

Hong Kong Student Science Project Competition 2023

Template of Extended Abstract (Invention)

(Word Limit: 1,600 words, Pages: 3 pages only)

Team Number: JAPE013

Project Title: Ecofly

Project Type: Invention

To our best knowledge, there are / are no * similar works in the market; (if there are,) related product links are as below:

iRecycling: <http://gmc.baguio.com.hk/irecycle-your-recycling-award-platform/?lang=en>

EarthHero: <https://www.earthhero.org/>

RecycleCRD: <https://apps.apple.com/ca/app/recyclecrd/id834679117>

The enhancement our project made / the difference with related products are:

The enhancement our project has made in comparison to other products is the addition of a camera scanner for the sorting capabilities. While other projects mainly focus on spreading awareness for recycling and upcycling projects, ours is able to support the consumer by showing them directly how and where to recycle, regardless of where they are in the city.

Another unique aspect of our design is the connection to maps, allowing them to find the correct recycling bins. Our app is also more focussed on Hong Kong itself, unlike other products on the market, which are targeted to all people and hence is more specialized. We will also be able to collect feedback from our users directly as our alpha test subjects may be able to supply us with information easily. Furthermore, our design is very cost efficient as it is very straightforward, meaning less money spent on research and development, and therefore lower prices for the consumers.

The final unique element of our product was that we included a reward scheme based on feedback. Similar to levels on gamification platforms, we sort users into 'plant leagues'. After recycling a certain amount (5 items), we allowed them to 'level up'.

**Please delete if not applicable. The competition values the originality of works. Students must do enough literature research to ensure that their works are unique and list relevant reference materials before starting research or invention.*

I. Background

In order to learn about the audience we are addressing, we created an online survey and invited 17 participants to fill it out. These 17 participants are middle aged (between the ages of 30-50) and are therefore likely the people that are tasked with taking out the garbage for themselves or for their family.

The other technology needed for our application would be a camera and a location. Both of these are easily accessible to anyone with a phone or any other electronic device, which makes it convenient for the user.

Although there are other apps on the market which are either able to scan or to give information on recycling, we have found that there are no apps which combine all of these technologies and none that focus specifically on Hong Kong, instead giving a very vague explanation so it fits all users.

II. Objectives

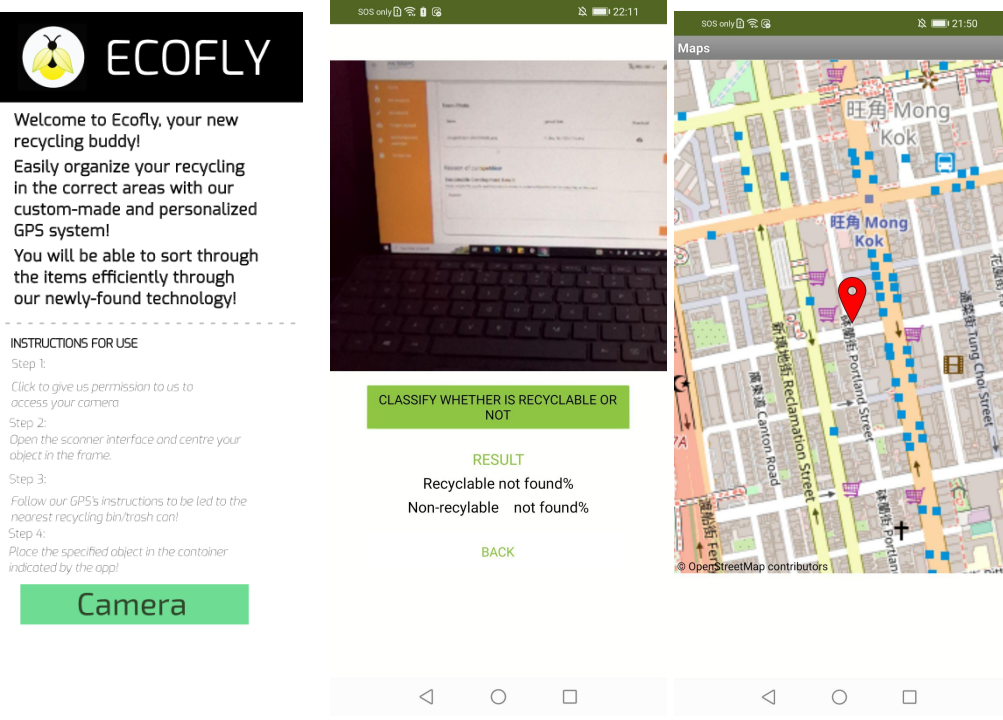
The aim of the project is to help the people of Hong Kong to reduce the percentage of our recycled

waste and help build together towards a brighter future.

