用训练得到的模型预测

2023-6-18

进入MMSegmentation主目录

In [36]:

```
import os
os.chdir('../mmsegmentation')
```

In [37]:

```
os.getcwd()
```

Out[37]:

'F:\\openprj\\openmmlab\\mmsegmentation'

导入工具包

In [38]:

```
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline

from mmseg.apis import init_model, inference_model, show_result_pyplot
import mmcv
import cv2
```

载入配置文件

In [39]:

```
# 载入 config 配置文件
from mmengine import Config
cfg = Config.fromfile('pspnet-WatermelonDataset_20230618.py')
```

In [40]:

```
from mmengine.runner import Runner
from mmseg.utils import register_all_modules

# register all modules in mmseg into the registries
# do not init the default scope here because it will be init in the runner

register_all_modules(init_default_scope=False)
runner = Runner.from_cfg(cfg)
```

```
06/18 17:30:12 - mmengine - INFO -
------------------------------------------------------------
System environment:
    sys.platform: win32
    Python: 3.8.16 (default, Mar  2 2023, 03:18:16) [MSC v.1916 64 bit (AMD6
4)]
    CUDA available: True
    numpy_random_seed: 0
    GPU 0: NVIDIA GeForce RTX 4050 Laptop GPU
    CUDA_HOME: None
    MSVC: n/a, reason: fileno
    PyTorch: 1.10.1
    PyTorch compiling details: PyTorch built with:
  - C++ Version: 199711
  - MSVC 192829337
  - Intel(R) Math Kernel Library Version 2020.0.2 Product Build 20200624 for
Intel(R) 64 architecture applications
  - Intel(R) MKL-DNN v2.2.3 (Git Hash 7336ca9f055cf1bfa13efb658fe15dc9b41f074
0)
```

载入模型

In [41]:

```
checkpoint_path = './work_dirs/WatermelonDataset/iter_3000.pth'
model = init_model(cfg, checkpoint_path, 'cuda:0')
```

```
Loads checkpoint by local backend from path: ./work_dirs/WatermelonDataset/iter_3
000.pth
```

载入测试集图像，或新图像

In [42]:

```
img = mmcv.imread('./data/Watermelon87_Semantic_Seg_Mask/img_dir/val/5b3c8018N634d43bd.jpg')
```

语义分割预测

In [43]:

```
result = inference_model(model, img)
```

In [44]:

```
result.keys()
```

Out[44]:

```
['seg_logits', 'pred_sem_seg']
```

In [45]:

```
pred_mask = result.pred_sem_seg.data[0].cpu().numpy()
```

In [46]:

```
pred_mask.shape
```

Out[46]:

```
(800, 800)
```

In [47]:

```
np.unique(pred_mask)
```

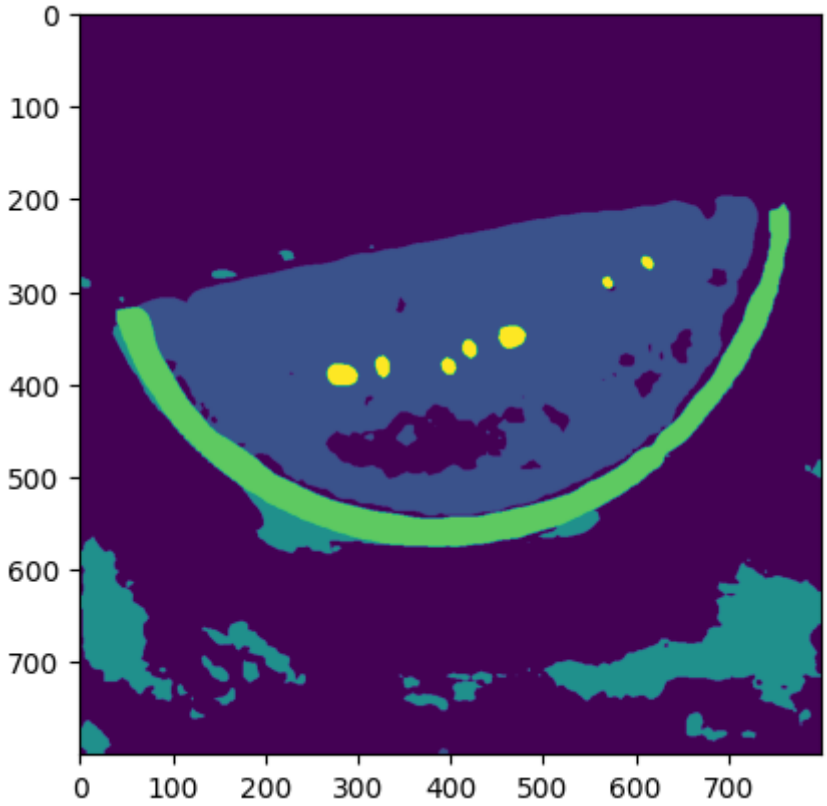
Out[47]:

```
array([0, 1, 2, 3, 4], dtype=int64)
```

