# TEXAS STATE UNIVERSITY®

*The rising STAR of Texas*

# Group E2.05 - 31 Degrees Team

## Sponsor Information

- 31 Degrees provides beverage dispensing machines and beverage product for customers
- Special events
  - Louisiana State Fair, the Fort Worth Livestock Show & Rodeo and various music and margarita festivals
- Longer-term partnerships
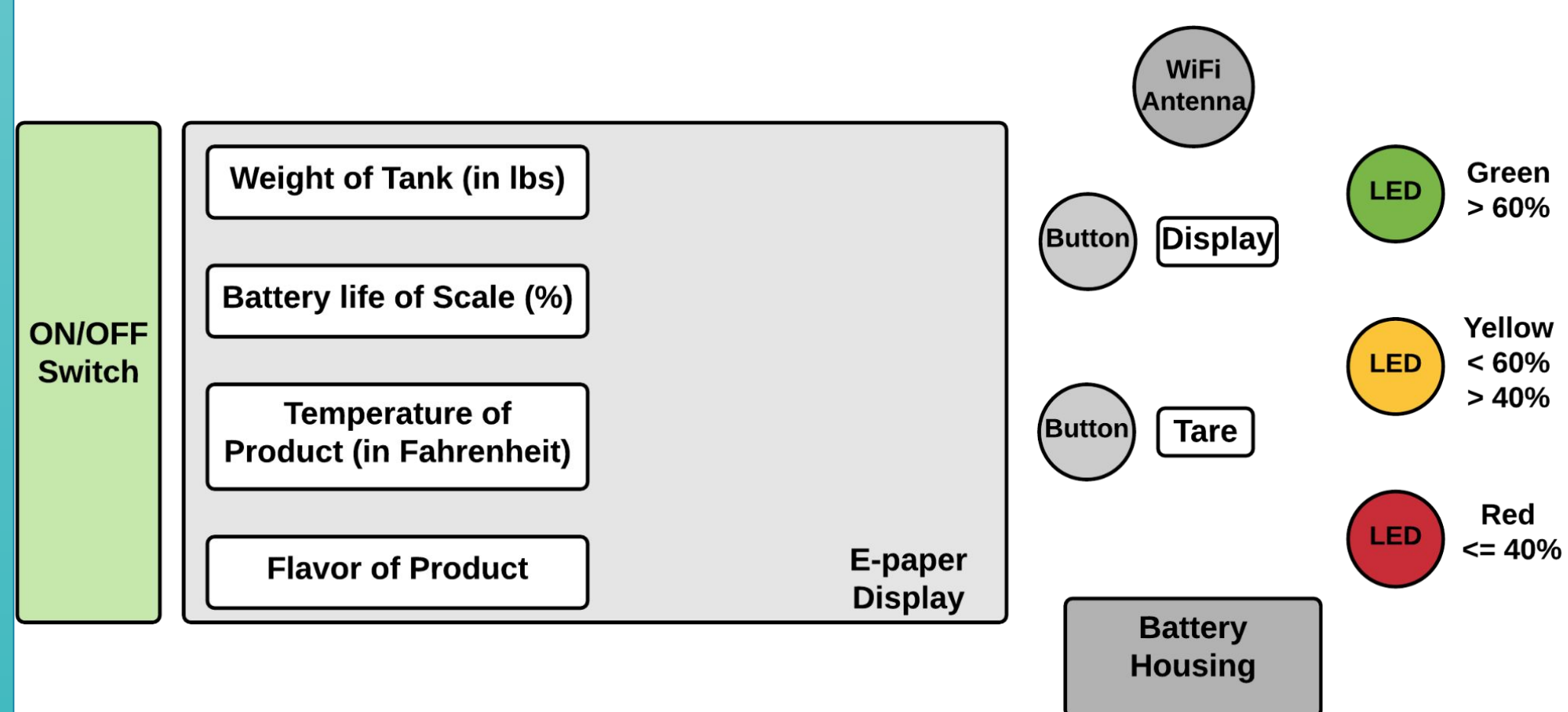  - Schlitterbahn, the Dallas Cowboys, Typhoon Texas and FC Dallas

