User Guide

1.Introduction

The purpose of this user guide is to provide step-by-step instructions for Fire & Smoke Detection Platform. This platform is designed for the author's Master project "Fire detection system platform integrating GUI and deep learning architectures". For the instruction video, please visit https://youtu.be/2QsQoibVQnI.

The function of this platform is to provide a graphical user interference to implement fire & smoke detection using deep learning architectures. Specifically, six deep learning architectures are integrated in the platform, i.e., YOLO V3, YOLO V4, Mask RCNN, Faster RCNN, EfficientDet and Deeplab V3+. Using these architectures, the platform can detect and locate fire and smoke in the images, videos, real-time video from local camera and smart phone camera. Due to restriction of computation resources, these deep learning models are trained with limited iterations, and hence they may not be able to provide highly accurate detection.

2.Requirements

Windows 10, CUDA 9.0, cuDNN 7.1.4 (depends on your own computer)

Python=3.5.4, Keras=2.1.5, tensorflow-gpu=1.10.0, numpy=1.14.5, py-opencv=3.4.2, PyQt5=5.13.0, Pillow=6.0.0

Visual C++ Redistributable Package may be also needed, check it if there is bug.

3.How to start?

1 Download the codes.

2 Create a virtual environment and install all required libraries

3 Open the folder "GUI" in PyCharm. Now the system path of PyCharm should be "…../GUI" .

Set the project interpreter to be the virtual environment you created.

4 Run the file named with "main.py". It will take a moment to load models before the main window appears.

4. How to use?

4.1 Mode Selection

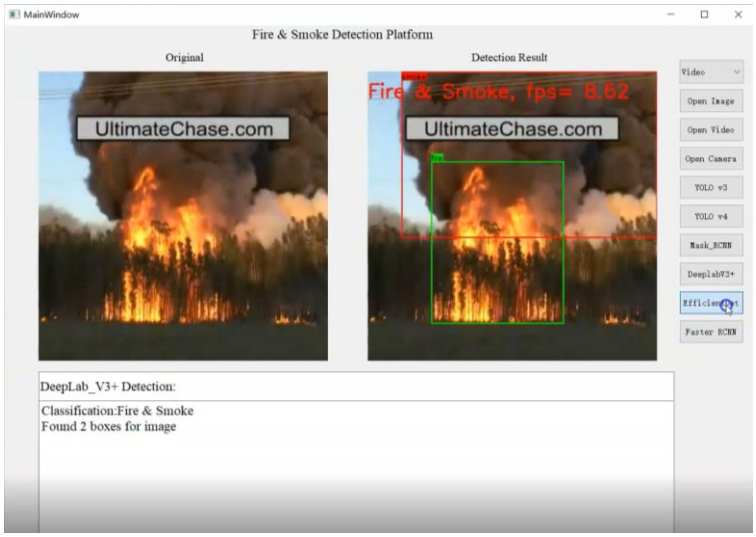
There are four modes, i.e., image, video, local camera and phone camera. User can choose one mode from the list by clicking the “Mode” button.

4.2 Image Detection

To enter the image detection mode, user can choose “Image” from the mode list after clicking the “Mode” button. By clicking the “Open Image” button, user can choose an image file from local files. Then user can choose one deep learning model to start detection by clicking the corresponding button named with it.

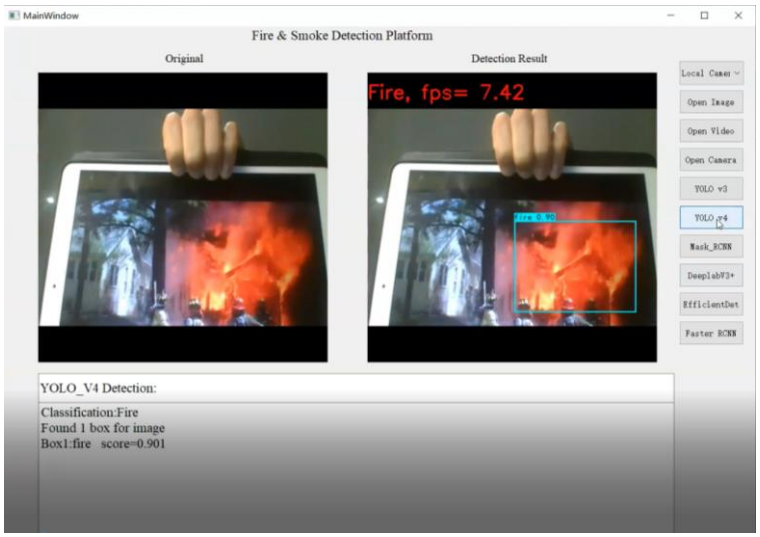
4.2 Video Detection

To enter the video detection mode, user can choose “Video” from the mode list after clicking the “Mode” button. By clicking the “Open Video” button, user can choose a video file from local files. Then user can choose one deep learning model to start detection by clicking the corresponding button named with it.



