Labeling

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Introduction

- Machine/Deep Learning are data-driven algorithm

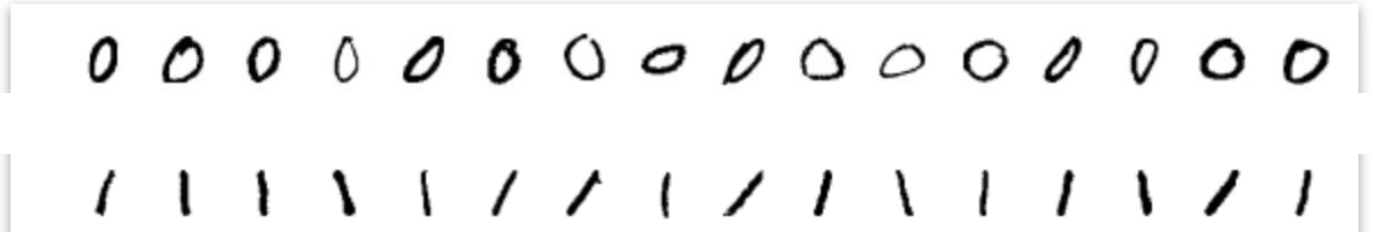
Data is most important.

1. Classification
2. Segmentation
3. Object detection

How to labeling?

1. Classification

MNIST



Label: 0

Label: 1

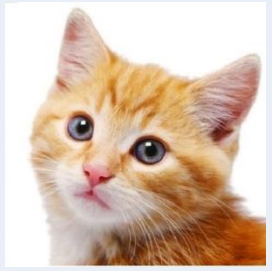
Label: “狗”

Label: 0

Label: “貓”