## Why a Smart Scale System?

Our product is a smart scale system that enables event workers to monitor an operational dashboard that shows when a tank should be refilled, the flavor and temperature of the product, and the battery percentage. 31 Degrees can use this knowledge to make better cost-effective decisions, identify improper use of machinery, theft, and more.
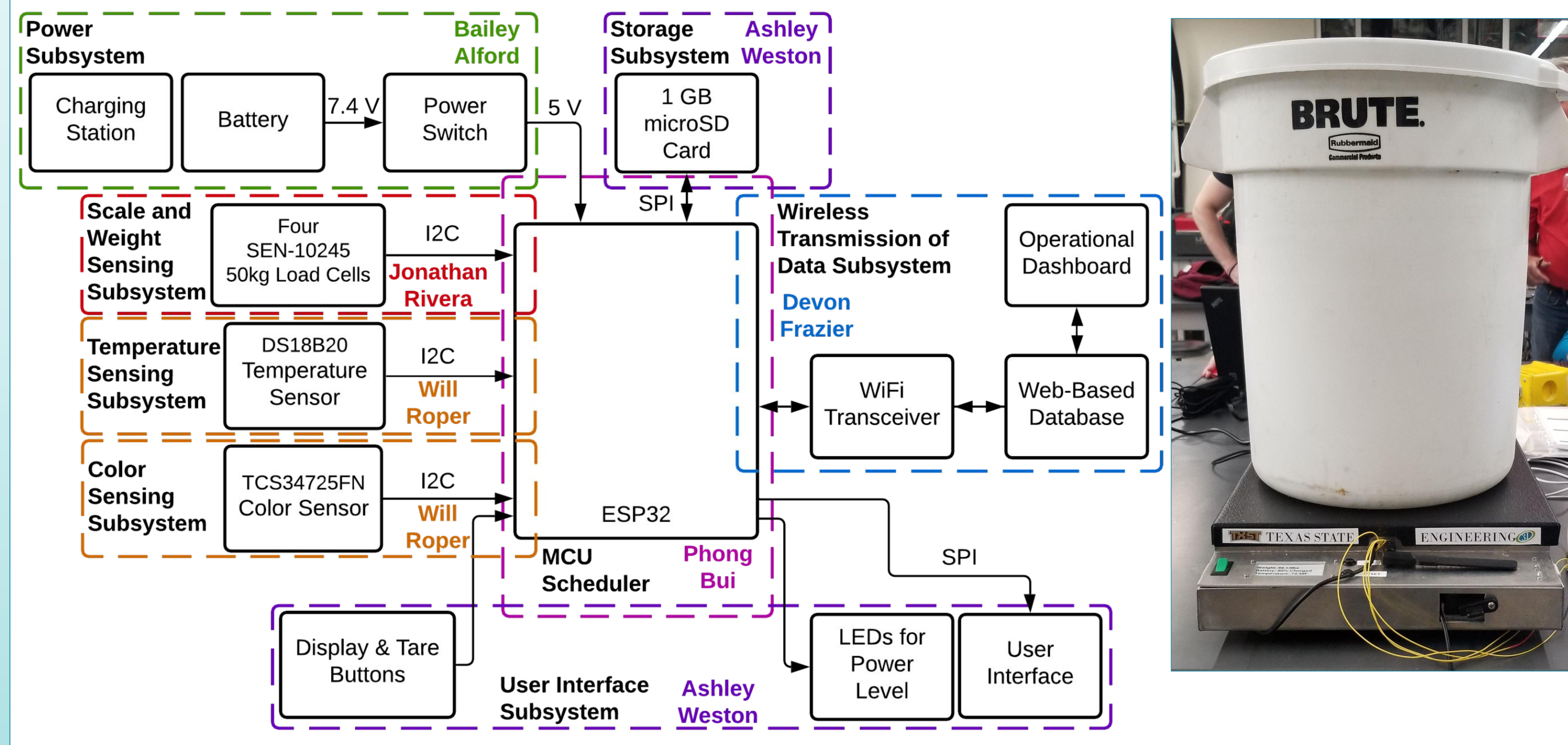
## Design Approach

