MICHIGAN STATE UNIVERSITY

Project Plan Presentation

One-Button-Laundry Project

The Capstone Experience

Team Whirlpool

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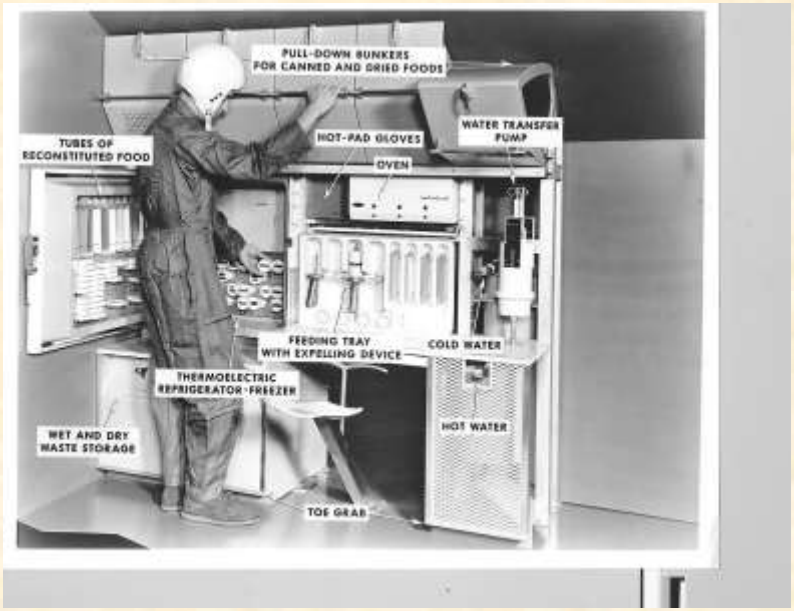
Spring 2026



From Students…
…to Professionals

Project Sponsor Overview

- Last remaining US Based Kitchen and Home Appliance Manufacturer
- Headquarters – Benton Harbor, MI
- Constantly trying to improve home innovation



1960's first prototype space kitchen

Whirlpool

Project Functional Specifications

Problem:

- Users Default to a “Normal” Wash setting due to overwhelming setting combinations
- Interfaces are difficult to navigate with visual impairment

Solution:

“One-button-Laundry” washer – proof of concept with LLMs and computer vision to configure washer based on soil level, fabric type and color.

Project Design Specifications

- Mobile App – connects via Bluetooth for Remote Control, real-time updates & manual setting configuration
- Smart Washer Interface – simulated with Raspberry pi and 7-inch display for dynamic settings, remaining time, and warnings
- AI – chat for advice, conflicts flagging

