

풀스택서비스구축

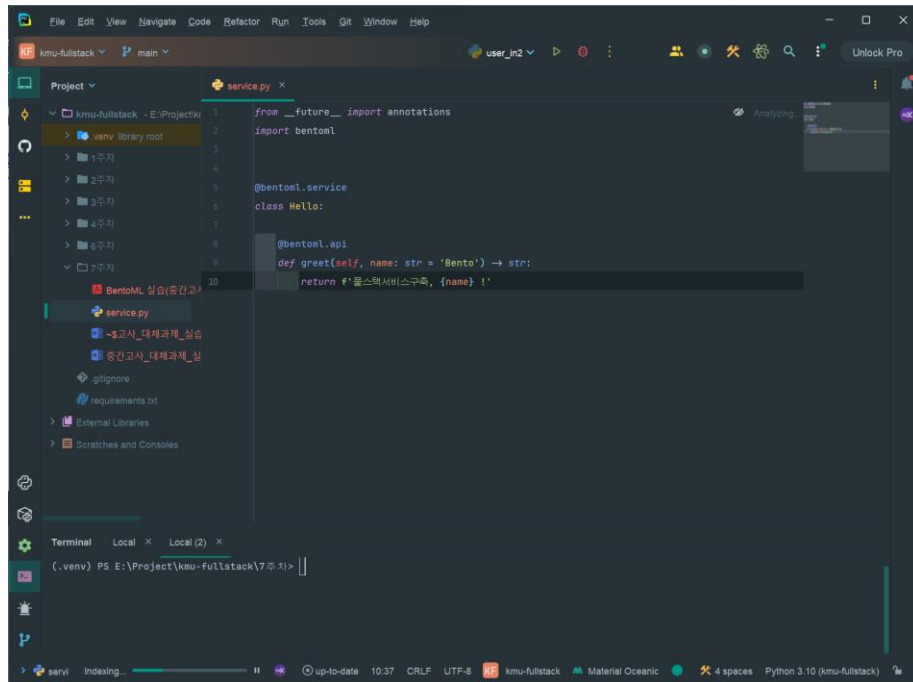
중간고사 대체과제

인공지능응용

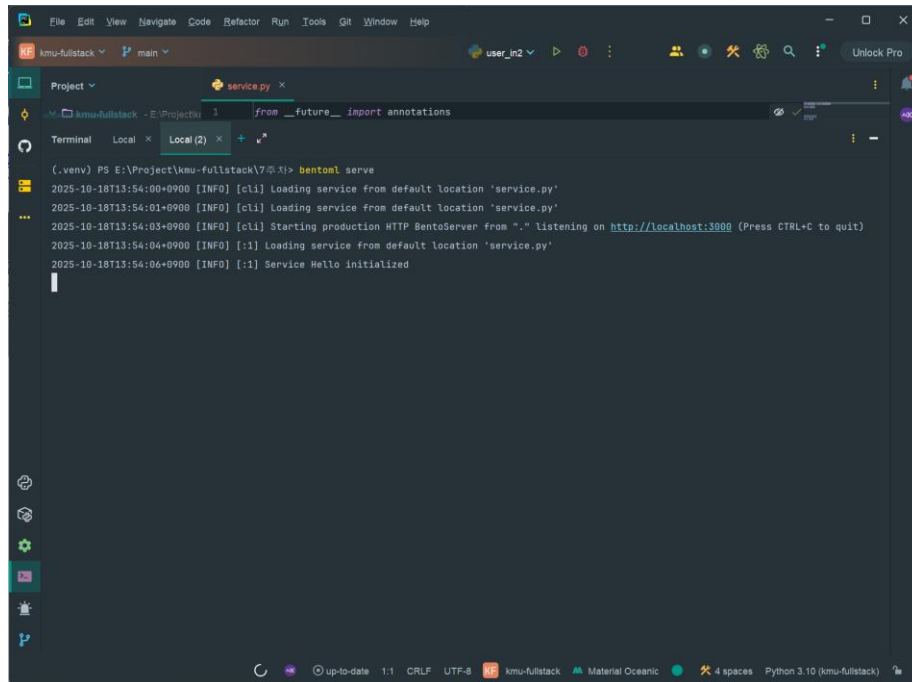
K2025029 금동환

목차

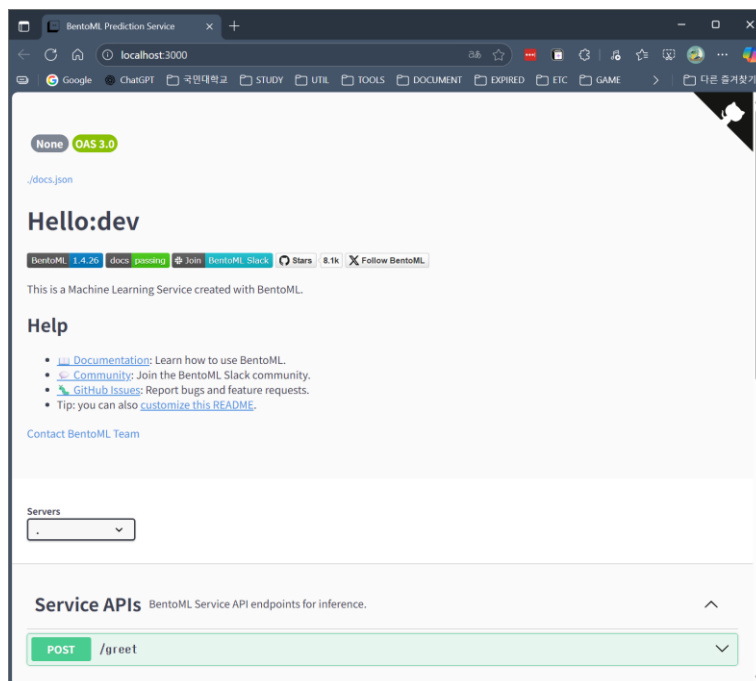
