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LAMPIRAN

1. Kode Program Penenalan Pola Gambar.

```
#Import Necessary Libraries
import cv2
import numpy as np
import datetime
import matplotlib.pyplot as plt
import os
import pickle
import time
import os
import pickle
from tkinter import Tk
from tkinter.filedialog import askopenfilename
import matplotlib.pyplot as plt
from skimage.io import imread
from skimage.transform import resize

#Fungsi Waktu
t = datetime.datetime.now()

#Melakukan Pembacaan Video
cap = cv2.VideoCapture('data-video/data-video (10).avi')

#Ekstraksi Frame
output_folder1 = 'fgmask-background-substraction'
if not os.path.exists(output_folder1):
    os.makedirs(output_folder1)

#Perulangan Mulai dari Nol
frame_count = 0

#Ektraksi fitur ORB Template
image_template = cv2.imread('template-matching/mengeram.png', 0)

#Penetapan Waktu untuk Database
current_time = datetime.datetime.now()
kernel = None

#Deteksi Background Substraction
backgroundObject = cv2.createBackgroundSubtractorMOG2(detectShadows=True)

#Deteksi fitur keypoint dengan ORB
def ORB_detector(new_image, image_template):
    image1 = cv2.cvtColor(new_image, cv2.COLOR_BGR2GRAY)
    orb_detector = cv2.ORB_create(500, 1.2)
    kp1, des1 = orb_detector.detectAndCompute( image1, None)
    kp2, des2 = orb_detector.detectAndCompute( image_template, None)
    bf = cv2.BFMatcher(cv2.NORM_HAMMING, crossCheck=True)
    matches = bf.match(des1, des2)
    matches = sorted(matches, key=lambda val: val.distance)
    return len(matches)
```

```
#Perulangan video
if (cap.isOpened() == False):
   print("Error opening video stream or file")

while (cap.isOpened()):
   ret, frame = cap.read()

#ROI 1
x1, y1 = 19, 80
x4, y4 = 99, 190
cv2.rectangle(frame, (x1, y1), (x4, y4), (0, 255, 0), 2)
roi_1 = frame[y1:y4, x1:x4]

#ROI 2
   x1, y1 = 102, 39
   x4, y4 = 600, 425
   cv2.rectangle(frame, (x1, y1), (x4, y4), (0, 255, 0), 2)
   roi_2 = frame[y1:y4, x1:x4]

#Pengenalan POLA dengan ORB
matches = ORB_detector(roi_1, image_template)
   output_string = "Mengeram: " + str(matches) + "%"
   if matches > 25:
      # 19 25
      cv2.putText(frame, output_string, (20, 70), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 0,
255), 2)
      # print("Mengeram", current_time)
      print_text = "Mengeram "
   else:
      cv2.putText(frame, "", (20, 70), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 0, 255), 2)
      # print("", current_time, "d")

#Pengenalan POLA Background Substraction dan SVM
fgmask = backgroundObject.apply(roi_2)
   _, fgmask = cv2.threshold(fgmask, 250, 255, cv2.THRESH_BINARY)
   fgmask = cv2.erode(fgmask, kernel, iterations=1)
   fgmask = cv2.dilate(fgmask, kernel, iterations=10)
   contours, _ = cv2.findContours(fgmask, cv2.RETR_EXTERNAL,
cv2.CHAIN_APPROX_SIMPLE)

   for cnt in contours:
      if cv2.contourArea(cnt) > 2000:
         x, y, w, h = cv2.boundingRect(cnt)

         Categories = ['Mating', 'Not-Mating']
         # print(os.path.abspath(os.getcwd()))
         model = pickle.load(open('model-220.p', 'rb'))

         # Adjust the width and height to 100x100
         w = 100
         h = 100
         # Calculate the new x and y coordinates to keep the center of the bounding box the
same
         x = x + int((w - 100) / 2)
         y = y + int((h - 100) / 2)

         roi_box = roi_2[y:y+h, x:x+w]
         img_resize = resize(roi_box, (150, 150, 3))
```

```
        l = [img_resize.flatten()]
        probability = model.predict_proba(l)

        cv2.rectangle(roi_2, (x, y), (x + w, y + h), (0, 0,255 ), 2)
        cv2.putText(roi_2, Categories[model.predict(l)[0]], (x, y - 10),
cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 0, 255), 2, cv2.LINE_AA)
        # print("Detected and Croping", current_time)
        # print(Categories[model.predict(l)[0]], current_time)
        perilaku = Categories[model.predict(l)[0]]
        print_text=perilaku;
        # if perilaku == 'Mating':
        #     print_text = 'Mating'

    # Extract the foreground from the frame using the segmented mask.
    foregroundPart = cv2.bitwise_and(roi_2, roi_2, mask=fgmask)
    # Stack the original frame, extracted foreground, and annotated frame.
    stacked = np.hstack((roi_2, foregroundPart, roi_2))

    #Menampilkan Hasil
    if ret == True:
        cv2.imshow('FRAME ROI-1 DAN ROI-2', frame)
        cv2.imshow('MASKING', fgmask)
```