4.3 Local Camera Detection

To enter the local camera detection mode, user can choose “Local Camera” from the mode list after clicking the “Mode” button. By clicking the “Open Camera” button, user can open the camera of computer. Then user can choose one deep learning model to start detection by clicking the corresponding button named with it.



4.4 Phone Camera Detection

Firstly, user should install IP Camera app on the smart phone. For Android user, you can install “IP Webcam” from Google Play. For IOS user, you can install it from Apple App Store. This project is only tested on Android device (HUAWEI MATE20). To start the IP camera of your smart phone, you can press “Open Server” button on the bottom of the app. Then you should find the IP address in the red box on the screen of your phone and replace the IP address in line 79 of main.py with your own IP address. To connect your smart phone with your computer, please make sure they are in the same Wi-Fi network.


```
79          camera = cv.VideoCapture('rtsp://admin:admin@100.77.206.71:8080/h264_ulaw.sdp')
```

To enter the phone camera detection mode, user can choose “Phone Camera” from the mode list after clicking the “Mode” button. Then user can choose one deep learning architecture to start detection by clicking the corresponding button named with it.

Appendix

All packages installed in the environment, 99% are not related to this project!

Package Version

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absl-py 0.7.1

alabaster 0.7.11

asn1crypto 0.24.0

astor 0.8.0

astroid 2.0.4

Augmentor 0.2.8

Babel 2.6.0

backcall 0.1.0

bleach 2.1.4

certifi 2018.8.24

cffi 1.11.5

chardet 3.0.4

click 7.1.2

colorama 0.3.9

cryptography 2.3.1

cycler 0.10.0

Cython 0.29.19

decorator 4.4.0

defusedxml 0.6.0

docutils 0.14

easydict 1.9

entrypoints 0.2.3

future 0.18.2

gast 0.2.2

google-pasta 0.2.0

grpcio 1.21.1

h5py 2.9.0

html5lib 1.0.1

idna 2.7

imageio 2.8.0

imagesize 1.1.0

imgviz 1.1.0

ipykernel 4.10.0

ipython 6.5.0

ipython-genutils 0.2.0

isort 4.3.4

jedi 0.12.1

Jinja2 2.10

joblib 0.13.2

jsonschema 2.6.0

jupyter-client 5.2.3

jupyter-core 4.4.0

Keras 2.1.5

Keras-Applications 1.0.8

Keras-Preprocessing 1.1.0

kiwisolver	1.1.0
labelme	3.2.0
lazy-object-proxy	1.3.1
Markdown	3.1.1
MarkupSafe	1.0
matplotlib	3.0.3
mccabe	0.6.1
mistune	0.8.3
mkl-fft	1.0.6
mkl-random	1.0.1
mock	3.0.5
nbconvert	5.5.0
nbformat	4.4.0
networkx	2.4
numpy	1.14.5
numpydoc	0.9.1
packaging	17.1
pandas	0.24.2
pandocfilters	1.4.2
parso	0.4.0
pickleshare	0.7.4
Pillow	6.0.0
pip	10.0.1
prompt-toolkit	1.0.15
protobuf	3.8.0
psutil	5.4.7
pycodestyle	2.4.0
pycparser	2.19
pyflakes	2.0.0