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1. Service.py

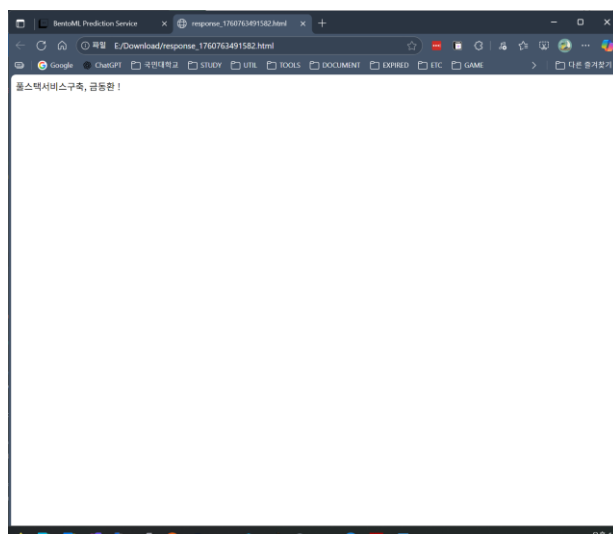
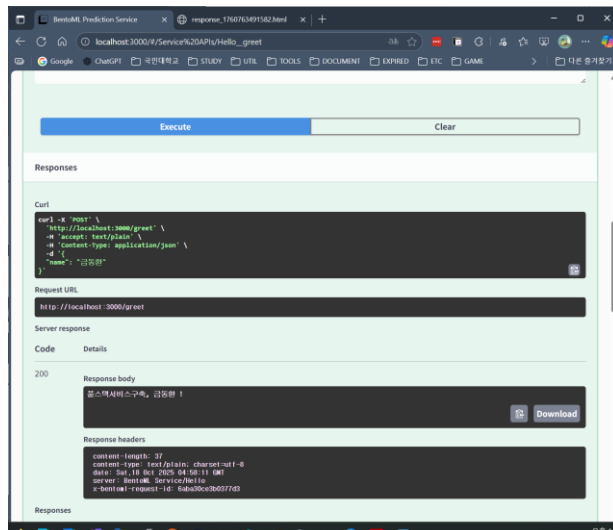
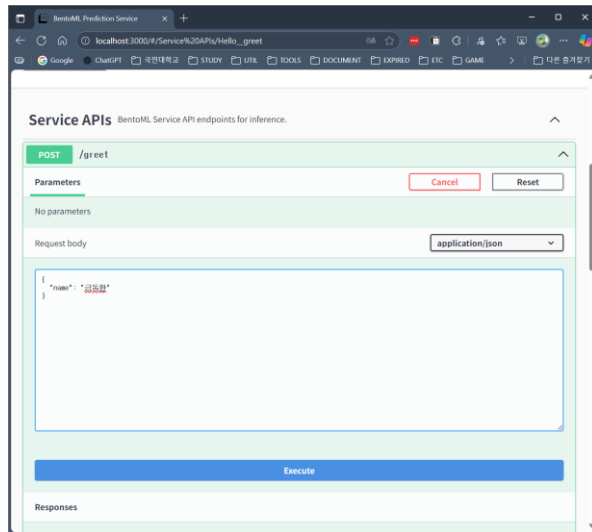
2. 서버 실행



