LAMPIRAN

1. Lampiran 1

   Source code Arduino Uno:

   ```
   #define SENSOR_1_PIN A0
   void setup() {
   Serial.begin(9600);
   while(!Serial){}
   }


   void loop() {
     int SENSOR_1_VALUE = analogRead(SENSOR_1_PIN);
   Serial.println(String(SENSOR_1_VALUE));
   delay(1000);
   }
   ```

2. Lampiran 2

   Source code Raspberry Pi:

   - Pengambilan gambar

     ```
     from cv2 import *
     import cv2
     import time


     cam = cv2.VideoCapture(0)
     result, image = cam.read()
     if result:
         cv2.imwrite("/home/pi/Selected/1.png", image)
     else:
         print("no image")
     time.sleep(2)
     cam.release()
     cv2.destroyAllWindows()
     ```

- Pengolahan dan pemotongan gambar

```python
import cv2
import numpy as np

img=cv2.imread('/home/pi/Selected/1.png')
crop_img = img[5:430, 95:585]
rgb=cv2.cvtColor(crop_img,cv2.COLOR_BGR2RGB)
hsv=cv2.cvtColor(rgb,cv2.COLOR_RGB2HSV)
low_green=np.array([30, 60, 50],dtype=np.uint8)
high_green=np.array([70, 255, 255],dtype=np.uint8)
mask=cv2.inRange(hsv,low_green,high_green)
result=cv2.bitwise_and(crop_img, crop_img, mask=mask)
noiseless=cv2.fastNlMeansDenoisingColored(result,None,20,20,7,21)
ret,final = cv2.threshold(mask, 0, 255, cv2.THRESH_BINARY)

edged = cv2.Canny(final, 10, 250)

contours, hierarchy = cv2.findContours(final.copy(),
cv2.RETR_EXTERNAL, cv2.CHAIN_APPROX_NONE)

idx = 0
for c in contours:
    x,y,w,h = cv2.boundingRect(c)
    if w>30 and h>30:
            idx+=1
            new_img=final[y:y+h,x:x+w]
            #cropping images
            cv2.imwrite("/home/pi/Selected/cropped/"+str(idx) + '.png',
new_img)
cv2.imshow("Original Image",image)
cv2.imshow("Canny Edge",edged)
cv2.waitKey(0)
```

```python
print('>> Objects Cropped Successfully!')
print(">> Check out 'cropped' Directory")
```

