



A LIVE WEBINAR

# IMPLEMENTASI PROTOKOL MQTT PADA PROYEK COMPUTER VISION BERBASIS ESP32



**Rizky Dermawan, S.Si**  
Founder Rizky Project



Sabtu, 8 Oktober 2022  
**19:30 WIB** - Selesai



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Live at:



**Nama** : Rizky Dermawan

**Asal** : Makassar, Sulawesi Selatan

**Pendidikan** : S1 Kimia FMIPA UNHAS (2010 – 2015)

**Profesi** : - Laboratory Officer Bosowa School  
- Owner Rizky Project



## Software

- ✓ Pycharm IDE <https://www.jetbrains.com/pycharm/download/>
- ✓ Arduino IDE <https://www.arduino.cc/en/software>
- ✓ Wokwi Simulator <https://wokwi.com>

## Python Package

- ✓ OpenCV 4.6.0 <https://github.com/opencv/opencv-python>
- ✓ CV Zone 1.4.1 <https://github.com/cvzone/cvzone>
- ✓ Mediapipe 0.8.7 <https://github.com/google/mediapipe>
- ✓ Paho MQTT 1.6.1 <https://github.com/eclipse/paho.mqtt.python>

## Arduino Libraries

- ✓ PubSub Client <https://github.com/knolleary/pubsubclient>



## MQTT: The Standard for IoT Messaging

MQTT is an OASIS standard messaging protocol for the Internet of Things (IoT). It is designed as an extremely lightweight publish/subscribe messaging transport that is ideal for connecting remote devices with a small code footprint and minimal network bandwidth. MQTT today is used in a wide variety of industries, such as automotive, manufacturing, telecommunications, oil and gas, etc.

# WHY MQTT

## Lightweight and Efficient

MQTT clients are very small, require minimal resources so can be used on small microcontrollers. MQTT message headers are small to optimize network bandwidth.

## Reliable Message Delivery

Reliability of message delivery is important for many IoT use cases. This is why MQTT has 3 defined quality of service levels: 0 - at most once, 1- at least once, 2 - exactly once

## Bi-directional Communications

MQTT allows for messaging between device to cloud and cloud to device. This makes for easy broadcasting messages to groups of things.

## Support for Unreliable Networks

Many IoT devices connect over unreliable cellular networks. MQTT's support for persistent sessions reduces the time to reconnect the client with the broker.

## Scale to Millions of Things

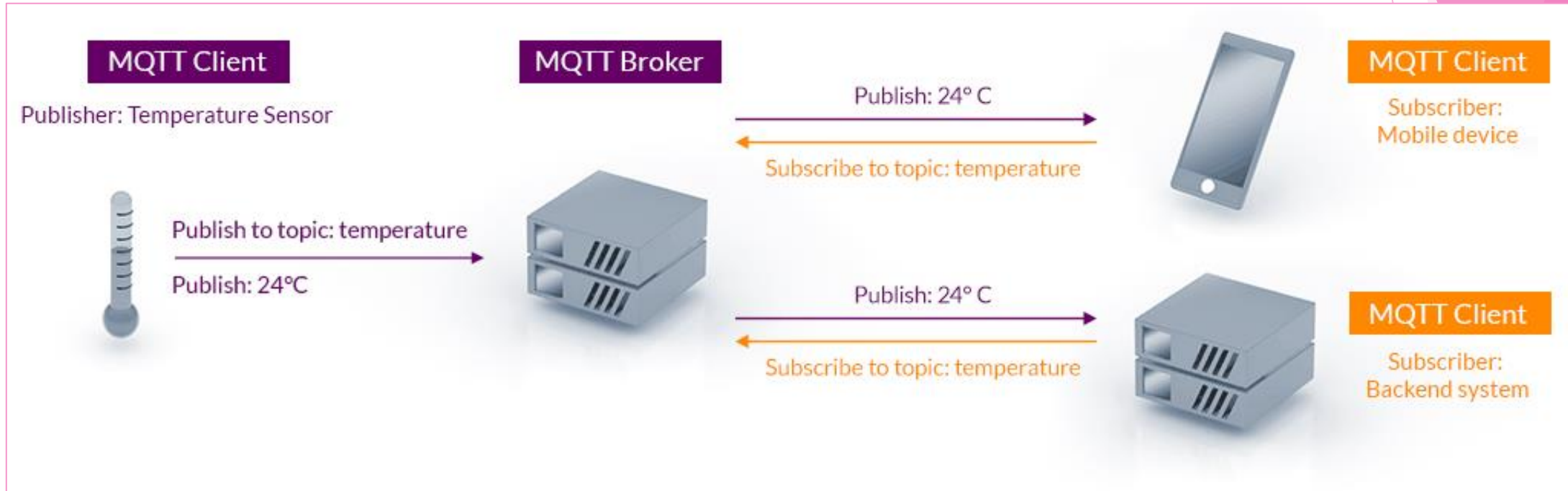
MQTT can scale to connect with millions of IoT devices.