Pygments	2.4.0
pylint	2.1.1
pyOpenSSL	18.0.0
pyparsing	2.4.0
PyQt5	5.13.0
PyQt5-sip	12.7.2
pyqt5-tools	5.13.0.1.5
PySocks	1.6.8
python-dateutil	2.7.3
python-dotenv	0.13.0
pytz	2019.1
PyWavelets	1.1.1
PyYAML	5.1
pyzmq	17.1.2
QtPy	1.9.0
requests	2.19.1
rope	0.14.0
scikit-image	0.15.0
scikit-learn	0.21.2
scipy	1.3.0
seaborn	0.9.0
setuptools	39.1.0
simplegeneric	0.8.1
six	1.12.0
snowballstemmer	1.2.1
Sphinx	2.0.1
sphinxcontrib-applehelp	1.0.1
sphinxcontrib-devhelp	1.0.1
sphinxcontrib-htmlhelp	1.0.2

sphinxcontrib-jsmath 1.0.1

sphinxcontrib-qthelp 1.0.2

sphinxcontrib-serializinghtml 1.1.3

tensorboard 1.10.0

tensorflow 1.10.0

tensorflow-estimator 1.14.0

tensorflow-gpu 1.10.0

termcolor 1.1.0

testpath 0.3.1

tornado 5.1.1

tqdm 4.46.0

traitlets 4.3.2

typed-ast 1.1.0

urllib3 1.23

wcwidth 0.1.7

webencodings 0.5.1

Werkzeug 0.15.4

wheel 0.31.1

win-inet-pton 1.0.1

win-unicode-console 0.5

wincertstore 0.2

wrapt 1.12.1

alabaster	0.7.11
asn1crypto	0.24.0
astroid	2.0.4
babel	2.6.0
backcall	0.1.0
blas	1.0
bleach	2.1.4
ca-certificates	2020.1.1

certifi	2018.8.24
cffi	1.11.5
chardet	3.0.4
colorama	0.3.9
cryptography	2.3.1
cudatoolkit	8.0
cudnn	7.1.4
decorator	4.4.0
defusedxml	0.6.0
docutils	0.14
entrypoints	0.2.3
hdf5	1.8.20
html5lib	1.0.1
icc_rt	2019.0.0
icu	58.2
idna	2.7
imagesize	1.1.0
intel-openmp	2019.4
ipykernel	4.10.0
ipython	6.5.0
ipython_genutils	0.2.0
isort	4.3.4
jedi	0.12.1
jinja2	2.10
jpeg	9b
jsonschema	2.6.0
jupyter_client	5.2.3
jupyter_core	4.4.0
lazy-object-proxy	1.3.1
libopencv	3.4.2
libpng	1.6.37
libsodium	1.0.16
libtiff	4.0.10
markupsafe	1.0
mccabe	0.6.1
mistune	0.8.3
mkl	2018.0.3
mkl_fft	1.0.6
mkl_random	1.0.1
nbconvert	5.5.0
nbformat	4.4.0

numpy	1.15.2
numpy-base	1.15.2
numpydoc	0.9.1
opencv	3.4.2
openssl	1.0.2u
packaging	17.1
pandoc	2.2.3.2
pandocfilters	1.4.2
parso	0.4.0
pickleshare	0.7.4
pip	10.0.1
prompt_toolkit	1.0.15
psutil	5.4.7
py-opencv	3.4.2
pycodestyle	2.4.0
pycparser	2.19
pyflakes	2.0.0
pygments	2.4.0
pylint	2.1.1
pyopenssl	18.0.0
pyparsing	2.4.0
pyqt	5.9.2
pysocks	1.6.8
python	3.5.4
python-dateutil	2.7.3
pytz	2019.1
pyzmq	17.1.2
qt	5.9.6
qtpy	1.9.0
requests	2.19.1
rope	0.14.0
setuptools	40.2.0
simplegeneric	0.8.1
sip	4.19.8
six	1.11.0
snowballstemmer	1.2.1
sphinx	2.0.1
sphinxcontrib-applehelp	1.0.1
sphinxcontrib-devhelp	1.0.1
sphinxcontrib-htmlhelp	1.0.2
sphinxcontrib-jsmath	1.0.1

sphinxcontrib-qthelp	1.0.2
sphinxcontrib-serializinghtml	1.1.3
sqlite	3.28.0
testpath	0.3.1
tornado	5.1.1
traitlets	4.3.2
typed-ast	1.1.0
urllib3	1.23
vc	14.1
vs2015_runtime	14.16.27012
wcwidth	0.1.7
webencodings	0.5.1
wheel	0.31.1
win_inet_pton	1.0.1
win_unicode_console	0.5
wincertstore	0.2
wrapt	1.10.11
xz	5.2.4
zeromq	4.2.5
zlib	1.2.11
zstd	1.3.7