

# devfest 2022

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Wide side navigation'
```

## Exploring Robot Programming with Python

 Google Developer Groups  
Brunei



Hafiq Anas & Syamimi Rajak  
Robolab, School of Digital Science,  
Universiti Brunei Darussalam

# Today's content:

1. What is a robot?
2. What are the robots doing?
3. Who are we?
4. What makes a robot?
5. Workshop
6. Challenge

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`class="description">...`



What is a robot?



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navigation' data-title='Hide side navigation'
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" A robot is an **autonomous system** (agent) which exists in the physical world, that can **sense its environment** (including its own internal state) and **act on its environment** to achieve some goals. "

- Mataric, M. J. (2007). *The robotics primer*. MIT press.



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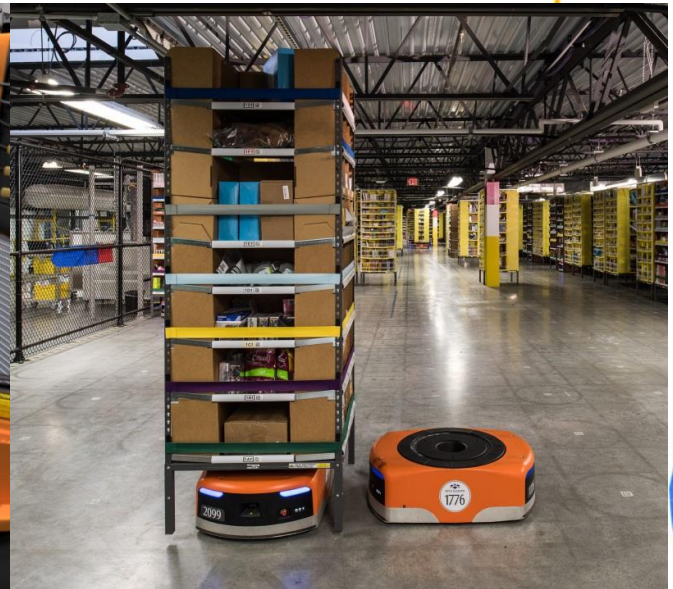
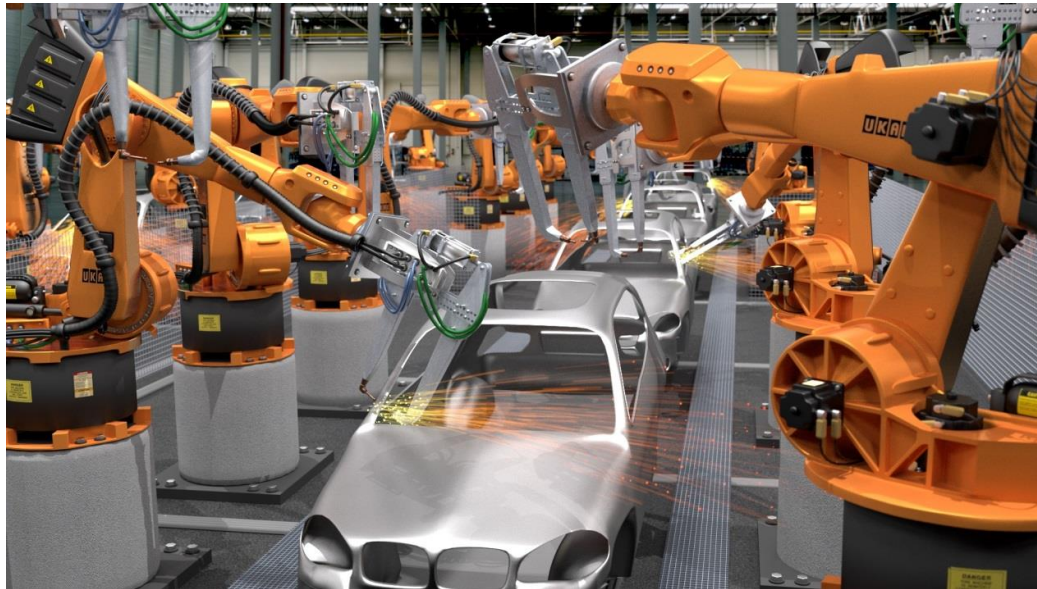


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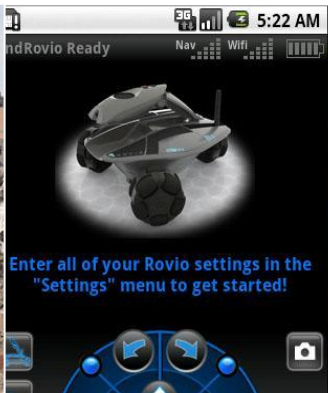
What are the robots  
doing?



