

DAFTAR PUSTAKA

- Abdulmunim, M. E., & Abass, H. K. (2017). Logo matching in Arabic documents using region based features and SURF descriptor. *2017 Annual Conference on New Trends in Information and Communications Technology Applications, NTICT 2017, March*, 75–79. <https://doi.org/10.1109/NTICT.2017.7976128>
- Ambalina, L. (2019). *What is Image Annotation? – An Intro to 5 Image Annotation Services*. <https://hackernoon.com/what-is-image-annotation-an-intro-to-5-image-annotation-services-yt6n3xfj>
- Chethan Kumar, B., Punitha, R., & Mohana. (2020). YOLOv3 and YOLOv4: Multiple object detection for surveillance applications. *Proceedings of the 3rd International Conference on Smart Systems and Inventive Technology, ICSSIT 2020, Icssit*, 1316–1321. <https://doi.org/10.1109/ICSSIT48917.2020.9214094>
- Dixit, U. D., & Shirdhonkar, M. S. (2016). Automatic logo detection and extraction using singular value decomposition. *International Conference on Communication and Signal Processing, ICCSP 2016*, 787–790. <https://doi.org/10.1109/ICCSP.2016.7754252>
- Fadillah, R. Z., Irawan, A., Susanty, M., & Artikel, I. (2021). Data Augmentasi Untuk Mengatasi Keterbatasan Data Pada Model Penerjemah Bahasa Isyarat Indonesia (BISINDO). *Jurnal Informatika*, 8(2), 208–214. <https://ejournal.bsi.ac.id/ejurnal/index.php/ji/article/view/10768>
- Fisher, R. B. (2013). *Dictionary of Computer Vision and Image Processing*.
- Geraldy, C., & Lubis, C. (2020). Pendeteksian Dan Pengenalan Jenis Mobil Menggunakan Algoritma You Only Look Once Dan Convolutional Neural Network. *Jurnal Ilmu Komputer Dan Sistem Informasi*, 8(2), 197. <https://doi.org/10.24912/jiksi.v8i2.11495>
- Harahap, H. P. (2016). Pendeteksi Objek Pada Citra Menggunakan Pencocokan Titik-Titik Fitur Berbasis Algoritma SURF dan MSER. *Komputasi*, 13(2), 71–79.
- Karaoglu, S., Tao, R., Van Gemert, J. C., & Gevers, T. (2017). Con-Text: Text Detection for Fine-Grained Object Classification. *IEEE Transactions on Image Processing*, 26(8), 3965–3980. <https://doi.org/10.1109/TIP.2017.2707805>
- Krizhevsky, A., Sutskever, I., & Hinton, G. E. (2017). ImageNet classification with deep convolutional neural networks. *Communications of the ACM*, 60(6), 84–90. <https://doi.org/10.1145/3065386>
- Le, V. P., Nayef, N., Visani, M., Ogier, J. M., & De Tran, C. (2014). Document retrieval based on logo spotting using key-point matching. *Proceedings - International Conference on Pattern Recognition*, 1, 3056–3061.

