

시작하기에 앞서

2025년 3월에 시작된 산불로 인해 많은 소방
대원들이 목숨을 잃었습니다. 그들을 기리며
만든 프로젝트입니다. 잠시 시간을 내어 그들
의 노고를 생각해주시면 감사하겠습니다.

기술 스택

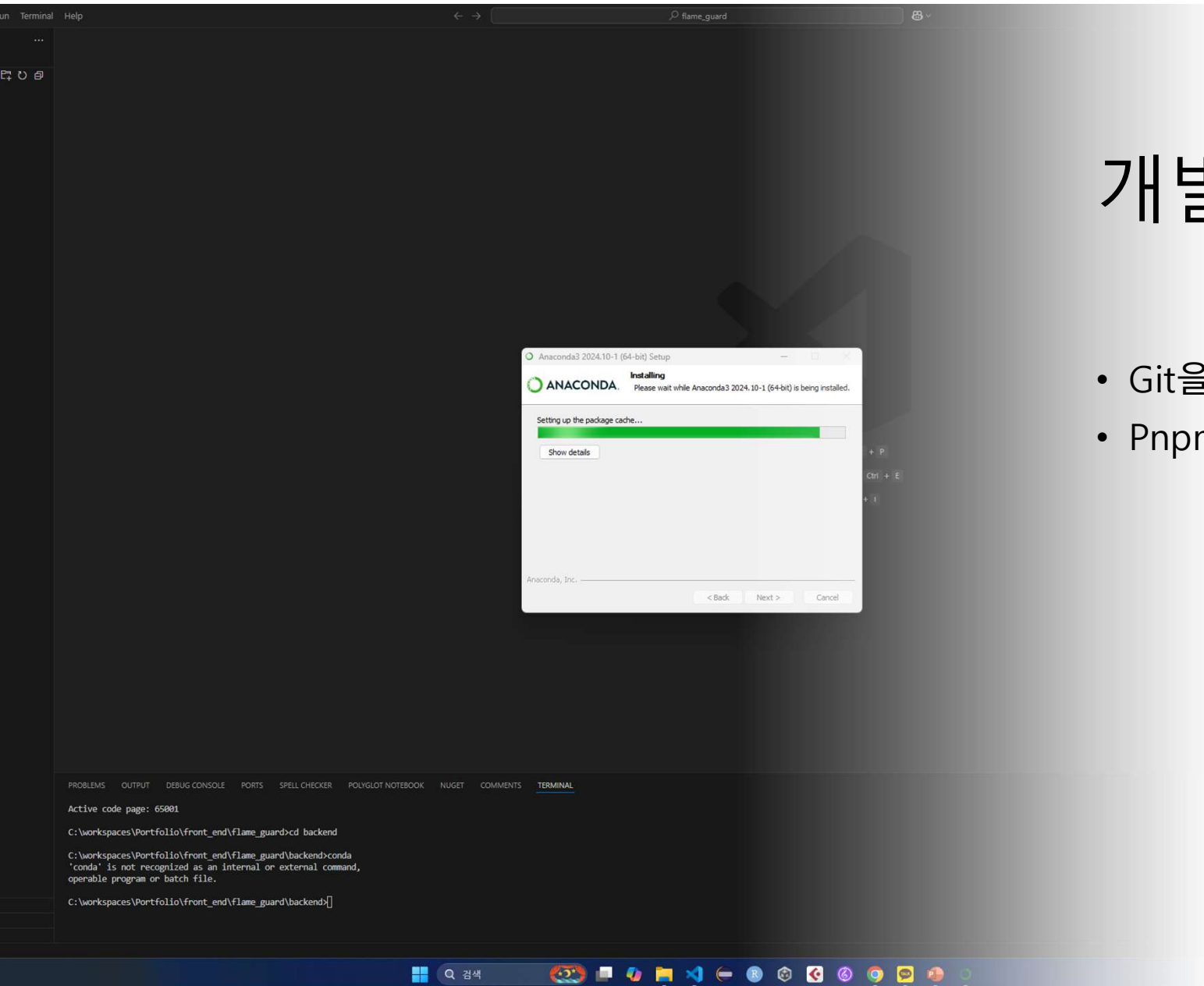
Next.js

Python (Fast API)

YOLO

개발 환경 구축

- Git을 통한 기본 틀 다운로드
- Pnpm 및 anaconda3 설치



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.26100.3476]
(c) Microsoft Corporation. All rights reserved.

