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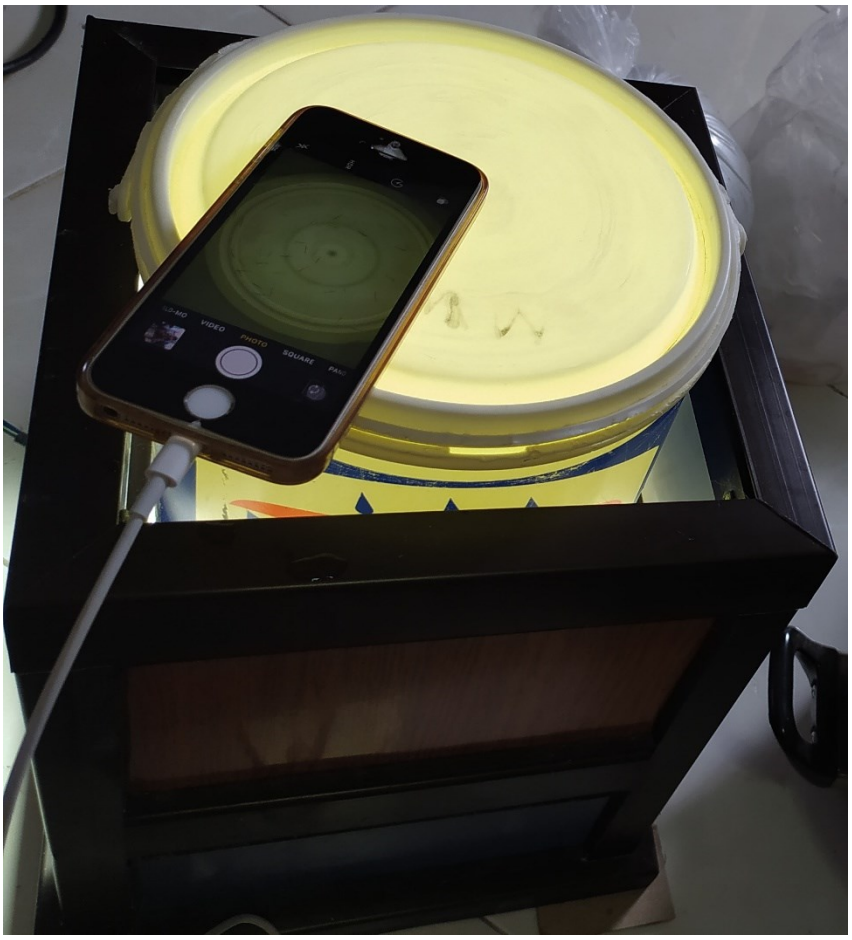
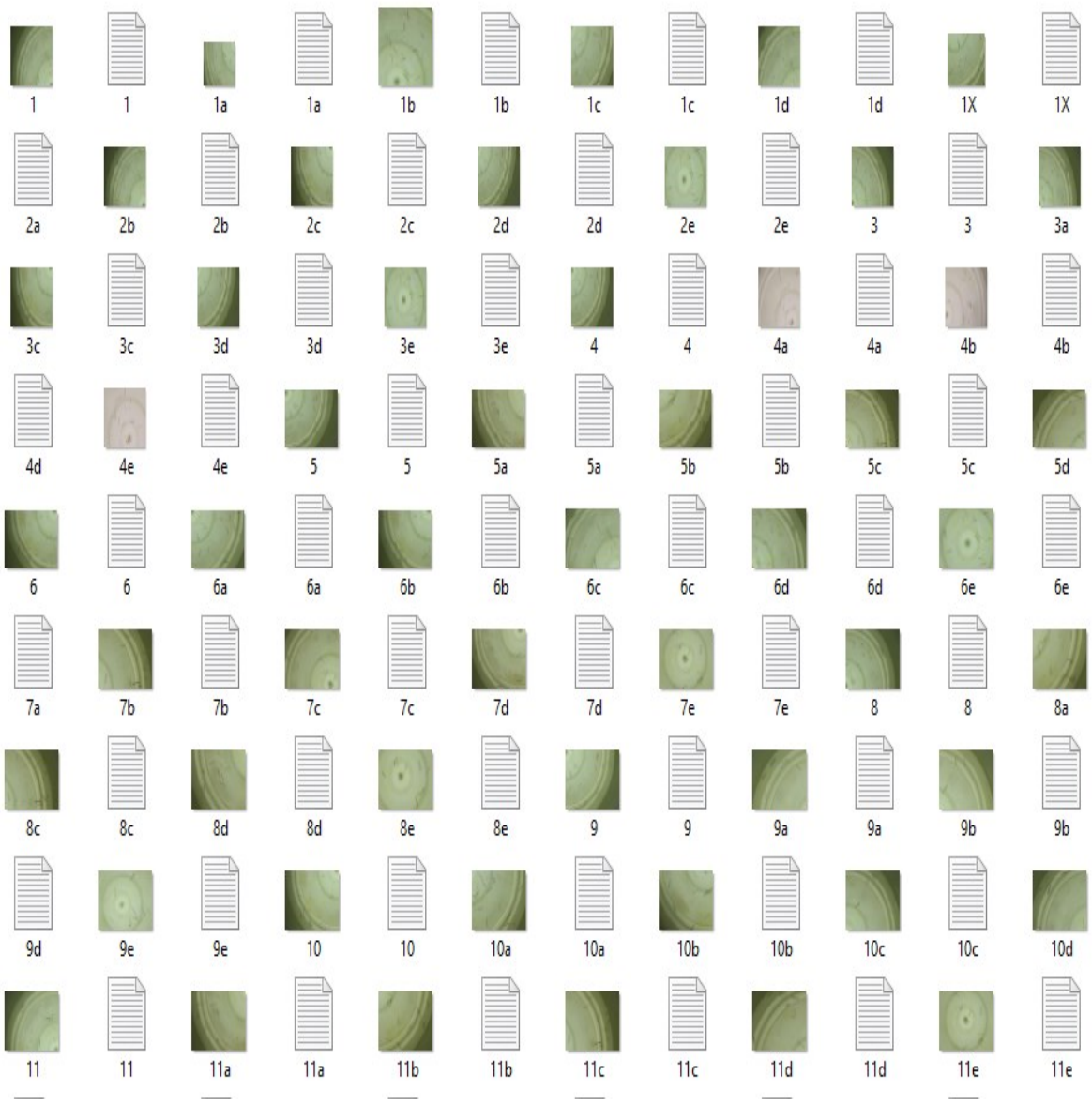
Lampiran 1. Proses Pengambilan Foto Larva Udang