- Use several weight sensors in Wheatstone bridge configuration to increase weight capacity
- Operate scale on battery power to improve mobility and ease of use
- Transmit data via WiFi to an online MySQL database
- Use e-paper display for physical user interface
- Thermistor temperature sensor for temperature sensing and RGB color sensor for flavor matching
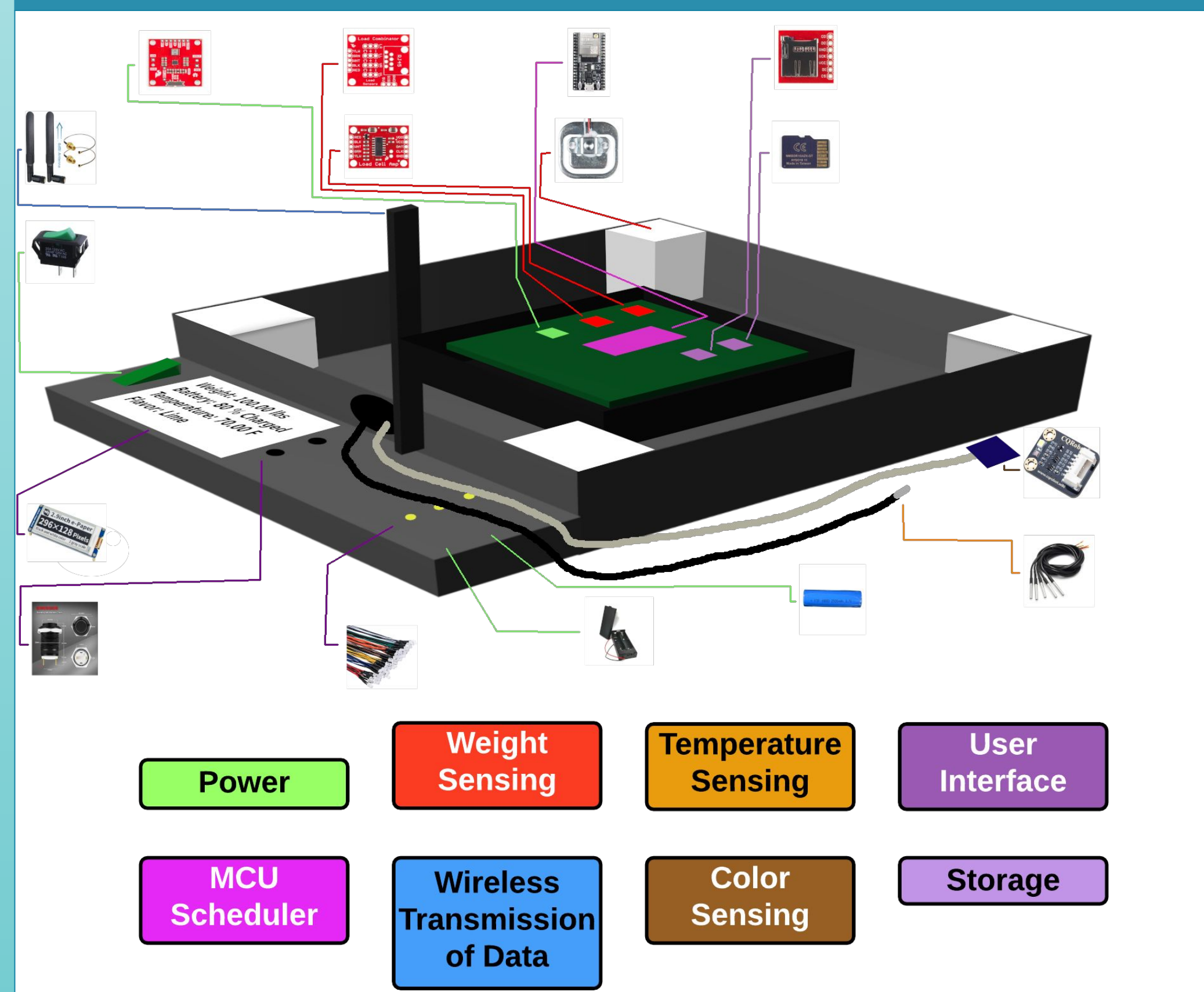- microSD card for connectionless data storage
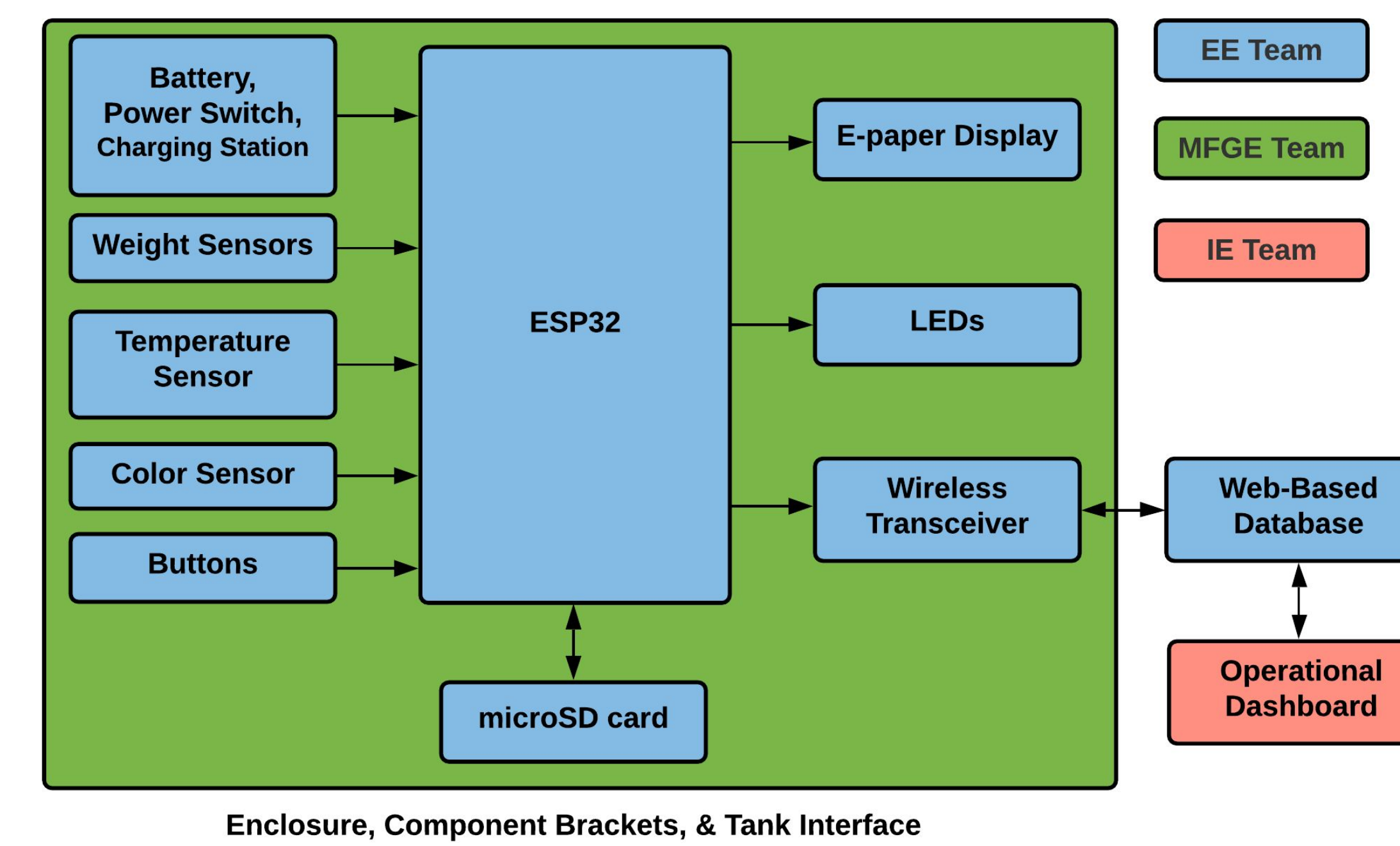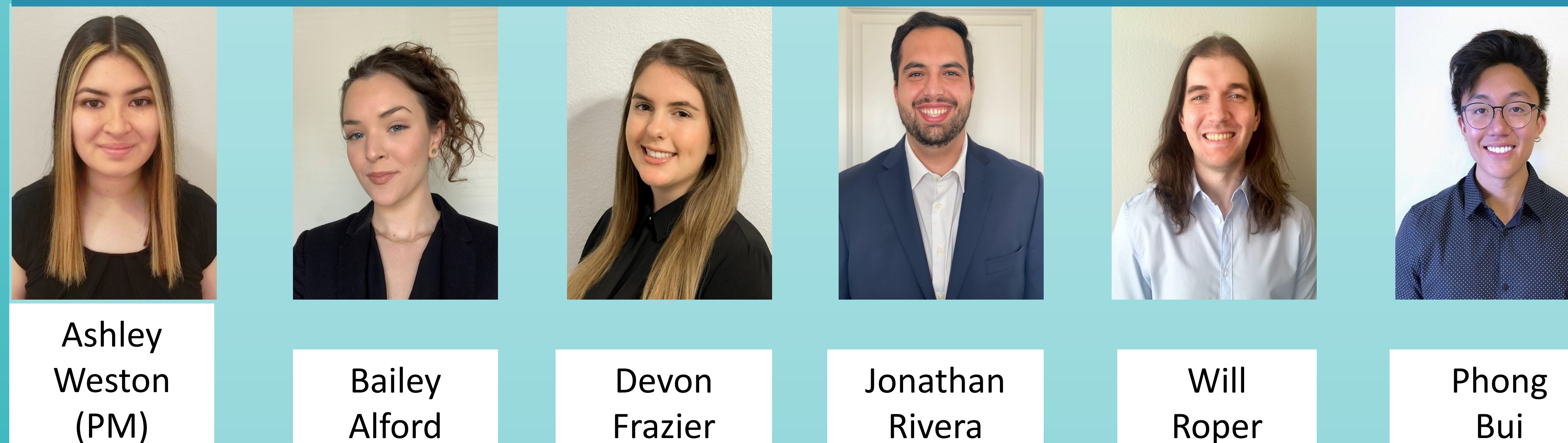
## User Interface Design