C:\Users\kms54>conda create -n flameguard python=3.9
WARNING: A conda environment already exists at 'C:\Users\kms54\anaconda3\envs\flameguard'

Remove existing environment?
This will remove ALL directories contained within this specified prefix directory, including any other conda environment
s.

(y/[n])? y

Channels:
- defaults
Platform: win-64
Collecting package metadata (repodata.json): done
Solving environment: done

## Package Plan ##

environment location: C:\Users\kms54\anaconda3\envs\flameguard

added / updated specs:
- python=3.9
```

Anaconda를 활용한 환경 구축

Conda env create -f
environment.yml

```
C:\Users\kms54>activate flameguard

(flameguard) C:\Users\kms54>pip install ultralytics
Collecting ultralytics
  Using cached ultralytics-8.3.96-py3-none-any.whl.metadata (35 kB)
Collecting numpy<=2.1.1,>=1.23.0 (from ultralytics)
  Downloading numpy-2.0.2-cp39-cp39-win_amd64.whl.metadata (59 kB)
Collecting matplotlib>=3.3.0 (from ultralytics)
  Downloading matplotlib-3.9.4-cp39-cp39-win_amd64.whl.metadata (11 kB)
Collecting opencv-python>=4.6.0 (from ultralytics)
  Using cached opencv_python-4.11.0.86-cp37-abi3-win_amd64.whl.metadata (20 kB)
Collecting pillow>=7.1.2 (from ultralytics)
  Using cached pillow-11.1.0-cp39-cp39-win_amd64.whl.metadata (9.3 kB)
Collecting pyyaml>=5.3.1 (from ultralytics)
  Downloading PyYAML-6.0.2-cp39-cp39-win_amd64.whl.metadata (2.1 kB)
Collecting requests>=2.23.0 (from ultralytics)
  Downloading requests-2.32.3-py3-none-any.whl.metadata (4.6 kB)
Collecting scipy>=1.4.1 (from ultralytics)
  Downloading scipy-1.13.1-cp39-cp39-win_amd64.whl.metadata (60 kB)
Collecting torch>=1.8.0 (from ultralytics)
  Using cached torch-2.6.0-cp39-cp39-win_amd64.whl.metadata (28 kB)
Collecting torchvision>=0.9.0 (from ultralytics)
  Using cached torchvision-0.21.0-cp39-cp39-win_amd64.whl.metadata (6.3 kB)
Collecting tqdm>=4.64.0 (from ultralytics)
  Using cached tqdm-4.67.1-py3-none-any.whl.metadata (57 kB)
```

Ultralytics download

pnpm 설치 오류 해결 x fire_detection Dataset > Overview x

universe.roboflow.com/testworkspace-qz0ne/fire_detection-nhru2

Search 500,000+ Open Source Computer Vision Projects...

fire_detection
Object Detection

Overview

Images 7691

Dataset 2

Model 1

API Docs

Analytics

7.7k images

fire_detection Computer Vision Project

testworkspace Updated 4 months ago

0 stars Download Project

TAGS
Object Detection Model snap

CLASSES (2)
0 1

METRICS

mAP ①	Precision ①	Recall ①
99.4%	99.6%	99.7%

Try This Model
Drop an image or [browse your device](#)

A description for this project has not been published yet.

Use this trained ML model to detect fire in your images or videos. Try it in your browser, or deploy via our Hosted Inference API and other deployment methods.

Cite This Project

LICENSE CC BY 4.0

15°C 흐림

오전 2:01 2025-03-27

Roboflow를 통한 학습 데이터 선정


