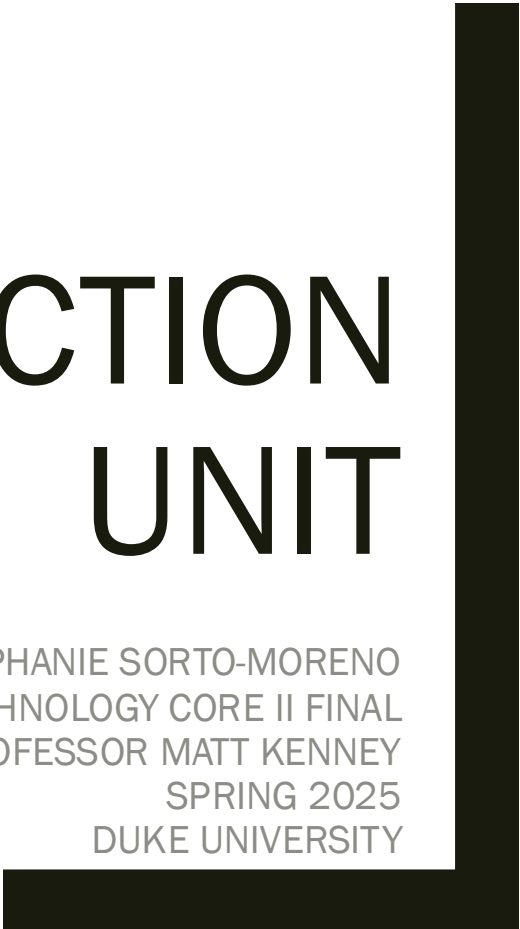




# AI REFLECTION UNIT

STEPHANIE SORTO-MORENO  
DESIGNTK 531 – TECHNOLOGY CORE II FINAL  
PROFESSOR MATT KENNEY  
SPRING 2025  
DUKE UNIVERSITY



# Project Background

## 1 Started with:

A personal tool for daily reflection using color-coded cards

## 2 Challenge Identified:

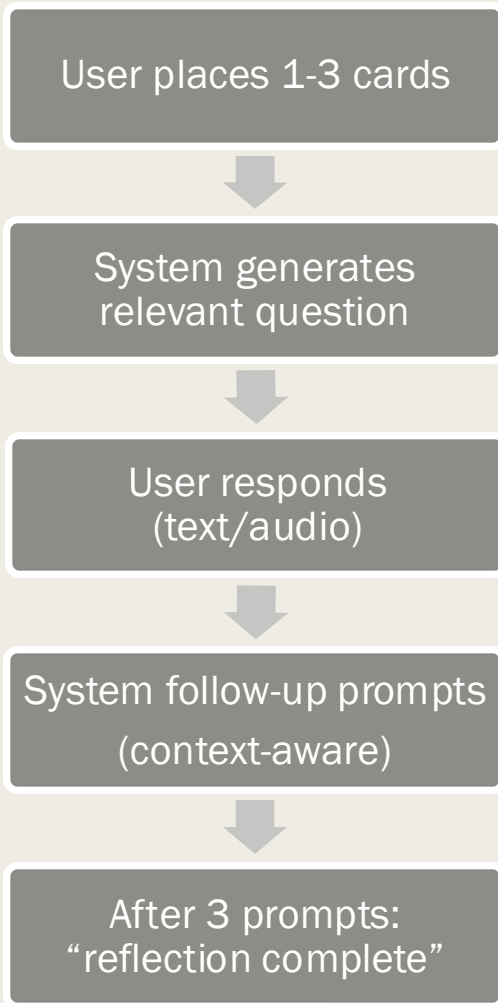
The initial concept lacked specific context no defined journey, clear user, or business need

## 3 Key Discovery:

Testing revealed exceptional value in high-touch service environments where emotional data is valuable but rarely captured

→ **Pivot Point:** This insight transformed the project from a personal tool into a business solution for capturing real-time emotional intelligence in critical customer journeys.

