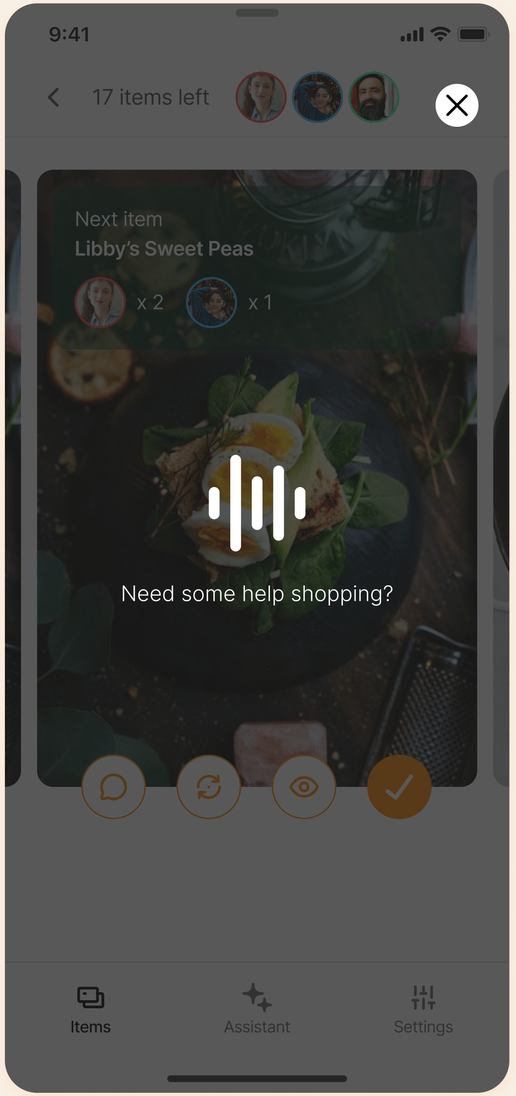
Purpose: Provide optional, hands-free, real-time support that adapts to the shopper's journey.

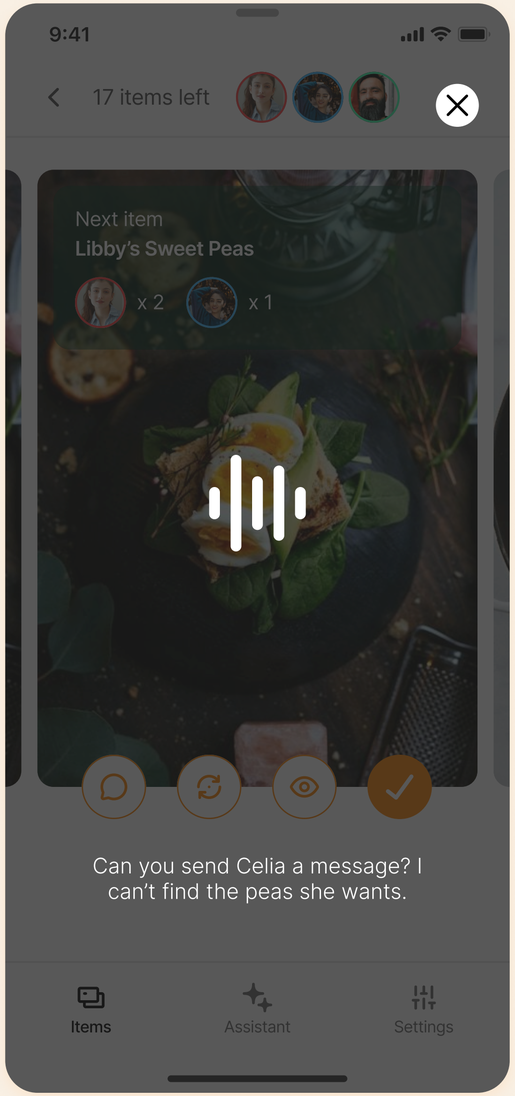
Key interactions

Ask questions like: "Where's the oat milk?" "What's next on Order B?" "Is this spinach a good alt?"
Voice output responds with mapped guidance or suggestions
Haptic feedback if phone goes into pocket
Always-available; never required

