

BIN GENIUS ONE PAGE REPORT

Background: Improper waste management raises many concerns, Statistics from Metro Vancouver have shown that by 2022, “30% of what is thrown in the garbage is organic materials”; this data indicates that Canadians have poor waste sorting habits. We believe this is due to a shortage of education in waste management from a young age, which is why we wanted to create an educational waste sorting innovation.

Innovation: Bin Genius works through an AI trained camera, with its main function being to detect and differentiate the type of waste presented to it. The camera will be mounted behind the trash bins, overseeing them. There will also be an odor sensor that can detect high concentrations of carbon dioxide, methane, nitrogen and hydrogen sulfide, gases that are a result of decomposing organic waste. Its main purpose will be detecting any wrong disposing of organic products, which will be hastily removed and put in the green bin. All of these features will be managed by an app that is used to manage and monitor both the AI camera and the odor sensor.

Design Process/Procedure: Our project started with researching and designing the odor sensor. Our first prototype was made with a smell sensor connected to an LED light on a breadboard. If the sensor detects bad air quality, the light turns purple, else, it will be blue. It was then tested inside an enclosed space and an outdoor environment. It performed well inside but not as well outside with one lighting up faster than the other. We believe this is due to the amount of airflow produced when we had to lift the lid of the bin up to put our device in. Our final prototype was integrated inside of the bin lid, this helps with getting the sensor to capture all of the gasses inside of the bin, and it functioned correctly both in inside and outside conditions.

Our next step was to work on the AI camera. It was trained using a YoloV8, an AI object detection model, through 5000 pictures of trash as a dataset. After testing, it can differentiate between recyclables and non recyclables with an 80% accuracy.

Lastly was to create our app, which was made using Flutterflow. The app offers a way to track points you earned when disposing of trash correctly, a live cam of the AI camera, and 2 educational games for the students/children to learn about disposing trash correctly.

Conclusion: Our vision is to educate the youth with our innovation. We believe that in order to combat waste being wrongly sent to landfills, we need to plan for the future. By educating young students and correcting their mistakes of wrongful trash disposal, in due time, we will have a society who works together by doing something as little as not putting a plastic bottle in the landfill bin.

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