- Pembacaan hasil pemotongan gambar dan mengunggah data

```python
import cv2
from datetime import datetime
import pytz
import numpy as np
import pyrebase
import serial
import time

config = {
  "apiKey": "AIzaSyCHx0Vrunry-Mdm7PFY7itdywJXPfzjXTU",
  "authDomain": "monitoringtanaman-aae71.firebaseapp.com",
  "databaseURL": "https://monitoringtanaman-aae71-default-rtdb.asia-southeast1.firebasedatabase.app",
  "projectId": "monitoringtanaman-aae71",
  "storageBucket": "monitoringtanaman-aae71.appspot.com",
  "messagingSenderId": "974883709571",
  "appId": "1:974883709571:web:067171baedfdd0861ab1b6"
}

firebase = pyrebase.initialize_app(config)
Jam = pytz.timezone("Asia/Pontianak")
Waktu = datetime.now(Jam)
hasil = Waktu.strftime("%H:%M:%S")


ser = serial.Serial('/dev/ttyUSB0', 9600, timeout=1.0)
time.sleep(3)
ser.reset_input_buffer()
```

```python
line  = ser.readline().decode('utf-8')
print('Tingkat Kelembapan: ', line)


img1=cv2.imread('/home/pi/Selected/cropped/1.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_1 = np.sum(img1 == 255)
jumlah_1 = pixel_1/12000
luas_1 = jumlah_1*100
desimal_luas_1 = round(luas_1)
print('Luas Tanaman 1:', desimal_luas_1, "%")


img2=cv2.imread('/home/pi/Selected/cropped/2.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_2 = np.sum(img2 == 255)
jumlah_2 = pixel_2/12000
luas_2 = jumlah_2*100
desimal_luas_2 = round(luas_2)
print('Luas Tanaman 2:', desimal_luas_2, "%")


img3=cv2.imread('/home/pi/Selected/cropped/3.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_3 = np.sum(img3 == 255)
jumlah_3 = pixel_3/12000
luas_3 = jumlah_3*100
desimal_luas_3 = round(luas_3)
print('Luas Tanaman 3:', desimal_luas_3, "%")


img4=cv2.imread('/home/pi/Selected/cropped/4.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_4 = np.sum(img4 == 255)
jumlah_4 = pixel_4/12000
luas_4 = jumlah_4*100
```

```python
desimal_luas_4 = round(luas_4)
print('Luas Tanaman 4:', desimal_luas_4, "%")


img5=cv2.imread('/home/pi/Selected/cropped/5.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_5 = np.sum(img5 == 255)
jumlah_5 = pixel_5/12000
luas_5 = jumlah_5*100
desimal_luas_5 = round(luas_5)
print('Luas Tanaman 5:', desimal_luas_5, "%")


img6=cv2.imread('/home/pi/Selected/cropped/6.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_6 = np.sum(img6 == 255)
jumlah_6 = pixel_6/12000
luas_6 = jumlah_6*100
desimal_luas_6 = round(luas_6)
print('Luas Tanaman 6:', desimal_luas_6, "%")


img7=cv2.imread('/home/pi/Selected/cropped/7.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_7 = np.sum(img7 == 255)
jumlah_7 = pixel_7/12000
luas_7 = jumlah_7*100
desimal_luas_7 = round(luas_7)
print('Luas Tanaman 7:', desimal_luas_7, "%")


img8=cv2.imread('/home/pi/Selected/cropped/8.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_8 = np.sum(img8 == 255)
jumlah_8 = pixel_8/12000
luas_8 = jumlah_8*100
```

```python
desimal_luas_8 = round(luas_8)
print('Luas Tanaman 8:', desimal_luas_8, "%")

img9=cv2.imread('/home/pi/Selected/cropped/9.png' ,
cv2.IMREAD_GRAYSCALE)
pixel_9 = np.sum(img9 == 255)
jumlah_9 = pixel_9/12000
luas_9 = jumlah_9*100
desimal_luas_9 = round(luas_9)
print('Luas Tanaman 9:', desimal_luas_9, "%")
print('Waktu: ' , hasil)

database = firebase.database()
storage = firebase.storage()

database.child("Tanaman").child("Tanaman
1").child("Kematangan").set(desimal_luas_1)
database.child("Tanaman").child("Tanaman
1").child("Waktu").set(hasil)
database.child("Tanaman").child("Tanaman
1").child("Kelembapan").set(line)
database.child("Tanaman").child("Tanaman
2").child("Kematangan").set(desimal_luas_2)
database.child("Tanaman").child("Tanaman
2").child("Waktu").set(hasil)
database.child("Tanaman").child("Tanaman
2").child("Kelembapan").set(line)
database.child("Tanaman").child("Tanaman
3").child("Kematangan").set(desimal_luas_3)
database.child("Tanaman").child("Tanaman
3").child("Waktu").set(hasil)
```

```
database.child("Tanaman").child("Tanaman
3").child("Kelembapan").set(line)
database.child("Tanaman").child("Tanaman
4").child("Kematangan").set(desimal_luas_4)
database.child("Tanaman").child("Tanaman
4").child("Waktu").set(hasil)
database.child("Tanaman").child("Tanaman
4").child("Kelembapan").set(line)
database.child("Tanaman").child("Tanaman
5").child("Kematangan").set(desimal_luas_5)
database.child("Tanaman").child("Tanaman
5").child("Waktu").set(hasil)
database.child("Tanaman").child("Tanaman
5").child("Kelembapan").set(line)
database.child("Tanaman").child("Tanaman
6").child("Kematangan").set(desimal_luas_6)
database.child("Tanaman").child("Tanaman
6").child("Waktu").set(hasil)
database.child("Tanaman").child("Tanaman
6").child("Kelembapan").set(line)
database.child("Tanaman").child("Tanaman
7").child("Kematangan").set(desimal_luas_7)
database.child("Tanaman").child("Tanaman
7").child("Waktu").set(hasil)
database.child("Tanaman").child("Tanaman
7").child("Kelembapan").set(line)
database.child("Tanaman").child("Tanaman
8").child("Kematangan").set(desimal_luas_8)
database.child("Tanaman").child("Tanaman
8").child("Waktu").set(hasil)
database.child("Tanaman").child("Tanaman
8").child("Kelembapan").set(line)
```

```
database.child("Tanaman").child("Tanaman
9").child("Kematangan").set(desimal_luas_9)
database.child("Tanaman").child("Tanaman
9").child("Waktu").set(hasil)
database.child("Tanaman").child("Tanaman
9").child("Kelembapan").set(line
```