## Security Enabled

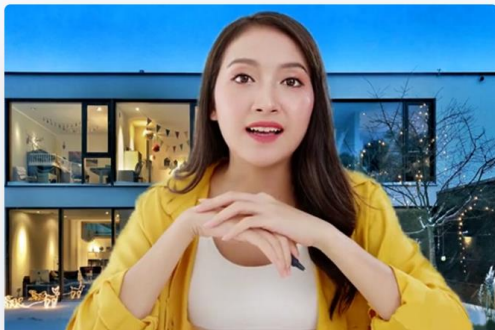
MQTT makes it easy to encrypt messages using TLS and authenticate clients using modern authentication protocols, such as OAuth.



# MQTT ARCHITECTURE

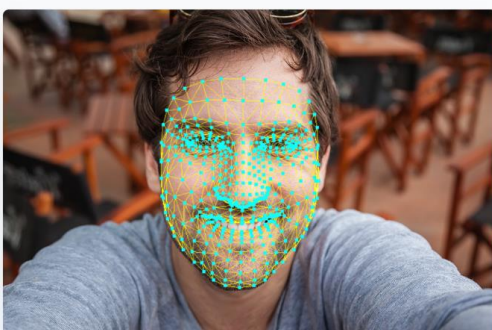


# MediaPipe



## Selfie Segmentation

Provides segmentation masks for prominent humans in the scene



## Face Mesh

468 face landmarks in 3D with multi-face support



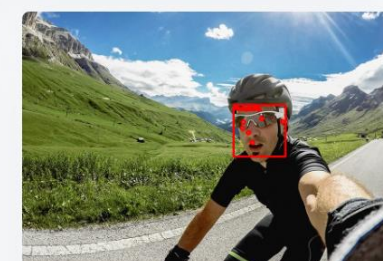
## Hair Segmentation

Super realistic real-time hair recoloring



## Object Detection and Tracking

Detection and tracking of objects in video in a single pipeline



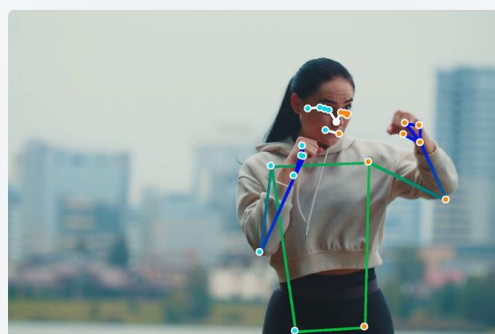
## Face Detection

Ultra lightweight face detector with 6 landmarks and multi-face support



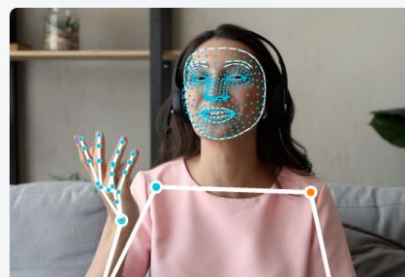
## Hand Tracking

21 landmarks in 3D with multi-hand support, based on high-performance palm detection and hand landmark model



## Human Pose Detection and Tracking

High-fidelity human body pose tracking, inferring up to 33 3D full-body landmarks from RGB video frames



## Holistic Tracking

Simultaneous and semantically consistent tracking of 33 pose, 21 per-hand, and 468 facial landmarks