# User Flow



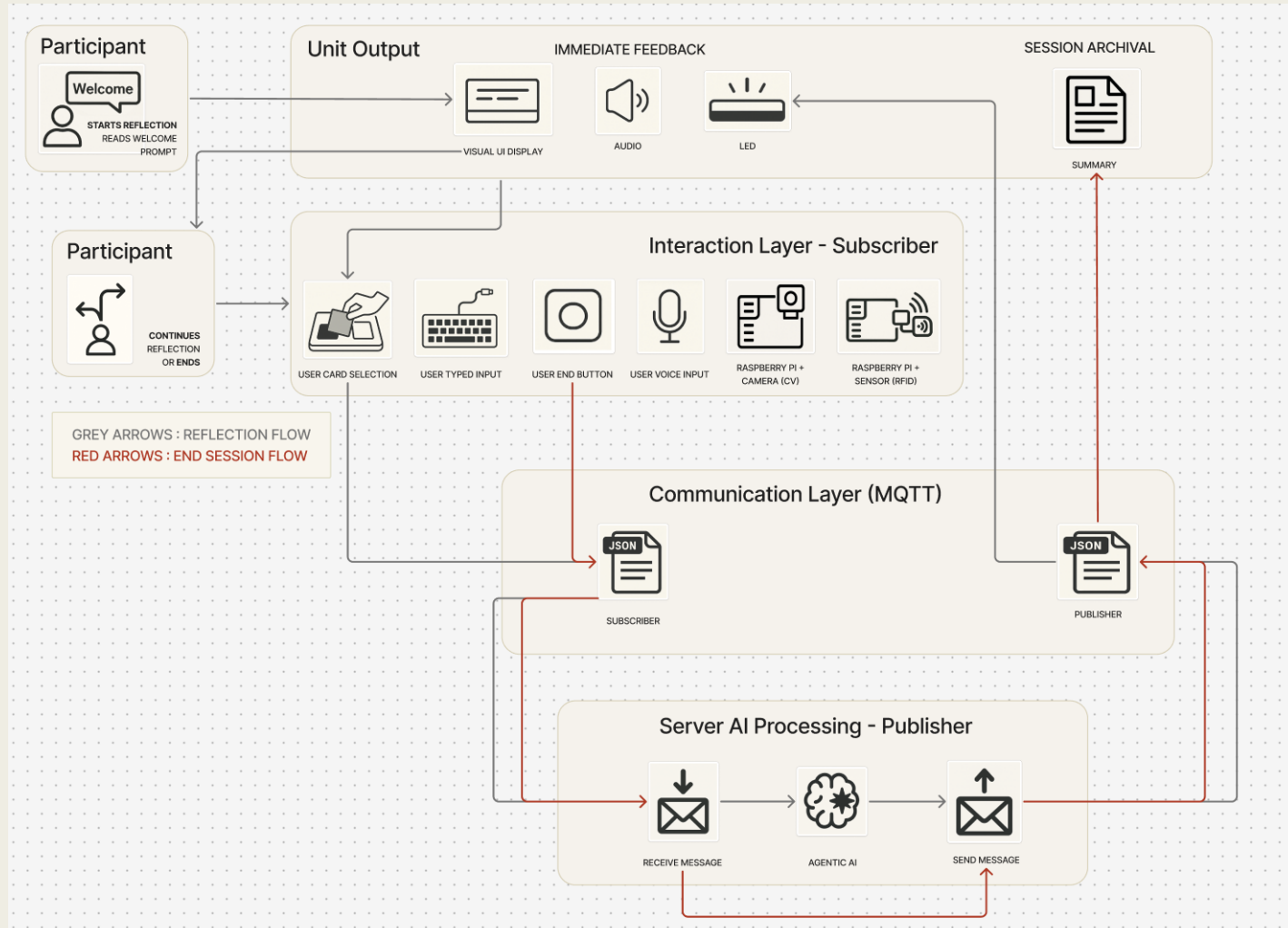
## Demo Code Setup (Current Prototype):