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" class="talk-name">...  
" class="description">...
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# Who are we?



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## Robotics and Intelligent Systems Lab (Robolab), School of Digital Science, UBD

“develop technologies that  
can make **artificial systems**  
smarter or more intelligent  
with the purpose **to support**  
**human everyday living**”



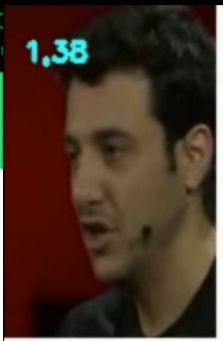
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# Intelligent systems | cyber-physical systems | robot systems

*+artificial intelligence, +internet of things, +robotics*



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**Classifier = MTCNN + Template Matching**  
**Method = Dynamic Margin Face Tracking with Template Matching (DMTMT)**  
**Time Taken=0.013, CanFPS=75**  
**(398,104),(402,102),(4,2)**



Human emotion recognition



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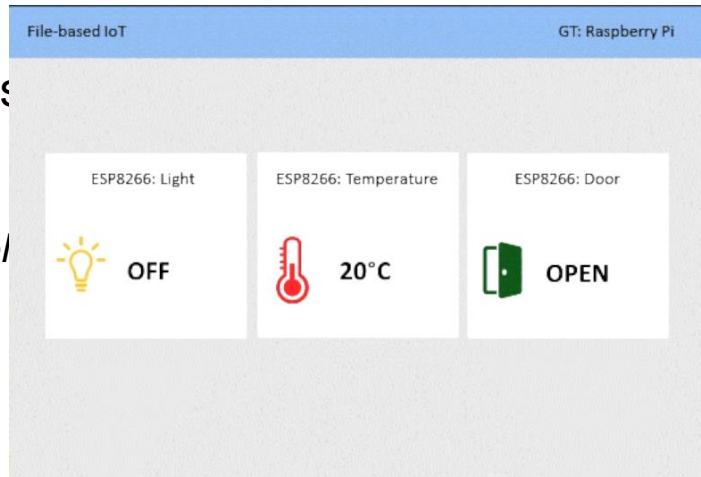