## 3D Object Detection

Detection and 3D pose estimation of everyday objects like shoes and chairs

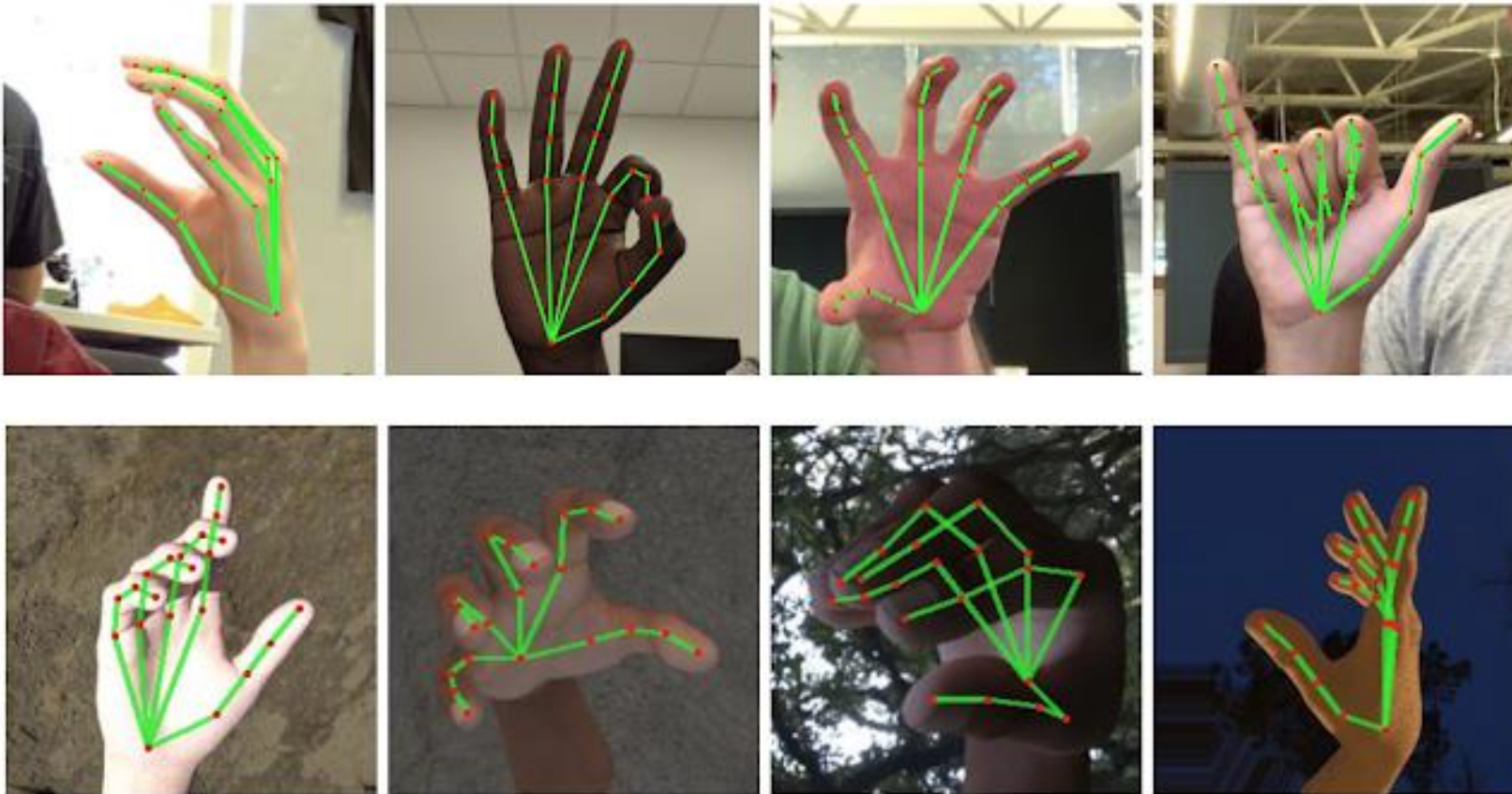
# CROSS PLATFORM

	<u>Android</u>	<u>iOS</u>	<u>C++</u>	<u>Python</u>	<u>JS</u>
<u>Face Detection</u>	✓	✓	✓	✓	✓
<u>Face Mesh</u>	✓	✓	✓	✓	✓
<u>Iris</u>	✓	✓	✓		
<u>Hands</u>	✓	✓	✓	✓	✓
<u>Pose</u>	✓	✓	✓	✓	✓
<u>Holistic</u>	✓	✓	✓	✓	✓
<u>Selfie Segmentation</u>	✓	✓	✓	✓	✓
<u>Hair Segmentation</u>	✓		✓		
<u>Object Detection</u>	✓	✓	✓		
<u>Box Tracking</u>	✓	✓	✓		

