SyntheticHomes ReadMe

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Github Source Link: https://github.com/Unity-Technologies/SyntheticHomes
https://github.com/Unity-Technologies/com.unity.perception

Website: https://unity.com/products/computer-vision#unity-perception-10

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I. Introduction

The Unity Synthetic Homes is a dataset generator based on photorealistic images that represent the indoor home environment. These images are to be intended for the use with computer vision models such as object detection, semantic segmentation, and instance segmentation. The application produces extensive randomizations such as materials, furniture types, configurations, camera angles, and clutter. Each of these can be tuned by modifying the associated configuration file.

The Synthetic Homes Applications is derived from the Unity Perception package. This package provides an extensive toolkit for generated randomized synthetic computer vision datasets alongside ground-truth annotations.

The dataset generated from this application is in the SOLO format. It must be converted to the COCO format prior to model training and evaluation.

This Readme is comprised of three parts parts

IInstallation Instructions
Modifying the configuration file
Running the executable to generate the dataset

II. Installation

Note: This application was executed using Windows 10

Clone the repository

```
Git clone https://github.com/Unity-Technologies/SyntheticHomes.git
```

Download the executable from here
https://github.com/Unity-Technologies/SyntheticHomes/releases

Place the executable file inside the cloned repository

III. Modifying the configuration file

1. Open the Sample Configuration File inside the repository directory
2. Inside the list of sensors, set all labelers to false except “instancesegmentationlabeler”

```
"sensors": [
  {
    "name": "Main Camera",
    "enabled": true,
    "type": "PerceptionCamera",
    "labelers": [
      {
        "name": "boundingbox2dlabeler",
        "enabled": false
      },
      {
        "name": "semanticsegmentationlabeler",
        "enabled": false
      },
      {
        "name": "instancesegmentationlabeler",
        "enabled": true
      },
      {
        "name": "depthlabeler",
        "enabled": false
      },
      {
        "name": "normallabeler",
        "enabled": false
      },
      {
        "name": "occlusionlabeler",
        "enabled": false
      },
      {
        "name": "pixelpositionlabeler",
        "enabled": false
      }
    ]
  }
],
```

3. Within randomizers, enable or disable each element to modify the executed scene

```
"randomizers": {
   "randomizerGroups": [
     {
       "randomizerId": "ScenarioSettings",
       "items": {
         "includeSingleFamilyVariantA": {
           "scalar": {
             "metadata": {},
             "value": {
               "bool": true
             }
           }
         },
         "includeSingleFamilyVariantB": {
           "scalar": {
             "metadata": {},
             "value": {
               "bool": true
             }
           }
         },
         "includeSingleFamilyVariantC": {
           "scalar": {
             "metadata": {},
             "value": {
               "bool": true
             }
           }
         },
         "includeMultiFamilyVariantA": {
           "scalar": {
             "metadata": {},
             "value": {
               "bool": true
             }
           }
         },
         "includeBathrooms": {
           "scalar": {
             "metadata": {},
             "value": {
               "bool": true
             }
```

IV. Running the Executable

1. Open a command prompt and navigate to the executable location
2. Run the application

```
start SyntheticHomes.exe config-file=SampleScenarioConfiguration.json
--resolution=640x480 --output-path D:\SyntheticHomes\data
```

3. View each generated image during runtime

Citation

[1] Unity Technologies, "Unity SynthHomes: A Synthetic Home Interior Dataset Generator," 2022. [Online]. Available: https://github.com/Unity-Technologies/SynthHomes. [Accessed: Mar. 02, 2023].