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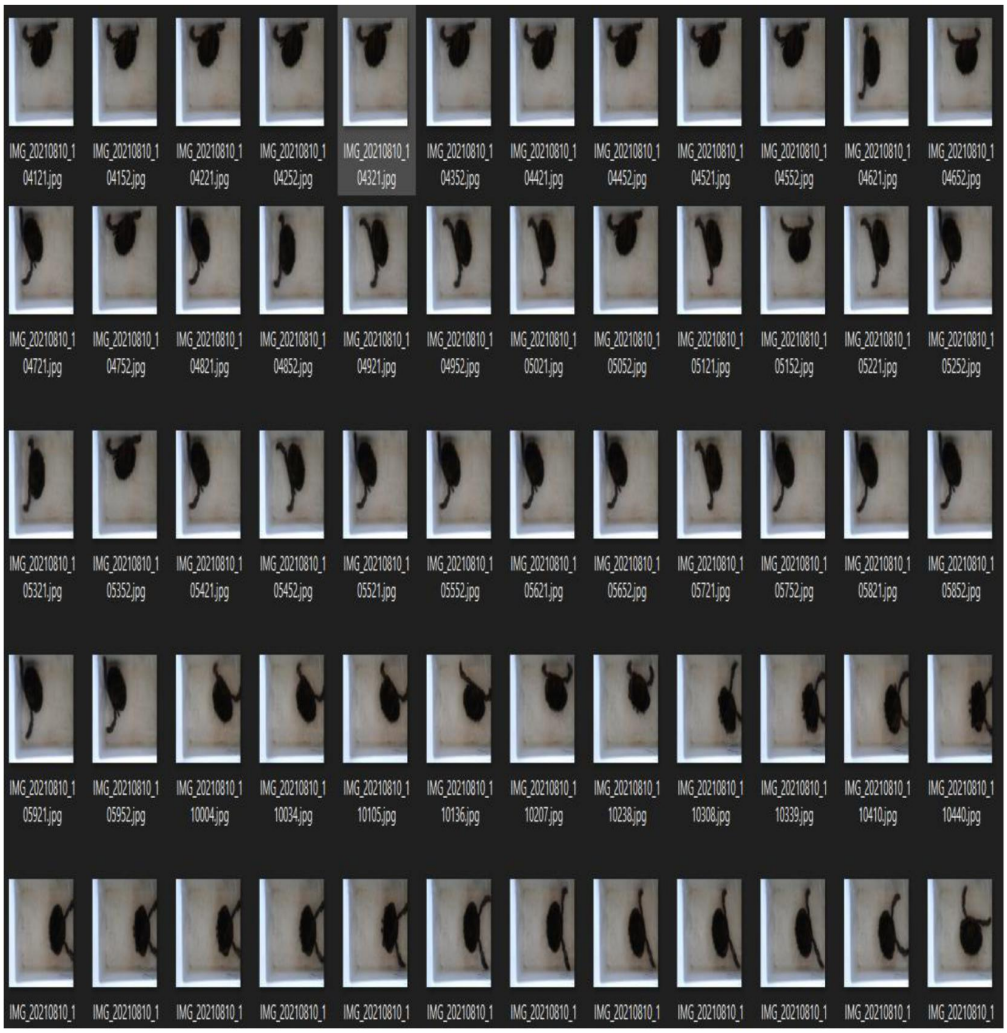
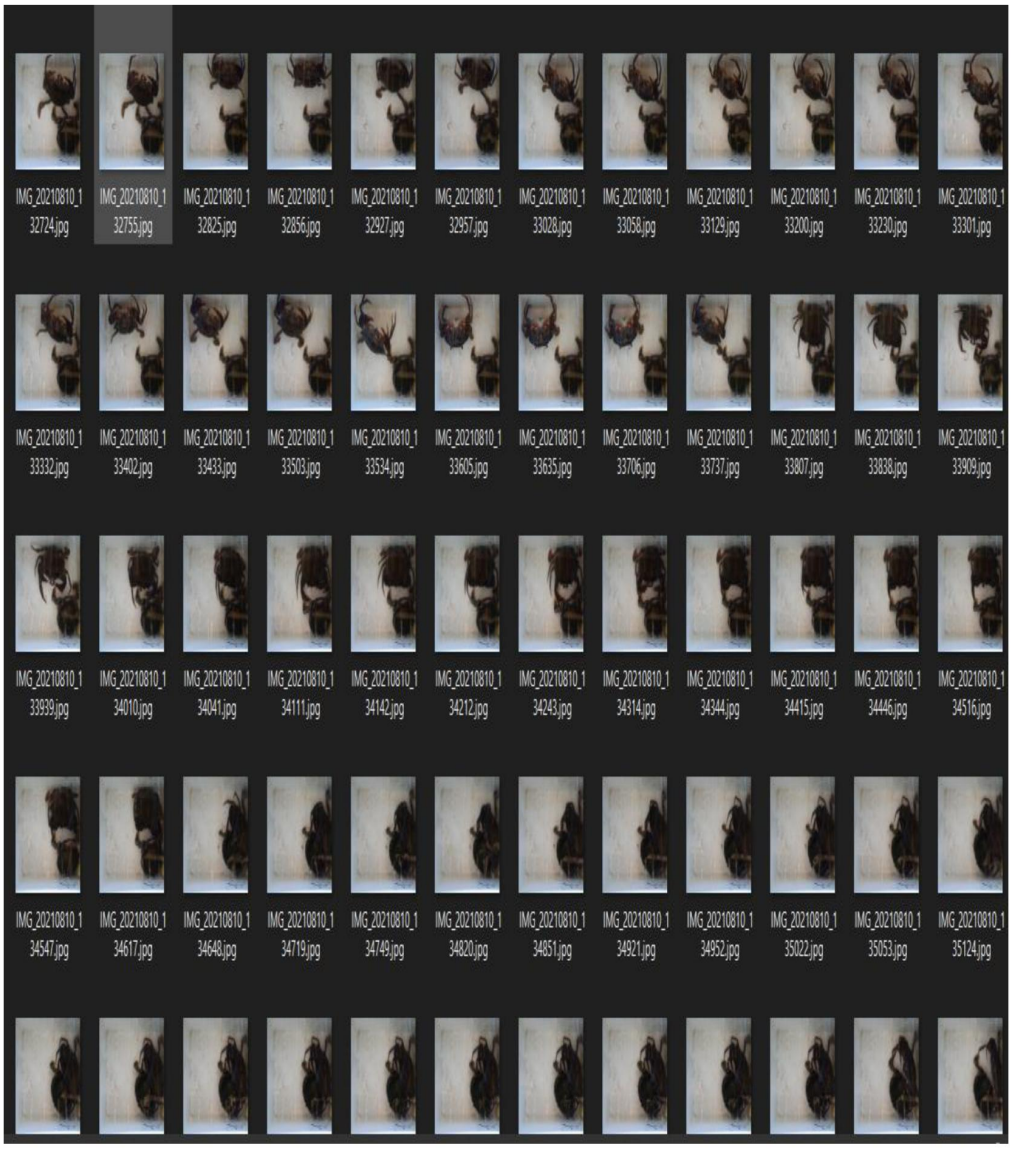
L A M P I R A N