<https://doi.org/10.1109/ICPR.2014.527>

- Low, J. (2020). *What is Image Annotation?* <https://medium.com/supahands-techblog/what-is-image-annotation-caf4107601b7>
- M . Linggar Anggoro. (2001). *Teori & Profesi Kehumasan: Serta Aplikasinya Di Indonesia*. Bumi Aksara.
- Martadi Martadi. (2002). REPOSISI CITRA MELALUI LOGO Studi Kasus Perubahan Logo PT Pos Indonesia. *Nirmana*, 4(1), 62–72. <http://puslit2.petra.ac.id/ejournal/index.php/dkv/article/view/16080>
- Mikołajczyk, A., & Grochowski, M. (2018). Data augmentation for improving deep learning in image classification problem. *2018 International Interdisciplinary PhD Workshop, IIPhDW 2018, May*, 117–122. <https://doi.org/10.1109/IIPHDW.2018.8388338>
- Pai, P. (n.d.). *Data Augmentation Techniques in CNN using Tensorflow*. Retrieved April 18, 2022, from <https://medium.com/ymedialabs-innovation/data-augmentation-techniques-in-cnn-using-tensorflow-371ae43d5be9>
- Pokhrel, S. (2020). *Image Data Labelling and Annotation — Everything you need to know*. <https://towardsdatascience.com/image-data-labelling-and-annotation-everything-you-need-to-know-86ede6c684b1>
- Pratama, O. (2020). *IMPLEMENTASI METODE YOLO UNTUK PENDETEKSIAN OBJEK PADA VIDEO PANTAUAN LALU LINTAS* [Universitas Gunadarma]. <https://library.gunadarma.ac.id/repository/implementasi-metode-yolo-untuk-pendeteksian-objek-pada-video-pantauan-lalu-lintas-skripsi>
- Rajcomar, S., Pillay, A. W., & Jembere, E. (2020). Paired Augmentation for Improved Image Classification using Neural Network Models. *2020 IEEE Asia-Pacific Conference on Computer Science and Data Engineering, CSDE 2020, 2020(Csde)*. <https://doi.org/10.1109/CSDE50874.2020.9411553>
- Sarwo, S., Heryadi, Y., Abdulrachman, E., & Budiharto, W. (2019). Logo detection and brand recognition with one-stage logo detection framework and simplified resnet50 backbone. *2019 International Congress on Applied Information Technology, AIT 2019, 1*. <https://doi.org/10.1109/AIT49014.2019.9144794>
- Sharma, N., Mandal, R., Sharma, R., Pal, U., & Blumenstein, M. (2018). Signature and logo detection using deep CNN for document image retrieval. *Proceedings of International Conference on Frontiers in Handwriting Recognition, ICFHR, 2018-Augus*, 416–422. <https://doi.org/10.1109/ICFHR-2018.2018.00079>
- Shirdhonkar, M. S., & Kokare, M. (2010). Automatic logo detection in document images. *2010 IEEE International Conference on Computational Intelligence and Computing Research, ICCIC 2010*, 905–907. <https://doi.org/10.1109/ICCIC.2010.5705878>

- Shorten, C., & Khoshgoftaar, T. M. (2019). A survey on Image Data Augmentation for Deep Learning. *Journal of Big Data*, 6(1). <https://doi.org/10.1186/s40537-019-0197-0>
- T Sutojo, E Mulyanto, V Suhartono, OD Nurhayati, Wijanarto. (2009). *Teori Pengolahan Citra Digital*. Andi.
- Vipin Tyagi. (2018). *Understanding Digital Image Processing*. CRC Press.
- Wu, R., Yan, S., Shan, Y., Dang, Q., & Sun, G. (2015). *Deep Image: Scaling up Image Recognition*. <http://arxiv.org/abs/1501.02876>
- Zhong, Z., Zheng, L., Kang, G., Li, S., & Yang, Y. (2020). Random erasing data augmentation. *AAAI 2020 - 34th AAAI Conference on Artificial Intelligence*, 13001–13008. <https://doi.org/10.1609/aaai.v34i07.7000>