Label: 1

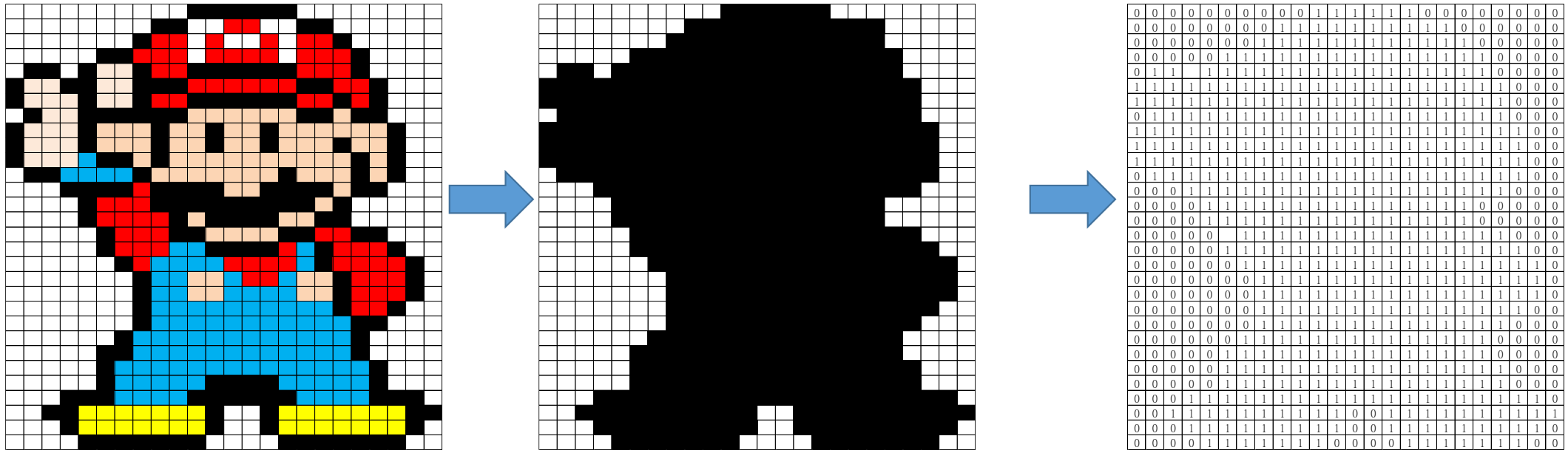
Onehot encoder

	狗 (0)	貓 (1)
	1	0
	0	1

2. Segmentation

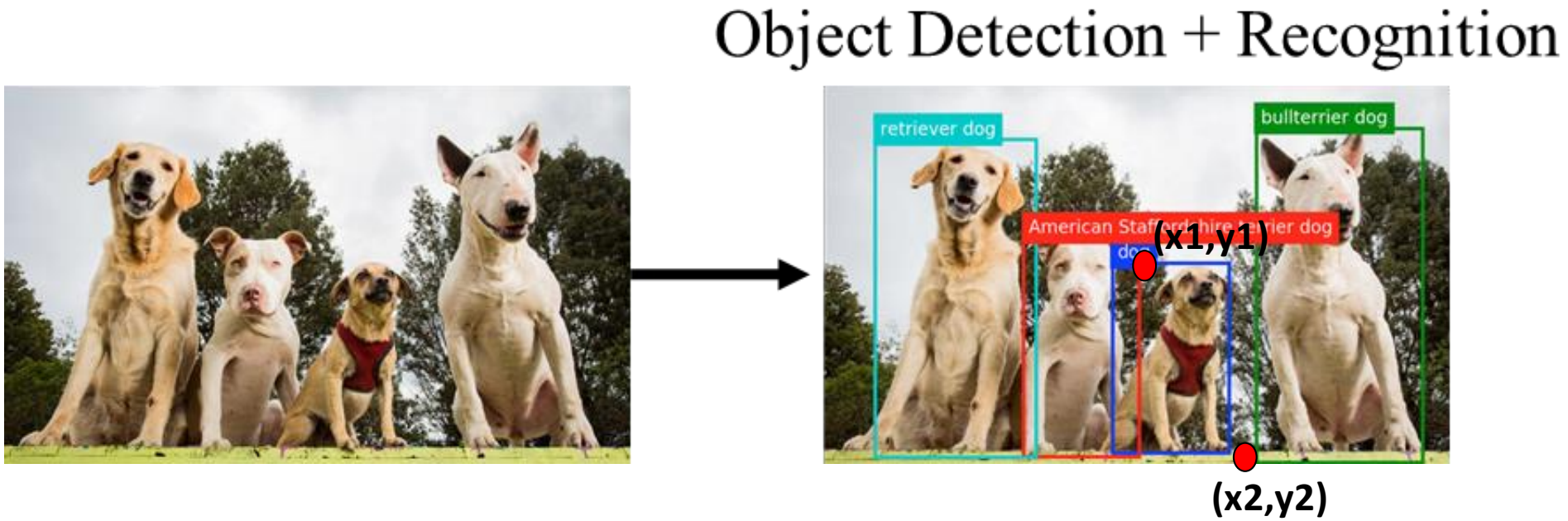
- Pixel-level classification

Image Segmentation



Foreground : 1
Background: 0

3. Object detection



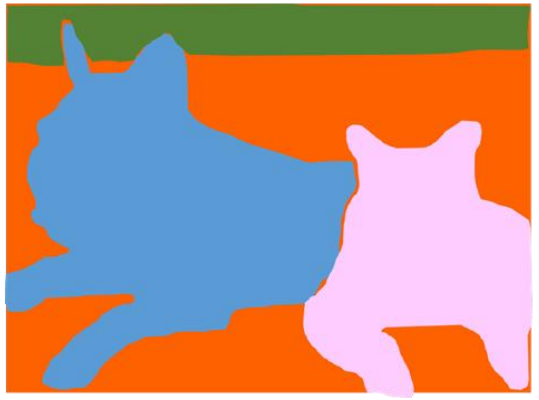
Object1: locatioization :(x1,y1) (x2,y2), label: dog

Image tasks in deep learning

Classification

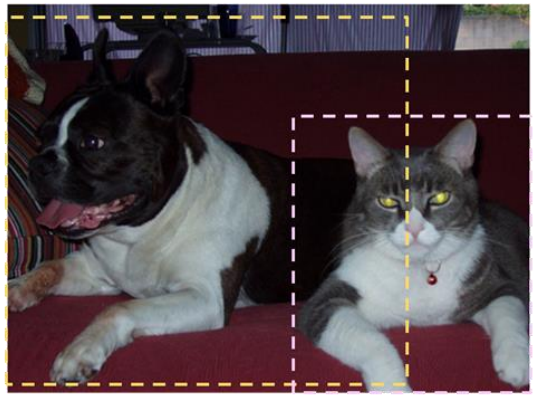
假設
狗機率是0.51
貓機率是0.49
這張圖是狗

Semantic Segmentation



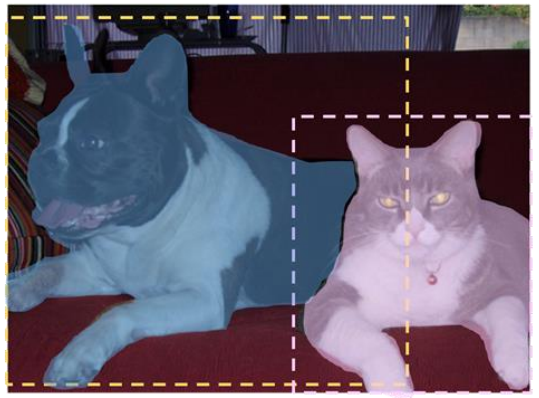
pixel-by-pixel
藍色Mask是狗
紅色Mask是貓
橘色Mask是沙發
綠色是Background

Object detection



這張圖裡面有
一隻貓
一隻狗

Instance Segmentation



Object detection後
的框框內那些pixel
是實際的物件。

Introduction

AI (artificial intelligence) in Chinese (人工智慧)

It’s based on big data, big data is based on Human effort intelligence(工人智慧).

What do we do in Human effort intelligence?