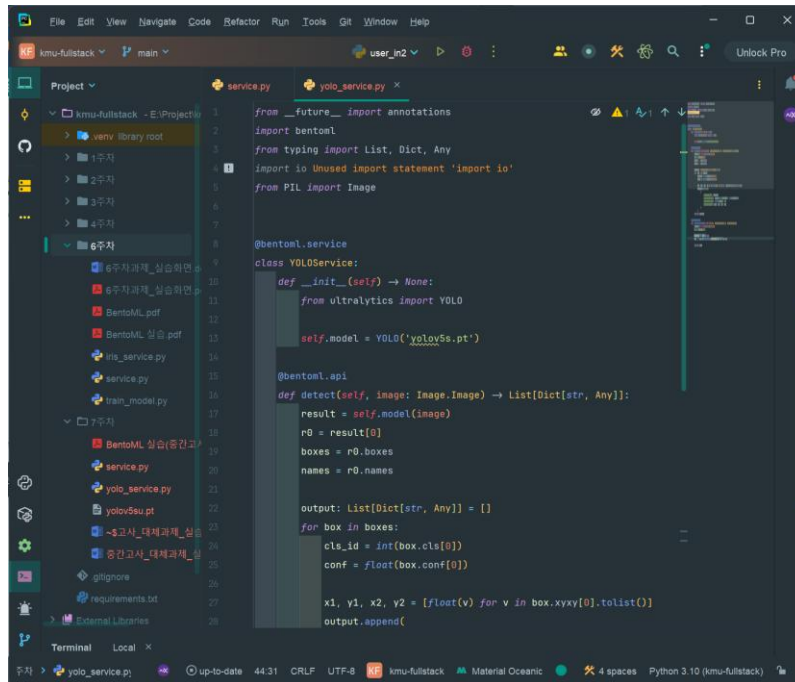
```
File Edit View Navigate Code Refactor Run Tools Git Window Help
kmu-fullstack main
Project service.py
kmu-fullstack - E:\Project\1 from __future__ import annotations
Terminal Local Local (2)
(.venv) PS E:\Project\kmu-fullstack\7주차> bentoml serve
2025-10-18T13:54:00+0900 [INFO] [cli] Loading service from default location 'service.py'
2025-10-18T13:54:01+0900 [INFO] [cli] Loading service from default location 'service.py'
2025-10-18T13:54:03+0900 [INFO] [cli] Starting production HTTP BentoServer from "." listening on http://localhost:3000 (Press CTRL+C to quit)
2025-10-18T13:54:04+0900 [INFO] [:1] Loading service from default location 'service.py'
2025-10-18T13:54:06+0900 [INFO] [:1] Service Hello initialized
```