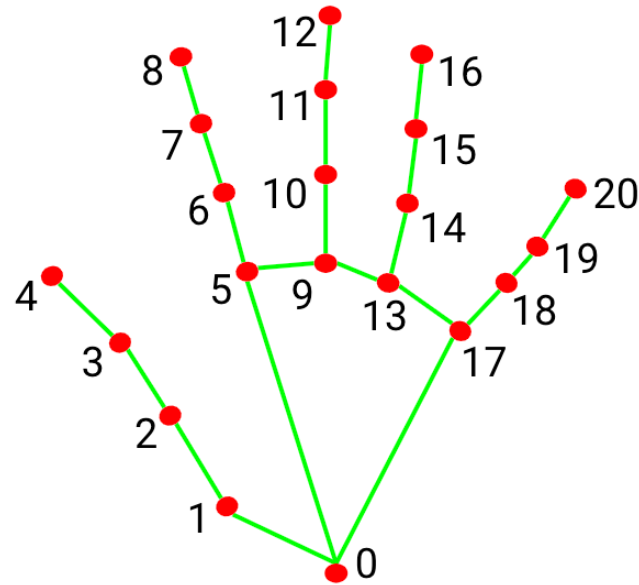
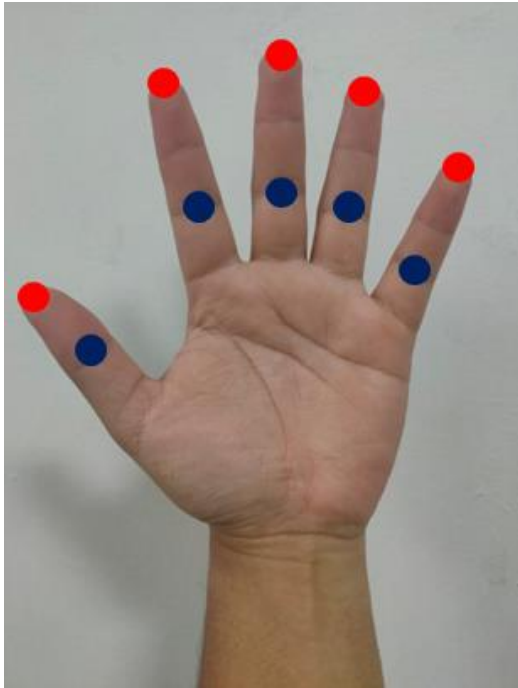


# MEDIAPIPE HANDS

MediaPipe Hands is a high-fidelity hand and finger tracking solution. It employs machine learning (ML) to infer 21 3D landmarks of a hand from just a single frame.