- Computer vision for card detection
- Input/output via computer terminal/keyboard

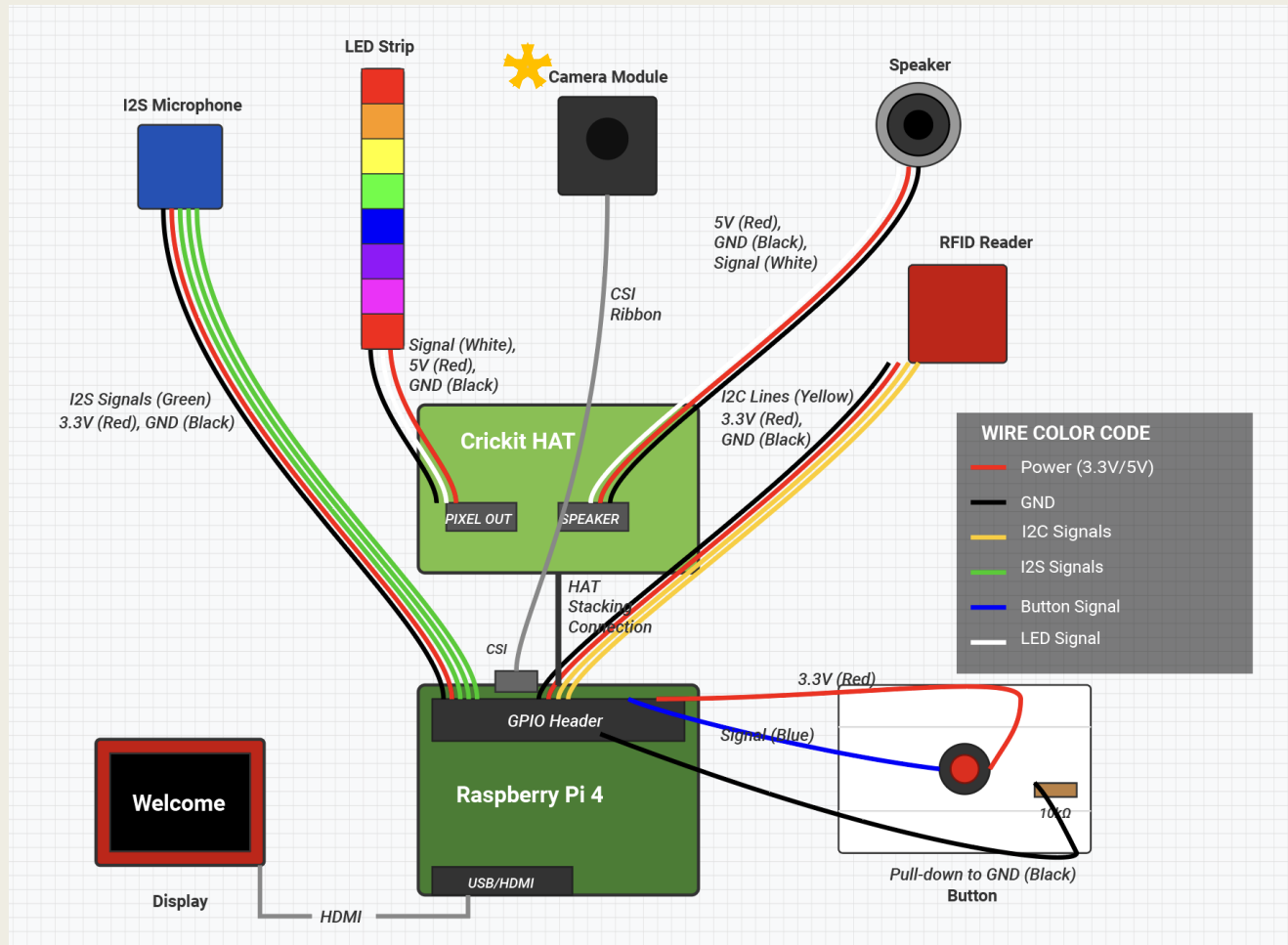
## Future State (Ideal Version):