2. Kode Program Training SVM

```
#Impor Library
import pandas as pd
from sklearn import svm
from sklearn.model_selection import GridSearchCV
import os
import cv2
import matplotlib.pyplot as plt
from skimage.transform import resize
from skimage.io import imread
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report,accuracy_score,confusion_matrix
import pickle
from PIL import Image

#Pengenalan Data
mypath= 'training/'
file_name = []
tag = []
full_path = []
for path, subdirs, files in os.walk(mypath):
    for name in files:
        full_path.append(os.path.join(path, name))
        tag.append(path.split('/')[-1])
        file_name.append(name)

# memasukan variabel yang sudah dikumpulkan pada looping di atas menjadi sebuah
dataframe agar rapih
df = pd.DataFrame({"path":full_path,'file_name':file_name,"tag":tag})
df.groupby(['tag']).size()
```

```
#Pengkategorian Data
Categories=['mating','not-mating']
flat_data_arr=[]
target_arr=[]
datadir='training/'
for i in Categories:
    print(f'loading... category : {i}')
    path=os.path.join(datadir,i)
    for img in os.listdir(path):
        img_array=imread(os.path.join(path,img))
        img_resized=resize(img_array,(150,150,3))
        flat_data_arr.append(img_resized.flatten())
        target_arr.append(Categories.index(i))
        print(f'loaded category:{i} successfully')
        flat_data=np.array(flat_data_arr)
        target=np.array(target_arr)
        df=pd.DataFrame(flat_data)
        df['Target']=target
```

```
#Split Data
x=df.iloc[:,:-1]
y=df.iloc[:,-1]
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.20,random_state=77,stratify=
y)
print('Splitted Successfully')
```

```
#Pelatihan Model
param_grid={'C':[0.1,1,10,100],'gamma':[0.0001,0.001,0.1,1],'kernel':['rbf','poly']}
svc=svm.SVC(probability=True)
print("Training model dimulai, Mohon menunggu sampai proses Traing model selesai")
model=GridSearchCV(svc,param_grid)
model.fit(x_train,y_train)
print('Model Telah berhasil di Training')
model.best_params_
```

3. Kode Program Pembacaan Sensor

```
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
#include <WiFiClientSecureBearSSL.h>
#include <Wire.h>
#include <Adafruit_Sensor.h>
#include <Adafruit_BME280.h>

// Replace with your network credentials
const char* ssid     = "NSAndi";  //nama ssid wifi, hanya support wifi "2,5Gh"
const char* password = "123456788"; //pasword wifi

// REPLACE with your Domain name and URL path or IP address with path
const char* serverName = "https://192.168.42.63/sensordata/post-esp-data.php";
//const char* serverName = "http://192.168.42.63/post-esp-data.php";

// Keep this API Key value to be compatible with the PHP code provided in the project page.
// If you change the apiKeyValue value, the PHP file /post-esp-data.php also needs to have the
same key
String apiKeyValue = "tPmAT5Ab3j7F9";
```