LAMPIRAN

LAMPIRAN

Lampiran 1 Dataset



Akademi Keperawatan Batari Toja Watampone9.jpg



AMIKOM8.jpg



Institut Pertanian Bogor4.jpg



Akademi Keperawatan Batari Toja Watampone8.jpg



AMIKOM7.jpg



Institut Pertanian Bogor3.jpg



Akademi Keperawatan Batari Toja Watampone7.jpg



AMIKOM6.jpg



Institut Pertanian Bogor2.jpg



Akademi Keperawatan Batari Toja Watampone6.jpg



AMIKOM5.jpg



Institut Pertanian Bogor1.jpg



Akademi Keperawatan Batari Toja Watampone4.jpg



AMIKOM3.jpg



Institut Pertanian Bogor.jpg



STIA Puangrimaggalutung Bone1.jpg



STIE AMKOP Makassar3.jpg



STIE Yayasan Pendidikan Ujung Pandang1.jpg



STIA Puangrimaggalutung Bone2.jpg



STIE AMKOP Makassar4.jpg



STIE Yayasan Pendidikan Ujung Pandang4.jpg



STIA Puangrimaggalutung Bone3.jpg



STIE AMKOP Makassar5.jpg



STIE Yayasan Pendidikan Ujung Pandang5.jpg



STIA Puangrimaggalutung Bone5.jpg



STIE AMKOP Makassar7.jpg



STIE Yayasan Pendidikan Ujung Pandang6.jpg



STIA Puangrimaggalutung Bone6.jpg



STIE AMKOP Makassar8.jpg



STIE Yayasan Pendidikan Ujung Pandang9.jpg



STIESIA Surabaya9.jpg



STIF9.jpg



Universitas Indonesia9.jpg



STIESIA Surabaya8.jpg



STIF8.jpg



Universitas Indonesia8.jpg



STIESIA Surabaya2.jpg



STIF7.jpg



Universitas Indonesia5.jpg



STIESIA Surabaya1.jpg



STIF6.jpg



Universitas Indonesia4.jpg



STIESIA Surabaya.jpg



STIF5.jpg



Universitas Indonesia3.jpg



Universitas Klabat5.jpg



Universitas Mercu Buana5.jpg



Universitas Klabat6.jpg



Universitas Mercu Buana6.jpg



Universitas Klabat7.jpg



Universitas Mercu Buana7.jpg



Universitas Klabat8.jpg



Universitas Mercu Buana8.jpg



Universitas Klabat9.jpg



Universitas Mercu Buana9.jpg



Universitas Muhammadiyah Makassar1.jpg



Universitas Muhammadiyah Makassar2.jpg



Universitas Muhammadiyah Makassar5.jpg



Universitas Muhammadiyah Makassar6.jpg



Universitas Muhammadiyah Makassar9.jpg



Universitas Negeri Manado1.jpg



Universitas Negeri Manado2.jpg



Universitas Negeri Manado3.jpg



Universitas Negeri Manado5.jpg



Universitas Negeri Manado6.jpg



Universitas Tadulako.jpg



Universitas Tadulako3.jpg



Universitas Tadulako4.jpg



Universitas Tadulako5.jpg



Universitas Tadulako6.jpg



Universitas Teknologi Surabaya5.jpg



Universitas Teknologi Surabaya6.jpg



Universitas Teknologi Surabaya7.jpg



Universitas Teknologi Surabaya8.jpg



Universitas Teknologi Surabaya9.jpg

Lampiran 2 Koleksi gambar ijazah dari website forlap.ristekdikti.go.id, dalam bentuk file *.jif dan *.pdf



NTIwQzA4NTctMDRBR00MkY4
Lig1NzAtMjgkM0ExOEQwOTUw
.jif



OTI0NDUlyRDEtOURDnS00MEQ
3LTK3OTQtQUlyUyQ0VFMzhEJjc
5.jif



N0Y2RDQwNkktMTVBQj00QkV
DLU13QjEtMUJFNCMzY5N0RE.
.jif



OTBBMURDMzgmEZGNC00OT
k2LUE3NEQNTYxNkVEQ0M3Nj
dC.jif



MkRCOTVERTctMkMwQS00QjN
ELTgzRjItNEU2NEZyRDkxQjk0.jif



OEIBMzgmjgtQkM5QS00OUZ
ELU14REEINDdFMTQ2ODdBRtJf
.jif



MDVGRTFCNDQtOTIGri00QTzL
Tk1NUQtODVCOTk5NDYzNkVg
.jif



OEFGQkEwREURDA1Mi00MkE
LUE3MjEtRjQzNzZkQTYzODAsJf
if



MDU1M0ZEOTQhTIFRi00RUy1
LTkwMzEQZUyMDRCNkU1NDd
F.jif



NUQwMU11NzktMTYyQy00NEZ
BLUEZrkUHRTYzMEVFNzNFmUE
4.jif



RE|BO|J3|Nj|A|H|z|RDRS00NTMw
LUJEN|f|O|Tc|Nj|Q5|NDAz|QTVd.p
df



RE|JEM|E|V|B|M|j|H|T|Q|T|U|1|M|S|0|0|M|k|L|L
U|F|F|N|j|g|t|R|T|g|x|M|z|d|M|j|A|x|M|D|h|g|.p
df