```
C:\Windows\System32\cmd
16          -1  1      32096  ultralytics.nn.modules.block.C3k2      [256, 64, 1, False]
17          -1  1      36992  ultralytics.nn.modules.conv.Conv        [64, 64, 3, 2]
18      [-1, 13]  1          0  ultralytics.nn.modules.conv.Concat      [1]
19          -1  1      86720  ultralytics.nn.modules.block.C3k2      [192, 128, 1, False]
20          -1  1     147712  ultralytics.nn.modules.conv.Conv        [128, 128, 3, 2]
21      [-1, 10]  1          0  ultralytics.nn.modules.conv.Concat      [1]
22          -1  1     378880  ultralytics.nn.modules.block.C3k2      [384, 256, 1, True]
23      [16, 19, 22]  1     432232  ultralytics.nn.modules.head.Detect      [8, [64, 128, 256]]

YOLO11n summary: 181 layers, 2,591,400 parameters, 2,591,384 gradients, 6.4 GFLOPs
```

Transferred 448/499 items from pretrained weights

Freezing layer 'model.23.dfl.conv.weight'

train: Scanning C:\workspaces\Portfolio\front_end\flame_guard\train\labels

train: New cache created: C:\workspaces\Portfolio\front_end\flame_guard\train\labels.cache

.cache

val: Scanning C:\workspaces\Portfolio\front_end\flame_guard\val\labels

val: New cache created: C:\workspaces\Portfolio\front_end\flame_guard\val\labels.cache

ache

Plotting labels to runs\detect\train6\labels.jpg.

optimizer: 'optimizer=auto' found, ignoring 'optimizer=adam' and

'momentum' automatically...

optimizer: AdamW(lr=0.000833, momentum=0.9) with param

(decay=0.0)

Image sizes 640 train, 640 val

Using 0 dataloader workers

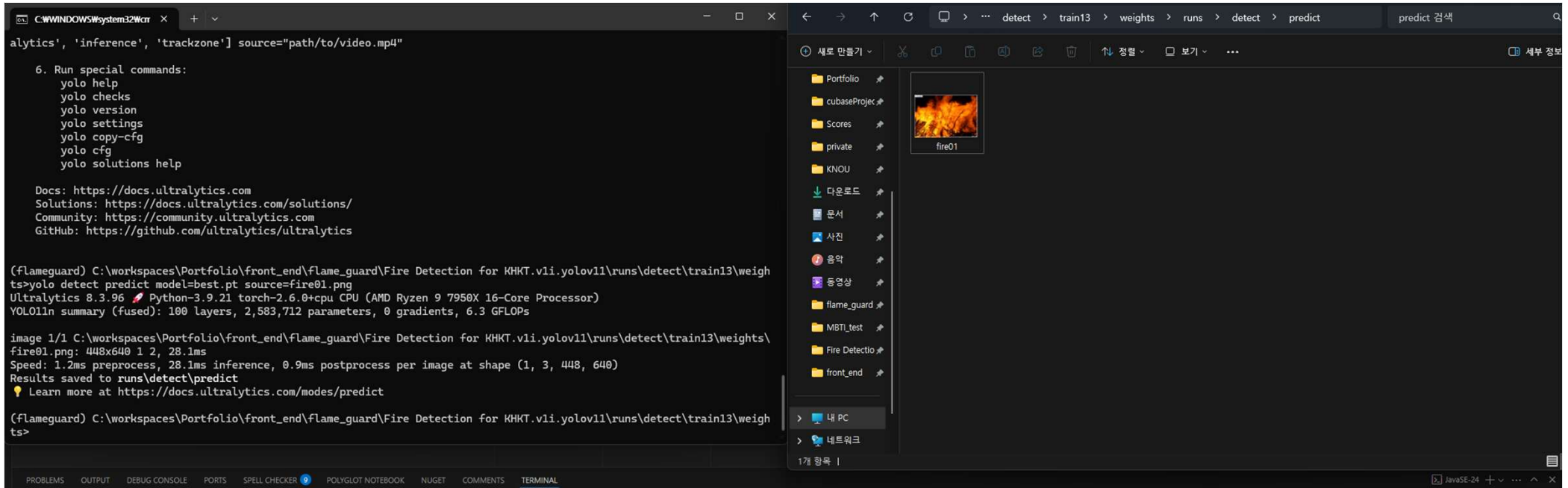
Logging results to runs\detect\train6

Starting training for 150 epochs...

Anaconda 환경에서 yolo 학습 시키기

- Epochs: 150
- Size: 640

Epoch	GPU_mem	box_loss	cls_loss
1/150	0G	1.943	4.547



학습된 모델로 결과 도출

Yolo detect predict
model=best.pt
source=fire01.png

화재 감지

다른 색상의 불꽃도 감지
가능



SQLite 연동 성공

