



# THE WIN

## ONLINE USER EXPERIENCE AND GAMING INTERFACE

### CAMPAIGN MENU

The user will have the possibility of choosing among **four levels** of difficulty



When playing against the AI, a **"Help" button** is **available** and if pressed the best move possible will be computed and printed out

### COLLECT THEM ALL !

The use of the help button is tracked. The user will be **rewarded with stars** if she or he wins.

- **Three stars** if he defeats the AI **without any help**
- **Two stars** if **only one help** is requested
- **One star** if **more than one help** is requested

LEVEL 1



### ONLINE MENU



### SEND REQUEST

#### Functionalities:

- Display the list of players present on the network using bluetooth discovery
- Send a game invitation to a players on the network
- Refresh to update the list



### INVITE RECEIVED

#### Functionalities:

- Receive invitations from other groups to play against their AI or against a player
- Accept or refuse invitations. Refusing an invitation, sends it automatically to the other user and goes back to listening mode to receive other invitations

## ALPHAGO ZERO

Play against the AlphaGo Zero algorithm, the first method that **managed to beat the Go world champion in 2016, but well-tuned to be now unbeatable at connect-4.**

- Is trained by self-play reinforcement learning
- It combines a **neural network** and **Monte-Carlo Tree Search** in an elegant policy iteration framework to achieve stable learning



- Two clone model play using their NN's weight while a learning model sharpens his policy by gathering data from self-play, and every 100 games is tested, the training on a GPU took 3.13 days and covered roughly 3700 games

### WHY CHOOSE ALPHAGO ZERO :

- **Plays instantly** (way faster than any Minimax), doesn't need to compute an enormous amount of games in advance
- **Highly powerfull**, wins 95 games out of 100 against a basic Minimax algorithm
- A training that provides **20 different models** and thus a possibility to implement a level system

## HAND RECOGNITION PLAY IN AN IMMERSIVE ENVIRONMENT

### Camera capture



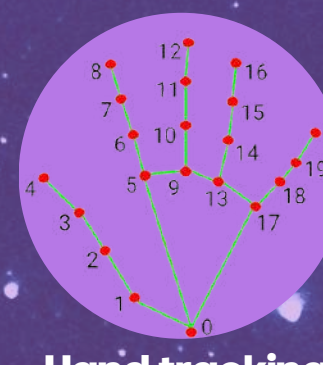
cv2.flip(image, 1)  
Horizontal flip

### Image preprocessing



cv2.cvtColor(image, cv2.COLOR\_BGR2RGB)  
BGR-to-RGB color conversion

### Image conversion



### Hand tracking

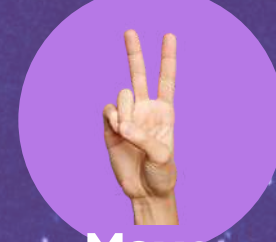
0.WRIST  
1.THUMB\_CMC  
2.THUMB\_MCP  
3.THUMB\_IP  
4.THUMB\_TIP  
5.INDEX\_FINGER\_MCP  
6.INDEX\_FINGER\_PIP  
7.INDEX\_FINGER\_DIP  
8.INDEX\_FINGER\_TIP  
9.MIDDLE\_FINGER\_MCP  
10.MIDDLE\_FINGER\_PIP  
11.MIDDLE\_FINGER\_DI  
12.MIDDLE\_FINGER\_TI  
13.RING\_FINGER\_MCP  
14.RING\_FINGER\_PIP  
15.RING\_FINGER\_DIP  
16.RING\_FINGER\_TIP  
17.PINKY\_MCP  
18.PINKY\_PIP  
19.PINKY\_DIP  
20.PINKY\_TIP

hand.process0  
Finger hand detection

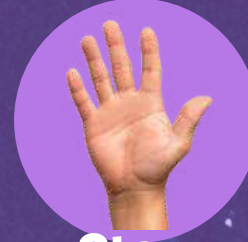
The machine learning  
Hand landmark

Gesture detection based  
on pre-defined map

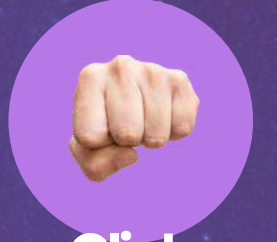
### Gesture recognition



Move



Stop



Click







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### ONLINE MENU



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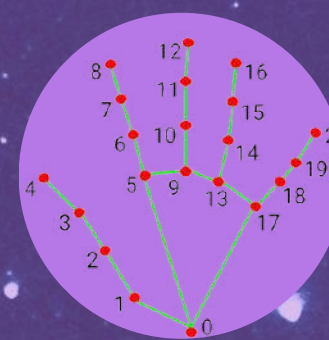
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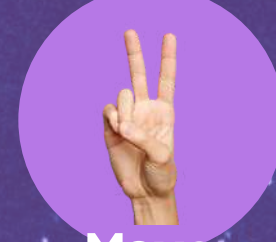
0.WRIST	10.MIDDLE_FINGER_PIP
1.THUMB_CMC	11.MIDDLE_FINGER_DI
2.THUMB_MCP	12.MIDDLE_FINGER_TI
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hand.process0  
Finger hand detection