RE|M|w|N|0|I|4|O|T|E|T|E|O|E|U|z|O|S|0|0|R|T|c|w
L|T|k|3|M|z|g|t|Q|z|N|B|N|k|M|2|N|j|y|M|T|M|3.
pdf



RE|Q|5|M|j|Y|O|M|k|U|H|r|j|D|R|C|0|0|Q|k|e|Y|L
U|I|z|R|D|Y|r|U|U|1|M|T|I|G|N|J|N|D|R|T|h|.p
df



RE|V|C|M|z|U|z|Q|z|Y|N|z|F|D|N|C|0|0|N|J|M|3
L|U|J|y|N|0|M|t|Q|T|Q|y|N|z|F|F|M|D|M|0|M|D|c
z.pdf



R|J|B|F|N|T|c|x|M|E|E|T|N|k|Q|x|N|S|0|0|M|k|M|y|L
U|E|3|M|D|A|f|O|E|Z|C|O|T|M|w|M|U|Y|5|R|T|d
D.pdf



R|J|V|F|M|D|A|w|M|k|Y|O|E|R|C|M|y|0|0|Q|T|I
G|L|U|I|5|Q|z|Q|I|M|E|V|D|M|D|Y|1|M|j|A|z|N|z
c3.pdf



R|j|V|F|O|D|I|4|O|D|Y|T|O|D|F|D|M|C|0|0|D|Z
G|L|T|k|3|O|I|c|t|N|j|F|D|O|I|z|Q|T|x|M|D|Y|x.
pdf



R|J|Z|G|Q|z|M|T|r|k|Y|r|D|I|C|Q|S|0|0|Q|T|E|1|L
T|k|Z|R|k|U|t|N|D|g|z|M|k|J|F|R|D|N|D|R|U|E|w.
pdf



R|k|F|B|N|z|g|4|R|J|A|R|E|R|C|O|C|0|0|O|T|M|1
L|T|g|1|O|D|g|t|M|j|B|N|D|g|0|z|c|w|M|O|F|E.
pdf

Lampiran 3 Source code

1. Pengaturan nama kelas (obj.name)

```
Akademi Keperawatan Batari Toja Watampone
AMIKOM
Institut Pertanian Bogor
STIA Puangrimaggalatung Bone
STIE AMKOP Makassar
STIE Yayasan Pendidikan Ujung Pandang
STIESIA Surabaya
STIFA
Universitas Indonesia
Universitas Klabat
Universitas Mercu Buana
Universitas Muhammadiyah Makassar
Universitas Negeri Manado
Universitas Tadulako
Universitas Teknologi Surabaya
```

