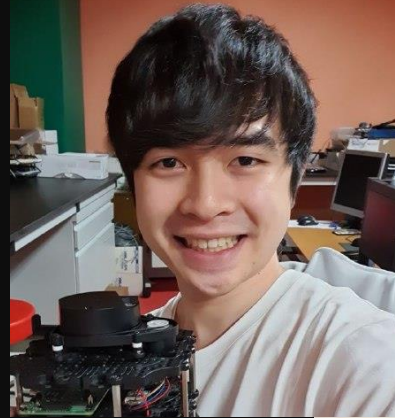


devfest

```
// You'll need  
// com.google  
listRef.listAll  
.addOn  
prefixes.  
// ALL  
// You  
}  
it  
each { item  
the items  
}
```

# Exploring Robot Programming with Python

 Google Developer Groups  
Brunei



Hafiq Anas & Nazrul Ismail  
Robolab, School of Digital Science,  
Universiti Brunei Darussalam

# Today's contents:

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

```
ext(  
  'Section Title',  
  style: TextStyle(  
    color: Colors.blue[200],  
  ),  
),  
),  
s.star,  
r: Colors.blue[500],  
Text('23'),
```

# devfest



Google Developer Groups

Brunei

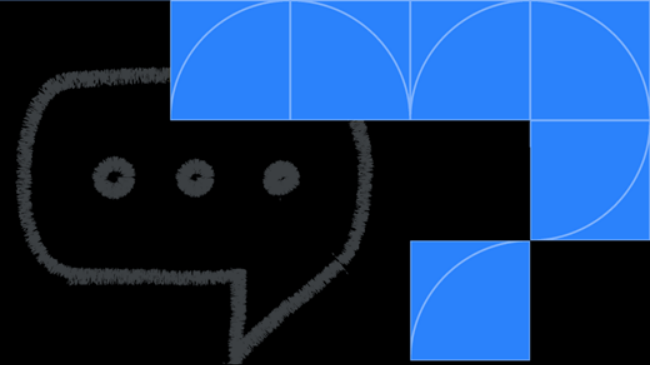


# What is a robot?

```
Text('Simple Statement or URL',  
style: TextStyle(  
color: Colors.blue[200],  
),  
),  
),
```

# devfest

```
s.star,  
r: Colors.blue[500],  
Text('23'),
```



*" 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. "*

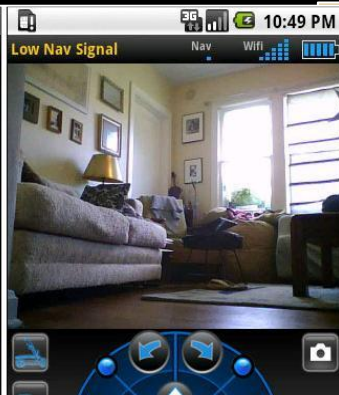
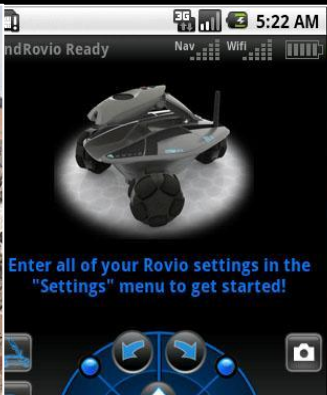
- Mataric, M. J. (2007). *The robotics primer*. MIT press.







# devfest









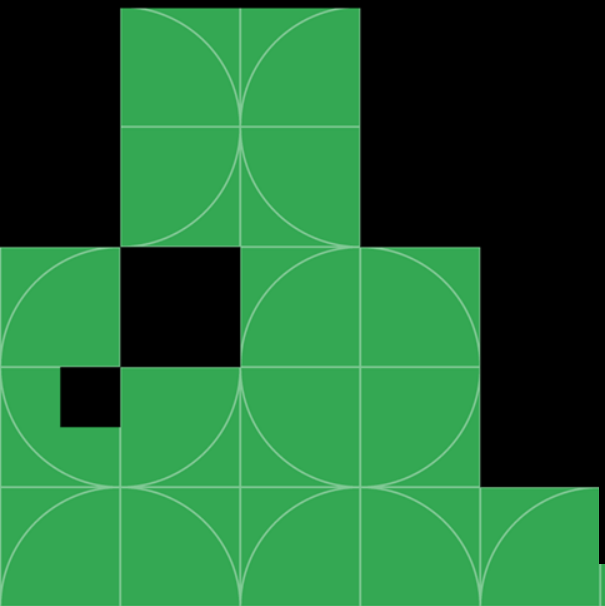


```
Text('Simple Statement or URL',  
  style: TextStyle(  
    color: Colors.green[200],  
  ),  
),  
),  
s.star,  
r: Colors.green[500],  
Text('23'),
```