Lampiran 2. Waktu Perhitungan Menggunakan Program Kepadatan < 50

Jumlah benih udang	Waktu perhitungan
1	2.54
2	2.49
3	2.6
4	2.35
15	2.7
29	2.99
30	2.61
35	2.72
37	2.65
39	3.08
42	3.14
43	2.73
44	2.88
44	2.7
44	2.9
45	3.19
45	2.85
45	2.65
46	2.34
46	2.31
46	2.3
47	2.84
49	2.98
50	2.15
50	2.15
Rata- rata	2.67

Lampiran 3. Data Training Sistem



Lampiran 4. File Konfigurasi Training small-larva-test.cfg

```
[net]
# Testing
batch=1
subdivisions=1
# Training
#batch=64
#subdivisions=16
width=416
height=416
channels=3
momentum=0.9
decay=0.0005
angle=0
saturation = 1.5
exposure = 1.5
hue=.1

learning_rate=0.001
burn_in=1000
max_batches =4000
policy=steps
steps=1600,1800
scales=.1,.1


filters=128
size=1
stride=1
pad=1
activation=leaky

[convolutional]
batch_normalize=1
size=3
stride=1
pad=1
filters=256
activation=leaky

[convolutional]
size=1
stride=1
pad=1
filters=18
activation=linear


[yolo]
mask = 0,1,2
anchors = 10,13,  16,30,  33,23,  30,61,  62,45,  59,119,
116,90,  156,198,  373,326
classes=1
num=9
```