2. Training

```
from google.colab import drive
drive.mount('/content/gdrive')

!ln -s /content/gdrive/My\ Drive/ /mydrive
!ls /mydrive

!git clone https://github.com/AlexeyAB/darknet

%cd darknet
!sed -i 's/OPENCV=0/OPENCV=1/' Makefile
!sed -i 's/GPU=0/GPU=1/' Makefile
!sed -i 's/CUDNN=0/CUDNN=1/' Makefile
!sed -i 's/CUDNN_HALF=0/CUDNN_HALF=1/' Makefile

!make

!wget
https://github.com/AlexeyAB/darknet/releases/download/d
arknet_yolo_v3_optimal/yolov4.weights
```

```
def imShow(path):
    import cv2
    import matplotlib.pyplot as plt
    %matplotlib inline

    image = cv2.imread(path)
    height, width = image.shape[:2]
    resized_image = cv2.resize(image, (3*width, 3*height),
    interpolation = cv2.INTER_CUBIC)

    fig = plt.gcf()
    fig.set_size_inches(18, 10)

plt.axis("off")
    plt.imshow(cv2.cvtColor(resized_image,
    cv2.COLOR_BGR2RGB))
    plt.show()

def upload():
    from google.colab import files
    uploaded = files.upload()
    for name, data in uploaded.items():
        with open(name, 'wb') as f:
            f.write(data)
            print ('saved file', name)

def download(path):
    from google.colab import files
    files.download(path)

!cp /mydrive/yolov4/obj.zip ../

!unzip ../obj.zip -d data/
```

```

!cp /mydrive/yolov4/yolov4-custom.cfg ./cfg

!cp /mydrive/yolov4/obj.names ./data
!cp /mydrive/yolov4/obj.data ./data

!cp /mydrive/yolov4/generate_train.py ./
!cp /mydrive/yolov4/generate_test.py ./

def download(path):
    from google.colab import files

files.download(path)

!python generate_train.py
!python generate_test.py

!wget
https://github.com/AlexeyAB/darknet/releases/download/d
arknet_yolo_v3_optimal/yolov4.conv.137

!./darknet detector train data/obj.data cfg/yolov4-
custom.cfg yolov4.conv.137 -dont_show -map

```

3. Proses *testing* gambar

```

from google.colab import drive
drive.mount('/content/gdrive')

!ln -s /content/gdrive/My\ Drive/ /mydrive
!ls /mydrive

!git clone https://github.com/AlexeyAB/darknet

%cd darknet
!sed -i 's/OPENCV=0/OPENCV=1/' Makefile
!sed -i 's/GPU=0/GPU=1/' Makefile
!sed -i 's/CUDNN=0/CUDNN=1/' Makefile

```

```

!/usr/local/cuda/bin/nvcc --version

!make

!ls /mydrive/yolov4

def download(path):
    from google.colab import files
    files.download(path)

def imShow(path):
    import cv2
    import matplotlib.pyplot as plt
    %matplotlib inline

    image = cv2.imread(path)
    height, width = image.shape[:2]
    resized_image = cv2.resize(image, (3*width,
3*height), interpolation = cv2.INTER_CUBIC)

    fig = plt.gcf()
    fig.set_size_inches(18, 10)
    plt.axis("off")
    plt.imshow(cv2.cvtColor(resized_image,
cv2.COLOR_BGR2RGB))
    plt.show()

!cp /mydrive/yolov4/backup/yolov4-
custom_last.weights ./

!cp /mydrive/yolov4/obj.names ./cfg
!cp /mydrive/yolov4/obj.data ./cfg

!cp /mydrive/yolov4/obj.names ./data
!cp /mydrive/yolov4/obj.data ./data

!cp /mydrive/yolov4/yolov4-custom.cfg ./cfg

!cp /mydrive/yolov4/obj.zip ../
!unzip ../obj.zip -d data/
!cp /mydrive/yolov4/obj.names ./cfg
!cp /mydrive/yolov4/obj.data ./cfg

!cp /mydrive/yolov4/obj.names ./data
!cp /mydrive/yolov4/obj.data ./data

!cp /mydrive/yolov4/yolov4-custom.cfg ./cfg

!cp /mydrive/yolov4/generate_test.py ./

```

```
!cp /mydrive/yolov4/generate_train.py ./
!cp /mydrive/yolov4/generate_test.py ./

!python generate_train.py
!python generate_test.py

%cd cfg
!sed -i 's/batch=64/batch=1/' yolov4-custom.cfg
!sed -i 's/subdivisions=16/subdivisions=1/'
yolov4-custom.cfg
%cd ..

/content/darknet/cfg
/content/darknet

!cp /mydrive/Images/itb3.jpg ./

!./darknet detector test data/obj.data cfg/yolov4-
custom.cfg /mydrive/yolov4/backup/yolov4-
custom_last.weights /mydrive/Images/itb3.jpg -
thresh 0.3
imshow('predictions.jpg')
```