Screen Mockup: Home Screen

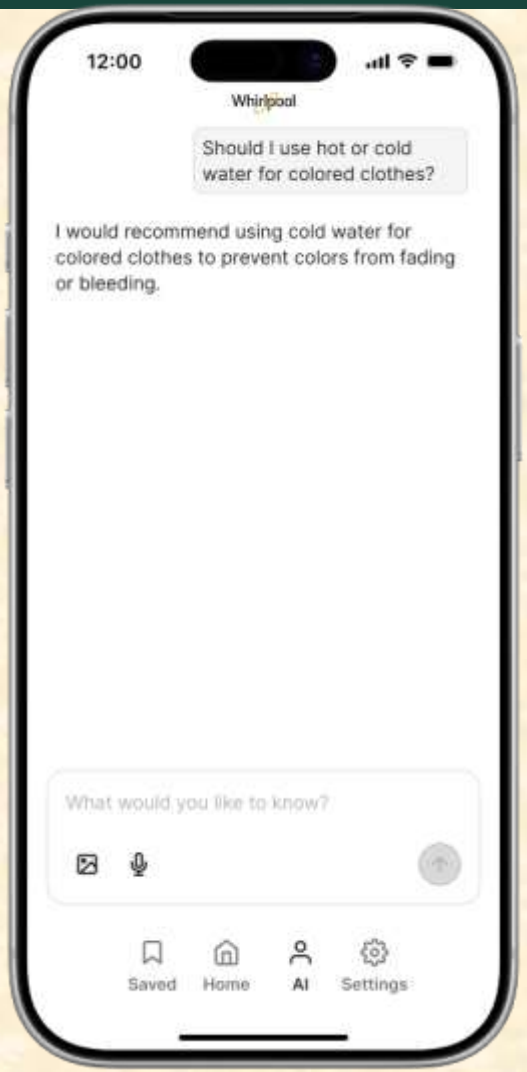




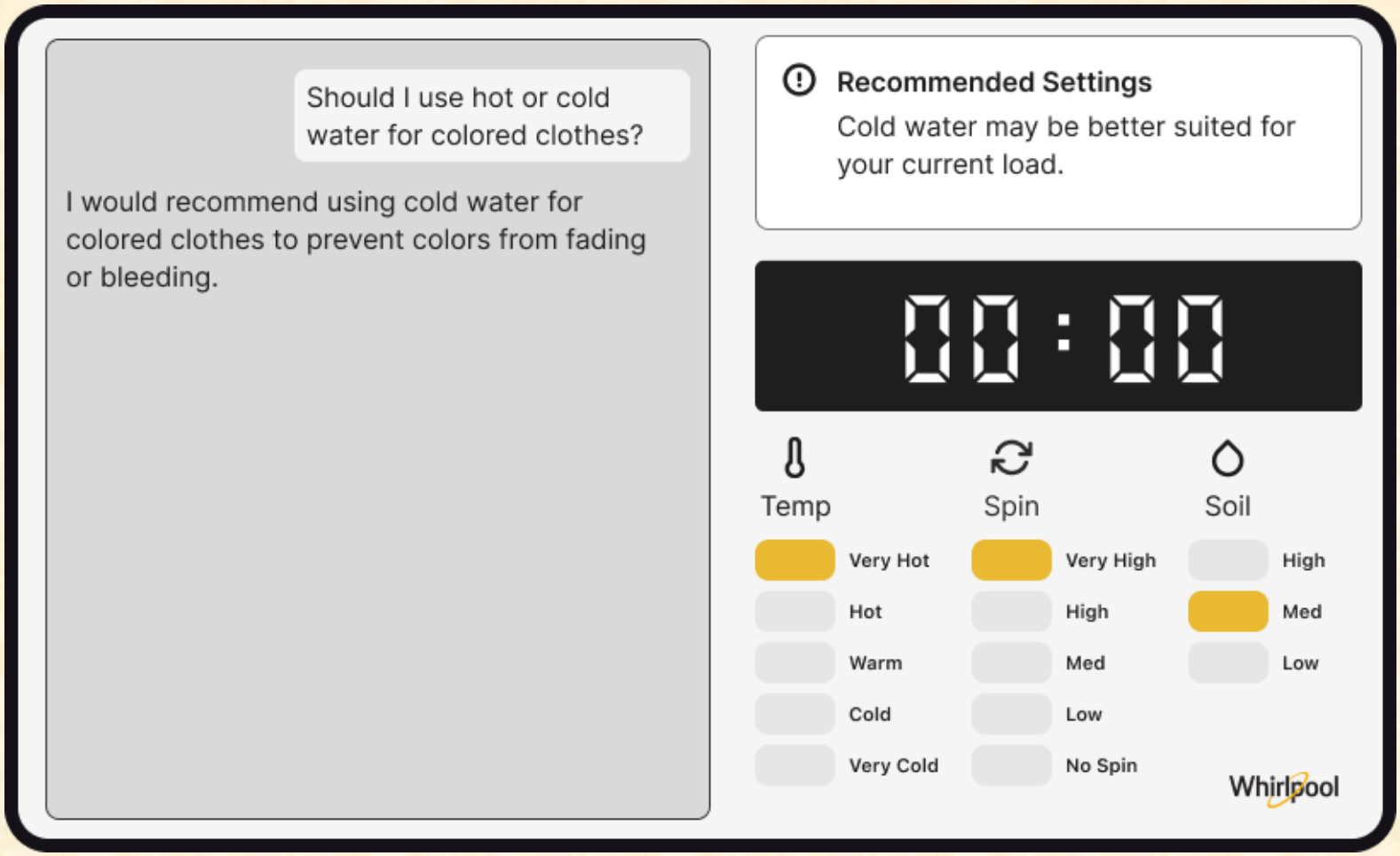
Screen Mockup: Saved Screen



Screen Mockup: AI chat



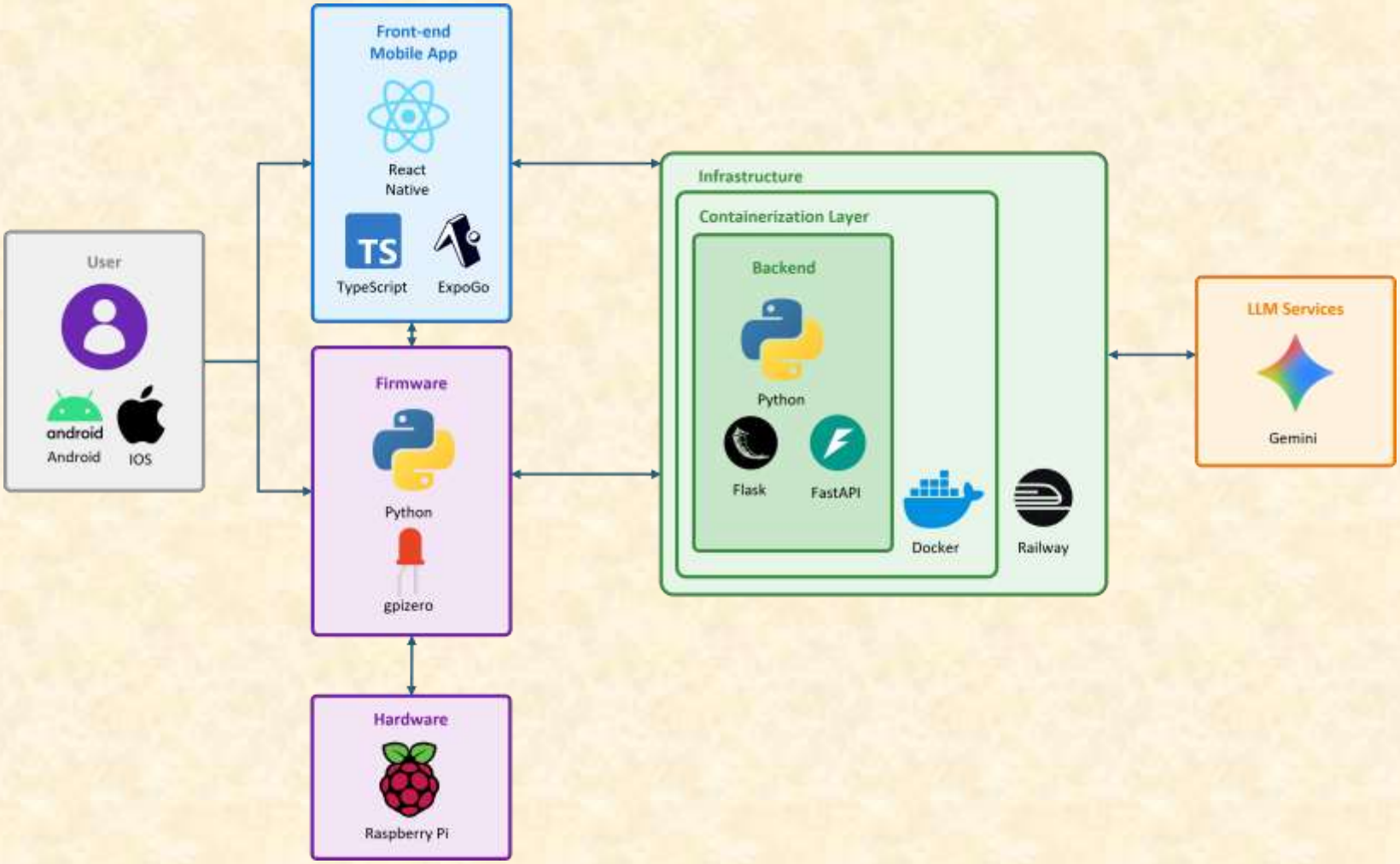
Screen Mockup: Panel



Project Technical Specifications

- Firmware & Hardware:
  - Raspberry Pi 5 (Python, gpizero)
  - Camera, Microphone, Speaker, 7" Display, Lid Sensor
- Mobile Application:
  - React Native (TypeScript)
  - Expo / Expo Go
- Backend & Cloud:
  - FastAPI / Flask (Python).
  - Docker containerization hosted on Railway.
- AI Services:
  - Gemini API

Project System Architecture



Project System Components

- Hardware Platforms:
  - Raspberry Pi 5
  - Peripherals: Camera, Microphone, Speaker, 7" Screen (UI)
  - Sensors: Lid closure sensor, Internal LED illumination
- Software Platforms
  - React Native & Expo
  - Gemini API
  - FastAPI & Railway
  - Bluetooth LE

Project Risks

- Risk 1: AI Accuracy
  - Likelihood of Hallucinated output and inaccurate conclusions
  - Mitigation- Prompt engineering, Deterministic Logic Engine as Failsafe
- Risk 2: Lack of Washing Machine
  - No physical Washing machine to simulate actual environment/ software compatibility
  - Mitigation – simulation on Raspberry pi, and other hardware simulation using LEDs and Portable manual washer
- Risk 3: Camera Accuracy
  - Difference in lighting, combined with already poor lighting leading to differences in camera perception
  - Mitigation- normalization of color balance, special cameras to aid LLM reasoning
- Risk 4: Noise Disruption
  - Laundry room noises will likely interfere with commands
  - Mitigation- noise gate Directional microphone

Questions?