Human emotion recognition

Intelligent s

| robot

+artificial intel

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# File-based Internet of Things



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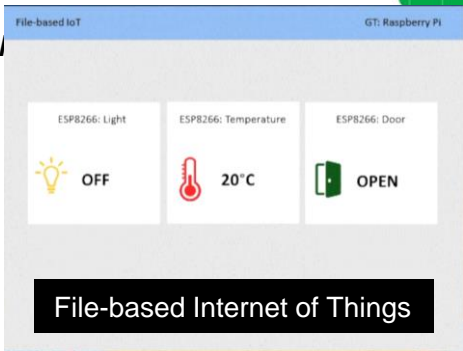
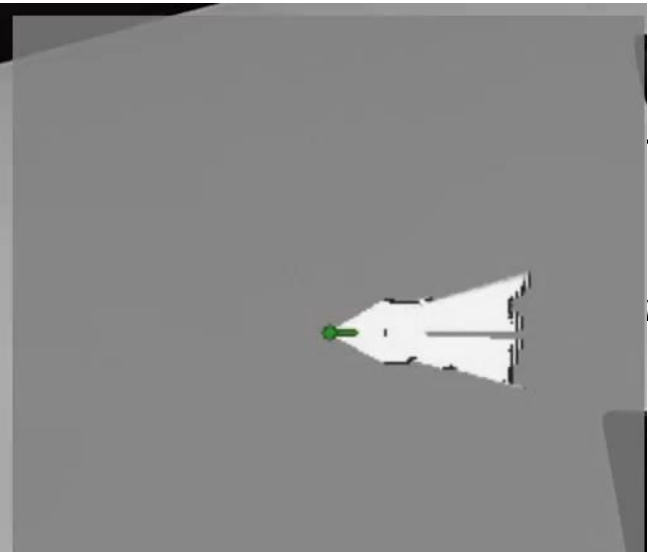
Human emotion recognition

Intelligent s

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File-based Internet of Things

Autonomous Robot Navigation

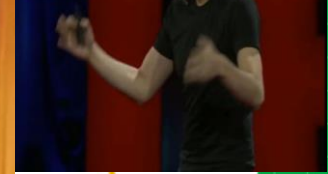
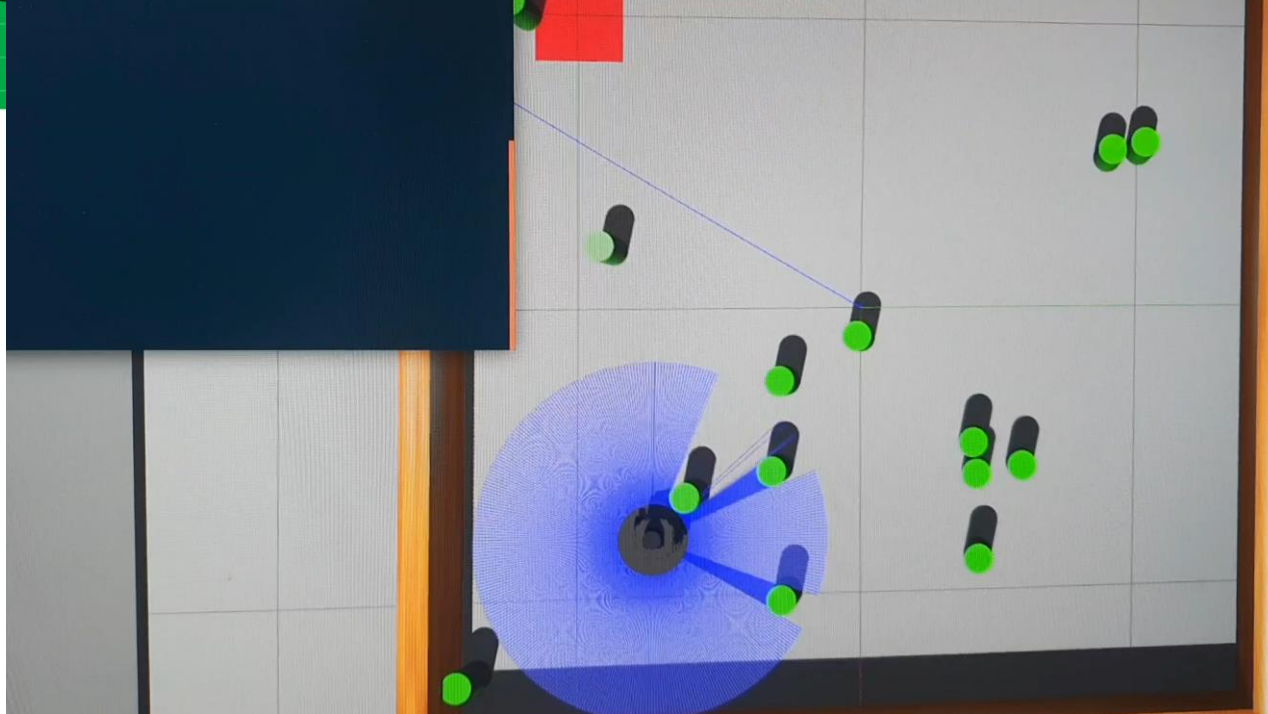


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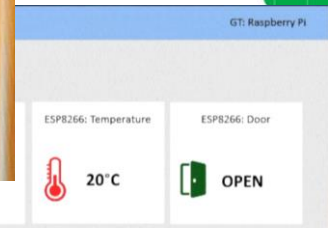


1.38

Classifier = MTCHN + Template Matching  
Method = Dynamic Margin Face Tracking with Template Matching (DMTMT)  
Time Taken=0.013, ConfFPS=75  
(388,104),(402,102),(4,2)



emotion recognition



# Deep RL Navigation in Crowd

File-based Internet of Things



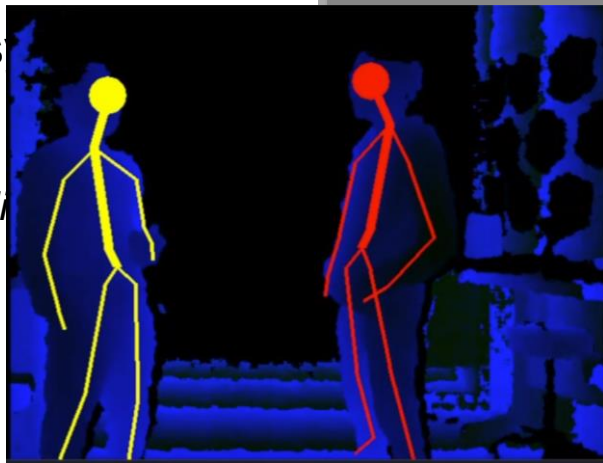
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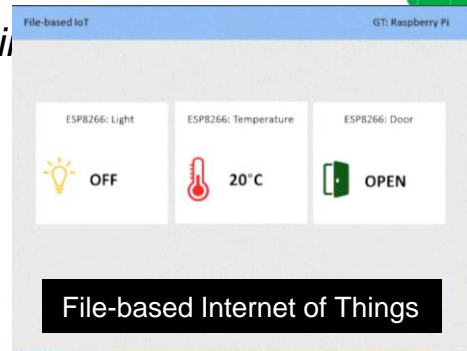
