

# Smart Terrarium: Carp Yuelongmen

Hu Bin & Zhang Qixiang & Feng Shuo  
 Instructors: Prof Soo Yuen Jien & Prof Colin Tan  
 Teaching Assistants: Sean Tan Ruixiang & Low Xi Zhi

### Introduction

A wonderful day, buy some fish to raise. lalalala...  
 After several days... Fishes jumped out of tank

Where are my fish ??? empty...  
 Smart Terrarium! Help me to monitor fish and plants!  
 Wow!!!

The smart terrarium, or "Carp Yuelongmen" system, aims to monitor the condition of fish and plants to build a smart terrarium.

See below for more!

- Save the fish
- Water the flower
- Monitor the condition of terrarium

Message received!!!!  
 Beep!!!!

Siphonic Effect! some water! Lalala

High light level, no wonder my plants grow well!  
 before → after

This season always need more water!

Smart Terrarium: Carp Yuelongmen  
 This system is designed to help you monitor the condition of your fish and plants in your terrarium. It can help you to save the fish and water the flower.

### Deep Learning Model-fish detector

MODEL	RECALL	mAP
Baseline/Faster RCNN-ResNet50	87.2	88.4
Faster RCNN/ECA-module	90.1	89.4
Faster RCNN+MT+ECA-module	91.2	90.5

Figure 1. Basically we use Faster RCNN as the fish detector. We take 2000 photos of the fish swimming in the tank and label 500 images. Then, we apply a SE attention module to the backbone of the detector while we apply the backbone to a mean teacher model as its encoder so that we can extract more semantic message from the other 1200 unlabeled images.

### Function Description

This smart terrarium manages to monitor fish and flower well.

With the smart terrarium, I am soooooo cool!

Siphonic Effect

### K-Mean Decoration Suggestion system

Location data

Original      Kmean Scatter      Centralize