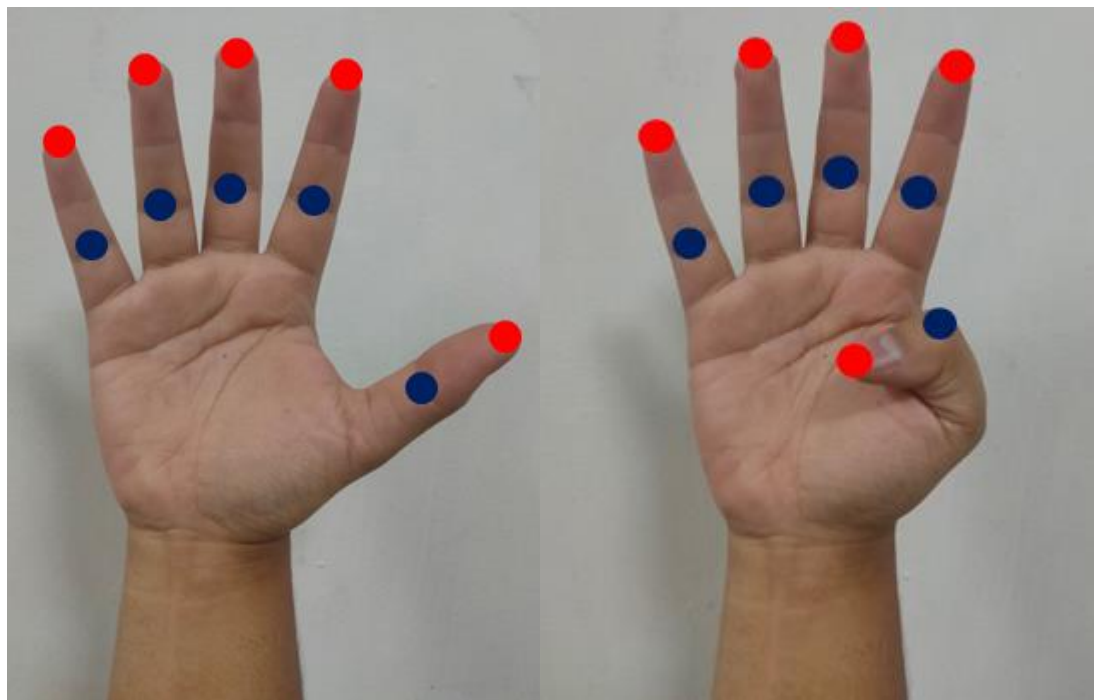


# HAND LANDMARKS

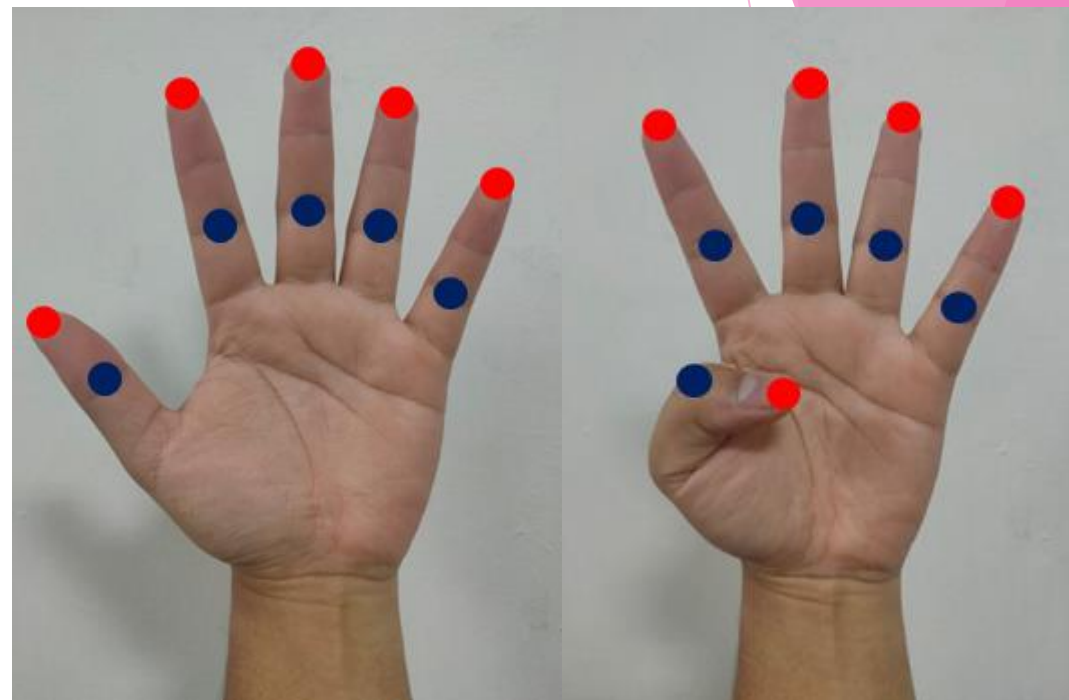


- 0. WRIST
- 1. THUMB\_CMC
- 2. THUMB\_MCP
- 3. THUMB\_IP
- 4. THUMB\_TIP
- 5. INDEX\_FINGER\_MCP
- 6. INDEX\_FINGER\_PIP
- 7. INDEX\_FINGER\_DIP
- 8. INDEX\_FINGER\_TIP
- 9. MIDDLE\_FINGER\_MCP