Solves

Cognitive overload while moving through store
Interruptive UI switching
Lack of confidence for newer shoppers
Accessibility gaps for multitasking or disabled users





Modular Mesh Bag System

Modality: Physical

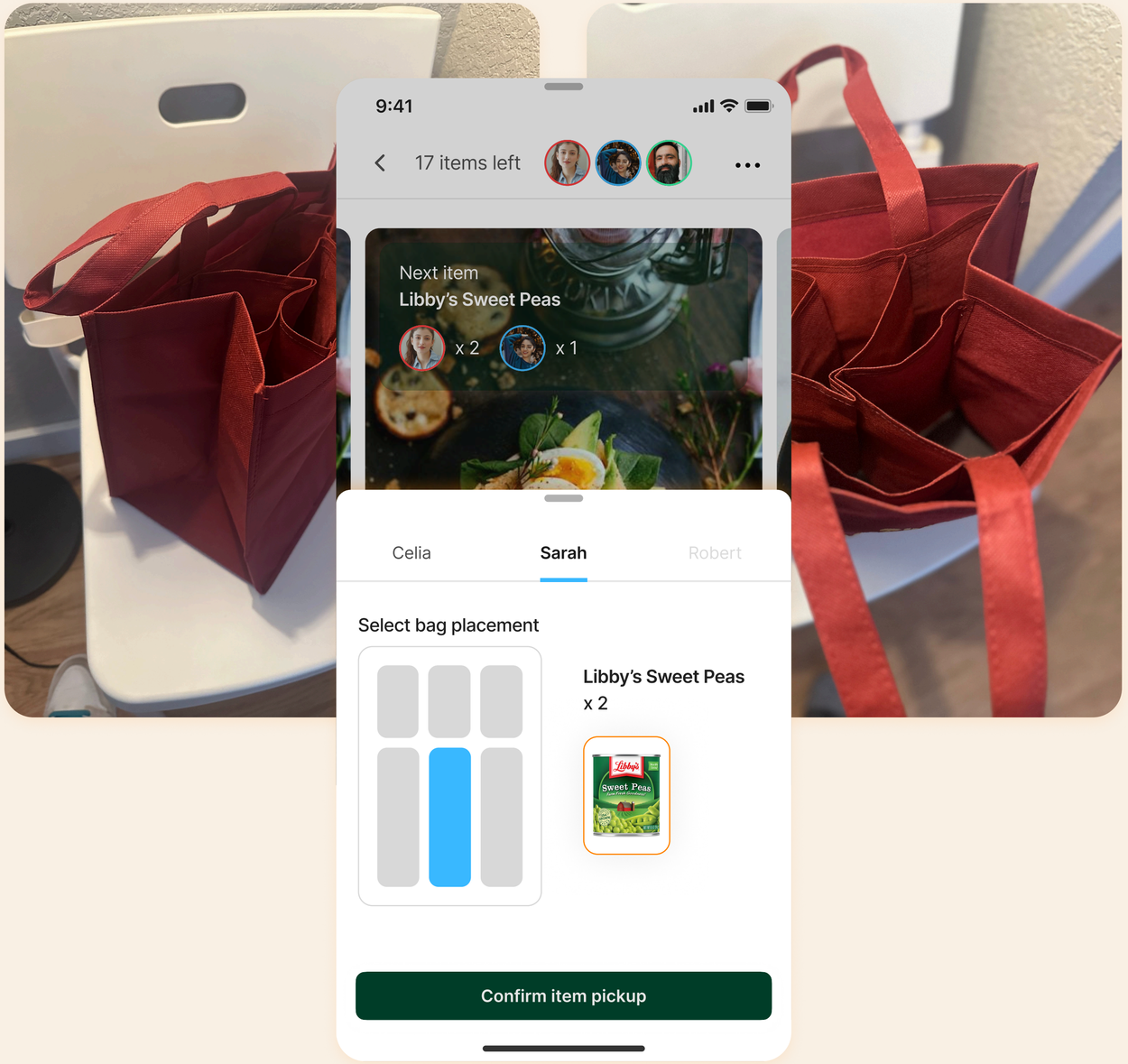
Purpose: Provide optional, hands-free, real-time support that adapts to the shopper's journey.