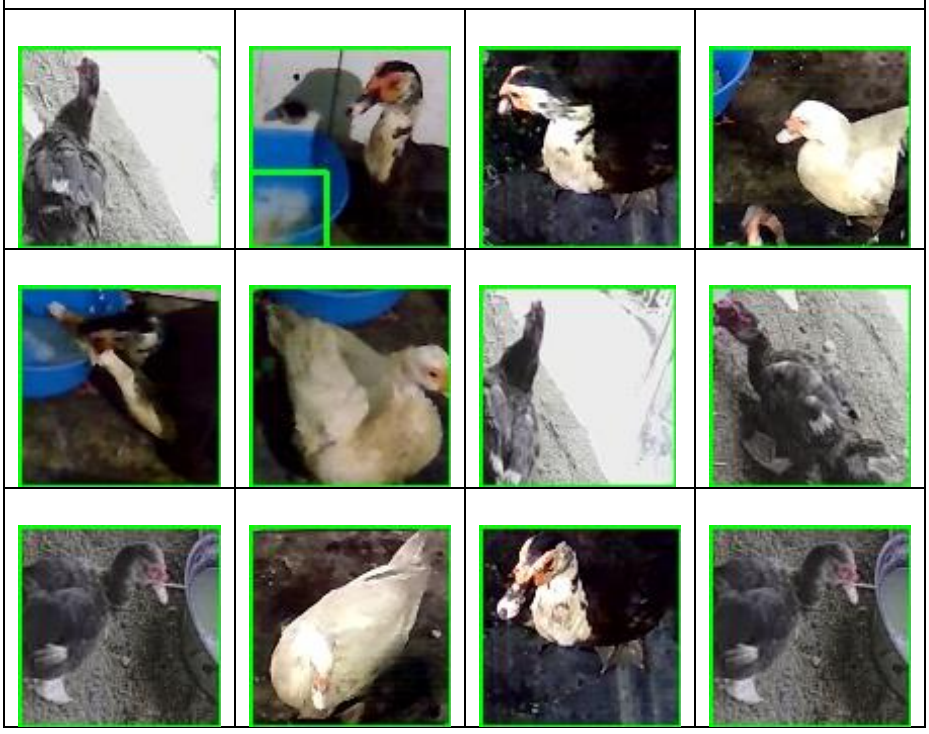
```
String sensorName = "BME280";
String sensorLocation = "Office";

/*#include <SPI.h>
#define BME_SCK 18
#define BME_MISO 19
#define BME_MOSI 23
#define BME_CS 5*/

#define SEALEVELPRESSURE_HPA (1013.25)

Adafruit_BME280 bme;  // I2C
//Adafruit_BME280 bme(BME_CS);  // hardware SPI
//Adafruit_BME280 bme(BME_CS, BME_MOSI, BME_MISO, BME_SCK);  // software SPI

void setup() {
  Serial.begin(115200);

  WiFi.begin(ssid, password);
  Serial.println("Connecting");
  while(WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.print("Connected to WiFi network with IP Address: ");
  Serial.println(WiFi.localIP());

  // (you can also pass in a Wire library object like &Wire2)
  bool status = bme.begin(0x76);
  if (!status) {
    Serial.println("Could not find a valid BME280 sensor, check wiring or change I2C
address!");
    while (1);
  }
}

void loop() {
  //Check WiFi connection status
  if(WiFi.status()== WL_CONNECTED){

    std::unique_ptr<BearSSL::WiFiClientSecure>client(new BearSSL::WiFiClientSecure);

    // Ignore SSL certificate validation
    client->setInsecure();

    //create an HTTPClient instance
    HTTPClient https;

    // Your Domain name with URL path or IP address with path
    https.begin(*client, serverName);

    // Specify content-type header
    https.addHeader("Content-Type", "application/x-www-form-urlencoded");

    // Prepare your HTTP POST request data
    String httpRequestData = "api_key=" + apiKeyValue + "&sensor=" + sensorName
```

```
                + "&location=" + sensorLocation + "&value1=" +
String(bme.readTemperature())
                + "&value2=" + String(bme.readHumidity()) + "&value3=" +
String(bme.readPressure()/100.0F) + "";
   Serial.print("httpRequestData: ");
   Serial.println(httpRequestData);

   // You can comment the httpRequestData variable above
   // then, use the httpRequestData variable below (for testing purposes without the BME280
sensor)
   //String                    httpRequestData                    =
"api_key=tPmAT5Ab3j7F9&sensor=BME280&location=Office&value1=24.75&value2=49.
54&value3=1005.14";

   // Send HTTP POST request
   int httpResponseCode = https.POST(httpRequestData);

   // If you need an HTTP request with a content type: text/plain
   //http.addHeader("Content-Type", "text/plain");
   //int httpResponseCode = https.POST("Hello, World!");

   // If you need an HTTP request with a content type: application/json, use the following:
   //http.addHeader("Content-Type", "application/json");
   //int                    httpResponseCode                    =
https.POST("{\"value1\":\"19\",\"value2\":\"67\",\"value3\":\"78\"}");

   if (httpResponseCode>0) {
    Serial.print("HTTP Response code: ");
    Serial.println(httpResponseCode);
   }
   else {
    Serial.print("Error code: ");
    Serial.println(httpResponseCode);
   }
   // Free resources
   https.end();
  }
  else {
   Serial.println("WiFi Disconnected");
  }
  //Send an HTTP POST request every 30 seconds
  delay(30000);
}
```

