Eco-Marino: A Cooperative Video Game for Promoting Clean Ocean

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Abstract

Eco-Marino is an interactive exhibition created for the Madeira Whale Museum located in Caniçal, Portugal. The exhibition conveys the message of clean ocean in the form of a cooperative video game. The game, built in the Unity Game Engine, allows three guests to act as an underwater litter cleaning team. Using a wheel, guests control a submarine to clean and explore the ocean floor. Litter is picked up using the two joysticks, which controls the left and right arms of the submarine. Sea creatures occasionally are caught in the litter, requiring guests to work together to remove the trash and free the animals.

Keyword - Cooperative game, ocean littering, Unity engine, virtual underwater world

Background

There had been huge amounts of whaling and associated activities in the Madeira archipelago until 1981. The Madeira Whale Museum was created as a testament to the history, as well as a driving force for marine biology research and education. Since ocean littering problem has posed a vast and growing threat to the marine life, the museum has decided to deliver the message about environmental protection in an entertaining way in order to supplement other more serious existing contents.

Design Process

A team of two faculties and six students were formed to work on this project. Each member has dedicated role in the team, such as game designer, 2D/3D artists, sound designer, programmer, engineering, etc. A dedicated project room was equipped with various technology and prototyping tools. The working environment was setup with marine themed decorations such as miniature paper crafted marine creatures for inspiration. Over 16 weeks, the team went through phases of researching, brainstorming, design, prototyping, testing, and final implementation at the museum.

Concept

Throughout iterations of research and discussions with museum staffs, the *Eco-Marino* emerged among several other ideas. In this concept, guests roam freely through the open

underwater world, giving the choice of how and when their objectives are completed. This interactive experience will allow up to three guests to play at a time. Guests need to cooperate with each other in order to collect trash and rescue animals. Eco-Marino's simple story and gameplay conveys three significant messages to the guests: the impact of litter on marine life, the guest's role in the eco system, and their ability to affect the ecosystem.

Game Design

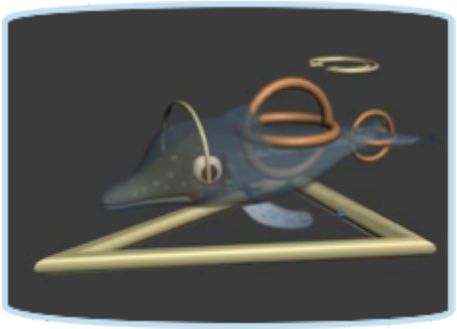
Eco-Marino has three missions. First, guests are introduced to the vacuum, with the goal of collecting small pieces of litter such as cigarette stubs, straws, bottle caps, etc., that are lying around the charging station. Second, guests are introduced to the claw where they must collect large tires. Third, guests must help two animals trapped in litter: a dolphin caught within an oil drum, and a seal stuck in a six-pack ring. Guests need to return the submarine to the docking station before they consume all oxygen. There is a reward system giving positive feedbacks as guests achieve more goals in this game.

Implementation

The game was implemented using Unity Game Engine, which makes the game cross-platform and easy to be upgraded in the future. The terrain and ambient sounds of the underwater world have been designed carefully to enrich the experience. There are over 19 unique sea creatures bringing the diversity of the ocean to the virtual environment. Special consideration has been done to make the physical controllers durable because of the nature of public exhibition.

Final Remark

Feedbacks from early user tests and museum visitors have shown that *Eco-Marino* does serve the purpose of being an engaging, educational, and entertaining exhibition. A special build for regular input device was prepared for the demo session at the conference.



Dolphin 3D model

Installation at the museum