A Data-driven Approach to Analyzing Post-consumer Food Waste in Dining Halls

System for Compost Recording: Automated Plate Waste Statistics (SCRAPS)

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Johns Hopkins University | Student Affairs Dining

MultiD

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Food Waste Challenge

58%

58 percent of methane emissions from municipal solid waste landfills are from food waste (U.S. EPA, 2025).

Partner Needs

Hopkins Dining needs a way to measure food waste to determine the success of their waste reduction initiatives in dining halls.

1. Automated and Consistent Data Collection

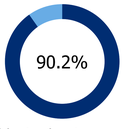
Existing **Weigh Your Waste** audits provide in-depth information about types of food waste, but require volunteers and therefore happen infrequently.

2. Quantitative Information

Total Compost Weight (Known) | **PRE-consumer** | **POST-consumer (Our Solution)**

Hopkins Dining knows total compost weight from a location, but not how much comes from pre-consumer (back of house preparation) and post-consumer (plate waste) sources.

User Insights

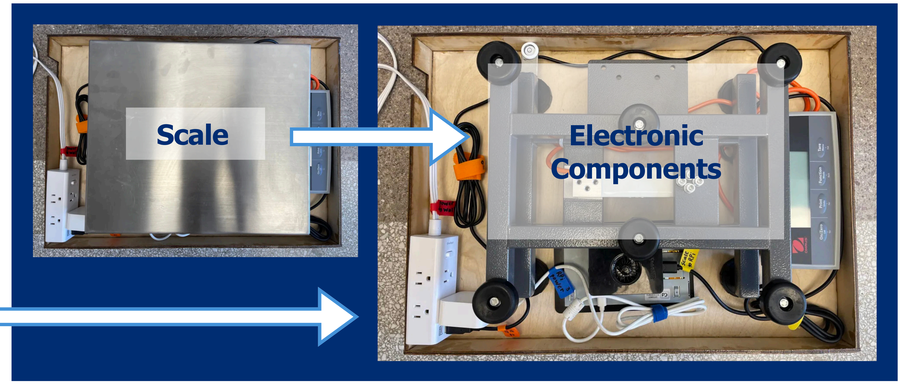


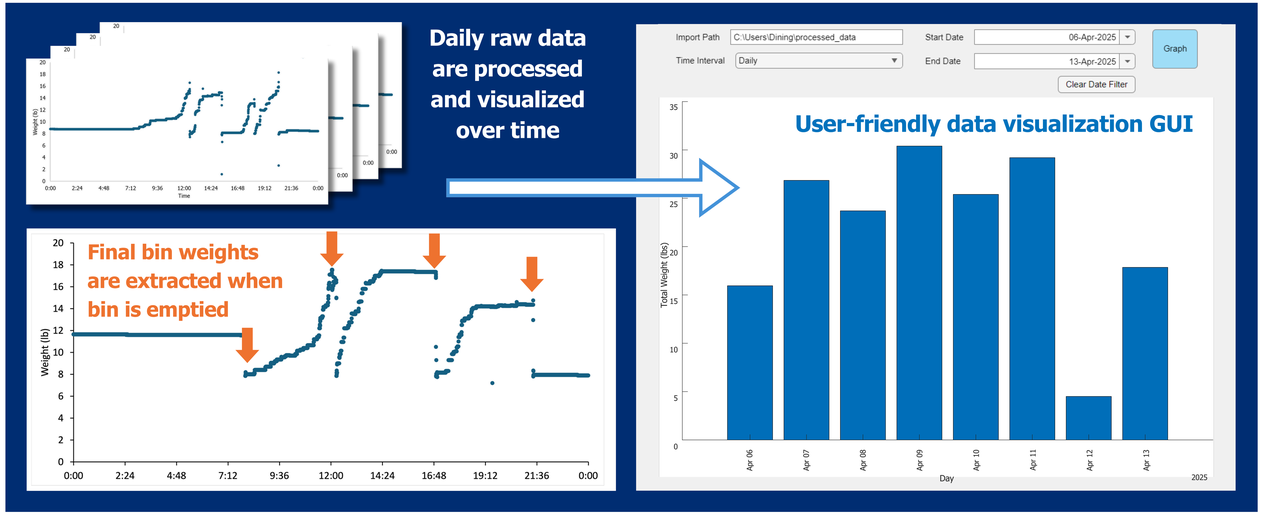
of JHU students surveyed **leave food on their plate** at least **25%** of the time.

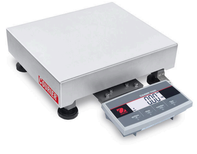
Interviews show that students care about the impact food waste has on our environment.

Students are conscious of their food waste and would like to reduce how much they throw out.

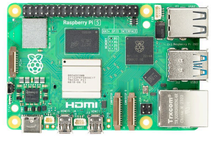
Our Solution







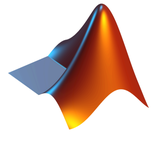
Scale automatically collects weight data every 5 seconds



Raspberry Pi stores, processes, and transmits data

Python script extracts final bin weights and calculates daily totals

Raw data and total weights uploaded to cloud-based storage



MATLAB GUI visualizes weight trends over time

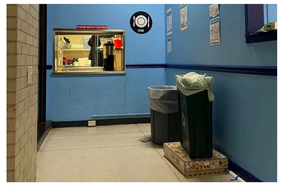
Testing

Peabody Dining Hall

- Selected for consistent practices, small size, open dining arrangement
- Week-long trial run to tune data processing script

Community Engagement

- Important for a successful, long-lived solution
- Tabling event to decorate scale case with stickers to engage Peabody students



Key Outcomes

Inform purchasing and operational decisions

Improve continuity and classification of compost statistics

Encourage responsible consumption by students

Future Directions

Scale Up

- Additional units can be integrated with only slight modifications.

On-site Adaptation

- Basic diagnostic tools and a visual guide equip staff to keep the system running, limiting disruption of staff workflow and data collection.

Student-facing Dashboard

- Provide timely information to update students on amount of food waste produced