# devfest



## Project Showcase



Human emotion recognition





devfest

## Adversarial attacks on ResNet Architecture

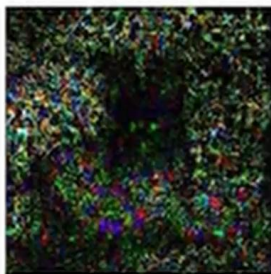
Original class = Tabby cat

Target class = sea lion

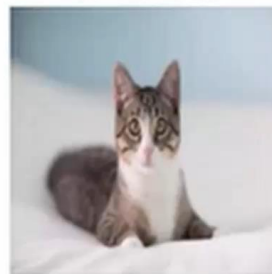
original



attack (amplified)

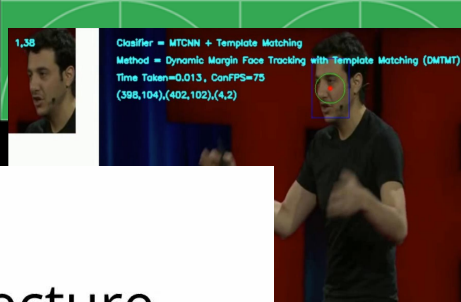


combined



True\_class prob. : 68.30 %  
Target\_class prob. : 0.01 %

Defense against Adversarial attacks



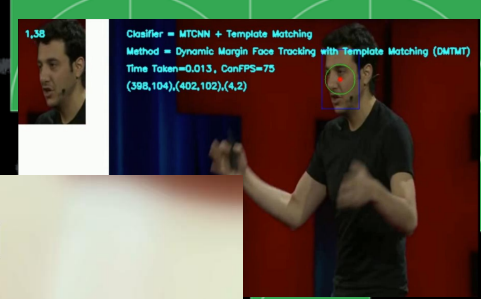
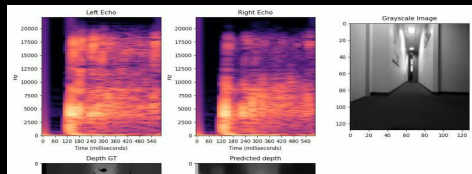
Recognition



```
Text('Simple Statement or URL',  
style: TextStyle(  
color: Colors.green[200],  
)),  
),  
),
```

devfest

```
s.star,  
r: Colors.green[500],  
Text('23'),
```



# Deep Reinforcement Learning-Based Mapless Crowd Navigation with Perceived Risk of the Moving Crowd for Mobile Robots

Hafiq Anas, Ong Wee Hong, Owais Ahmed Malik  
School of Digital Science, Universiti Brunei Darussalam  
Jalan Tungku Link, Brunei