Introduction

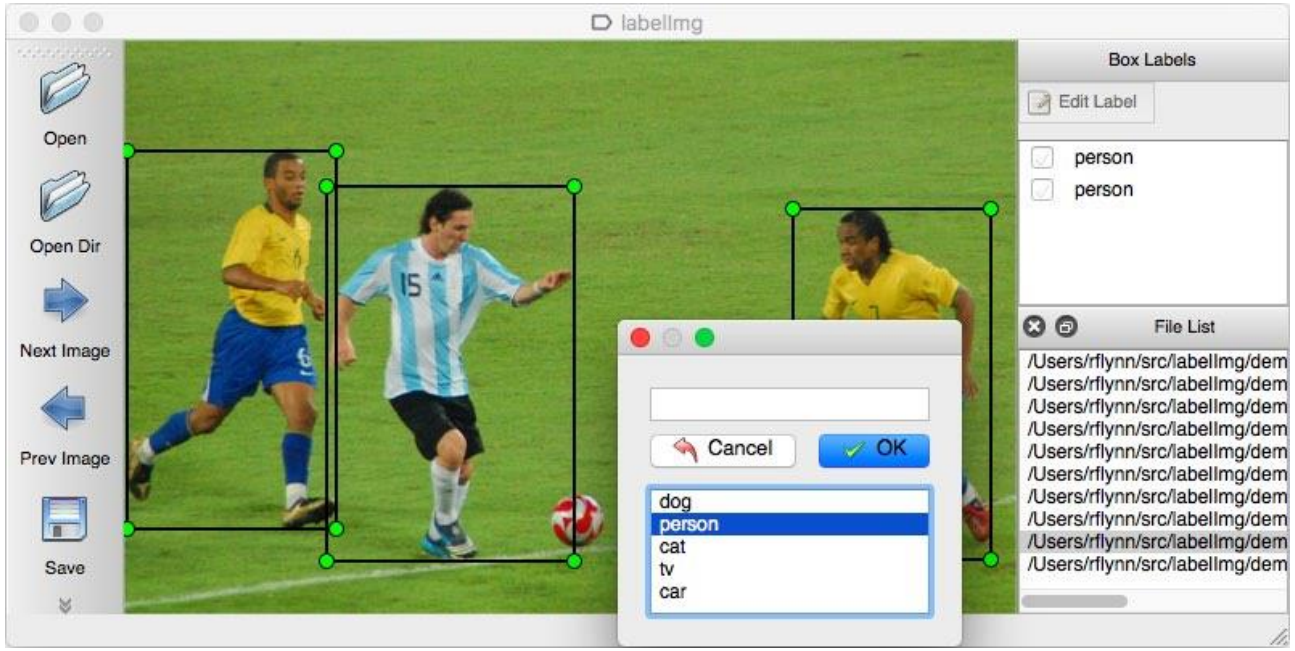
- I. LabelImg: 專門label boundary box(Object detection)

https://github.com/tzutalin/labelImg

- II. PixelAnnotationTool: 專門用來label segmentation annotation
  https://github.com/abreheret/PixelAnnotationTool
- III. Labelme: Object detection, segmentation, instance segmentation
- https://github.com/wkentaro/labelme
- IV. cvat: 皆可
- https://github.com/opencv/cvat

LabelImg

- LabelImg is a graphical image annotation tool and label object bounding boxes in images.
- Annotations are saved as XML files in PASCAL VOC format.



XML files in PASCAL VOC format

```xml
<annotation>
    <folder>B0123_N1chn120180517183908</folder>
    <filename>B0123_N1chn120180517183908 005.jpg</filename>
    <path>D:\car-video\0926\B0123_N1chn120180517183908\B0123_N1chn120180517183908 005.jpg</path>
    <source>
        <database>Unknown</database>
    </source>
    <size>
        <width>1280</width>
        <height>720</height>
        <depth>3</depth>
    </size>
    <segmented>0</segmented>
    <object>
        <name>c</name>
        <pose>Unspecified</pose>
        <truncated>0</truncated>
        <difficult>1</difficult>
        <bndbox>
            <xmin>584</xmin>
            <ymin>281</ymin>
            <xmax>639</xmax>
            <ymax>308</ymax>
        </bndbox>
    </object>
    <object>
```

Label圖像的大小

每個Object的class都包含一個Object boundary box訊息
VOC格式內定義
name: 要標註的類別。
pose:物件拍攝的角度
truncated: 物件是否有被截斷
difficult: 物件的檢測難度
Bndbox: 物件的座標