Lampiran 5. Kode Program Pengujian Sistem

```
# import packages
import numpy as np
import argparse
import time
import cv2
import os

# construct the argument parse and parse the arguments
ap = argparse.ArgumentParser()
ap.add_argument("-i", "--image", required=True,
    help="path to input image")
ap.add_argument("-c", "--confidence", type=float, default=0.2,
    help="minimum probability to filter weak detections")
ap.add_argument("-t", "--threshold", type=float, default=0.5,
    help="threshold when applying non-maxima suppression")
args = vars(ap.parse_args())

# load the YOLO class labels
labelsPath = "data/obj.names"
LABELS = open(labelsPath).read().strip().split("\n")

# paths to the YOLO weights and model configuration
weightsPath = "newweight/small-larva_final.weights"
configPath = "cfg/small-larva-test.cfg"

# initialize a list of colors to represent each possible class label
COLORS = (103, 220, 225)
# np.random.seed(42)
# COLORS = np.random.randint(0, 255, size=(len(LABELS), 3),
#   dtype="uint8")

# load our YOLO object detector
print("Processing...")
net = cv2.dnn.readNetFromDarknet(configPath, weightsPath)

# load input image and grab its spatial dimensions
image = cv2.imread(args["image"])
# image = cv2.resize(image, (0,0), fx=0.7, fy=0.7)
(H, W) = image.shape[:2]

# determine only the *output* layer names that we need from YOLO
ln = net.getLayerNames()
ln = [ln[i[0] - 1] for i in net.getUnconnectedOutLayers()]

# construct a blob from the input image and then perform a forward
# pass of the YOLO object detector, giving us our bounding boxes and
```

```
# associated probabilities
blob = cv2.dnn.blobFromImage(image, 1 / 255.0, (416, 416),swapRB=True,
crop=False)
net.setInput(blob)
start = time.time()
layerOutputs = net.forward(ln)
end = time.time()
print("Nilai blob: {}".format(blob.shape))

# initialize our lists of detected bounding boxes, confidences, and
# class IDs, respectively
boxes = []
confidences = []
classIDs = []

# loop over each of the layer outputs
for output in layerOutputs:
    # loop over each of the detections
    for detection in output:
        # extract the class ID and confidence (i.e., probability) form Image
        scores = detection[5:]
        classID = np.argmax(scores)
        confidence = scores[classID]
        # print ("Nilai Confidence dari object ialah :", confidence)
        # print ("Nilai ID dari Class ialah :", classID)

        # filter out weak predictions by ensuring the detected
        # probability is greater than the minimum probability
        if confidence > args["confidence"]:
            # scale the bounding box coordinates back relative to the size of
the image
            box = detection[0:4] * np.array([W, H, W, H])
            (centerX, centerY, width, height) = box.astype("int")
            # print ("Nilai dari B.Box ialah :", centerX," ", centerY, " ",
width, " ", height)

            # use the center (x, y)-coordinates to get the top and and left
            #corner of the bounding box
            x = int(centerX - (width / 2))
            y = int(centerY - (height / 2))
            print ("Nilai x dan y dari B.Box ialah :", x," ", y)

            # update our list of bounding box coordinates, confidences, and
class IDs
            boxes.append([x, y, int(width), int(height)])
            confidences.append(float(confidence))
            classIDs.append(classID)
```

```
# apply non-maxima suppression to suppress weak, overlapping bounding boxes
idxs = cv2.dnn.NMSBoxes(boxes, confidences, args["confidence"],
args["threshold"])

# ensure at least one detection exists
if len(idxs) > 0:
    # loop over the indexes
    for i in idxs.flatten():
        # extract the bounding box coordinates
        (x, y) = (boxes[i][0], boxes[i][1])
        (w, h) = (boxes[i][2], boxes[i][3])

        # draw a bounding box rectangle and label on the image
        # color = [int(c) for c in COLORS[classIDs[i]]]
        cv2.rectangle(image, (x, y), (x + w, y + h), COLORS, 8)
        text = "{}: {:.4f}".format(LABELS[classIDs[i]], confidences[i])
        print(text)
        cv2.putText(image, text, (x, y - 5), cv2.FONT_HERSHEY_SIMPLEX,2,
COLORS, 8)
        # cv2.putText(image, text, (x, y - 5), cv2.FONT_HERSHEY_SIMPLEX,0.2,
COLORS, 2)

# Font type
font = cv2.FONT_HERSHEY_SIMPLEX
# Font Coordinate
org = (20, 280)
# Font Size
fontScale = 10
# Font color with format (B,G,R)
color = (255, 0, 0)
# Font Thickness
thickness = 20

image = cv2.putText(image, '{} larva '.format(len(idxs)), org, font,
fontScale, color, thickness, cv2.LINE_AA)

# Write total of larva in the frame into larvaNumber.txt
with open("jumlahlarva.txt", "a") as myfile:
    myfile.write("Ada {} Larva yang terdeteksi\n".format(len(idxs)))

# show timing information on YOLO
print("YOLO took {:.6f} seconds".format(end - start))

# Save the output image
# cv2.imshow("Image.jpg", image)
cv2.imwrite("Image.jpg", image)
print ("ada", len(idxs), "Larva")
cv2.waitKey(0)
```