in recognition

ResNet Architecture



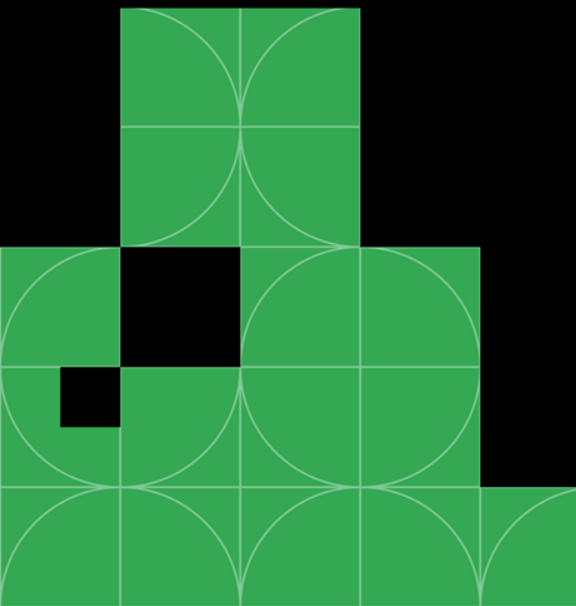
st Adversarial

Deep RL Social Navigation in Crowd

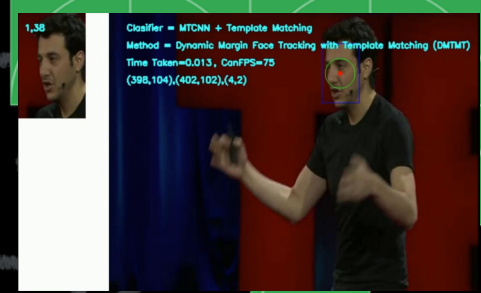
```
'Simple Statement or URL',
style: TextStyle(
  color: Colors.green[200],
),
),
),
```

# devfest

```
s.star,
r: Colors.green[500],
Text('23'),
```



...ping perception



Human emotion recognition



...nt Learning-Based  
Navigation with  
...g Crowd for Mobile Robots  
...ng, Dwaish Ahmed Malik  
...versiti Brunei Darussalam  
...link, Brunei

...avigation in Crowd

### Adversarial attacks on ResNet Architecture

Original class = Tabby cat  
Target class = sea lion

original	attack (amplified)	combined

True\_class prob. : 68.30 %  
Target\_class prob. : 0.01 %

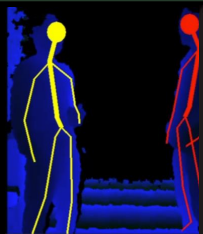
Defense against Adversarial attacks

## Human Activities Recognition





# devfest



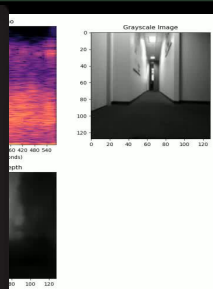
Human Activities Recognition



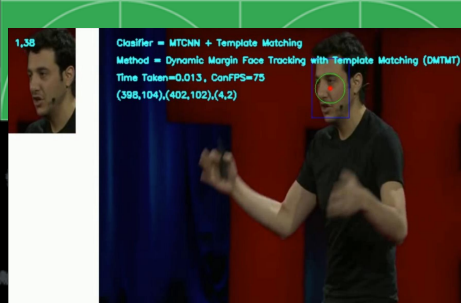
Self-Driving Car



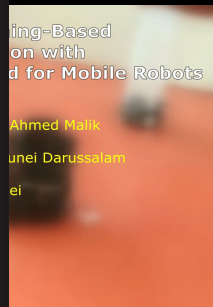
## AR Indoor Navigation



Deep learning perception




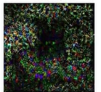

Human emotion recognition



Navigation in Crowd

### Adversarial attacks on ResNet Architecture

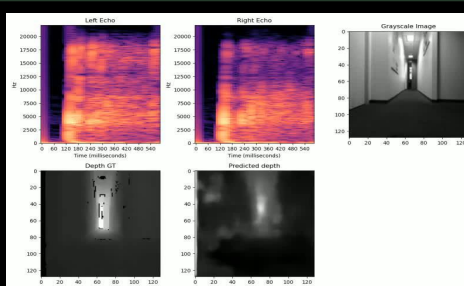
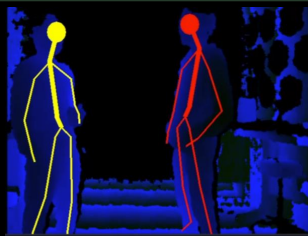
Original class = Tabby cat  
Target class = sea lion

original	attack (amplified)	combined
		

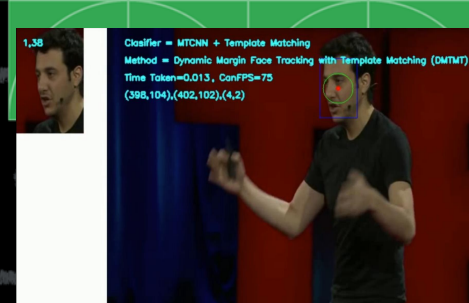
True\_class prob. : 68.30 %  
Target\_class prob. : 0.01 %