3. 응답 확인



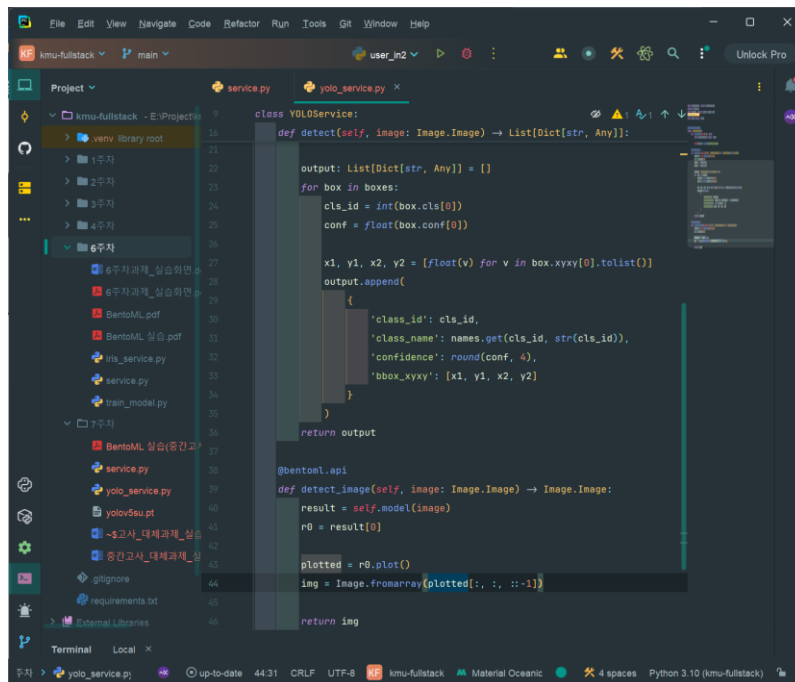
4. YOLO(Object Detection) 서비스 만들기



```

1 from __future__ import annotations
2 import bentoml
3 from typing import List, Dict, Any
4 import io
5 from PIL import Image
6
7
8 @bentoml.service
9 class YOLOService:
10     def __init__(self) → None:
11         from ultralytics import YOLO
12         self.model = YOLO('yolov5s.pt')
13
14     @bentoml.api
15     def detect(self, image: Image.Image) → List[Dict[str, Any]]:
16         result = self.model(image)
17         r0 = result[0]
18         boxes = r0.boxes
19         names = r0.names
20
21         output: List[Dict[str, Any]] = []
22         for box in boxes:
23             cls_id = int(box.cls[0])
24             conf = float(box.conf[0])
25
26             x1, y1, x2, y2 = [float(v) for v in box.xyxy[0].tolist()]
27             output.append(