Dataset Kepiting Non-Molting



Dataset Kepiting Molting

Listing program python

```
import cv2
import numpy as np
import matplotlib.pyplot as plt
import matplotlib
import pandas as pd
from skimage.color import rgb2gray
from skimage.transform import rescale, resize, downscale_local_mean
from sklearn.model_selection import train_test_split
from skimage import data, color, feature
from skimage.feature import hog
import glob


def load_data(dataset, tipo):
    label=[]
    arr = []
    strr = "DATASET/"+dataset+"/" + tipo + "/*"
    for file_ in glob.glob(strr):
      img = cv2.imread(file_)
      arr.append(img)
      label.append(dataset)
    return arr,label

def whole_train_data(tipo):
  molting_data, molting_label = load_data('Molting', tipo)
  nonmolting_data, nonmolting_label = load_data('Non_molting', tipo)
  data =np.concatenate((molting_data,nonmolting_data))
  labels =np.concatenate((molting_label, nonmolting_label))
  return data, labels

data_train, labels_train = whole_train_data('Train')
data_test, labels_test = whole_train_data('Test')
data_train.shape, labels_train.shape

def preprocessing(arr):
    arr_prep=[]
    for i in range(arr.shape[0]):
        img=cv2.cvtColor(arr[i], cv2.COLOR_BGR2GRAY)
```

```
        img=resize(img, (72, 72),anti_aliasing=True)
        arr_prep.append(img)
    return arr_prep



data_train_p = preprocessing(data_train)
data_test_p = preprocessing(data_test)
type(data_train[0])

def ExtractHOG(img):
    ftr,_=hog(img, orientations=8, pixels_per_cell=(16, 16),
            cells_per_block=(1, 1), visualize=True, multichannel=False)
    return ftr
def preprocessing_part_two(arr):
    arr_feature=[]
    for i in range(np.shape(arr)[0]):
        arr_feature.append(ExtractHOG(arr[i]))
    return arr_feature

data_train_ftr = preprocessing_part_two(data_train_p)
data_test_ftr= preprocessing_part_two(data_test_p)

from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import precision_score, \
    recall_score, confusion_matrix, classification_report, \
    accuracy_score, f1_score
model = KNeighborsClassifier(algorithm='auto', leaf_size=30,
metric='euclidean',
                    metric_params=None, n_jobs=None, n_neighbors=15,
                    weights='distance')
model.fit(data_train_ftr, labels_train)

predicted_y = model.predict(data_test_ftr)

from sklearn.metrics import classification_report
print (classification_report(labels_test, predicted_y,
target_names=["Molting", "Non_molting"]))

percentage = accuracy_score(labels_test, predicted_y)
import seaborn as sn
from sklearn.metrics import confusion_matrix, accuracy_score
res = confusion_matrix(labels_test, predicted_y)
print(" Confusion Matrix")
sn.heatmap(res, annot=True, fmt='d', xticklabels=["Molting", "Nonmolting"],
yticklabels=["Molting", "Nonmolting"])
```

```
print(f" Test Set: {len(data_test_p)}")
print(f" Accuracy = {percentage*100} %")
```