Defense against Adversarial attacks

devfest



Bio-sonar depth mapping perception



Human emotion recognition



AR Indoor Navigation

Self-Driving Car

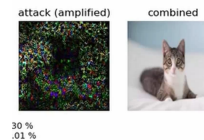


Deep Reinforcement Learning-Based

Deep RL Social Navigation in Crowd

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

attacks on ResNet Architecture



Defense against Adversarial attacks



```
Text('Simple Statement or URL',  
style: TextStyle(  
color: Colors.red[200],  
)),  
),  
),  
s.star,  
r: Colors.red[500],  
Text('23'),
```

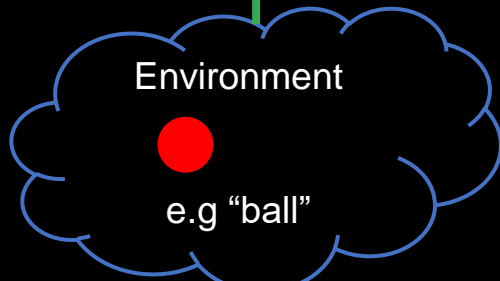
# devfest



Input(s)

Sense  
e.g "eyes"

Intelligent & Intent  
e.g "brain"



Manipulate  
e.g "legs"

Output(s)



```
'Simple Statement or URL',  
style: TextStyle(  
  color: Colors.red[200],  
),  
),  
),  
  
s.star,  
r: Colors.red[500],  
  
Text(1234)
```

# devfest

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

“Eyes” to sense the ball

“Legs” to manipulate the ball

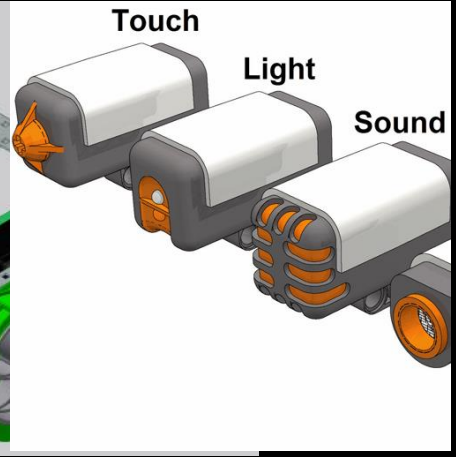
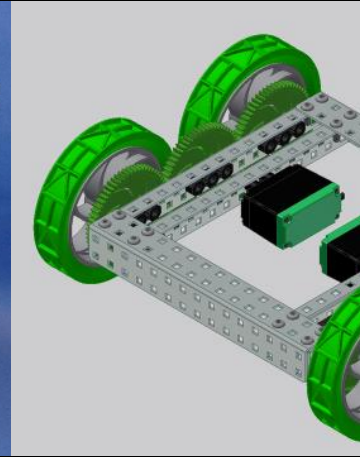
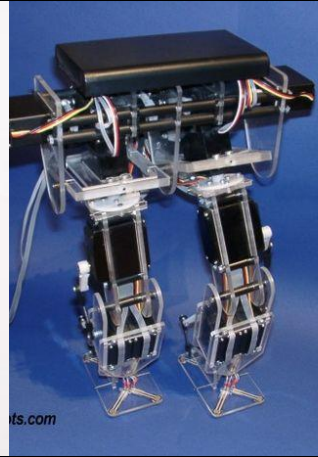


Source: <https://www.youtube.com/watch?v=kkUbyFa2MWc>

```
Text('Simple Statement or URL',  
style: TextStyle(  
color: Colors.red[200],  
),  
),  
),  
),
```

# devfest

```
s.star,  
r: Colors.red[500],  
Text('23'),
```



# devfest

```
Text('Simple Statement or URL',  
style: TextStyle(  
color: Colors.red[200],  
),  
),  
),  
),
```

```
s.star,  
r: Colors.red[500],  
Text('23'),
```