```

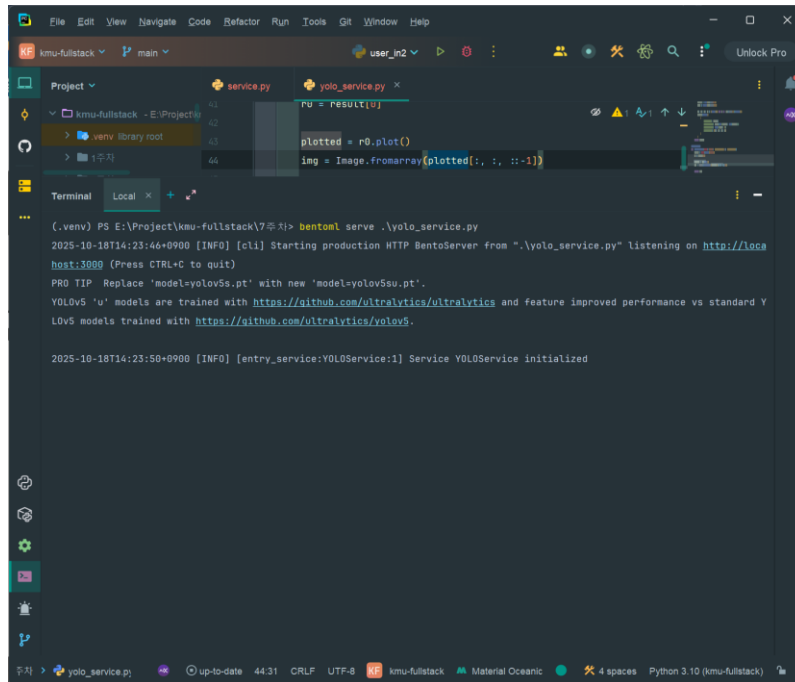


```

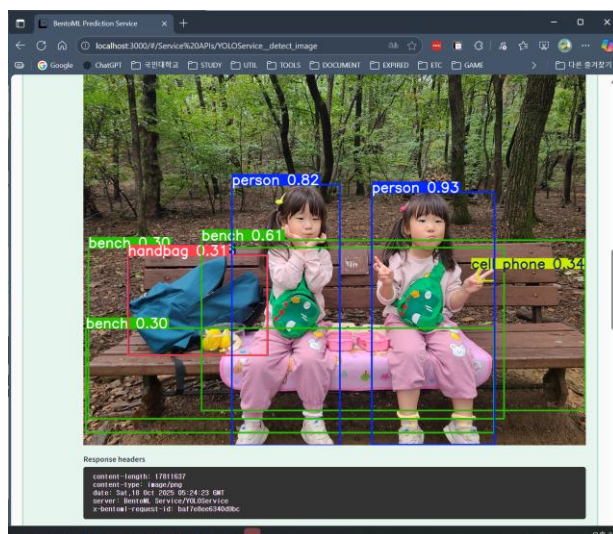
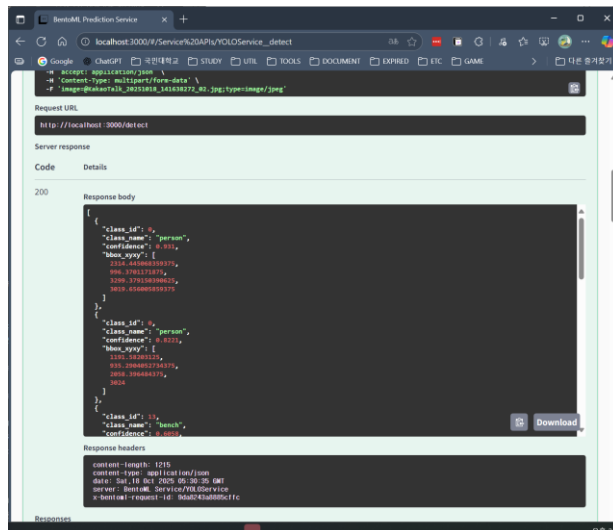
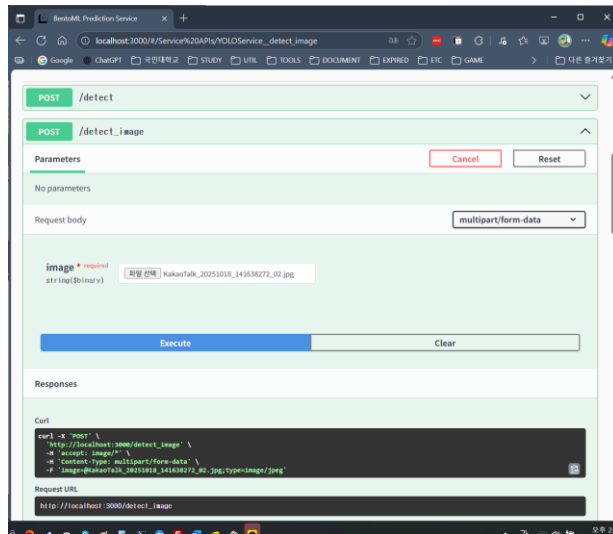
28         {
29             'class_id': cls_id,
30             'class_name': names.get(cls_id, str(cls_id)),
31             'confidence': round(conf, 4),
32             'bbox_xyxy': [x1, y1, x2, y2]
33         }
34     )
35     return output
36
37     @bentoml.api
38     def detect_image(self, image: Image.Image) → Image.Image:
39         result = self.model(image)
40         r0 = result[0]
41
42         plotted = r0.plot()
43         img = Image.fromarray(plotted[:, :, :3])
44         return img