可视化语义分割预测结果

In [48]:

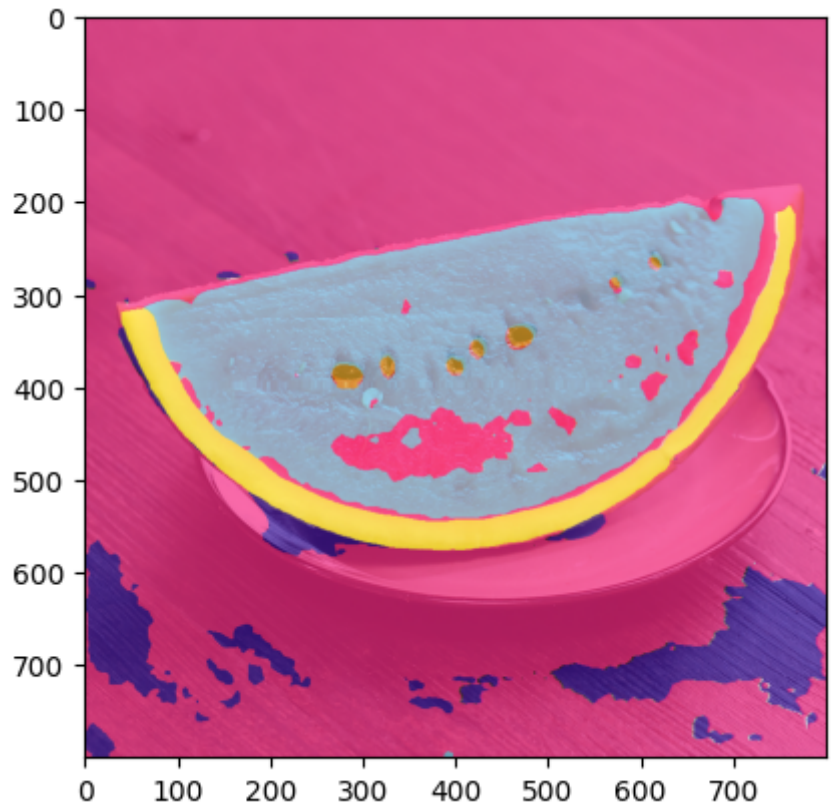
```
plt.imshow(pred_mask)
plt.show()
```



In [49]:

```
# 可视化预测结果
visualization = show_result_pyplot(model, img, result, opacity=0.7, out_file='pred.jpg')
plt.imshow(mmcv.bgr2rgb(visualization))
plt.show()
```

```
06/18 17:30:21 - mmengine - WARNING - `Visualizer` backend is not initialized be
cause save_dir is None.
```



获取测试集标注

In [50]:

```
label = mmcv.imread('./data/Watermelon87_Semantic_Seg_Mask/ann_dir/val/5b3c8018N634d43bd.png')
```

In [51]:

```
label.shape
```

Out[51]:

```
(800, 800, 3)
```

三个通道全部一样，只取一个通道作为标注即可。

In [52]:

```
label_mask = label[:,:,0]
```

In [53]:

```
label_mask.shape
```

Out[53]:

```
(800, 800)
```

In [54]:

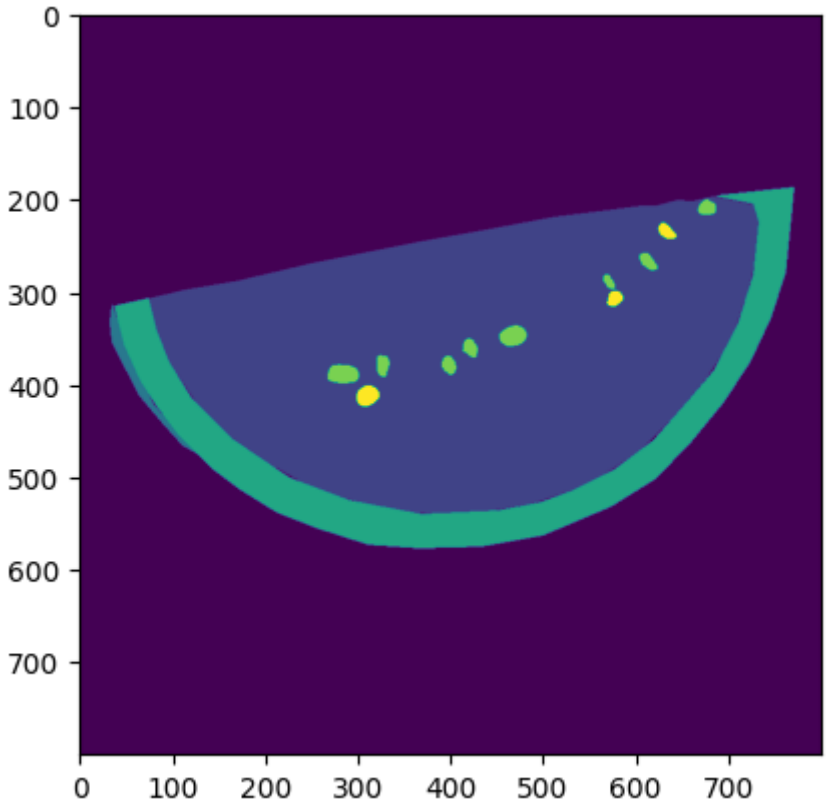
```
np.unique(label_mask)
```

Out[54]:

```
array([0, 1, 2, 3, 4, 5], dtype=uint8)
```

In [55]:

```
plt.imshow(label_mask)
plt.show()
```



对比测试集标注和语义分割预测结果

In [56]:

```
# 测试集标注
label_mask.shape
```

Out[56]:

(800, 800)

In [57]:

```
# 语义分割预测结果
pred_mask.shape
```

Out[57]:

(800, 800)

In [58]:

```
# 真实为前景，预测为前景
TP = (label_mask == 1) & (pred_mask==1)
```

In [59]:

```
# 真实为背景，预测为背景
TN = (label_mask == 0) & (pred_mask==0)
```

In [60]:

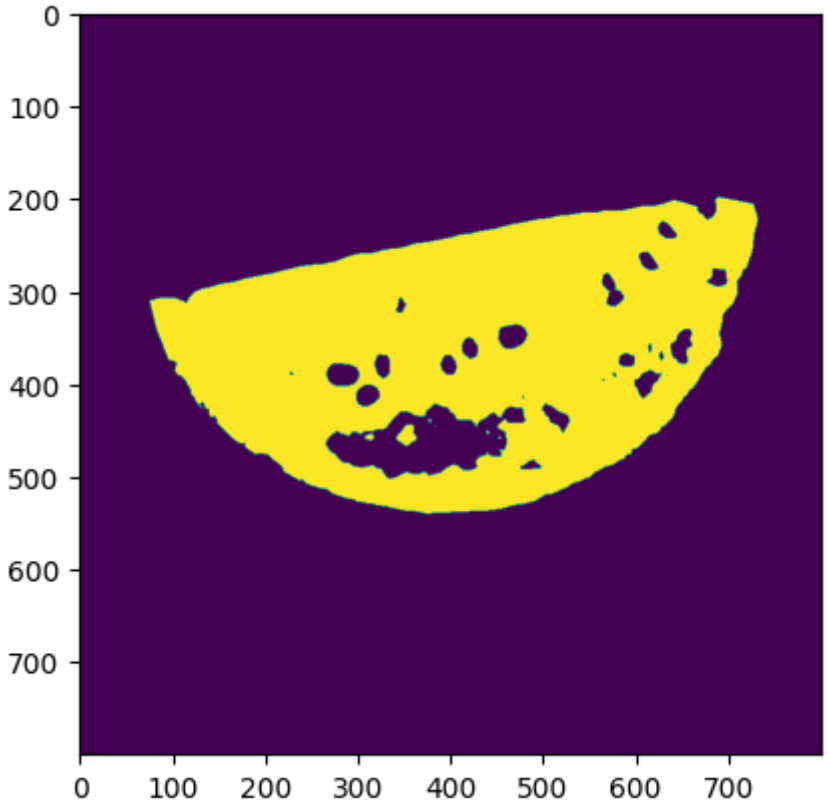
```
# 真实为前景，预测为背景
FN = (label_mask == 1) & (pred_mask==0)
```