## Block Diagram



## Overall Design



| Power | Weight Sensing | Temperature Sensing | User Interface |
| MCU Scheduler | Wireless Transmission of Data | Color Sensing | Storage |

## Multidisciplinary Team



Enclosure, Component Brackets, & Tank Interface

## Meet the Electrical Engineering Team



Ashley Weston (PM)

Bailey Alford

Devon Frazier

Jonathan Rivera

Will Roper

Phong Bui

## Testing

| Requirement | Result |
| --- | --- |
| Collect data every 10 minutes and insert to MySQL database. | Sent weight, battery, temperature, and color data successfully from scale to database. **PASS** |
| Measure weight upto 410 lbs. within ±0.1lbs. | Measured 430 lbs. using dumbbells on the scale. **PASS** |
| Detect temperatures within 32°F to 100°F within ±1°F. | Matched temperatures with a cooking thermometer with 94% accuracy of ±1°F. **PASS** |
| Correctly match liquid color to drink flavor. | 89% of 200 measurements aligned with manufacturer's given flavors. **PASS** |
| Save/send data in MicroSD card depending on WiFi status. | microSD correctly stored and sent data with WiFi off for 6 hours. **PASS** |
| Minimum battery life of 24 hours at 10-minute intervals | Battery percentage at 70% after running for 16 hours at 1-minute intervals. **PASS** |

