

Problem and Objective Statement: One UBC survey states that 27.7% of students do not know how to sort waste correctly, which is due to insufficient sustainability education, leading to ineffective waste sorting practices, and lower diversion rates. Bin Genius is a perfect fit to help students improve their waste-sorting habits using AI technology.

How does Bin Genius work: Bin Genius is powered by IoT hardware and AI technology. It includes a smartphone with a camera to distinguish waste types from the user's hand. The AI waste recognition was trained using YoloV8 and ran through 5,000 pictures of trash to educate it on the different types of waste. After testing, it can differentiate between recyclables and non-recyclables with an 80% accuracy.

Along with it, an IoT hardware equipped with a VOC (Volatile Organic Compound) sensor helps detect organic waste hidden in boxes missed by the camera, by sensing VOC gases (methane, benzene, formaldehyde, ammonia, alcohol, and others) produced through organic waste decomposition. Its sensitivity, determined by the resistance change in response to VOC gas concentrations ranging from 0-50 ppm, could be adjusted flexibly for indoor/outdoor modes. An LED shifts colors and a buzzer plays alert sounds based on VOC gas level.

Bin Genius also functions through an app that was made in Flutterflow. There will be unique functions for school faculty and students. Teachers will have access to a reporting tool that is used to track the amount of trash disposed of and to monitor any incorrect disposal from students. For students, the app offers educational and interactive games that fuel learning about waste disposal.

Impact and Mission: With our plan to adopt this innovation district-wide and then turn it into a community project, we believe that it will make an incredible change. All with the cost of \$45 or less per bin, and around \$150k to put it in all schools across Vancouver, which is an incredibly small amount compared to the \$100 million that BC spends on waste management.

Conclusion: Bin-Genius was created solely for sustainability and education to help students improve waste sorting habits. We aim to divert up to 80% of waste per school waste per school annually, helping landfills recycle more materials. One reason our innovation is different from others is instead of solving short-term solutions, we aim to advocate for long-term behavioural change in students and our community, guiding students to make smarter, environmentally conscious choices and build lasting habits.

Bibliography:

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