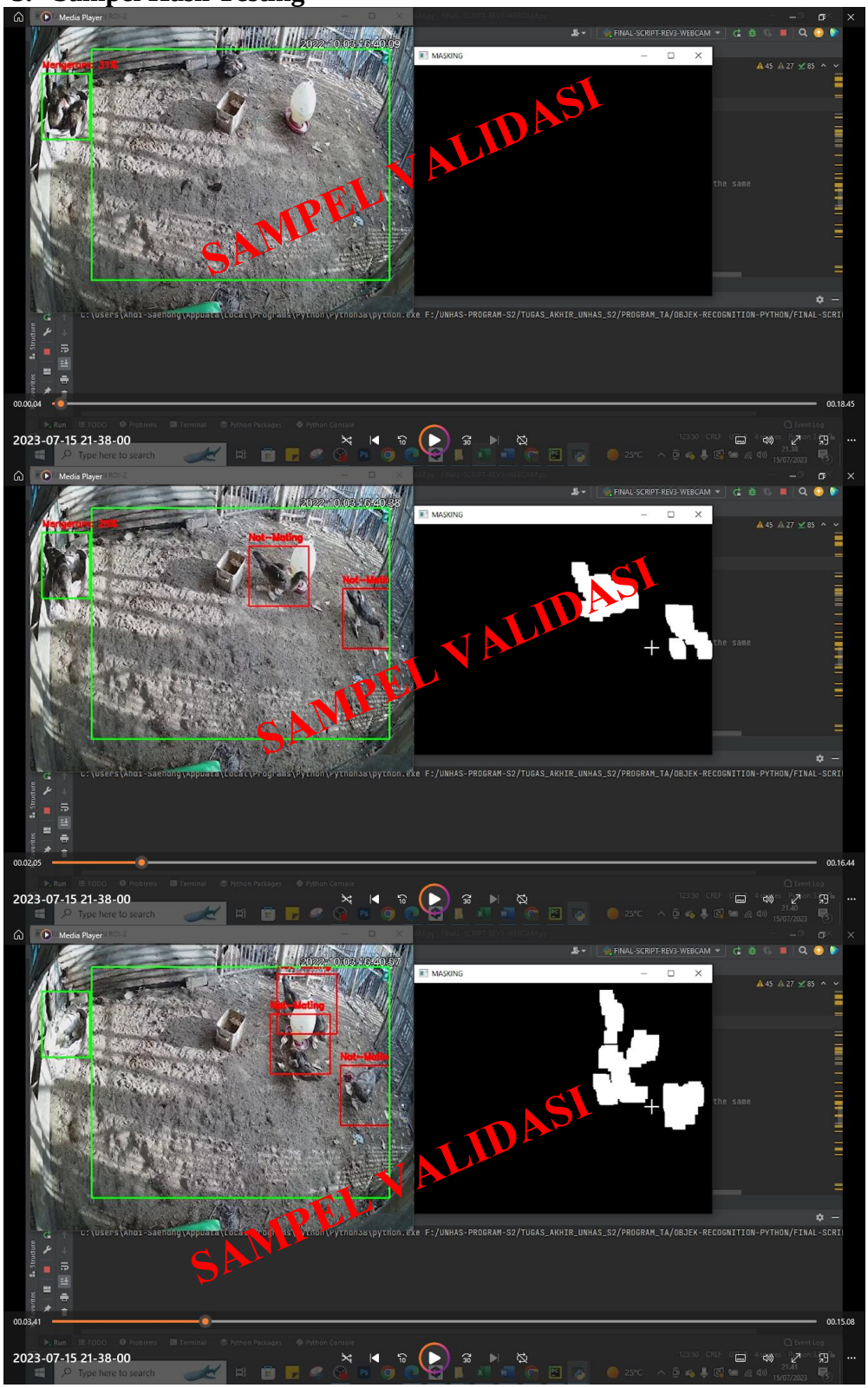
4. Sampel Training

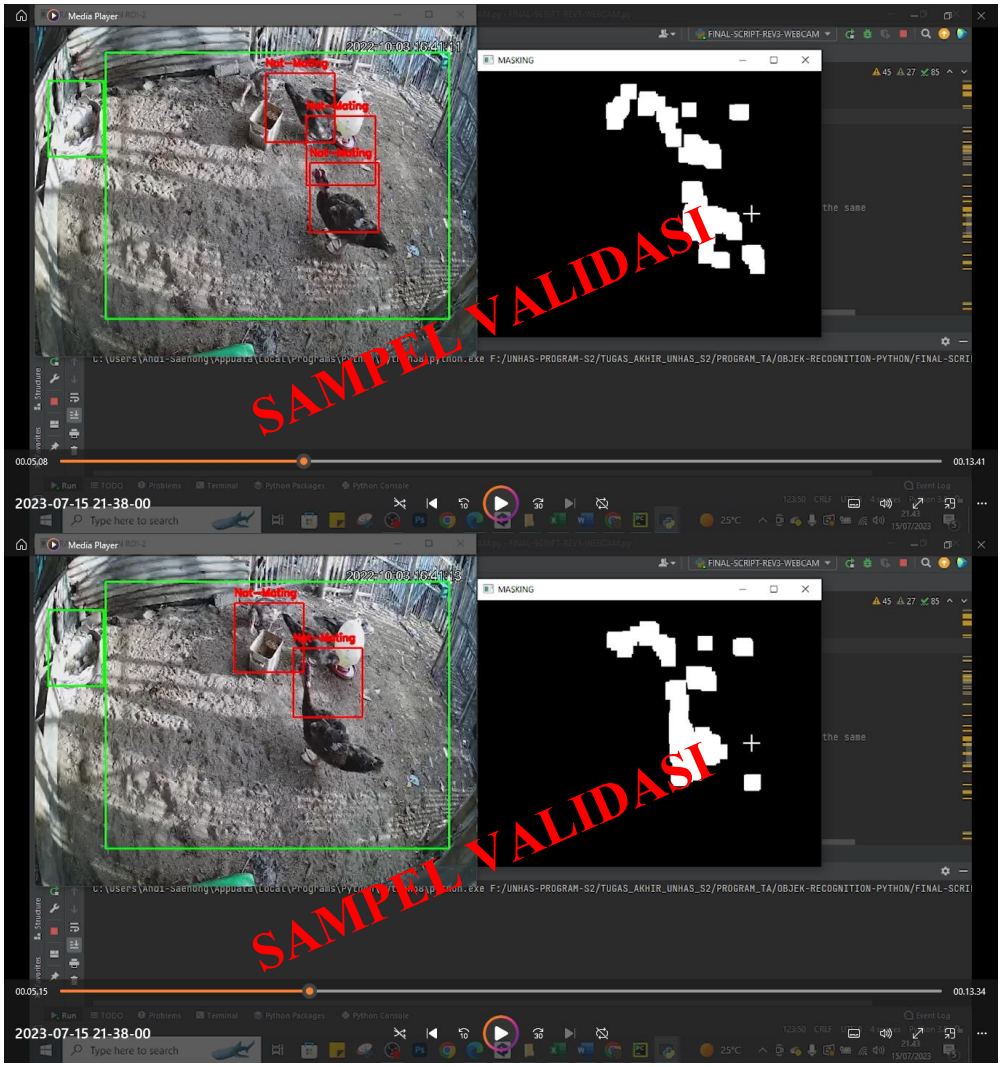
Sampel Perilaku Kawin unggas

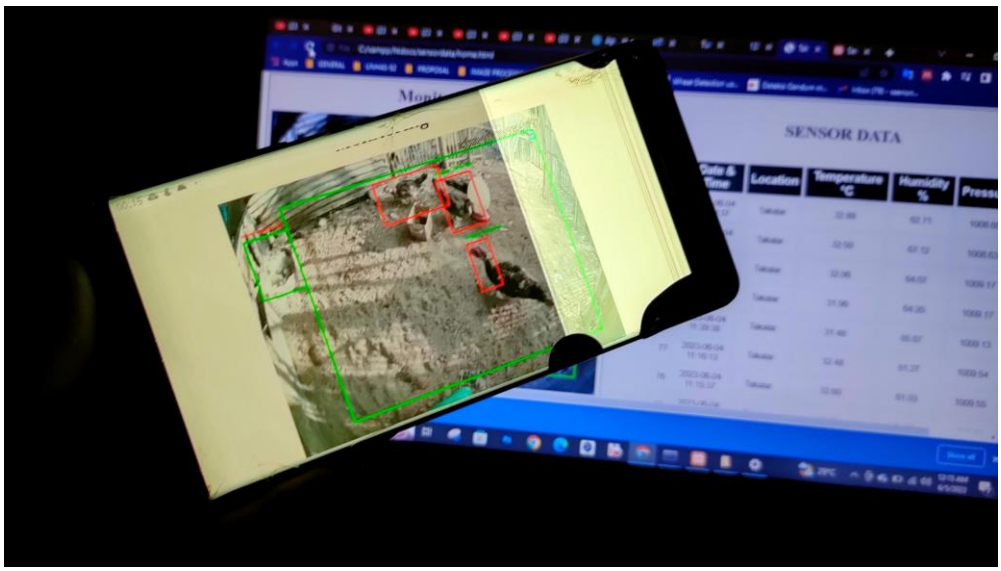