## Temperature Sensor
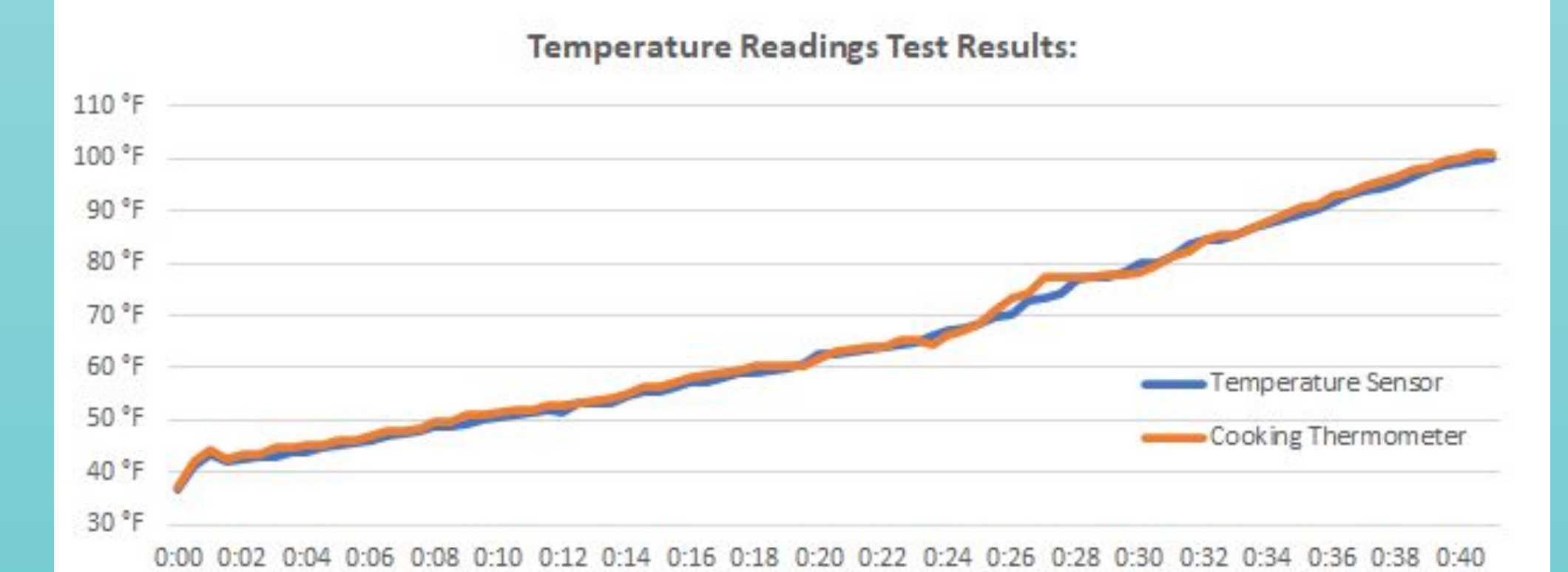


## Color Sensor
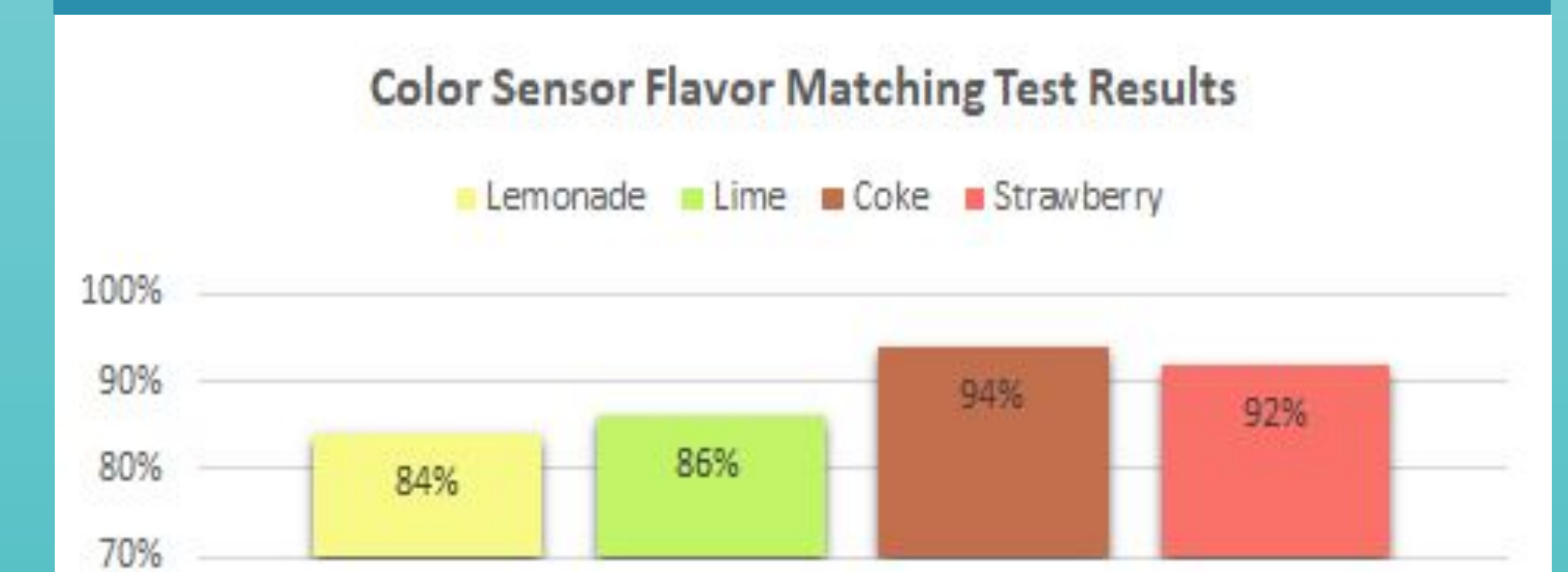


## Acknowledgments

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