NATIONAL DESIGN PROJECT

An initiative of the Design Education Advisory Committee

Report submitted by
: South View Primary School

Quest of SV Green Guardians

Background

The team is made up of students from the Robotics and Media club who are interested in deepening their knowledge and interest in the area of sustainability issues with the application of artificial intelligence technology.

With the use of the FIDS framework provided by Design for Change movement, students started the project by learning to ‘Feel’ for the user and empathize with the issues that they might be facing.

The team started by observing the behaviour of the students in the school in the area of sustainability. Through their observation and oral interviews with some of their classmates, they realised that the students in the school do not practice recycling actively. Most of the recyclables end up in the waste bin or even if they are recycled are not rinsed which result in the contamination of the recyclables.

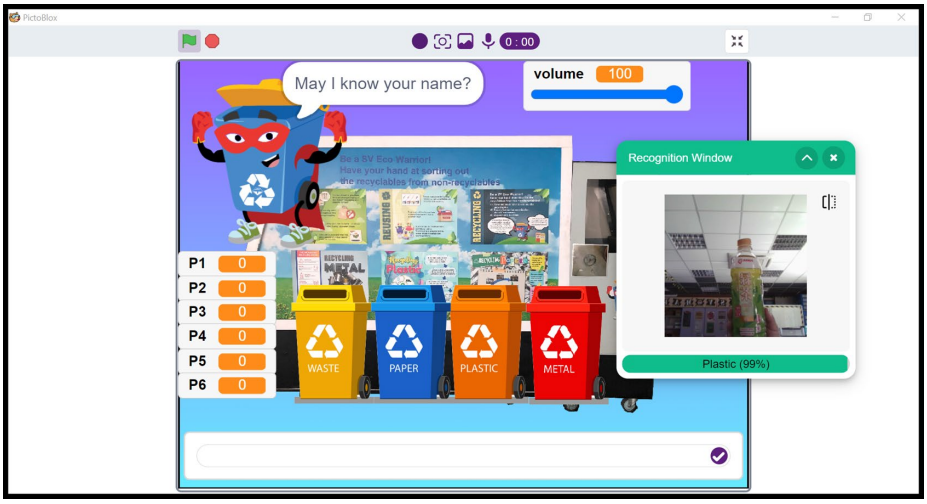
Thus they begin to define their problem statement as “How might we increase the engagement level and awareness of recycling right in the classroom?”. They also empathized with the students that the recycling points are not positioned in an area that is prominent enough.

In the next stage of imagining the possible solutions, the team wanted to produce an interactive A.I tool to engage the students to deposit their recyclables from the classroom. This tool will replace the need for the green guardians representatives from the classes to be on duty to monitor if the students have recycled correctly.

Prototyping of the A.I. tool

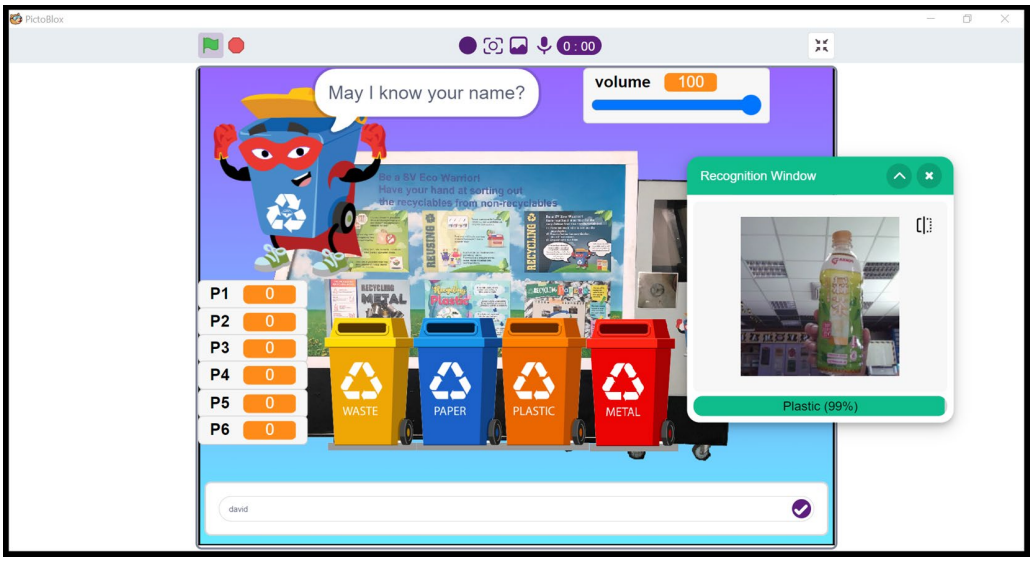
The team went through a few rounds of prototyping to decide how the A.I can be used to engage the students to collect the recyclables from their classrooms and bring them to the recycling point. To assist the team to make better decisions, the A.I will also be used in the collection of data such as which class or level is the most or least active in recycling.