Actuators/Effectors

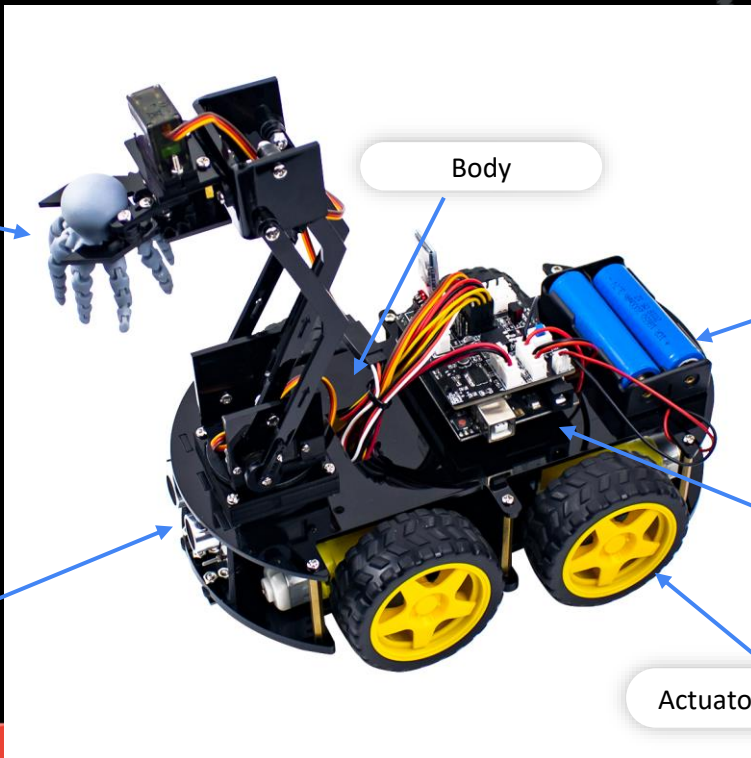
Body

Power Source

Controller

Sensors

Actuators/Effectors







```
Text('Section Title',  
  style: TextStyle(  
    color: Colors.yellow[200],  
  ),  
),  
),  
),
```

# devfest

```
s.star,  
r: Colors.yellow[500],  
Text('23'),
```



Google Developer Groups

Brunei



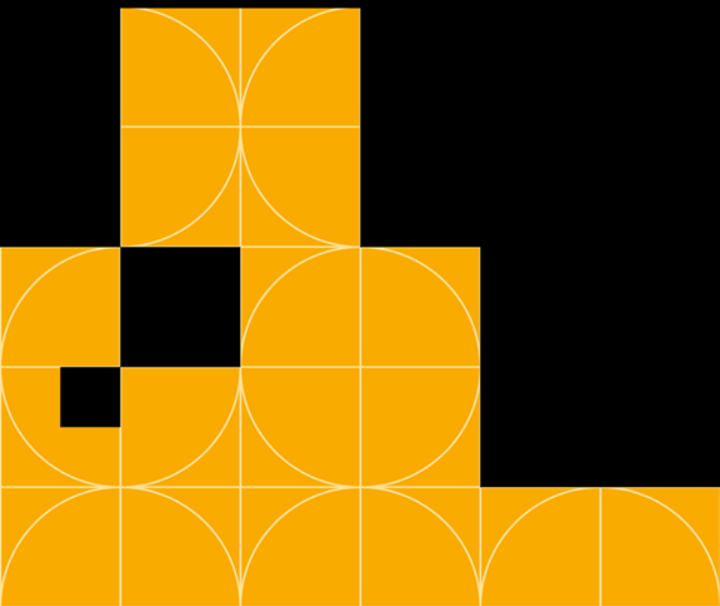
# Workshop

```
Text('Simple Statement or URL',  
  style: TextStyle(  
    color: Colors.yellow[200],  
  ),  
),  
),  
s.star,  
r: Colors.yellow[500],  
Text('23'),
```

# devfest



## Thank you!



<https://ailab.space>



[@ailabspace](https://www.instagram.com/ailabspace)



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