XML files in PASCAL VOC format

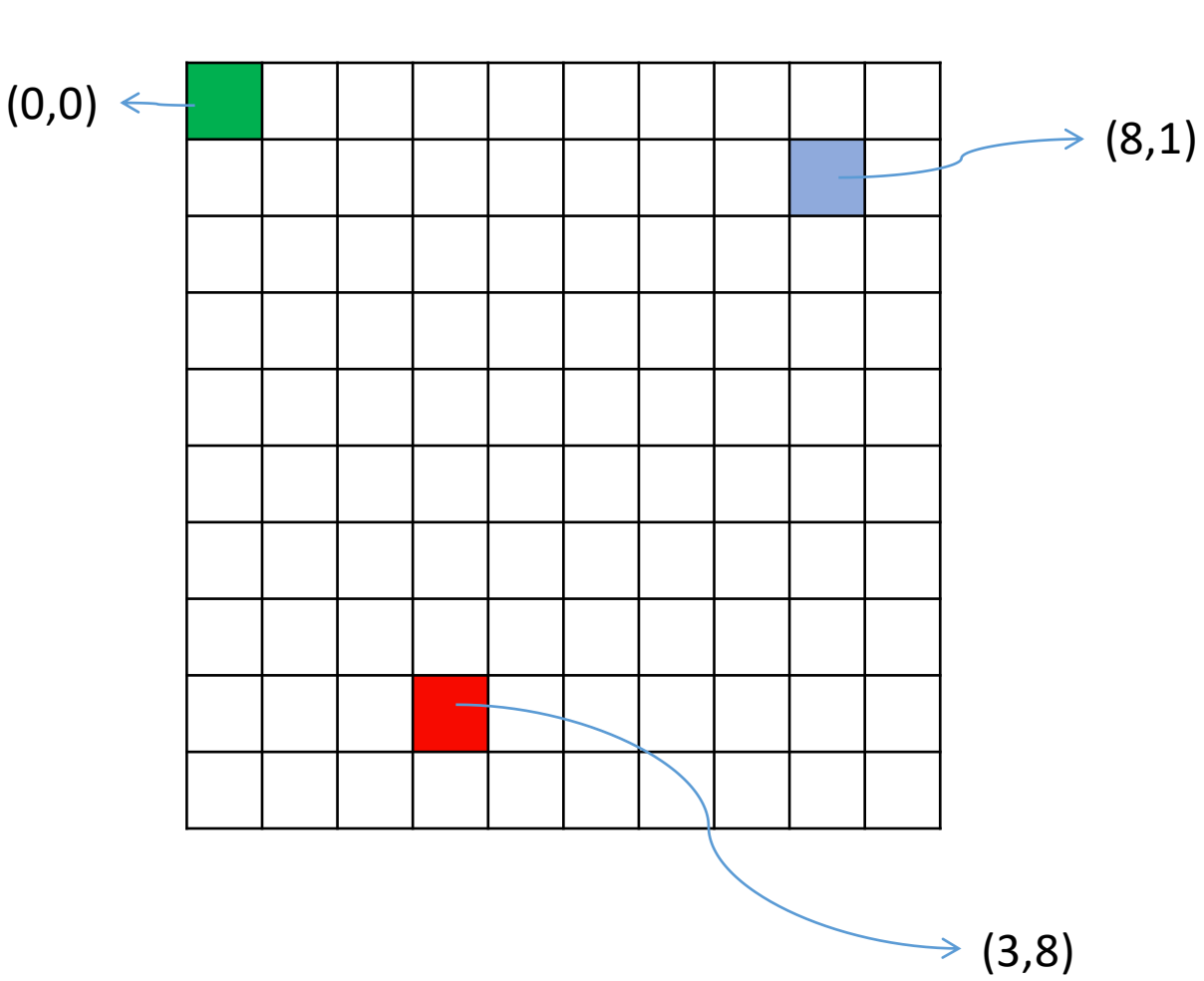
```xml
<annotation>
    <folder>B0123_N1chn120180517183908</folder>
    <filename>B0123_N1chn120180517183908 005.jpg</filename>
    <path>D:\car-video\0926\B0123_N1chn120180517183908\B0123_N1chn120180517183908 005.jpg</path>
    <source>
        <database>Unknown</database>
    </source>
    <size>
        <width>1280</width>
        <height>720</height>
        <depth>3</depth>
    </size>
    <segmented>0</segmented>
    <object>
        <name>c</name>
        <pose>Unspecified</pose>
        <truncated>0</truncated>
        <difficult>1</difficult>
        <bndbox>
            <xmin>584</xmin>
            <ymin>281</ymin>
            <xmax>639</xmax>
            <ymax>308</ymax>
        </bndbox>
    </object>
    <object>
```