In [61]:

```
# 真实为背景，预测为前景
FP = (label_mask == 0) & (pred_mask==1)
```

In [62]:

```
plt.imshow(TP)
plt.show()
```

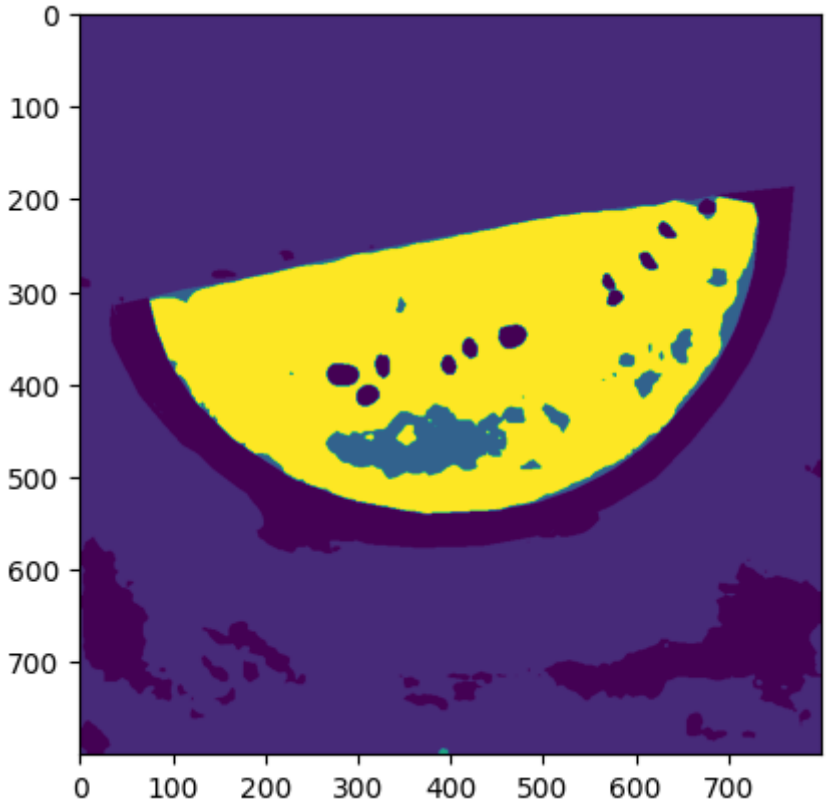


In [63]:

```
confusion_map = TP * 255 + FP * 150 + FN * 80 + TN * 30
```

In [64]:

```
plt.imshow(confusion_map)
plt.show()
```



混淆矩阵

In [65]:

```
from sklearn.metrics import confusion_matrix
```

In [66]:

```
confusion_matrix_model = confusion_matrix(label_mask.flatten(), pred_mask.flatten())
```

In [67]:

```
confusion_matrix_model
```

Out[67]:

```
array([[409913,    126,  38430,      2,      0,      0],
       [ 15596, 133544,      0,      5,    362,      0],
       [  1015,      0,    350,     18,      0,      0],
       [  6842,   1089,    846,  28398,      0,      0],
       [   257,    306,      0,      0,   1981,      0],
       [    54,    866,      0,      0,      0,      0]], dtype=int64)
```

In [68]:

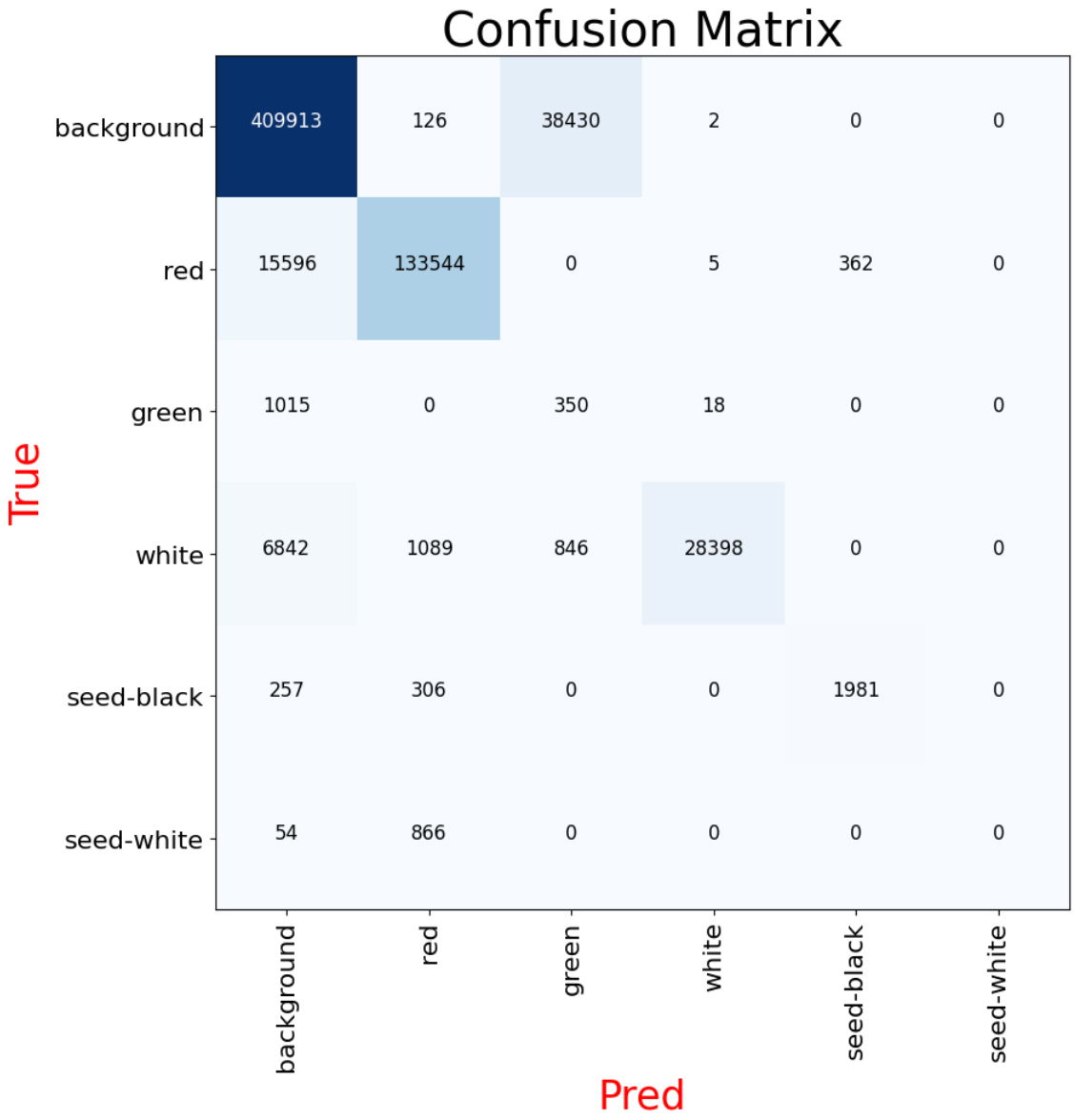
```
import itertools
def cnf_matrix_plotter(cm, classes, cmap=plt.cm.Blues):
    """
    传入混淆矩阵和标签名称列表，绘制混淆矩阵
    """
    plt.figure(figsize=(10, 10))

    plt.imshow(cm, interpolation='nearest', cmap=cmap)
    # plt.colorbar() # 色条
    tick_marks = np.arange(len(classes))

    plt.title('Confusion Matrix', fontsize=30)
    plt.xlabel('Pred', fontsize=25, c='r')
    plt.ylabel('True', fontsize=25, c='r')
    plt.tick_params(labelsize=16) # 设置类别文字大小
    plt.xticks(tick_marks, classes, rotation=90) # 横轴文字旋转
    plt.yticks(tick_marks, classes)

    # 写数字
    threshold = cm.max() / 2.
    for i, j in itertools.product(range(cm.shape[0]), range(cm.shape[1])):
        plt.text(j, i, cm[i, j],
                 horizontalalignment="center",
                 color="white" if cm[i, j] > threshold else "black",
                 fontsize=12)

    plt.tight_layout()

    plt.savefig('混淆矩阵.pdf', dpi=300) # 保存图像
    plt.show()
```

In [69]:

```
classes = ['background', 'red', 'green', 'white', 'seed-black', 'seed-white']
```

In [70]:

```
cnf_matrix_plotter(confusion_matrix_model, classes, cmap='Blues')
```



Unlabeled类别，既无预测结果，也无标签，因此混淆矩阵中不显示。

In [ ]:

```
```