

FiftyOne Tools ReadMe

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Github Source Link: <https://github.com/voxel51/fiftyone>

Website: <https://voxel51.com/fiftyone/>

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I. Introduction

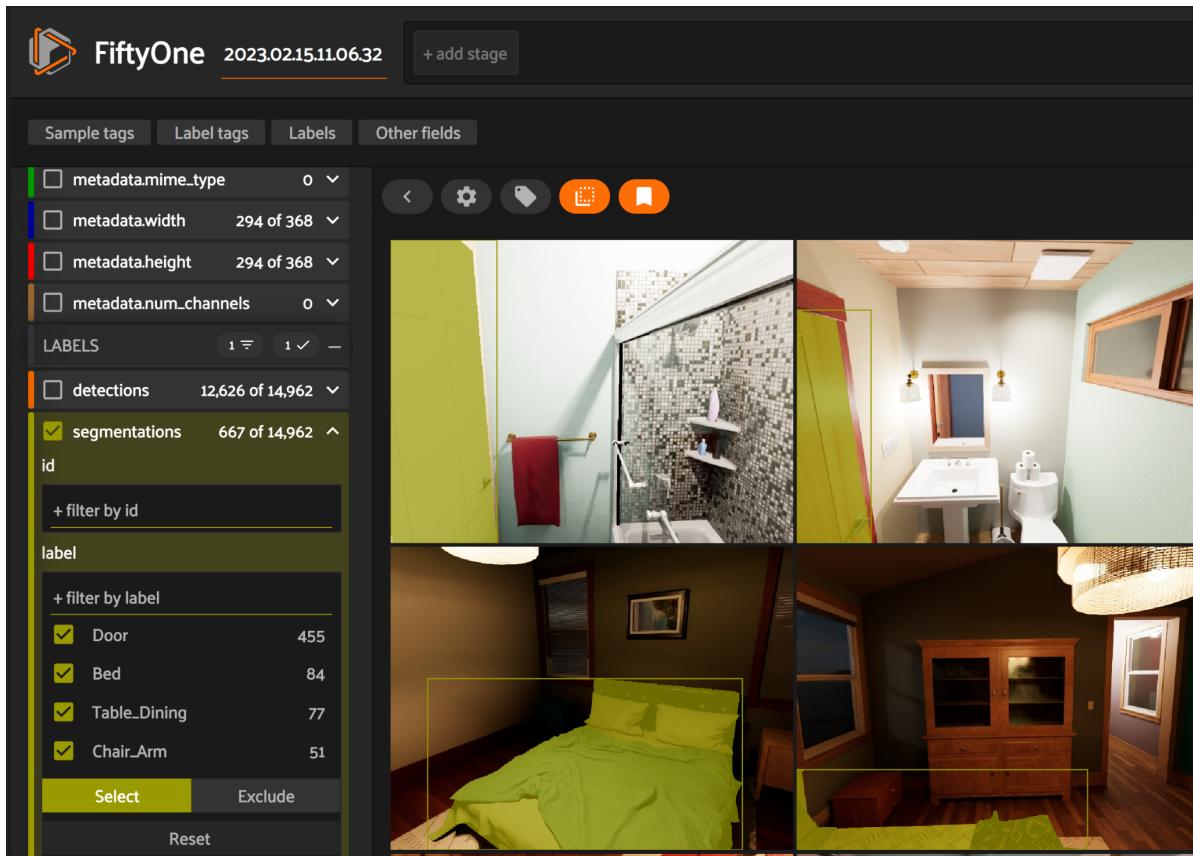
This ReadMe discusses the use of the open source tool FiftyOne. FiftyOne is used for building and modifying image datasets to be prepared for training with computer vision models. Specifically, in this case, the tool is used to modify the data generated with the [Unity SyntheticHomes](#) executable to be trained with the [YOLACT Instance Segmentation model](#).