Key interactions

One color-coded bag per order
Organize with individual slots in each bag
In-app slot assignment ("Assign to Red Bag, Slot 2")
Bags can be handed off to customer or transferred to grocery bags with handles.

Solves

Cart chaos during multi-order shopping
Frozen/thawed item misplacement
Inconsistent packing handoffs
Visual alignment between shopper + driver + customer



When things don’t go as planned

Modalities: All

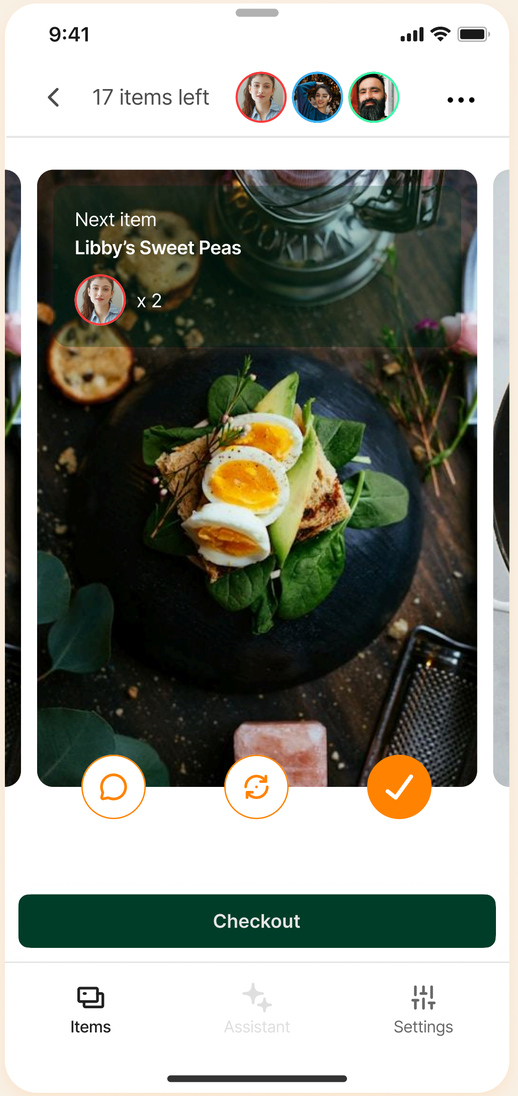
Purpose: To provide the user with basic functionality to fulfill their task.

