3 Development of a System that Serves as a Platform for the Survey of the Actual Conditions of Marine and River Debris

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Applicable principle

Principle 9: A commitment to promoting sustainability through education

1. Activity Overview

There is worldwide concern about the negative impact on ecosystems, living environments, fisheries, tourism, and so on, due to global environmental pollution caused by marine and river debris. Because marine debris flows into the sea from inland areas through rivers, in Japan, it is considered important not only to collect marine debris, but also to control the marine debris through a united effort of stakeholders in the basin areas from mountains to rivers and oceans. It is important for local governments to take actions too (“Basic Policy to Take Measures against Marine Debris Comprehensively and Effectively” Ministry of the Environment, May 2019).

Iwate Prefecture formulated the “Second Phase Iwate Prefecture Regional Plan for Promoting Measures against Marine Debris” in March of 2023. In the plan, it is stated that the prefecture aims to build a system to visualize natural environmental conservation activities with the full participation of all citizens of the prefecture, because, in order to control the emmission of waste plastics into oceans, a cohesive effort of diverse players is needed and the promotion of environmental cleanup campaigns is not only necessary in coastal areas, but across the entire prefecture.

2. Progress of the Activity

Considering the above background, together with students from the Faculty of Software and Information Science, the research team is working on phased steps to develop a system that will serve as a platform for the survey of the actual conditions of marine and river debris as well as a prototype application for posting data to encourage the participation of citizens of the prefecture.

In 2022, based on past research, the team established a system concept, conducted a field survey, created a prototype web-based system for the monitoring of data collection and visualization, and developed a prototype web application which is intended to be used for daily data posting. The prototype web application was exhibited at “Eco-Products 2022” held at Tokyo Big Sight in December.

2.1 Establishment of a System Concept

Since the system is intended to encourage the participation of all citizens of the prefecture, it is necessary to establish an easy-to-understand concept that covers everyone from children to adults. Therefore, the concept was defined as “a system that visualizes natural environmental conservation activities with data provided by prefectural citizens so that an environmental cleanup campaign is promoted.” In addition, a screen image was created for the system which was named “minoru Iwate.” Minoru means “bearing fruit” which implies imagery and assoiations such as “action bears fruit” and “data bears fruit.” Since there are many scenic spots in the prefecture, data can be collected that is not limited to marine debris, but also includes places with beautiful scenery.

Image of the system screen

2.2 Field Survey

On September 25, 2022, an “Autumn Zero Marine Debris Walk 2022 in Iwate” was held at Ainohama, Mizuumi, Ryoishi-cho in Kamaishi City. The research team members (students) participated in the event in order to understand the actual situation of coast cleanup activities and collect image data intended to be registered in the system. The resulting findings include: there are marine debris that can be collected (beverage bottles and cans, pieces of wood, fishing nets, etc.) and cannot be collected (debris in dangerous places, large debris, microplastics, etc.); there was more garbage at the water’s edge; it was difficult to record during cleanup activities.

Collected garbage

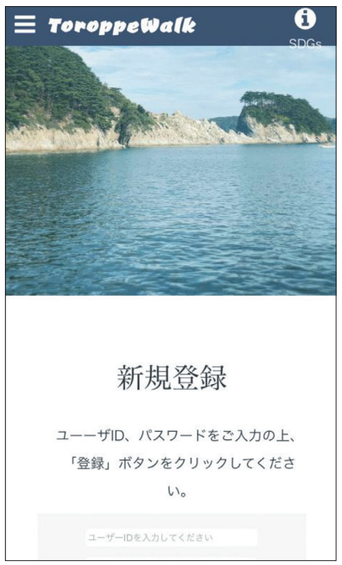
2.3 Developing a Prototype Web Application for Data Posting

As part of the graduation research of the research team members (students), a prototype web application for providing data that can be linked with “Minoru Iwate” was developed. The application enables posting images and location data of debris and beautiful scenery, and displaying a map of the locations of public trash cans. It is intended to be used while walking. Five students evaluated the prototype and made positive comments such as “Posting beautiful photos increases motivation” and “The design is simple and easy to use.” On the other hand, there was also a constructive opinion, “It would be better if there is a game element using a map.” In addition, in the “Eco-Products 2022,” comments were received such as, “This could be a good opportunity to think about picking up garbage, which we don’t think about routinely,” “It can be used in other situations, such as tourism and disaster prevention” and “The idea of mapping public trash cans is interesting.” On the other hand, there was also a constructive opinion, “I want game elements that parents and children can enjoy together.”

“Eco-Products 2022” scene

3. Future Activities

Although the beautiful scenery and marine resources of some of the prefecture’s rivers and coastlines are protected through organized volunteer cleanup activities, such contributions are not widely known in the prefecture. Individual people’s daily cleaning activities are also essential for natural environmental conservation. The team will continue to advance system development and contribute to the promotion of natural environmental conservation activities.



Prototype web application screen examples