```

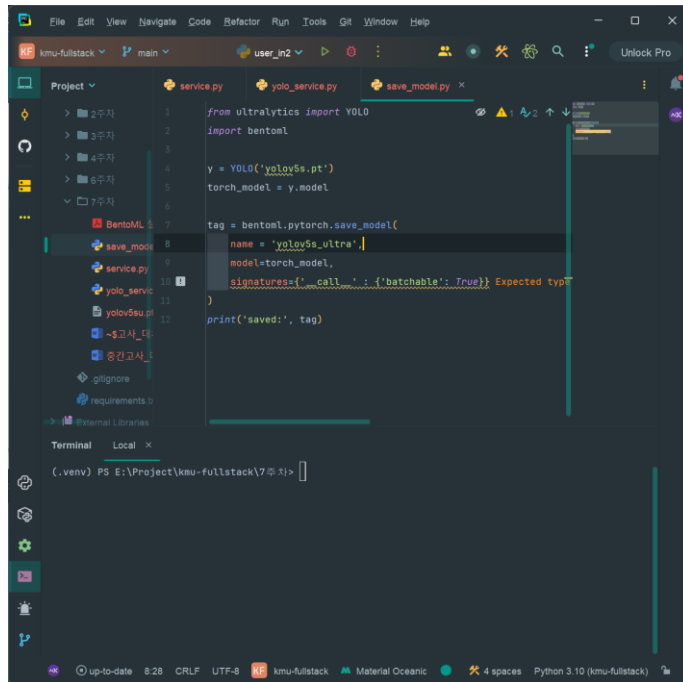
5. 실행



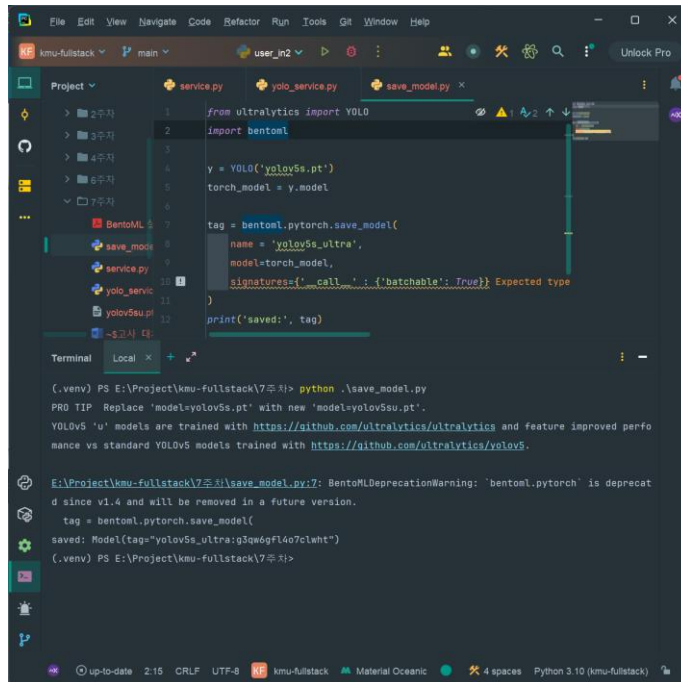
6. 테스트



7. PyTorch 모델 저장/관리



8. 실행



```
from ultralytics import YOLO
import bentoML

y = YOLO('yolov5s.pt')
torch_model = y.model

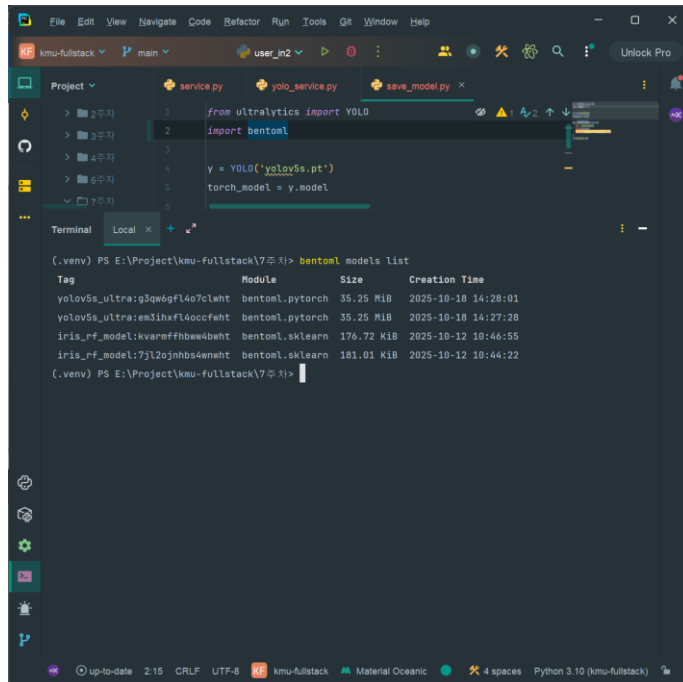
tag = bentoML.pytorch.save_model(
    name = 'yolov5s_ultra',
    model=torch_model,
    signatures={'__call__': {'batchable': True}} Expected type
)

print('saved:', tag)
```

```
(.venv) PS E:\Project\kmu-fullstack\7주차> python .\save_model.py
PRO TIP Replace 'model=yolov5s.pt' with new 'model=yolov5su.pt'.
YOLOv5 'u' models are trained with https://github.com/ultralytics/ultralytics and feature improved performance vs standard YOLOv5 models trained with https://github.com/ultralytics/yolov5.

E:\Project\kmu-fullstack\7주차> python .\save_model.py:7: BentoMLDeprecationWarning: 'bentoML.pytorch' is deprecated since v1.4 and will be removed in a future version.
  tag = bentoML.pytorch.save_model(
saved: Model(tag="yolov5s_ultra:g3qw6gfl4o7clwht")
(.venv) PS E:\Project\kmu-fullstack\7주차>
```