The interface of the A.I tool

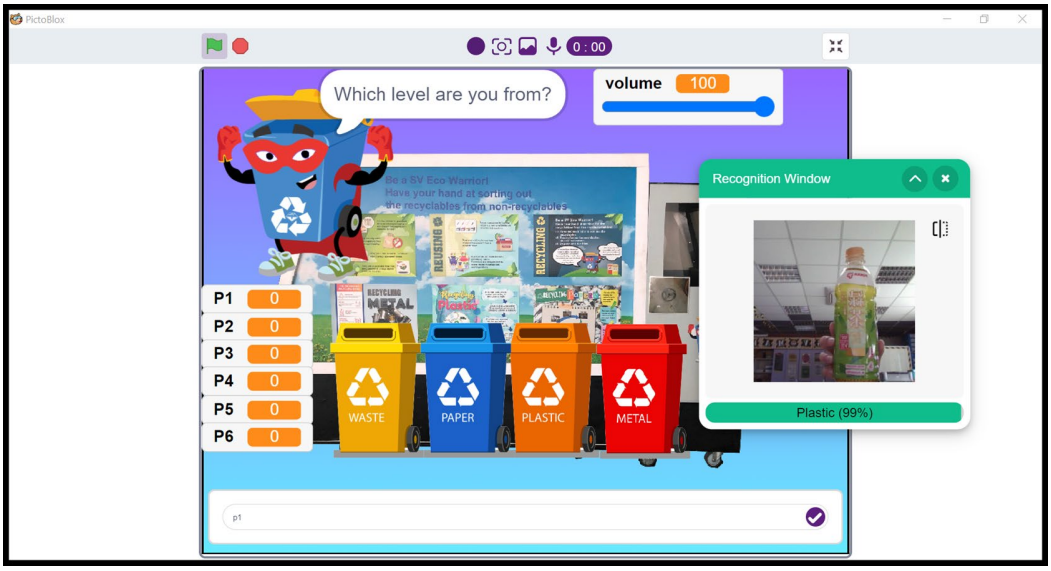


After the ‘start’ button has been pressed, the chatbot will be activated with the recognition window starting.