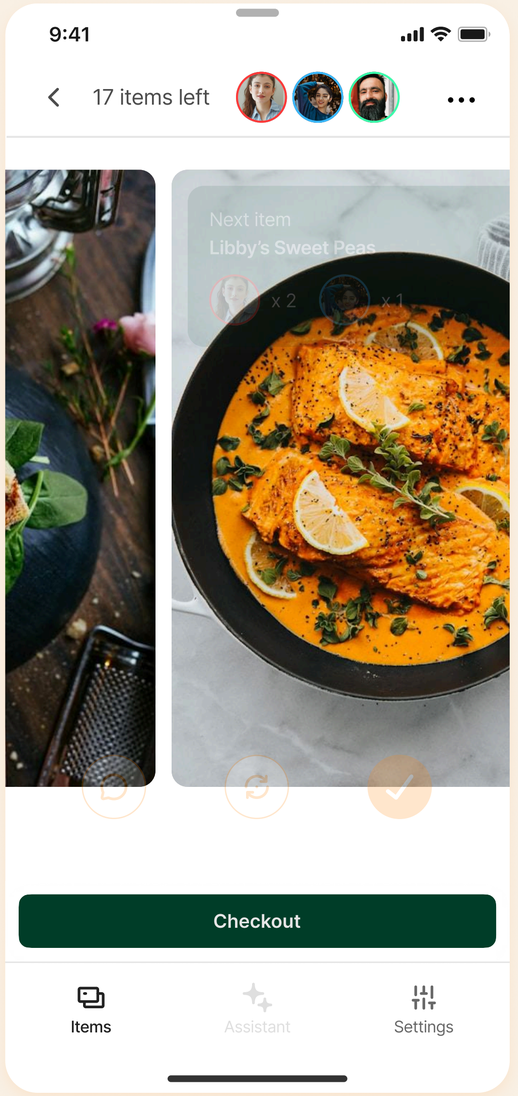
Key interactions

Tap-to-complete item actions
Manual substitution and swap
Visual-only navigation (basic list or image scroll)
Basic chat access
Static cart organization
Deferred and background sync

Solves

Maintains functionality during low connectivity
Enables core task completion without AI/voice
Reduces reliance on real-time data
Prevents full failure across modalities





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Store API Integration

Store layouts change. Items move.

To combat this, our system uses dynamic data updates powered by API integrations — capturing insights from ongoing shopping sessions across users.

As shoppers pick items, location data is passively logged, allowing the app to adjust aisle recommendations in near real time.

Over time, this creates a living map that evolves with each store, helping shoppers move faster and with more confidence, even in unfamiliar locations.











AI Model Integration

AI not as a replacement, but as a co-pilot — always available but never in the way.

We integrate LLMs directly into the shopping experience to act as real-time, context-aware assistants.

These models support voice navigation, product clarification, substitution logic, and customer messaging — enabling shoppers to work faster, with more confidence and fewer mistakes.









LUMA AI

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Finding any blind spots

I attempted to think through as many edge cases as possible.

Usability testing in the real-world would reveal *many more along the way*.

Cart disorganization → Mesh bags + in-app slot matching

Multi-order confusion → Color-coded stacks + slot tracking

Frozen item misplacement → Auto-prioritized as last

Produce anxiety → AI ripeness check + preference tags

Communication lag → Prewritten replies + voice assistant

Store layout confusion → Smart map + reorderable path

Cognitive overload → Modality-based flow, optional complexity with progressive disclosure

Delivery chaos → Color coded bag system syncs with app.

Augmenting the experience with AI-assisted features

The use of various models enhance the experience over multiple modalities.

As these models continue to improve, so should the general shopping experience.

AI camera check → Prevents mismatches, speeds picking

Ripeness tool → Guides confident produce selection

Voice assistant → Boosts flow, reduces tapping

Smart card sorting → Optimizes route, prevents spoilage

Slot suggestions → Improves bagging and checkout recall

Feedback engine → Builds mastery through coaching

Delivery chaos → Color coded bag system syncs with app.

Modalities in action

Modality isn't just about preference — it's about meeting the user where they are.

By giving shoppers multiple ways to interact with the system, we reduce friction, increase adaptability, and support different levels of experience and focus — all without adding complexity.

Touch → Enables fast, familiar control through stacked cards, filters, and item swaps.

Vision → Improves spatial accuracy and reduces friction with real-time product match and ripeness checks.

Voice → Provides hands-free guidance for quicker decisions and smoother flow.

Physical → Brings digital logic into the real world with organized mesh bags and clear slot placement for better handoffs.

Parting thoughts

This wasn’t just about designing better screens.

It was about designing a system that thinks with the shopper — one that adapts in real time, responds to real-world friction, and makes complexity feel invisible.

The result? A foundation for smarter, more human systems.

Built to scale.

Tuned for clarity.

Designed to get out of the way.

Thanks!