- Mencari jumlah pixel pada gambar

```
import cv2
import numpy as np

img=cv2.imread('/home/pi/3lettucebaru/hasil crop/6.png')
n_of_white_pix = np.sum(img == 255)


import cv2
import numpy as np

img=cv2.imread('/home/pi/3lettucebaru/hasil crop/6.png')
n_of_white_pix = np.sum(img == 255)
```

3. Lampiran 3

   Source code Visual Studio Code

   - Script.js

```
const ambil = document.querySelector(`[data-button="ambil"]`);
const hasil = document.querySelector(`[data-firebase="hasil"]`);

ambil.onclick = () => {
  firebase.database().ref('Tanaman').on("value", (snapshot) => {
    hasil.innerHTML = ''; // Kosongkan hasil sebelum menambahkan
data baru
    snapshot.forEach((childSnapshot) => {
      const tanamanNama = childSnapshot.key; // Dapatkan nama
"Tanaman" (contoh, "Tanaman 1")
```

```
        const tanamanData = childSnapshot.val();
        const Kematangan = tanamanData.Kematangan; // Nama
atribut "Kematangan"
        const Waktu = tanamanData.Waktu; // Nama atribut "Waktu"
        const Kelembapan = tanamanData.Kelembapan;

        hasil.innerHTML += (`
          <div>${tanamanNama} <br>Tingkat Kematangan(%):
${Kematangan} <br>Waktu: ${Waktu} <br>Kelembapan:
${Kelembapan}</div>
          <br>
        `);
      });
    });
}
```

- Index.html

```
<!DOCTYPE html>
<html lang="id">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-
scale=1.0">
    <link rel="stylesheet" href="./styles/style.css">
    <title>Monitoring Kematangan</title>

</head>
<body>

    <div class="container">
        <h1>Monitoring Tanaman</h1>
```

```html
    <div class="form">
        <button data-button="ambil">Tampilkan Data</button>
    </div>
    <div data-firebase="hasil" class="result">
        <!--  -->
</div>


    <!-- AMBIL DATA FIREBASE -->
<script src="https://www.gstatic.com/firebasejs/8.10.1/firebase-
app.js"></script>


<script src="https://www.gstatic.com/firebasejs/8.10.1/firebase-
auth.js"></script>
<script src="https://www.gstatic.com/firebasejs/8.10.1/firebase-
firestore.js"></script>
<script src="https://www.gstatic.com/firebasejs/8.10.1/firebase-
storage.js"></script>
<script src="https://www.gstatic.com/firebasejs/8.10.1/firebase-
database.js"></script>
<script src="./scripts/firebase-config.js"></script>
<script src="./scripts/script.js"></script>
</body>
</html>
```