Human emotion recognition

Intelligent s

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Navigation



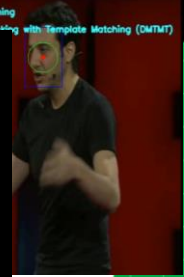
File-based Internet of Things

# Human Activities Discovery Crowd

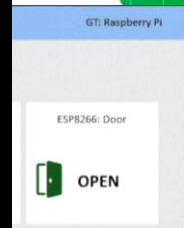


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Classifier = MTCHN + Template Matching  
Method = Dynamic Margin Face Training with Template Matching (DMFT)



cognition



pygame window

Server: 31 FPS  
Client: 62 FPS

Vehicle: Mercedes Coupe 2020  
Map: Town10HD\_Opt  
Simulation time: 0:02:18

Speed: 0 km/h  
Compass: 181° SW  
Accelero: ( 0.0, 0.0, 9.8)  
Gyrosco: ( 0.0, 0.0, 0.0)  
Location: (-114.4, 56.9)  
GNSS: (-0.000520, -0.001028)  
Height: -0 m

Throttle:   
Steer:   
Brake:   
Reverse:   
Hand brake:   
Manual:   
Gear: N

Collision:

Number of vehicles: 1

Self-Driving Car

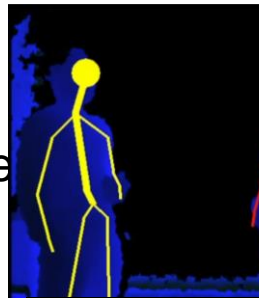


Navigation in Crowd

File-based Internet of Things



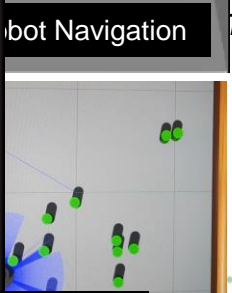
