BU

Senior Design
ENG EC 463 / 464

Memo

From: Aditya Wikara, Hayato Nakamura, Charles Thao, Kevin Sinaga, Shreenidhi Jayaram

From: Team 9 - Ecobin

Date: April 26, 2019

Subject: **ECOBIN: Customer Installation Report**

1.0 Customer Installation Details

Customer installation took place on Thursday, April 25th, 2019 at 6PM at the Senior Design Lab bench in PHO 111. The customer, Ben Cootner was present, along with team members Aditya Wikara, Hayato Nakamura, Charles Thao, Kevin Sinaga and Shreenidhi Jayaram representing the ECE team and Esther Huynh, Jiaqian Wu, Yuzi Li representing the ME team. The final product consists of three major components: the Ecobin physical mechanical component, hardware and software.

During the customer installation session, the team demonstrated the automatic lid, object detection, API, mechanical sorting, capacity detection, and the Ecobin iOS app. Mr. Cootner was pleased with the end product, with special remarks on the integrated object recognition, sorting mechanism and the iOS application.

2.0 Customer Requirements

The table below lists the requirements of the final products and remarks for further improvements. All of the requirements below are the customer's original requirements.

Requirement	Fulfillment	Customer remarks
Motion-activated automatic lid	Yes, with minor bug	Needs to ensure secured wiring
Object recognition and classification	Yes	Satisfied. Machine learning algorithm highly accurate
Sorting Mechanical Components	Yes	Satisfied
Ultrasonic capacity detection	Yes	Satisfied

API and Database	Yes	Satisfied
iOS Application	Yes	Add live refresh feature on App

3.0 Assessment of Product Installation

a. Evaluation

Most requirements were satisfied in the demonstration for Mr. Cootner. Prior to this demo, the ME team improved the mechanical prototype from the final functional testing. Due to a loose wire with the motion sensor, we had to make a minor adjustment during testing. The latest object recognition algorithm achieves upward 85% accuracy, and Mr. Cootner gave very positive remarks for this achievement. The sorting mechanical component could sweep the 1kg food can smoothly into the recycling bin. In addition, any object below a threshold of 60% accuracy was successfully categorized as trash in order to prevent false positives. The capacity sensor also sends correct measurements to the database and API and the information was displayed on the iOS application. The API, database and iOS application were able to display and update the correct information.

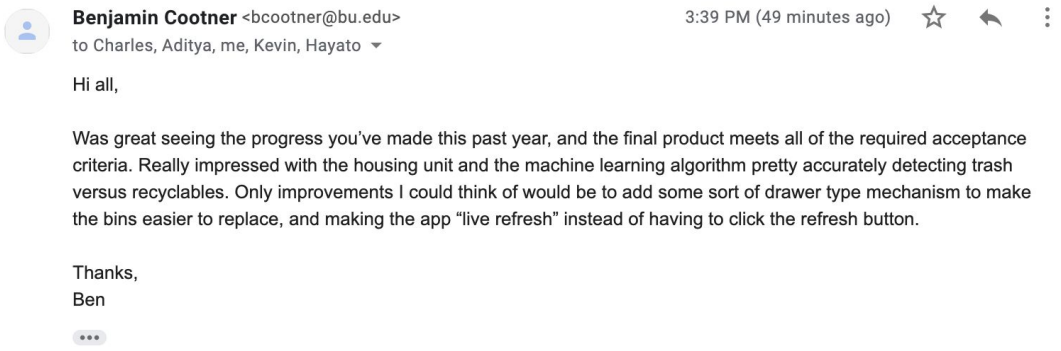
b. Further Improvements

Having received Mr. Cootner's feedback, the team plans to make the following modifications before presenting the final product on ECE Day, namely:

1. Enable "live refresh" capability on the iOS application.
2. Fix the bugs with the automatic lid feature.
3. Suggest to the Mechanical Engineer team to implement a drawer type mechanism to make the bins easier to replace if their budget allows it.

Addendum: Customer acceptance letter/email

After viewing the functionalities of the final Ecobin product in person, Mr. Cootner accepted the deliverable by email on Friday, April 26, 2019 at 3:39PM. In his customer acceptance email, Mr. Cootner remarked that all of the requirements have been met and that he was impressed with the housing unit and the accuracy of the machine learning algorithm.



Benjamin Cootner <bcootner@bu.edu> 3:39 PM (49 minutes ago)
to Charles, Aditya, me, Kevin, Hayato

Hi all,

Was great seeing the progress you've made this past year, and the final product meets all of the required acceptance criteria. Really impressed with the housing unit and the machine learning algorithm pretty accurately detecting trash versus recyclables. Only improvements I could think of would be to add some sort of drawer type mechanism to make the bins easier to replace, and making the app "live refresh" instead of having to click the refresh button.

Thanks,
Ben