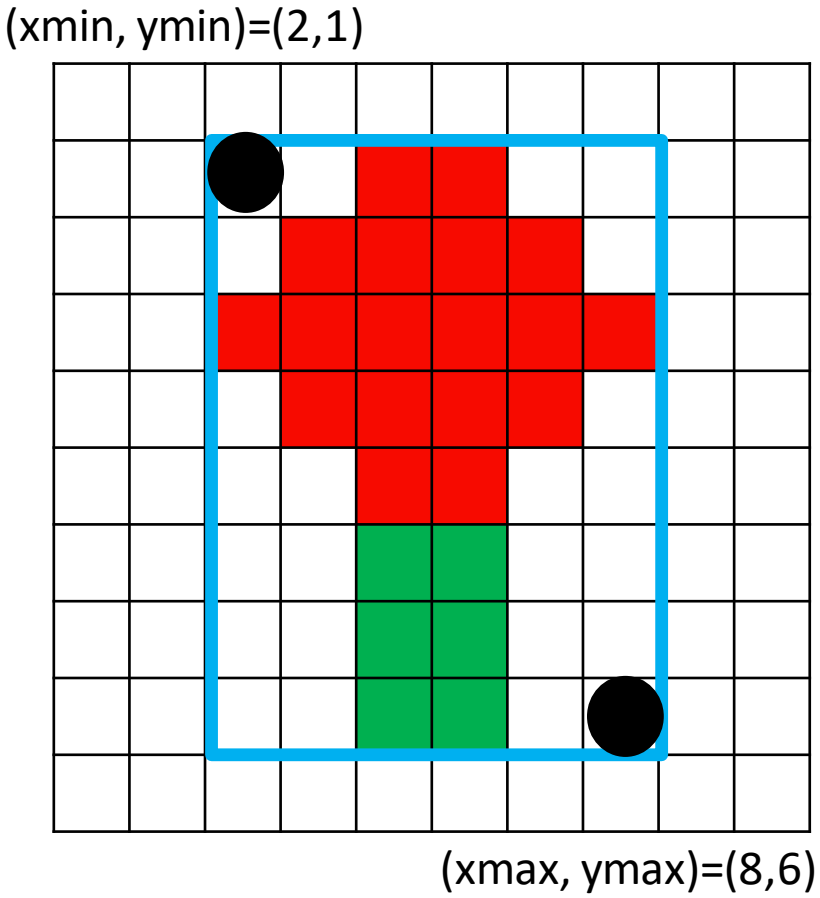
Label圖像的大小

(xmin, ymin)

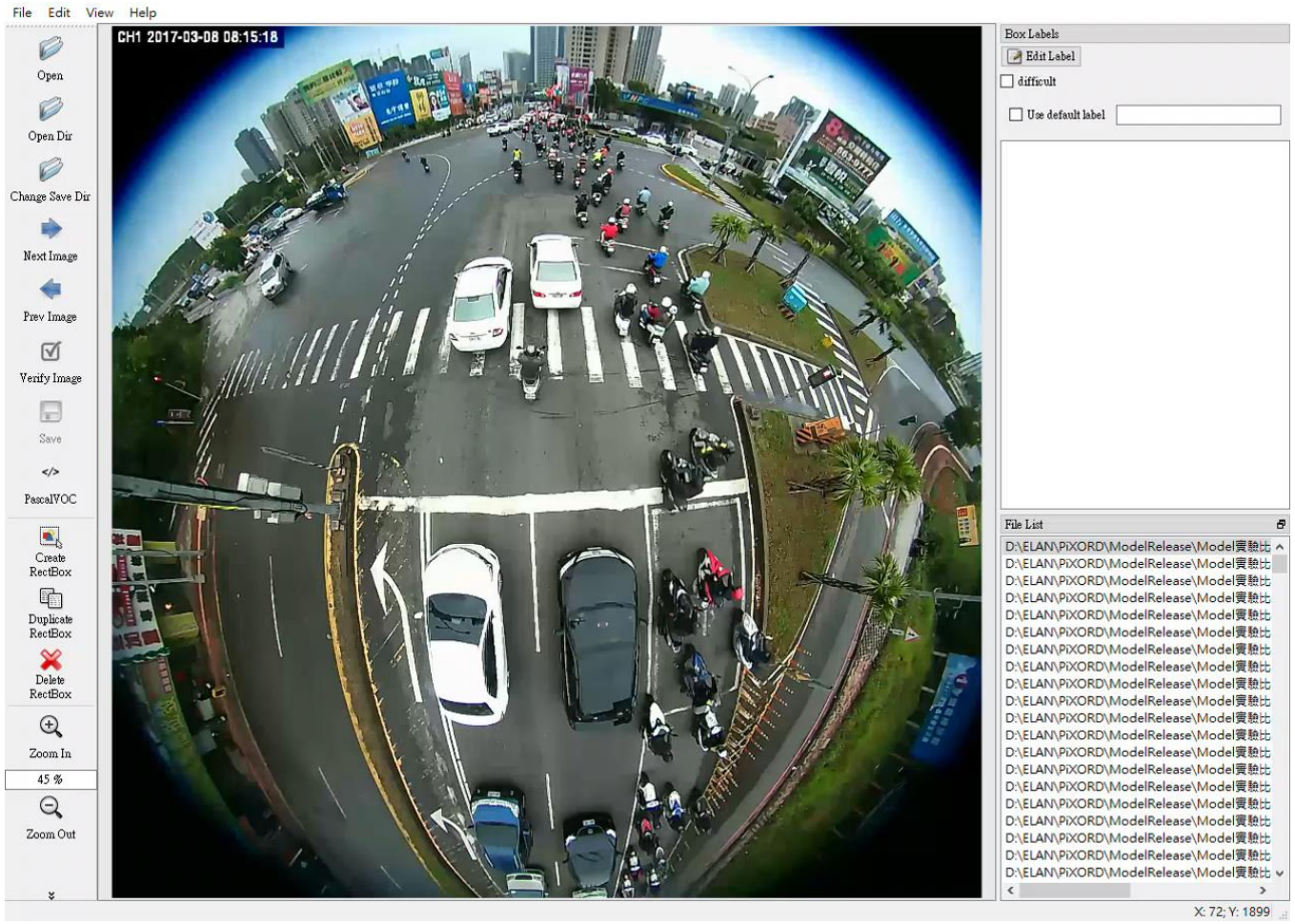
(xmax, ymax)