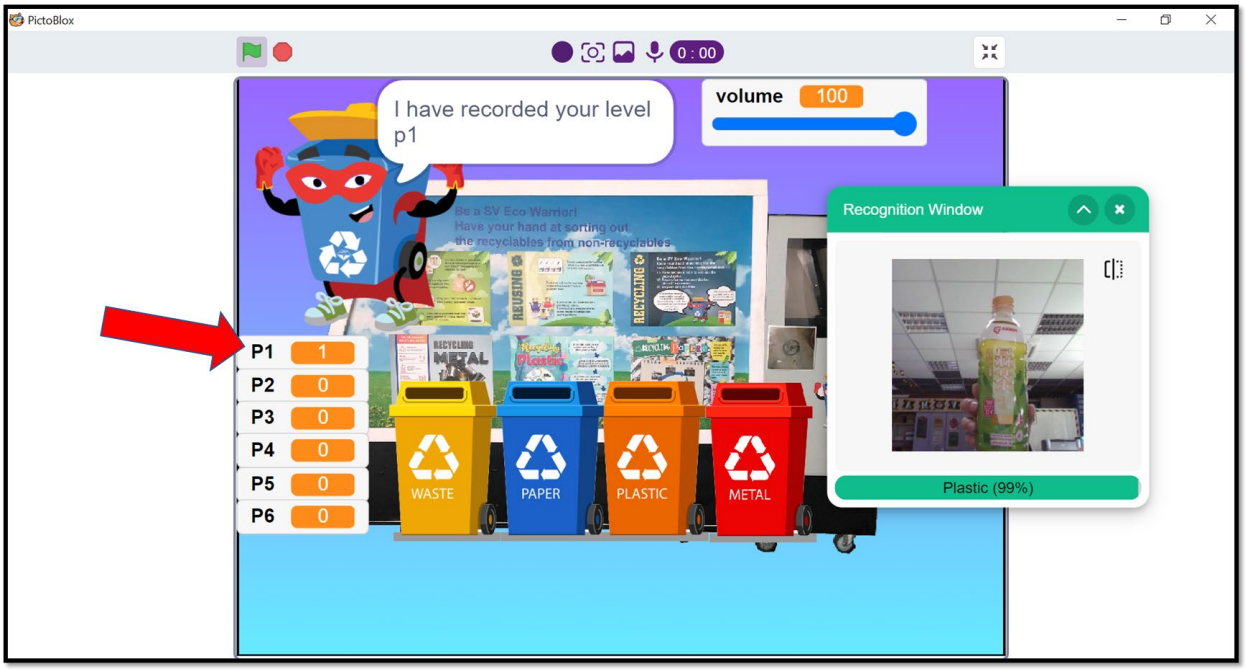
The team decided to use the chat bot function to engage with the students who are here to deposit their recyclables at the recycling point. They will key in their names and input their level. This will allow the team and the rest of the student population to have an instant feedback on how active the level is in their role in recycling.



The student will key in his/her name at the text box below.



The student will share which level he or she comes from. (updated: The tool has been updated to which P5 class as the trial implementation will take place for P5 level first.)



The level will be reflected. This will encourage the level to increase their own recycling rate.

The team have also used the school's recycling mascot to take the face of the chatbot to engage with the students as there is a familiarity.

The students can use the recognition window to scan for the image of their recyclable.

The Eco warrior will turn into a truck and move to the respective bin based on the scanned item.

After the recyclable has been classified by the A.I, the mascot will move over to the relevant recycling bin to inform students on which bin to deposit their recyclables in.

For materials related to paper, the chatbot will simply end with some encouraging message after the students have deposited the recyclables. For other materials such as plastic and metal, there will be a reminder to the students to rinse the items before depositing them into the recycling bin. This is due to the fact that many of the items that are made of these materials in the classroom are the plastic bottles and the metal cans that contain sweet drinks.

The chatbot ending the process with an encouraging message.

The chatbot will seek feedback from the students on its accuracy.

At the end of the conversation, the chatbot will ask the students if the classification made by the A.I has been accurate. This is to assist the team to improve machine learning for better recognition. The results of the feedback are hidden from the students and only made available to the team with the use of a special key.

Implementation of the A.I tool.

Students will respond to the A.I tool with the use of a laptop mounted on the SVPS recycling truck. The recycling truck also contains information about the importance of practising 3Rs to reduce waste issues in Singapore. This is also a recycling station in which students can sort the recyclables directly into the various bins such as plastic, metal, paper and waste bins.

This tool will be showcased in Term 4 Week 2 to 5 during P5 recess for a trial implementation.

The recycling station will be opened during recess timings for the Green Guardians or individuals in the class can bring their recyclables to the station for sorting. The information that they keyed in is valuable in helping the team to understand the recycling behaviour of each class in P5. This information will help the school to be more targeted in their outreach to the students on the practice of 3Rs. The Green Guardians will also check how well the recycling has been done at the end of the school day.

Moving Forward

The team recognised that more objects are made of composite materials these days. This can be challenging for recycling as it is difficult for people to understand if the objects can be recycled. As such, AI can be deployed to help the public to understand and choose their materials more wisely.