4. Lampiran 4

Datasheet Raspberry Pi 3B+
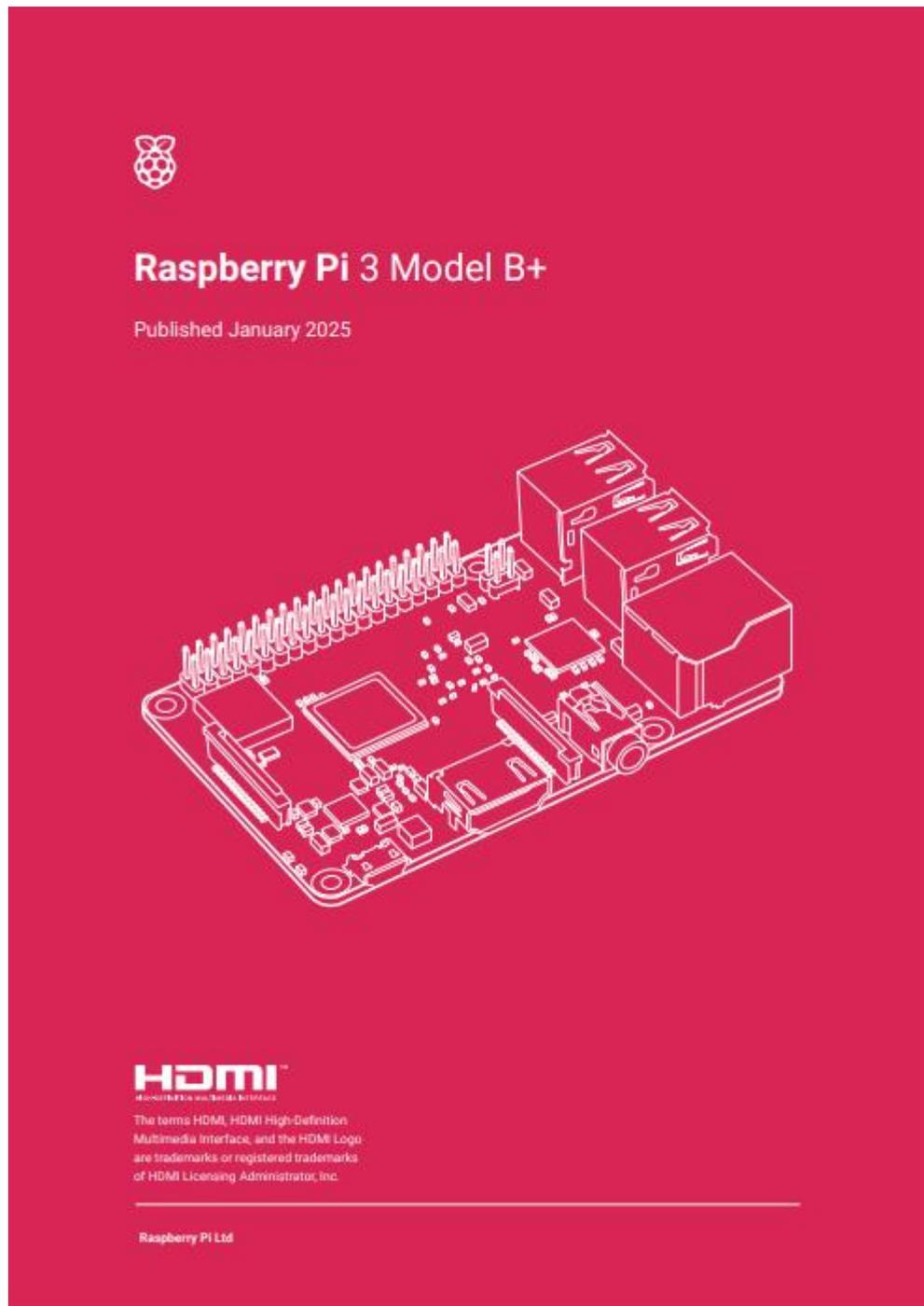
Overview

Raspberry Pi 3 Model B+ has a 64-bit quad-core processor running at 1.4GHz, dual-band 2.4GHz and 5GHz wireless LAN, Bluetooth 4.2/BLE, Gigabit Ethernet over USB 2.0, and PoE capability via a separate PoE HAT. The dual-band wireless LAN comes with modular compliance certification.

Raspberry Pi 3 Model B+ maintains the same mechanical footprint as both Raspberry Pi 2 Model B and Raspberry Pi 3 Model B.

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Specification

Processor:	Broadcom BCM2837B0, Cortex-A53 64-bit SoC @ 1.4GHz
Memory:	1GB
Connectivity:	• 2.4 GHz and 5 GHz IEEE 802.11b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
	• Gigabit Ethernet over USB 2.0 (maximum throughput 300Mbps) • 4 × USB 2.0 interface
Video and sound:	• 1 x full size HDMI • MIPI DSI display port • MIPI CSI camera port • 4 pole stereo output and composite video port
Multimedia:	H.264, MPEG-4 decode (1080p30); H.264 encode (1080p30); OpenGL ES 1.1, 2.0 graphics
SD card support:	Micro SD format for loading operating system and data storage
Input Power:	• 5V/2.5A DC via micro USB connector • 5V DC via GPIO header • Power over Ethernet (PoE)-enabled (requires separate PoE HAT)
Operating temperature:	0-50°C
MTBF[1] Ground Benign:	378 000 hours
Production lifetime:	Raspberry Pi 3 Model B+ will remain in production until at least January 2028
Compliance:	For a full list of local and regional product approvals, please visit pip.raspberrypi.com
List price:	**$35**