- LED light strip integration
- Built-in display with clean UI
- Audio feedback via speaker
- Voice input with microphone
- Physical stop button to end session
- Session end summary for post-analysis

# Systems Diagram



# Circuit Diagram



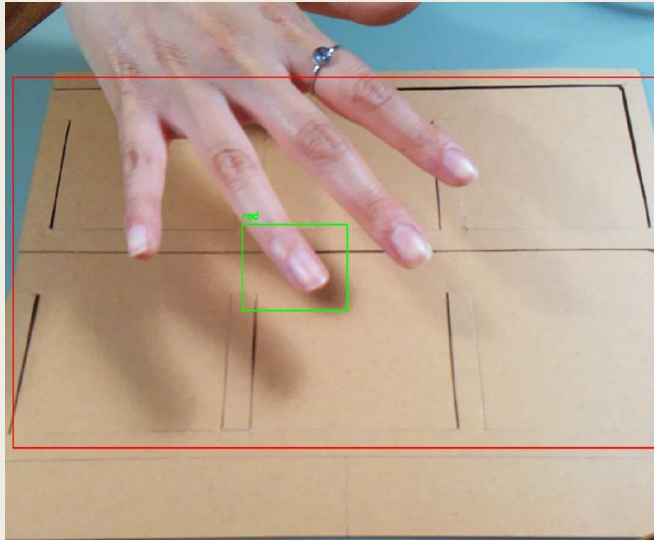
The current prototype setup includes only Camera Module for computer vision card detection.

*This wiring diagram presents the ideal future-state set-up exploration.*

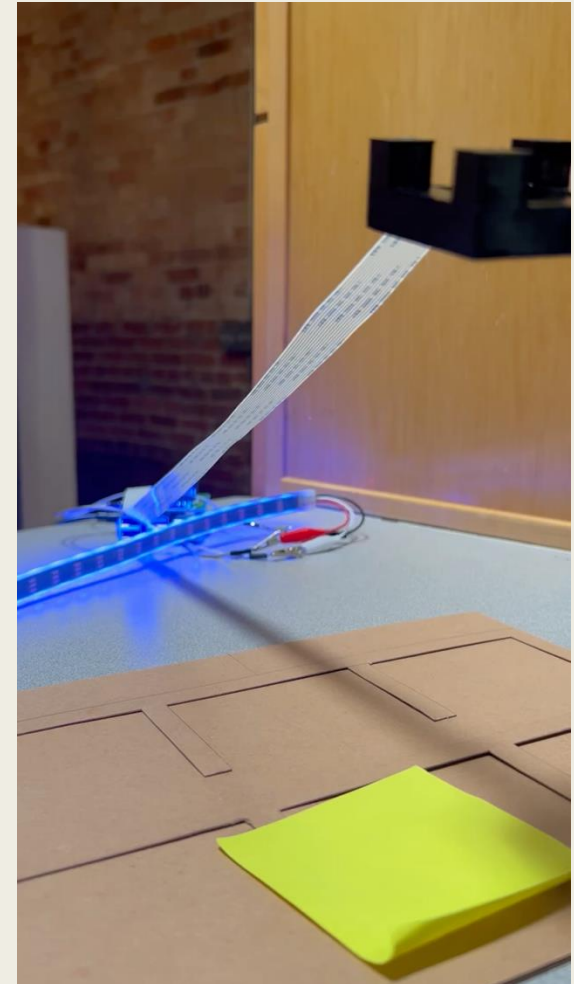
\*Ideal diagram references parts from Circuit Designer & visualization was AI-assisted (Claude).

\*\*Final prototype wiring and system integration was manually reviewed and validated.