Sampel Perilaku Tidak Kawin



5. Sampel Hasil Testing

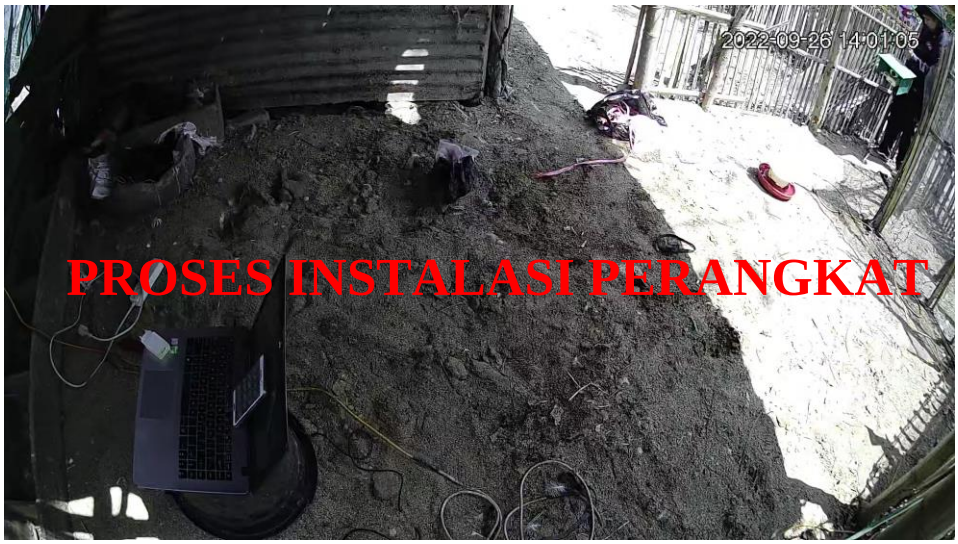






PENGUJIAN MENGGUNAKAN JARINGAN INTERNET


Media Player
PENGUJIAN SECARA REAL-TIME
VID20230708135246
Type here to search


2022-09-26 14:01:05
PROSES INSTALASI PERANGKAT


Monitoring
SENSOR DATA
PENGUJIAN KINERJA DATABASE