III. Methodology

Our first step was to create a survey to help make crucial decisions on what to include in the app, such as any additional features to include, assessing general opinions on recycling etc. After we had collected enough responses, we made note of them, and started to create our design. We started off with the logo using sketches and adobe illustrator, then moved onto Figma to create the interface of our app. While that was happening, we also began creating the technical parts of our app so that it functioned properly. We did so using the MIT app inventor and the extension, Teachable Machine Image Classifier. As the final stage, we connected the code to Figma to get our end result.

IV. Design of Invention



The image displays three screenshots of the Ecofly app interface. The first screenshot shows the welcome screen with the Ecofly logo (a bee) and the text: "Welcome to Ecofly, your new recycling buddy! Easily organize your recycling in the correct areas with our custom-made and personalized GPS system! You will be able to sort through the items efficiently through our newly-found technology!". Below this is a section titled "INSTRUCTIONS FOR USE" with four steps: Step 1: Click to give us permission to us to access your camera; Step 2: Open the scanner interface and centre your object in the frame; Step 3: Follow our GPS's instructions to be led to the nearest recycling bin/trash can!; Step 4: Place the specified object in the container indicated by the app!. A green "Camera" button is visible at the bottom. The second screenshot shows a classification screen with a green button "CLASSIFY WHETHER IS RECYCLABLE OR NOT", a "RESULT" section with "Recyclable not found%" and "Non-recyclable not found%", and a green "BACK" button. The third screenshot shows a map view of Mong Kok, Hong Kong, with a red location pin and a blue path leading to a recycling bin. The map includes street names like Reclamation Street and Portland Street.

Upon clicking on our app, a set of instructions lies in wait. After reading through the instructions, users can then understand that just a simple click of a button would bring him/her to the camera when needed, which would just scan the item to see whether it was recyclable or not by looking for the symbol. Our app would then connect the user directly to maps and chart a path to the nearest correct recycling or waste bin.

Then the user is presented 2 options, yes and no. If the user successfully recycled the item, they would click yes, and if not, they would click no. We sort users into 'plant leagues', and based on the frequency of their 'yes' and 'no' responses, after recycling a certain amount (5 items), we allow them to 'level up' plant leagues.

V. Application / Market Need

- Explain the area of **application** and function of invention
- Indicate the market need and impact of invention
- Discuss **limitation** and compare with existing related works (if any)

This invention will be used in the sustainable recycling “NGO” area of application and this invention has been made to ensure that users have an easier way to access all of the applications needed in one click. One limitation however, is that our product lacks the ability to obtain information by itself about new products and so may mean it will take some time for us to add it into the system.

One well-known recycling app is iRecycle, which shows a multitude of ways you can recycle your items and also supplies the user with real-time news about the environment. However, we felt it was unnecessary to have the news about the environment on the app’s interface as it is more efficient for users to simply go to a more accredited source, such as CNN for news in the environment. It has already been established in many news outlets that there is a section for sports, fashion, economics, the environment and so on.

VI. If your team will compete the Sustainable Development Award, please indicate the specific sustainable development goal the project is related to, and provide justification for competing for this award. (Word limit: 300 words)

Our project is connected with the Sustainable Development Goal 12, responsible consumption and production. Shortened to SDG 12, this is all about promoting efficiency and sustainability in using resources, and preventing wastage of resources. The very purpose of recycling, the key objective of our app, is exactly this. If we are able to reduce the amount of resources thrown away, and instead recycle these, we could save countless amounts of time, energy and resources. As an example, it requires 88% less energy to recycle plastics in comparison to the manufacture from raw materials. However, many plastic items are used just once and thrown away after single-use consumption.

Reducing the amount of pollution will not only allow the government to spend less money on building landfills and processing waste, but will also help with increasing the overall standards of living in Hong Kong as resources for those purposes can be used for other, better public and merit goods.

If our app is able to effectively increase the percentage of recycled items and therefore decrease the amount of waste in landfills, we may also be able to innovate and create better items made of recycled plastic and so on. One example would be making reusable bags, which will simultaneously make new products from waste and prevent people from using plastic bags, which might have created more waste.

VII. If your team will compete the Social Innovation Award, please list the target group or social issue the project focuses on, and provide justification for competing for this award. (Word limit: 300 words)

VIII. Conclusion

- Make a **data-driven** conclusion of the project and the way forward of the invention process
- Justify if the proposed project meets the objective(s)

Though our app is by no means perfect, we believe that this current version will be able to supply our users with the comfort and convenience that they need. Moreover, in the consumer interest survey we conducted, when asked whether they would be interested in an app such as ours, 78.5% voted yes. As the software is correct and functioning, and there is sufficient consumer demand, we believe our objective has been satisfied.

With more time, it would be useful to make a traditional or simplified Chinese version of our app to cater to a wider audience. Nonetheless, we foresee a bright future in Hong Kong's environment.

Our project is developed based on previous project and the enhancement is below:

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