Coordinate in digital image

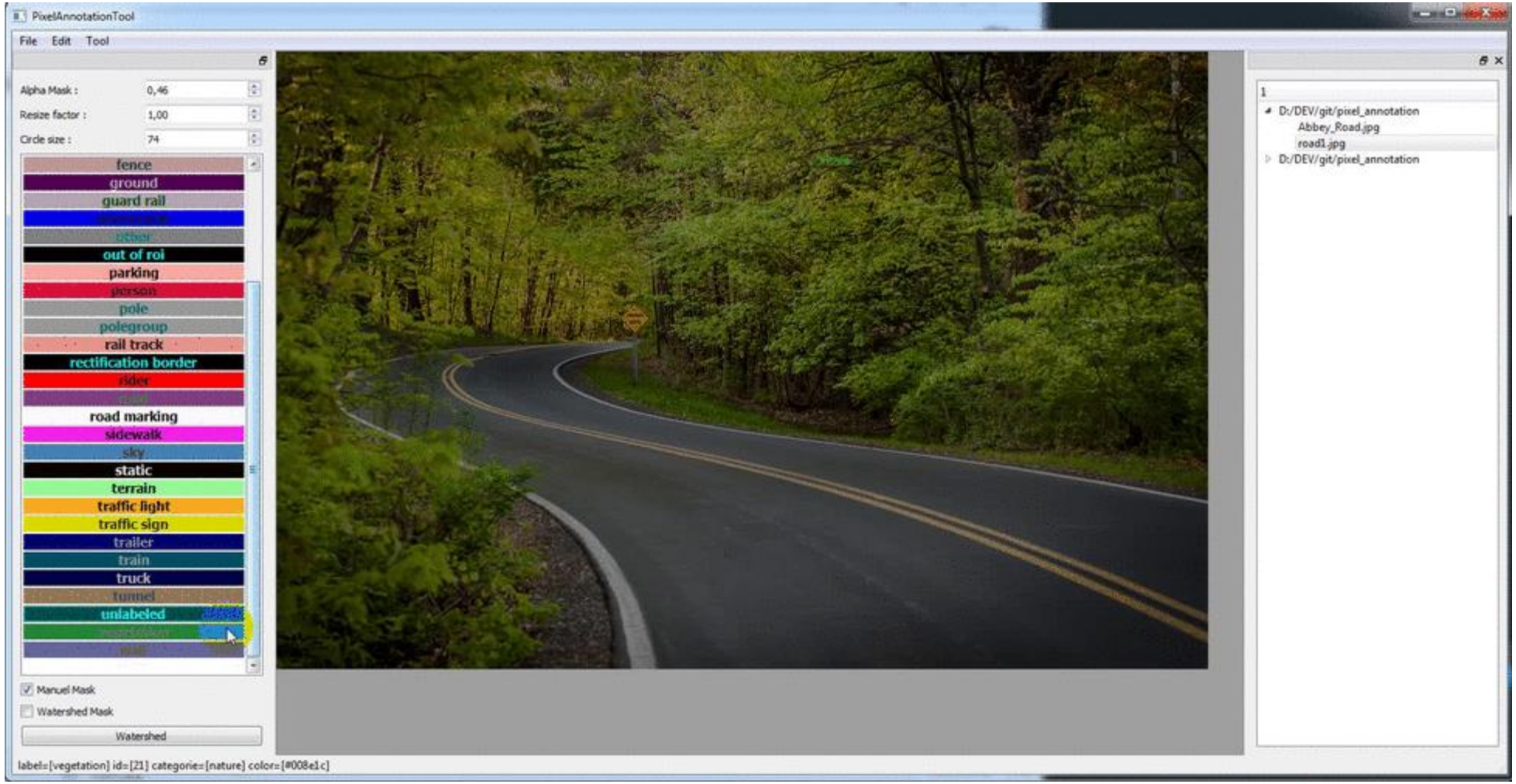




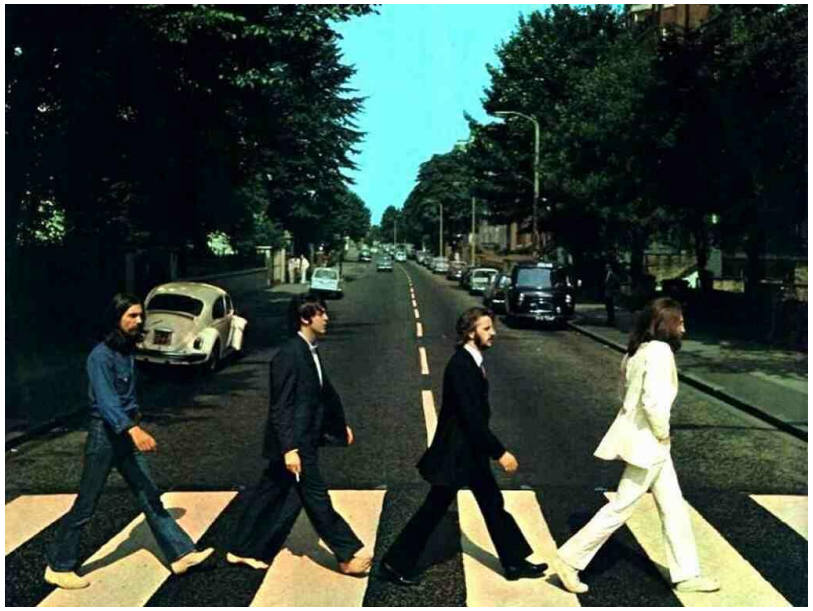
LabelImg


File
Edit
View
Help
Open
Open Dir
Change Save Dir
Next Image
Prev Image
Verify Image
Save
PascalVOC
Create RectBox
Duplicate RectBox
Delete RectBox
Zoom In
45 %
Zoom Out
CH1 2017-03-08 08:15:18
Box Labels
Edit Label
difficult
Use default label
File List
D:\ELAN\PiXORD\ModelRelease\Model實驗比
X: 72; Y: 1899