- 10. MIDDLE\_FINGER\_PIP

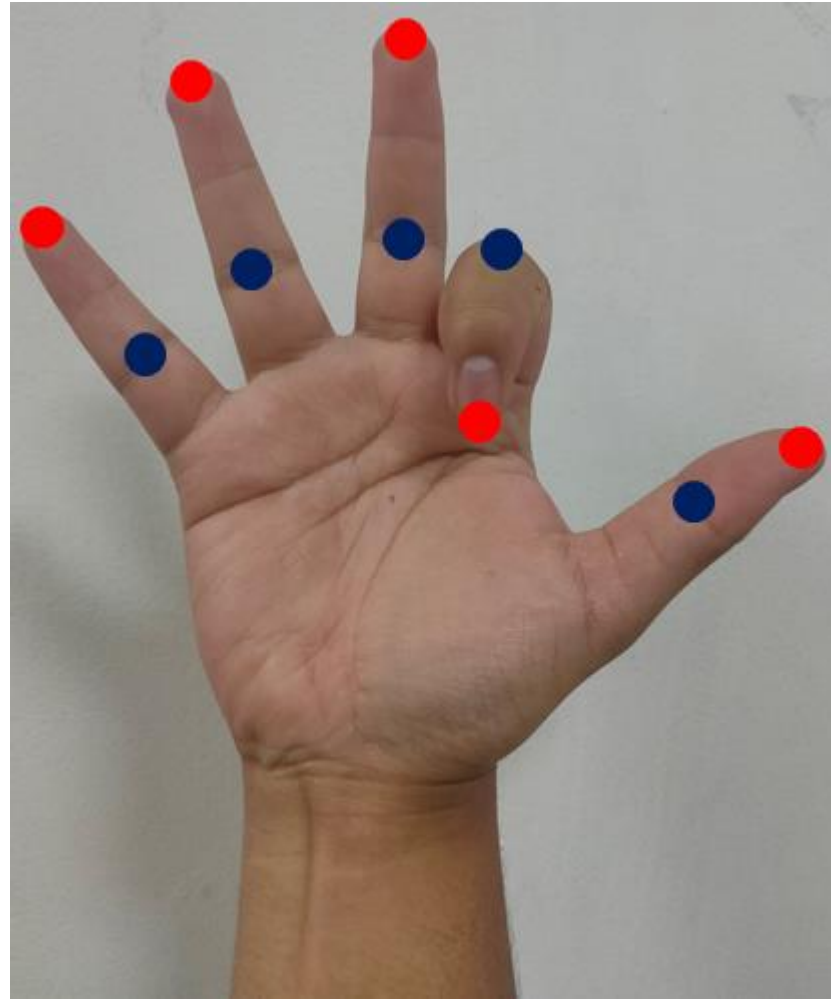
- 11. MIDDLE\_FINGER\_DIP
- 12. MIDDLE\_FINGER\_TIP
- 13. RING\_FINGER\_MCP
- 14. RING\_FINGER\_PIP
- 15. RING\_FINGER\_DIP
- 16. RING\_FINGER\_TIP
- 17. PINKY\_MCP
- 18. PINKY\_PIP
- 19. PINKY\_DIP
- 20. PINKY\_TIP