# Learnings from Prototyping



- Added ROI mask to restrict detection to chipboard area.
- Tuned HSV + added shutter delay to reduce false positives from hands
- LED strip interfered with CV, moved to back of frame.
- Dim lighting made CV unstable, needs consistent, even lighting.



# Ideal Product Ideation



## Updated Format:

- Make unit/cards in plastic
- Use RFID instead of CV for card detection.
  - would allow for compact design.
  - would allow for LED to be moved interior front of frame so that it is user facing.
  - card colors no longer need to be distinct.
  - opens up symbol exploration.

## Auditory interaction:

- additional user voice input
- additional unit sound output

## User Autonomy:

- Add physical stop button for user to end reflection at any point.

# Ideal Product Ideation

Scalability of unit allows for specific high-touch industry service reflection  
+ modular format for easy placement and set-up.



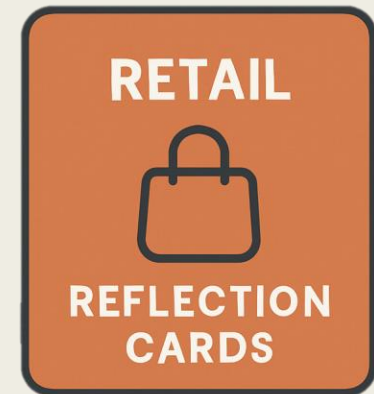
*Post-purchase  
Experience*

→ Placed where  
customers pick  
up new vehicles  
or finalize paperwork.



*Clinic visit  
pain points*

→ Positioned in exit  
corridor before  
checkout desk.



*Omnichannel  
pickup feedback*

→ Directly at  
pickup counter  
kiosks or mobile  
locker stations



# Ideal Product Ideation

## Cost to Produce Base Unit

Component	Cost Estimate
Raspberry Pi + RFID + Audio + LED	~\$80
Plastic Housing + Display	~\$40
Assembly + QA Testing	~\$20
Packaging	~\$10
<b>Total Estimated Unit Cost</b>	<b>~\$150</b>

## Margin per Unit

Enterprise Sale Price: **\$600**  
Gross Margin per Unit: **\$450**  
Gross Margin % : **75%**

*Enterprise modular design enables efficient production (~\$150 per unit) and strong margins (~75%), while add-ons like keyboards, RFID card packs, and display personalization offer scalable ways to expand revenue per deployment.*

**These extensions not only deepen user engagement but strategically reinforce the unit's low-cost, high-margin enterprise model.**

# Consumer Case Study

## **Vertical**

Automotive dealerships, healthcare clinics, and omnichannel retail industries with high-touch service interactions.

## **Target Audience**

Product, Customer Experience, and Service Operations leaders focused on enhancing client satisfaction, loyalty, and service performance.

## **Why This Device is Compelling**

Captures real-time emotional reflection at critical service moments without friction, using simple card placement instead of surveys, apps, or QR codes.

## **Price Justification**

\$600 enterprise unit price reflects durable modular hardware, enterprise-grade card interaction, and future expansion into SaaS analytics and insight services. High gross margin (~75%) ensures sustainability and service quality.

# Demo

This demonstration showcases a prototype of the reflection experience designed for post-car shopping. It captures customer highlights and friction points immediately after vehicle purchase.

The video walkthrough explains the technical setup with Computer Vision card detection, including Gemini 1.5 model integration, and the user research rationale behind the prompting logic.

[\[Watch it here\]](#)

# Reflection

This project is personally compelling because, in my previous work experience in retail product development, I directly experienced how unmet customer needs — like poor fit — led to frustration, lost sales, and missed loyalty opportunities.

Transitioning into technology and product innovation, I'm focused on designing scalable solutions that capture these moments in ways that drive both user satisfaction and business outcomes.

Long-term, I aim to lead work at the intersection of UX research, product strategy, emerging tech, helping organizations create more human-centered, data-informed experiences at scale.