[1] Mean Time Between Failure

Physical specification

Note: all dimensions in mm
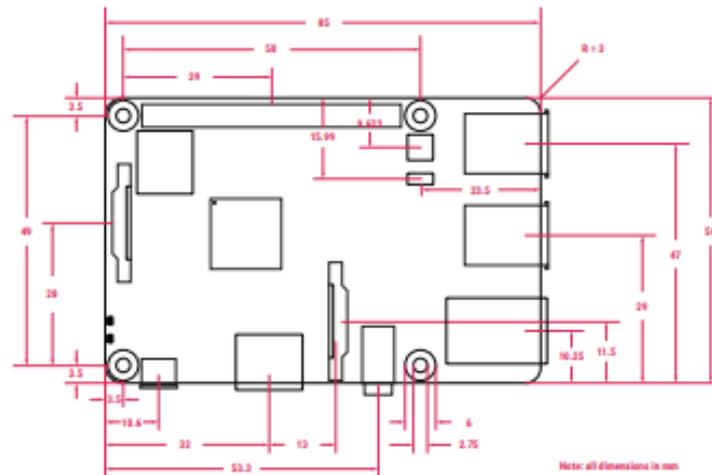
WARNINGS

- This product should only be connected to an external power supply rated at 5V/2.5 A DC. Any external power supply used with Raspberry Pi 3 Model B+ shall comply with relevant regulations and standards applicable in the country of intended use.

- This product should be operated in a well-ventilated environment, and if used inside a case, the case should not be covered.

- Whilst in use, this product should be placed on a stable, flat, non-conductive surface, and should not be contacted by conductive items.

- The connection of incompatible devices to the GPIO connection may affect compliance, result in damage to the unit, and invalidate the warranty.

- All peripherals used with this product should comply with relevant standards for the country of use and be marked accordingly to ensure that safety and performance requirements are met. These articles include but are not limited to keyboards, monitors, and mice when used in conjunction with the Rapsberry Pi.

- The cables and connectors of all peripherals used with this product must have adequate insulation so that relevant safety requirements are met.

SAFETY INSTRUCTIONS

To avoid malfunction or damage to this product, please observe the following:

- Do not expose to water or moisture, or place on a conductive surface whilst in operation.

- Do not expose to heat from any source; Raspberry Pi 3 Model B+ is designed for reliable operation at normal ambient temperatures.

- Do not expose the printed circuit board to high-intensity light sources (e.g. xenon flash or laser) whilst in operation.

- Take care whilst handling to avoid mechanical or electrical damage to the printed circuit board and connectors.

- Whilst it is powered, avoid handling the printed circuit board, or only handle it by the edges to minimise the risk of electrostatic discharge damage.

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5. Lampiran 5

Datasheet Webcam NYK A-50:

Spesifikasi NYK A50 Crusher & Fitur Lengkap

Tipe Produk	Brand	Nama Produk
	NYK	A50 Crusher
	Tipe Produk	**Warna**
	USB Webcam	Hitam

Detail Teknis	Resolusi Video	Tingkat Bingkai
	Full HD 1080p	30 fps
	Bidang Pandang Diagonal (dFoV)	**Tipe Mikrofon**
	69°	Built-in Microphone

Detail Produk	Dimensi	Panjang Kabel
	20 x 20 x 15 mm	1.9 m
	Berat	
	800 g	

Fitur Lainnya	Autofocus	White Balance
	Ada fitur autofocus	Ada fitur white balance
	Noise Cancelling	**Tripod**
	Tidak ada fitur noice cancelling	Ada tripod
	Pemasangan Plug and Play	**Zoom Digital**
	Ada fitur pemasangan plug and play	Tidak ada fitur zoom digital
	Kompatibilitas	
	Windows Vista, 7, 8, 10, 2000, XP; Vista	

6. Lampiran 6

Dokumentasi