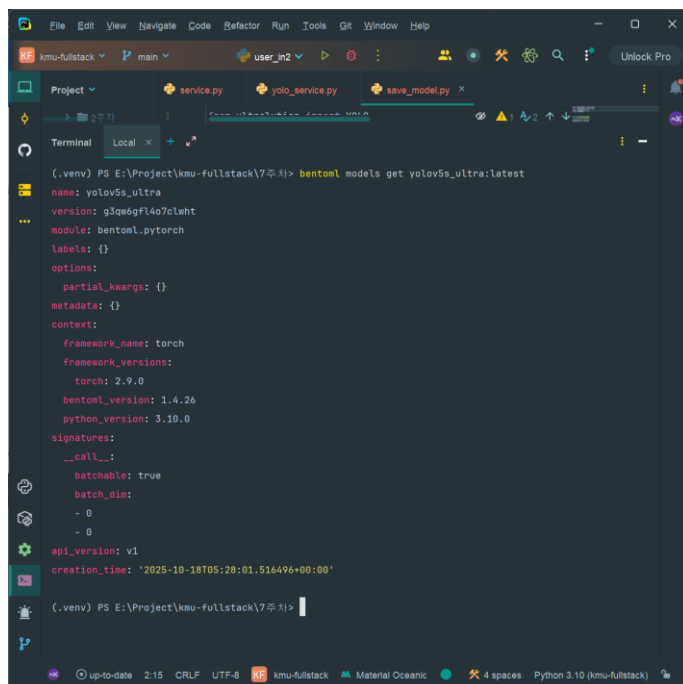
9. 로컬 Model Store 목록 확인



```
from ultralytics import YOLO
import bentoml

y = YOLO('yolov5s.pt')
torch_model = y.model

(.venv) PS E:\Project\kmu-fullstack\7주차> bentoml models list
Tag                Module                Size    Creation Time
yolov5s_ultra:g3qwgfl4o7clwht bentoml.pytorch 35.25 MiB 2025-10-18 14:28:01
yolov5s_ultra:em3ihxfl4occfwht bentoml.pytorch 35.25 MiB 2025-10-18 14:27:28
iris_rf_model:kvarmfhbww4bwht bentoml.sklearn 176.72 KiB 2025-10-12 10:46:55
iris_rf_model:7jl2ojnhbs4nwhht bentoml.sklearn 181.01 KiB 2025-10-12 10:44:22
(.venv) PS E:\Project\kmu-fullstack\7주차>
```



```
(.venv) PS E:\Project\kmu-fullstack\7주차> bentoml models get yolov5s_ultra:latest
name: yolov5s_ultra
version: g3qwgfl4o7clwht
module: bentoml.pytorch
labels: {}
options:
  partial_kwargs: {}
metadata: {}
context:
  framework_name: torch
  framework_versions:
    torch: 2.9.0
    bentoml_version: 1.4.26
    python_version: 3.10.0
signatures:
  __call__:
    batchable: true
    batch_dim:
      - 0
      - 0
api_version: v1
creation_time: '2025-10-18T05:28:01.516496+00:00'
(.venv) PS E:\Project\kmu-fullstack\7주차>
```