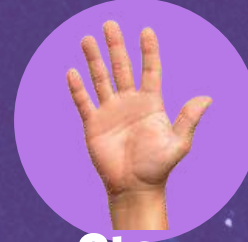
The machine learning  
Hand landmark

Gesture detection based  
on pre-defined map

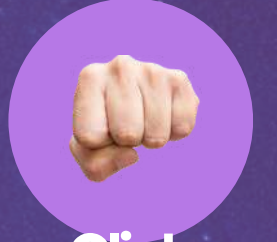
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#### Move



#### Stop



#### Click







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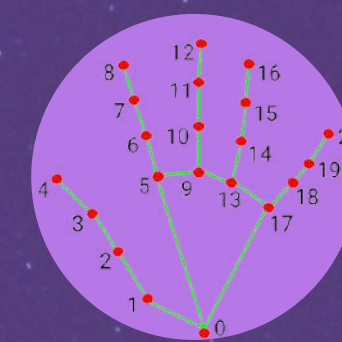
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## HAND RECOGNITION PLAY IN AN IMMERSIVE ENVIRONMENT

Camera capture

Image preprocessing

Image conversion



Hand tracking

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hand.process()

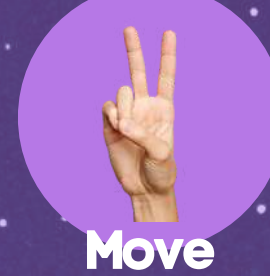
Finger hand detection

The machine learning

Hand landmark

Gesture detection based on pre-defined map

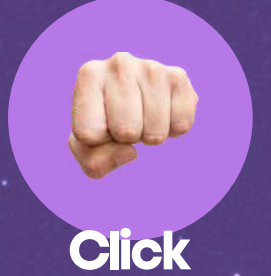
Gesture recognition



Move



Stop



Click



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### ONLINE MENU



SEND REQUEST



INVITE RECEIVED

Functionalities:

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Functionalities:

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# THE WIN

## A UNIQUE EXPERIENCE WITH THE BEST AI TOOL

### CAMPAIGN MENU

The user will have the possibility of choosing among **four levels of difficulty** with different generation of the AI



When playing against the AI, a **"Help" button** is available and if pressed the **best move** possible will be computed and **printed out**

### COLLECT THEM ALL !

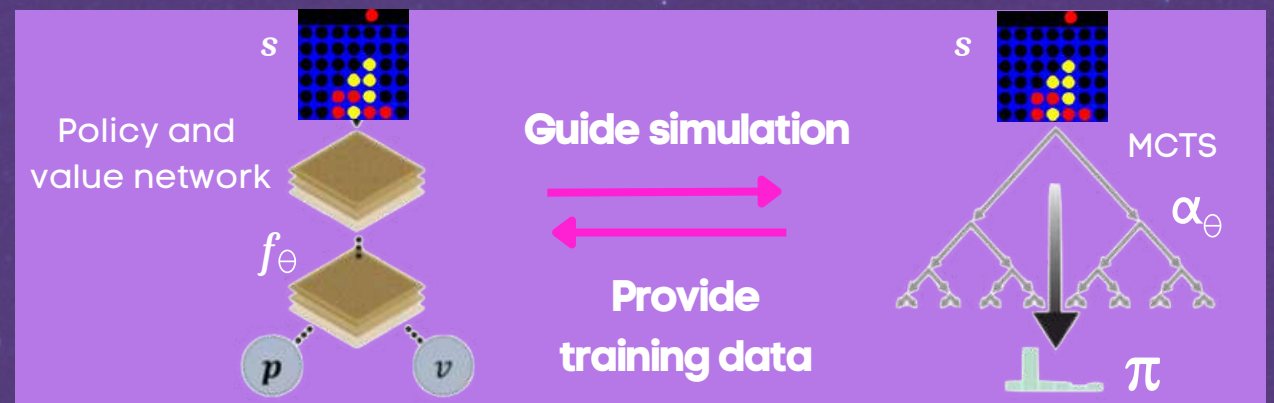
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## ONLINE EXPERIENCE

### ONLINE MENU

An experience online with **two modes** :



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### INVITE RECEIVED

#### Functionalities:

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## HAND RECOGNITION

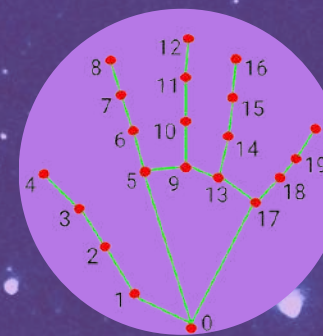
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### Image preprocessing



### Image conversion



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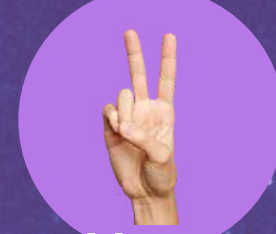
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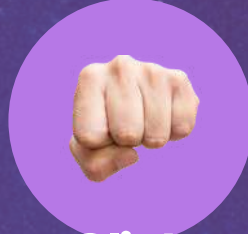
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### Move



### Stop



### Click