FiftyOne allows for curating high quality images to

- Modify COCO style Annotations
- Find Mistakes in bad annotations
- Select and modify specific object categories
- Visualize data

This ReadMe is comprised of four parts

1. Installation Instruction
2. Converting data to COCO format
3. Viewing the dataset with FiftyOne
4. Modify the data annotations



II. Installation

Note: This code was performed and tested using Ubuntu 20.04

1. Create Python3 environment
 - a. Create Python 3.7 Environment

```
conda create --name fiftyonenv python=3.7  
conda activate fiftyonenv
```

2. Install pysolotools

```
pip install pysolotools
```

3. Install FiftyOne

```
pip install fiftyone
```

III. Converting from SOLO to COCO format

Note: If original dataset is in SOLO format, pysolotools is necessary to convert to COCO format

1. Create a new Jupyter Notebook

```
code solo2coco.ipynb
```

2. Imports

```
from pysolotools.converters.solo2coco import SOLO2COCOConverter
from pysolotools.consumers import Solo
import os
```

3. Set the data input and output path

```
input_path = "/path/to/data/"
output_path = "/path/to/export/data"
```

4. Create a solo object from data

```
solo = Solo(input_path)
```

5. Convert to COCO and export data

```
dataset = SOLO2COCOConverter(solo)
dataset.convert(output_path=output_path)
```

IV. Viewing the Dataset with FiftyOne

1. Create FiftyOne Notebook

```
touch fiftyone_data.ipynb
```

2. Open notebook and import necessary packages

```
import fiftyone as fo
import fiftyone.zoo as foz
from fiftyone import ViewField as F
import os
```

3. Load the Dataset

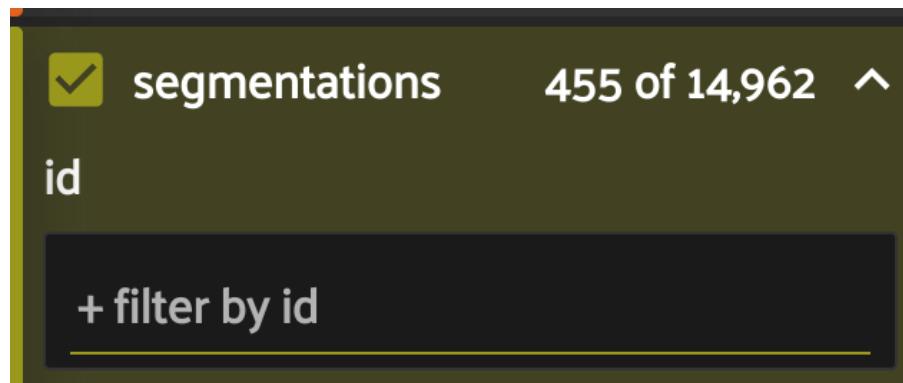
```
cwd = os.getcwd()
data_path = cwd + "/path/to/data"
labels_path = cwd + "path/to/annotations"
dataset_type = fo.types.COCODetectionDataset

dataset = fo.Dataset.from_dir(
    data_path=data_path,
    labels_path=labels_path,
    dataset_type = dataset_type,
)
```

4. View the Dataset with FiftyOne Viewer

```
session = fo.launch_app(dataset)
```

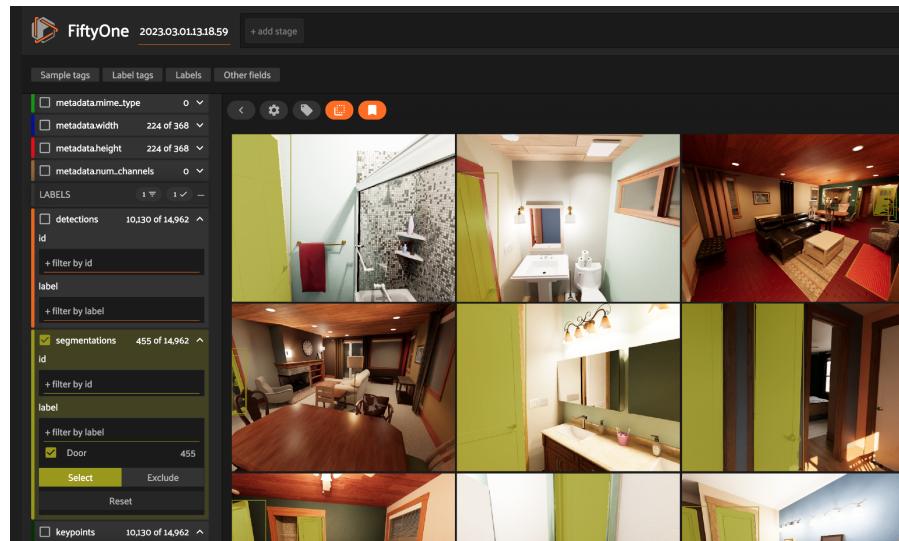
5. Select segmentations



6. Filter by Label to limit viewable annotations

label		
+ filter by label		
Wall	2012	▲
Cabinet_Handle	967	
Lighting_recessed	679	
Door_casing_flat	592	
art_frame	561	
Ceiling	521	▼