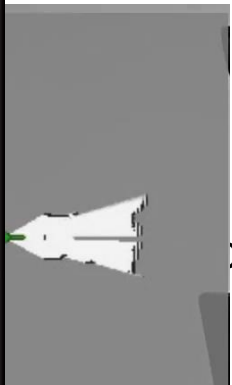
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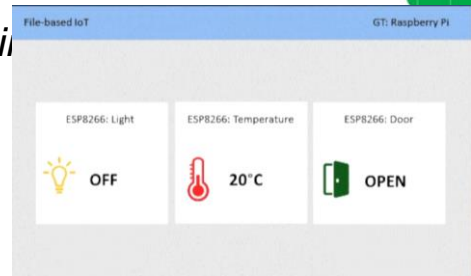
Human Activities



# AR-based Indoor Navigation



Human emotion recognition

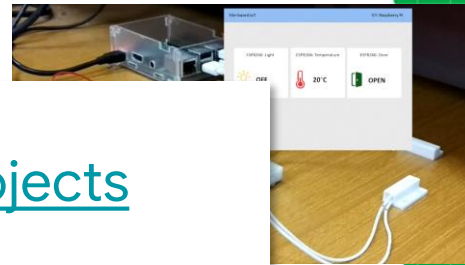


File-based Internet of Things





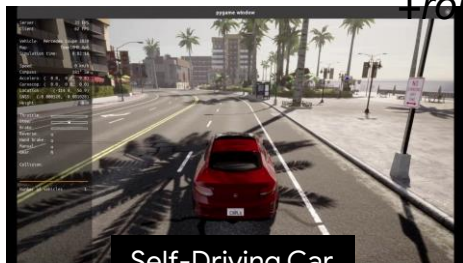
Human emotion recognition



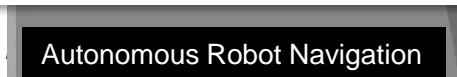
More information at <https://ailab.space/projects>



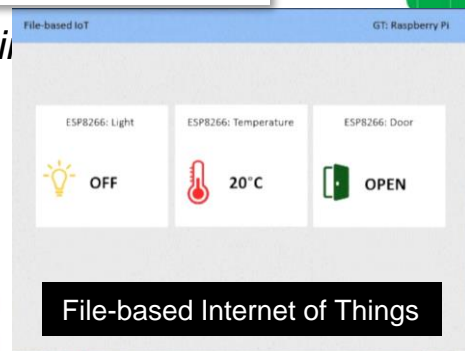
AR-based Indoor Navigation



Self-Driving Car



Deep RL Navigation in Crowd



File-based Internet of Things

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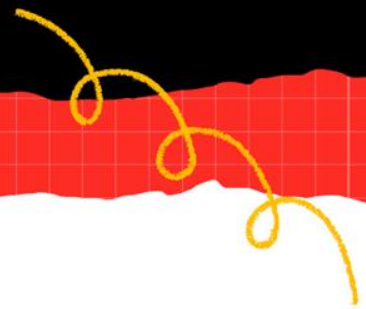
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# What makes a robot?

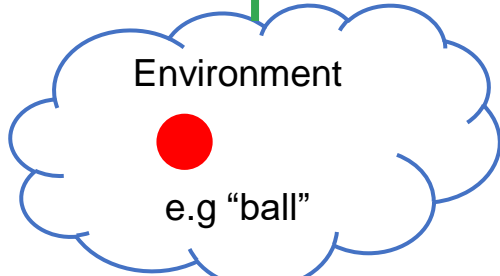
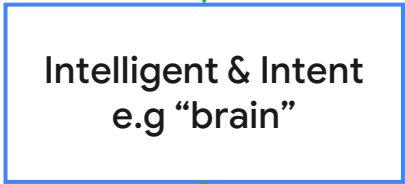


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Input(s)

Sense  
e.g "eyes"



Manipulate  
e.g "legs"

Output(s)

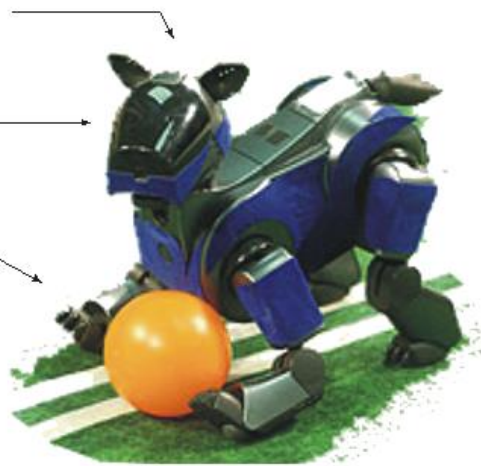