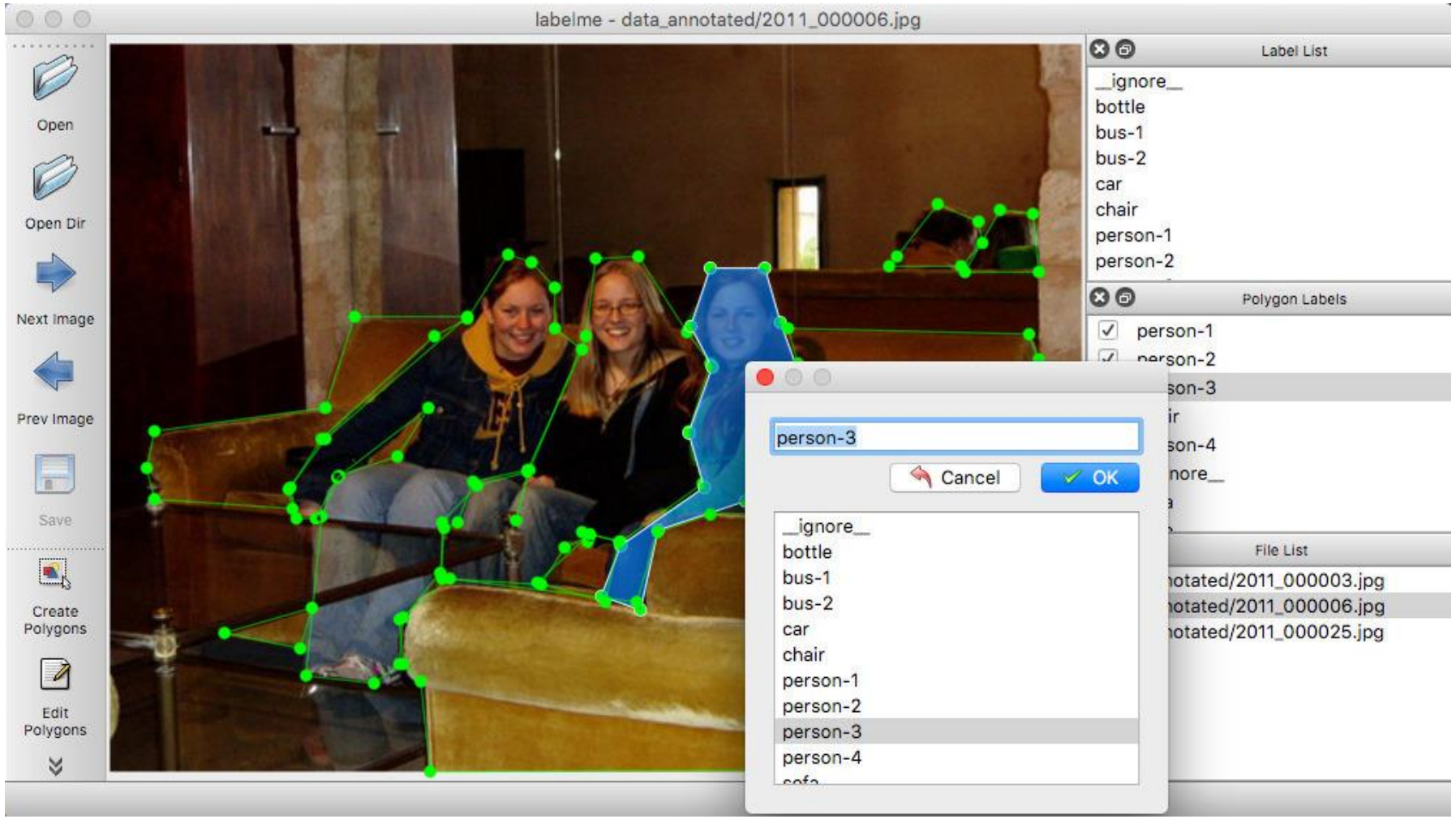
PixelAnnotationTool



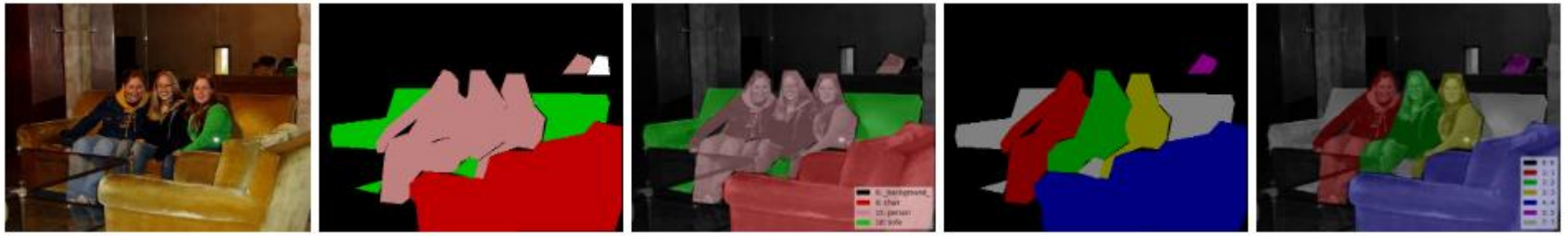
PixelAnnotationTool



Labelme


labelme - data_annotated/2011_000006.jpg
Open
Open Dir
Next Image
Prev Image
Save
Create Polygons
Edit Polygons
Label List
__ignore__
bottle
bus-1
bus-2
car
chair
person-1
person-2
Polygon Labels
person-1
person-3
Cancel
OK
__ignore__
bottle
bus-1
bus-2
car
chair
person-1
person-2
person-3
person-4
File List
otated/2011_000003.jpg
otated/2011_000006.jpg
otated/2011_000025.jpg

Labelme



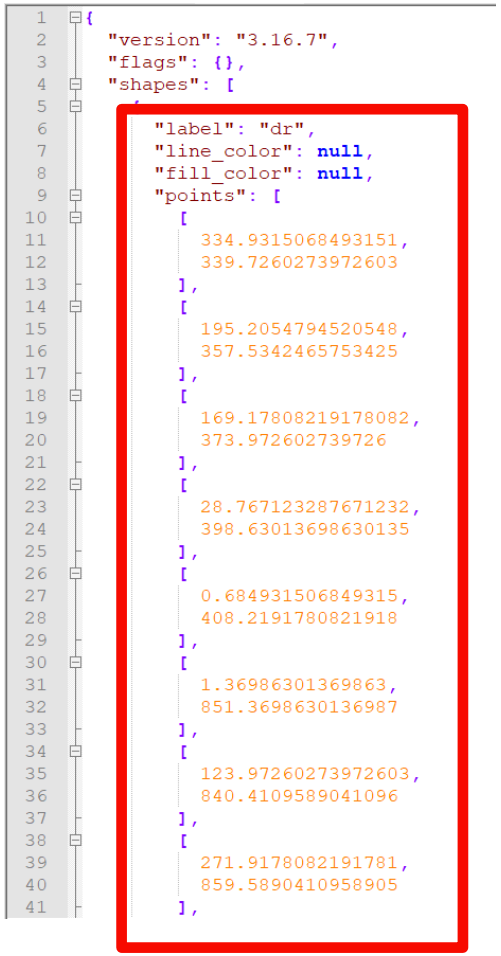
VOC dataset example of instance segmentation.

Other examples (semantic segmentation, bbox detection, and classification).

Labelme

Various primitives (polygon, rectangle, circle, line, and point).

Json files in lableme format



```
{
  "version": "3.16.7",
  "flags": {},
  "shapes": [
    {
      "label": "dr",
      "line_color": null,
      "fill_color": null,
      "points": [
        [
          334.9315068493151,
          339.7260273972603
        ],
        [
          195.2054794520548,
          357.5342465753425
        ],
        [
          169.17808219178082,
          373.972602739726
        ],
        [
          28.767123287671232,
          398.63013698630135
        ],
        [
          0.684931506849315,
          408.2191780821918
        ],
        [
          1.36986301369863,
          851.3698630136987
        ],
        [
          123.97260273972603,
          840.4109589041096
        ],
        [
          271.9178082191781,
          859.5890410958905
        ],
```

label: 被框起來的前景類別。
point: 多邊形點座標

Json files in lableme format