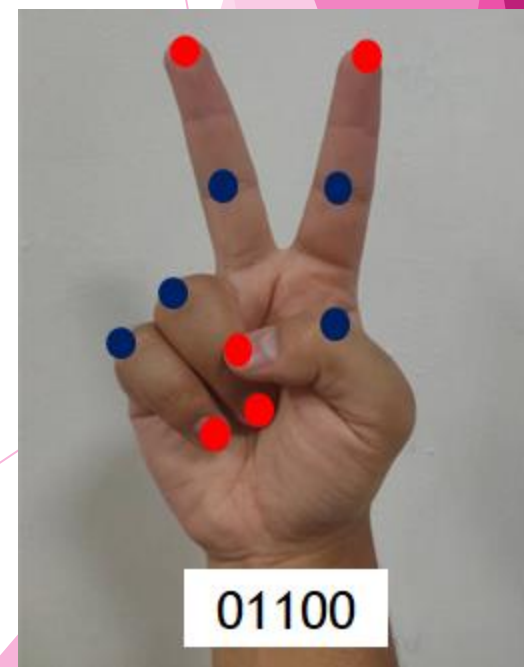
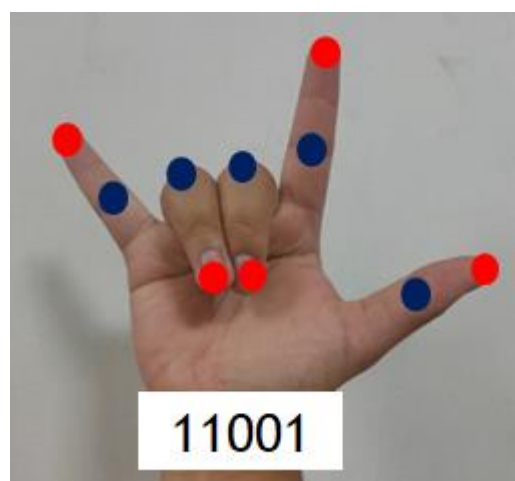
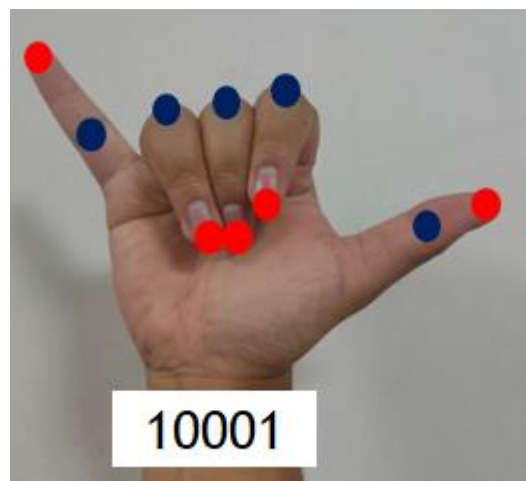
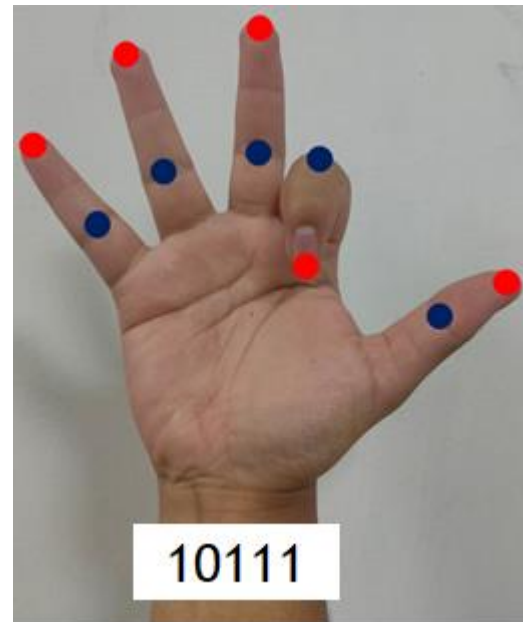
RIGHT HAND