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“Brain” for the intelligence  
“Intent” to win the game

“Eyes” to sense the ball

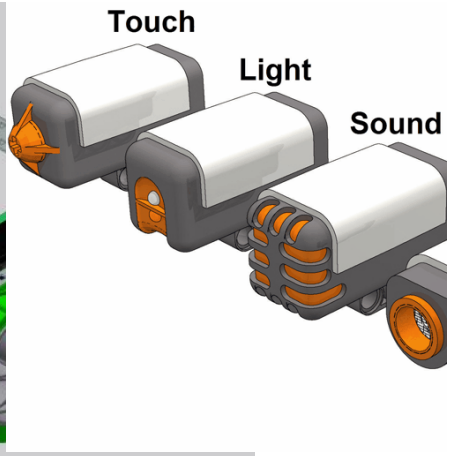
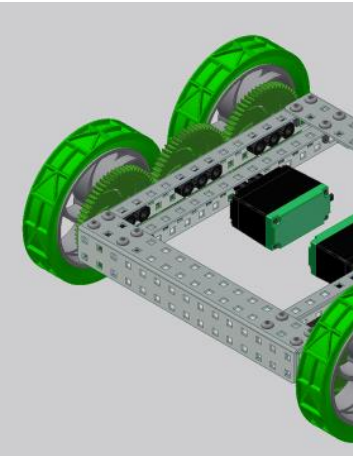
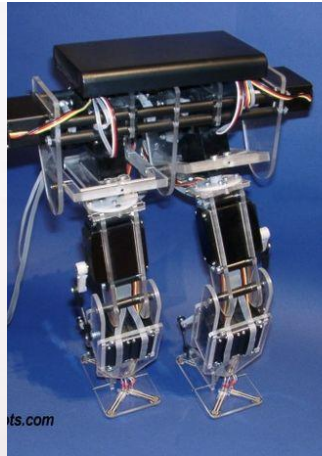
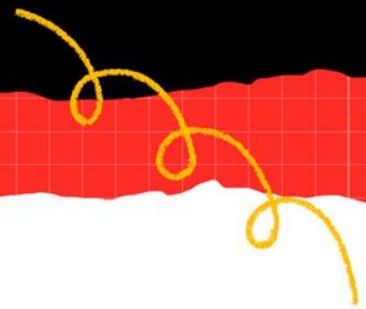
“Legs” to manipulate the ball



Source: <https://www.youtube.com/watch?v=kkUbyFa2MWc>



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```

Actuators/Effectors

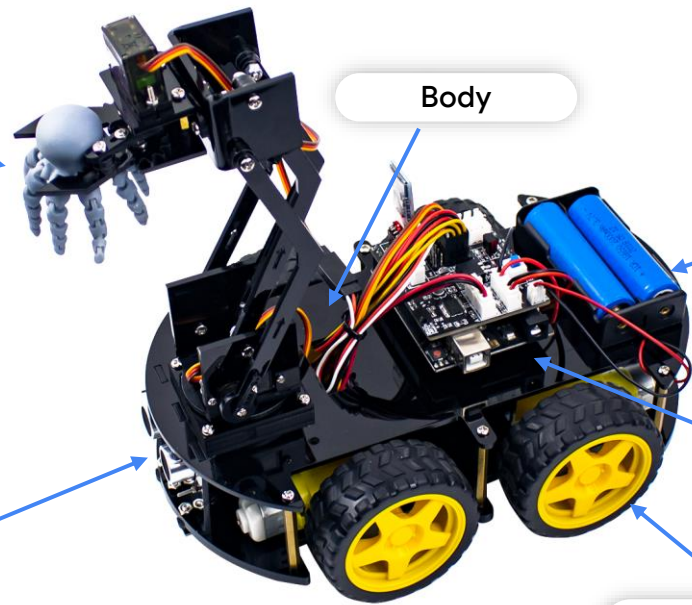
Body

Power Source

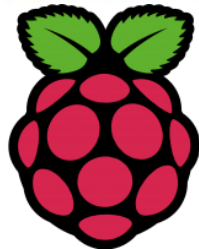
Controller

Sensors

Actuators/Effectors



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```



Alphabot2 Pi



Raspberry Pi



Python



C Language

C/C++



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# Workshop



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```

# Thank you!



<https://ailab.space>



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[@ailabspace](https://twitter.com/ailabspace)



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