```
EXPLORER
main.py
backend
  _pycache_
  .vscode
  api
  app
  _pycache_
  assets
  db
  _pycache_
  models
  _init_.py
  database.py
  utils
  sql_app.db
  log
  .gitignore
  environment.yml
  main.py
Fire Detection for KHKTVIYOLV11
frontend
runs
Next.js를 활용한 화재 감지 시스템.pptx

OUTLINE
TIMELINE
SQLITE EXPLORER
  sql_app.db
    detection_logs
      id: integer
      file_name: varchar
      result_image: varchar
      detections: json
      message: varchar
      has_fire: boolean
      created_at: datetime
    sessions
      id: varchar
      user_id: integer
      data: json
      created_at: datetime
      last_accessed_at: datetime
      expires_at: datetime
    users
      id: integer
      email: varchar
      password: varchar
      count_login: integer
      validation_number: varchar
      verified: boolean
      role: varchar
      plan: varchar
      created_at: datetime
      expired_at: datetime

MYSQL
0.0.0.0 Connect English
```

```
main.py
33
34 @asynccontextmanager
35 async def lifespan(app: FastAPI):
36     init_db()
37     yield
38
39 app = FastAPI(lifespan=lifespan)
40
41
42 app.add_middleware(
43     CORSMiddleware,
44     allow_origins=["*"],
45     allow_credentials=True,
46     allow_methods=["*"],
47     allow_headers=["*"],
48 )
49
50 api_dir = Path(__file__).parent / "api"
51
52 from api.predict_fire.router import router as predict_fire_router
53 app.include_router(predict_fire_router)
54
55 # auto import router
56 for api in api_dir.iterdir():
57     if api.is_dir(): # folder(each endpoint)
58         router_module = f"api.{api.name}.router"
59         try:
60             module = importlib.import_module(router_module)
61             if hasattr(module, "router"):
62                 app.include_router(module.router)
63             print(f"router added: {router_module}") # debug
64         except ModuleNotFoundError:
65             if api.name == "_pycache_" or api.name == "_init_":
66                 continue
67             print(f"router module not found (router.py is missing)")
68
69
70 # serve log folder as static files
71 log_directory = os.path.join(os.path.dirname(__file__), "log")
72
73 # log 폴더가 없으면 생성
74 if not os.path.exists(log_directory):
75     os.makedirs(log_directory)
76
77 app.mount("/log", StaticFiles(directory=log_directory), name="log")
78
```

```
PROBLEMS
[Warning] api.get_detection_log.router not found (router.py is missing)
[Success] router added: api.get_test.router
[Success] router added: api.predict_fire.router

(flameguard) c:\workspaces\Portfolio\front_end\flame_guard>
(flameguard) c:\workspaces\Portfolio\front_end\flame_guard>
(flameguard) c:\workspaces\Portfolio\front_end\flame_guard> c: && cd c:\workspaces\Portfolio\front_end\flame_guard\backend\main.py
sqlite:///c:\workspaces\Portfolio\front_end\flame_guard\backend\app\sql_app.db
c:\Users\hms\Anaconda3\envs\flameguard\lib\site-packages\pydantic\_internal\_config.py:373: UserWarning: 'orm_mode' has been renamed to 'from_attributes'
  warnings.warn(message, UserWarning)
[Success] router added: api.create_user.router
[Success] router added: api.get_detection_log.router
[Success] router added: api.get_test.router
[Success] router added: api.predict_fire.router

(flameguard) c:\workspaces\Portfolio\front_end\flame_guard>
```

구현중입니다

fastAPI