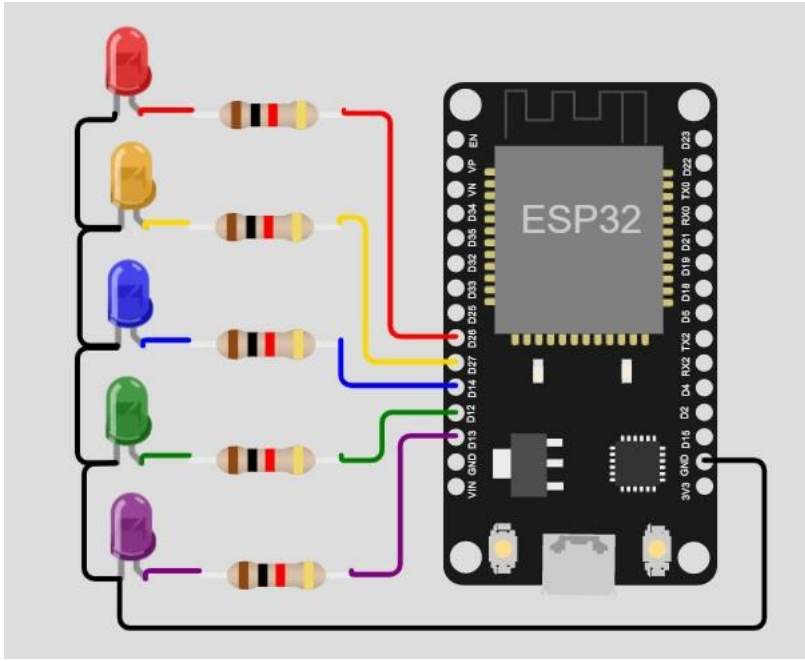


LEFT HAND

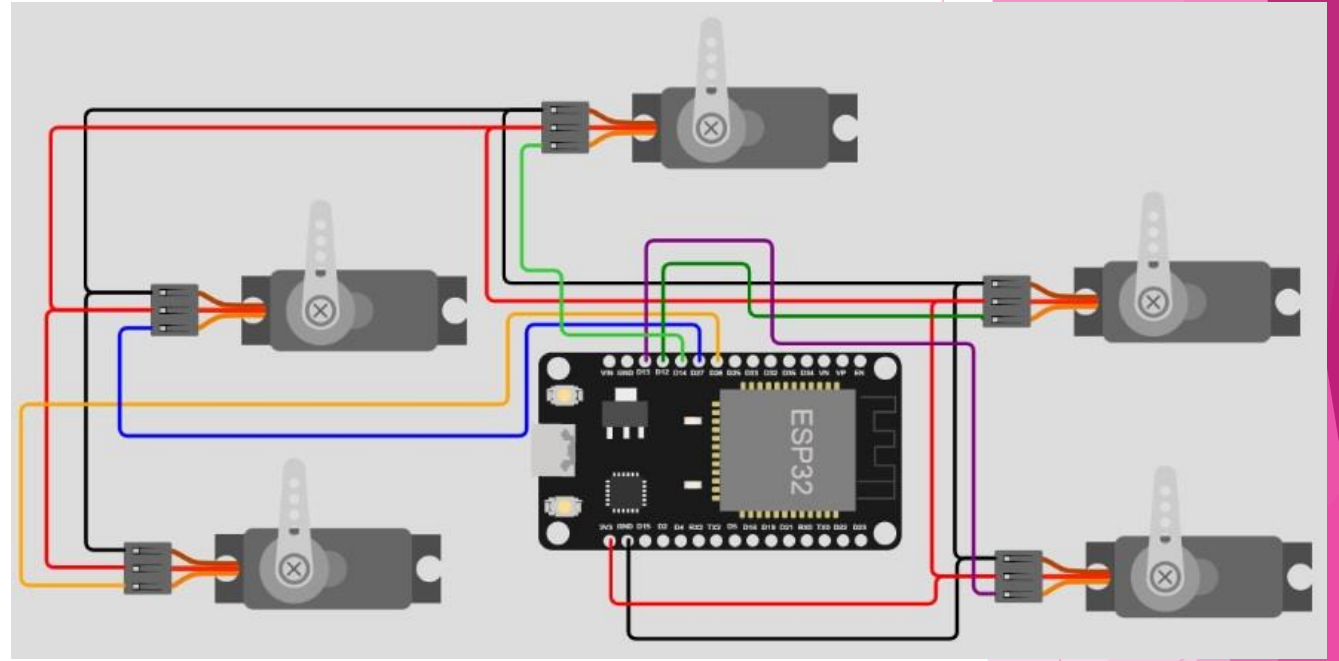






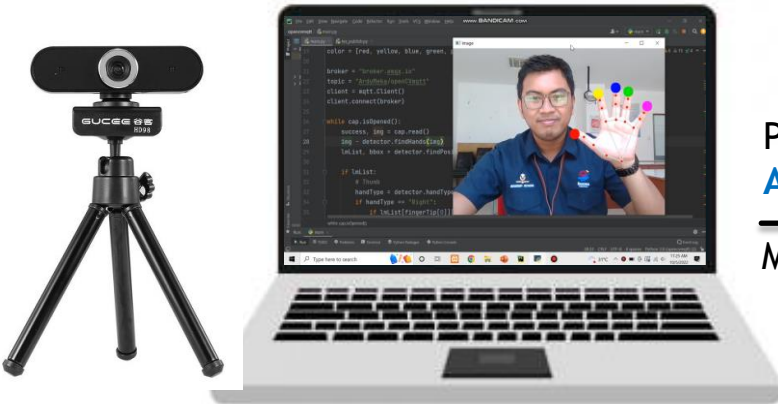
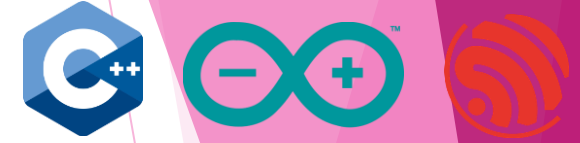


<https://wokwi.com/projects/343136740810162772>



<https://wokwi.com/projects/343461945646514772>

# ARSITEKTUR OPENCV - IOT



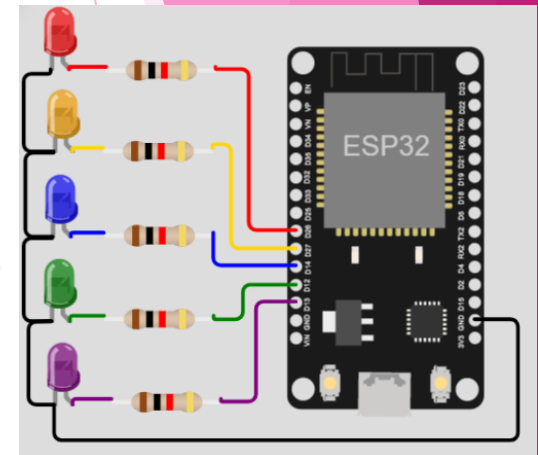
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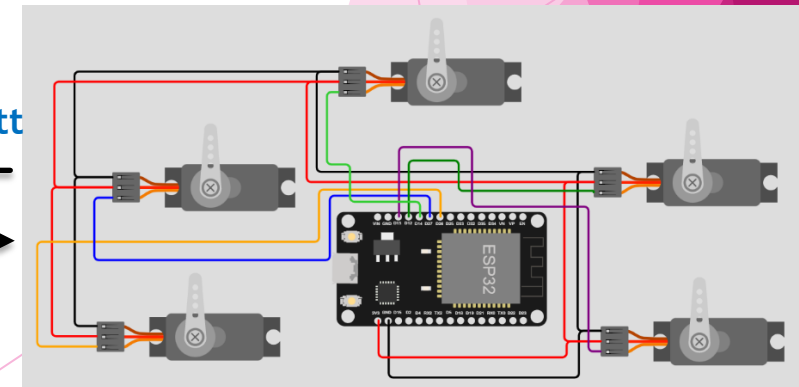
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