7. View data with specified annotations



V. Modifying the Data with FiftyOne

1. Map Specific Data Labels to intended training categories

```
dataset = dataset.map_labels("segmentations", {"Chair_Arm": "Chair",  
"Chair_Child": "Chair", "Chair_Club": "Chair", "Chair_Dining": "Chair",  
"Chair_Lounge": "Chair", "Chair_Office": "Chair", "Chair_Stool": "Chair"})  
dataset = dataset.map_labels("segmentations", {"Bed_Bunk": "Bed", "Bed_Crib":  
"Bed"})}
```

2. Specify Categories intended for training

```
dataset = dataset.filter_labels("segmentations", F("label").is_in(["Sofa",  
"Chair", "Door", "Table_Dining", "Bed", "Bench", "Window"]))
```

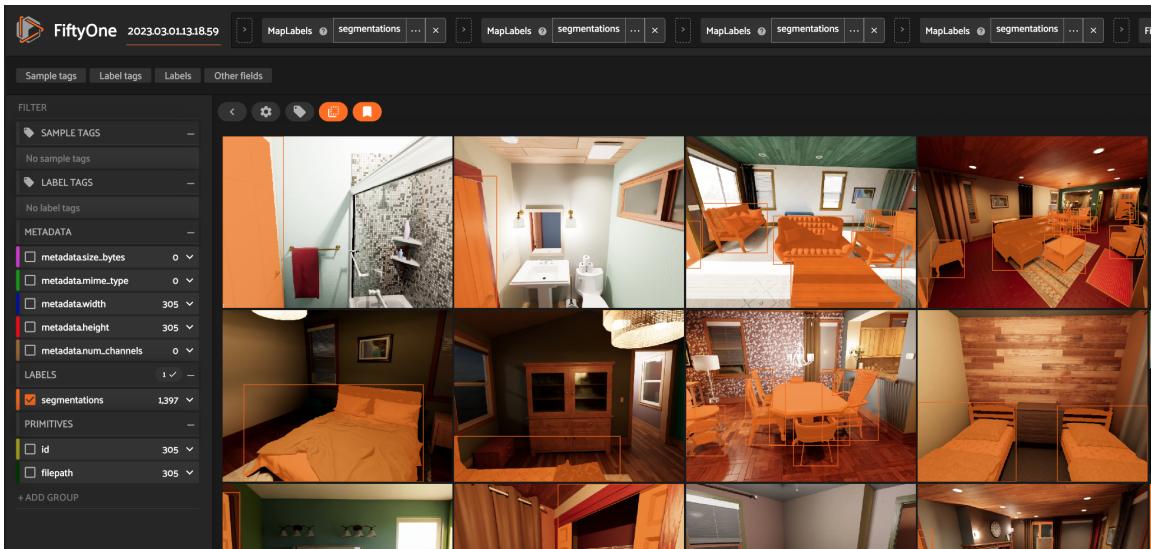
3. Exclude Detections and Keypoints

```
dataset = dataset.exclude_fields("detections").exclude_fields("keypoints")
```

4. Launch Session to view modifications

```
session = fo.launch_app(dataset1)
```

5. View modified image annotations



6. Split data to train and validation set

```
import fiftyone.utils.random as four  
view1, view2 = four.random_split(dataset1, [0.8, 0.2])
```

7. Export Dataset

```
view1.export(  
    export_dir=cwd + "/path/to/train",  
    dataset_type=fo.types.COCODetectionDataset,  
    label_field="segmentations",  
    overwrite=True,  
)  
  
view2.export(  
    export_dir=cwd + "/path/to/val",  
    dataset_type=fo.types.COCODetectionDataset,  
    label_field="segmentations",  
    overwrite=True,  
)
```

Citation

- [1] B. E. Moore and J. J. Corso, "FiftyOne," GitHub. Note: <https://github.com/voxel51/fiftyone>, 2020. [Online]. Available: <https://github.com/voxel51/fiftyone>. [Accessed: Mar. 02, 2023].