Part.1

Understanding AI

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1 What is AI?

Hello there! Artificial Intelligence (AI) refers to the ability of robots or computers to learn new things and make decisions on their own, just like how humans learn and make decisions. It can do things that usually require human intelligence, like recognizing your voice, understanding what you say, or even playing games.

Imagine having a toy that can understand your words and learn from the information you provide, just like how you learn from your parents, teachers, and friends. The more you teach it, the smarter it becomes. With your input, it will be able to do things on its own like playing games with you or helping you with your homework.

AI is not only used for playing games but it can be used for helping our community and solving big problems in our society, like combating crimes and finding cures for diseases.

So, in summary, AI is the ability of machines to learn and perform tasks that usually require human intelligence.

💬 Will AI take over the role of a singer?

An AI singer is a computer program that has been trained to sing like a human. Just like how humans can learn to sing by listening to music and practicing, AI singers are taught to sing by analyzing recordings of human singers and learning from them.

The AI singer can then use this knowledge to create its own music and sing songs just like a human would. Some AI singers even use special software to create unique vocal styles and effects that human singers might not be able to do.

To summarize, an AI singer is like a robot that has been taught to sing by listening to human singers and learning from them. It can then create its own music and sing songs in a unique way.

MEMO

Team Activity: Think of other examples of AI being used around you and share them with your teammates.
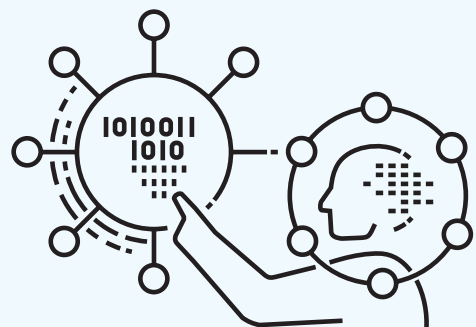
2 Into the world of AI

Let's think about the answers to the following two questions and fill in the missing boxes in the news anchor's live broadcast.

Q1 What is the 'intelligence' that humans possess?

Q2 Can computers or machines have intelligence like humans?

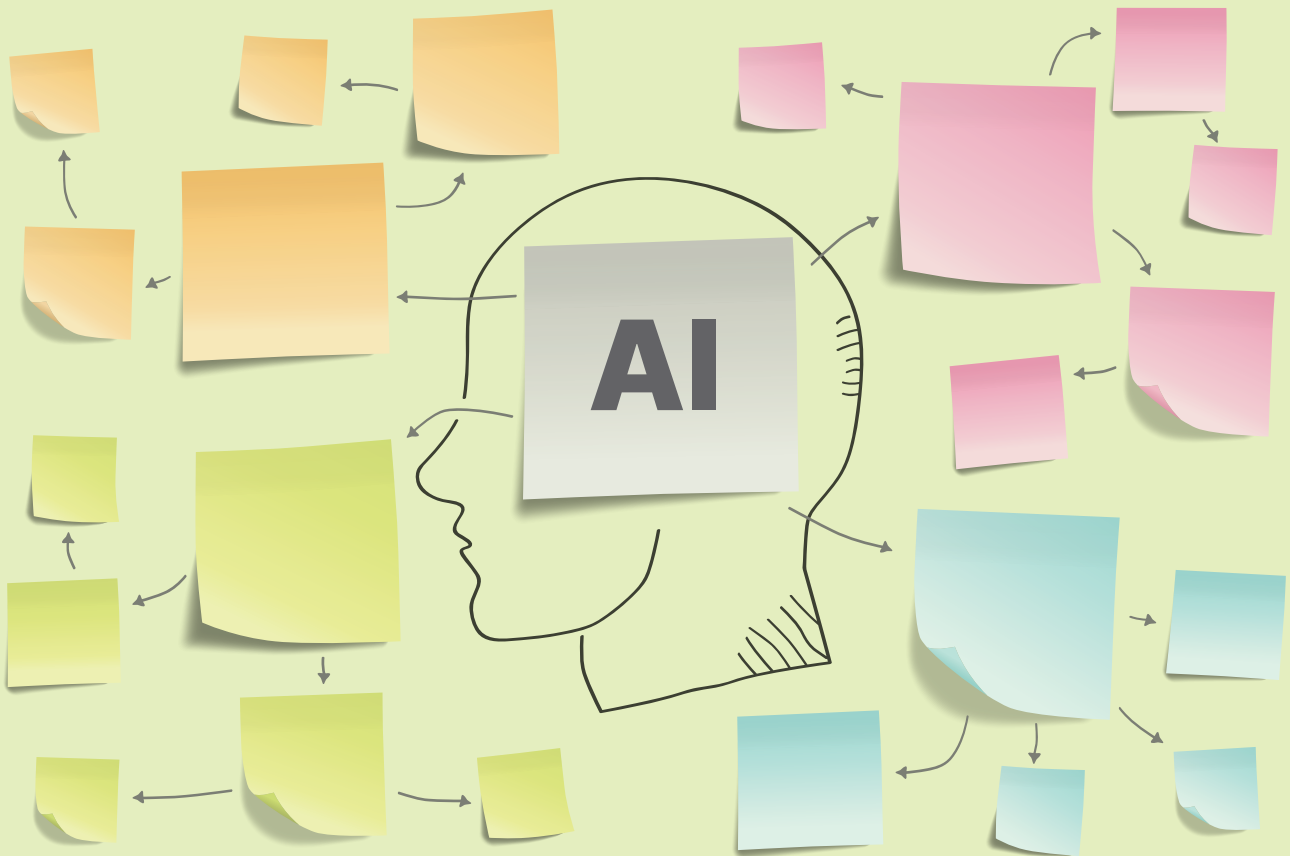**MEMO**

Let's think about and discuss some examples of AI being used around us.

Materials: Post-it notes, writing utensils

Examples of AI around us

Team Name:

Team Members:

Team Activity Google examples of AI, write them on the post-it notes, and share what you find with your teammates.

3 The role of AI

Intelligence Agent

An intelligent agent is a software or hardware program designed to mimic human intelligence. It is programmed to adapt to its environment by considering which sensors to use for perception, which actuators to use for actions, and how to measure its own performance in achieving the desired goals.

Agent type	Performance	Environment	Measurement	Actuator
Organizing Robot	Percentage of items correctly organized	Logistics warehouse, Organized boxes, etc.	Cameras, joint angle detectors, distance sensors, etc.	Jointed arms and hands, wheels, etc.
English Test AI Program	Student's test score	Students, Testing Institutions, etc.	Tools to insert the correct answers, such as keyboard, mouse,microphone, etc.	Screens displaying exercises, suggested courses, incorrect answers, etc.
Diagnosis System	Effect of treatment, Cost reduction	Patients, Hospital, Doctors, etc.	Equipment to document the patient's symptoms	Display showing the results

MEMO

💬 AI in the real world
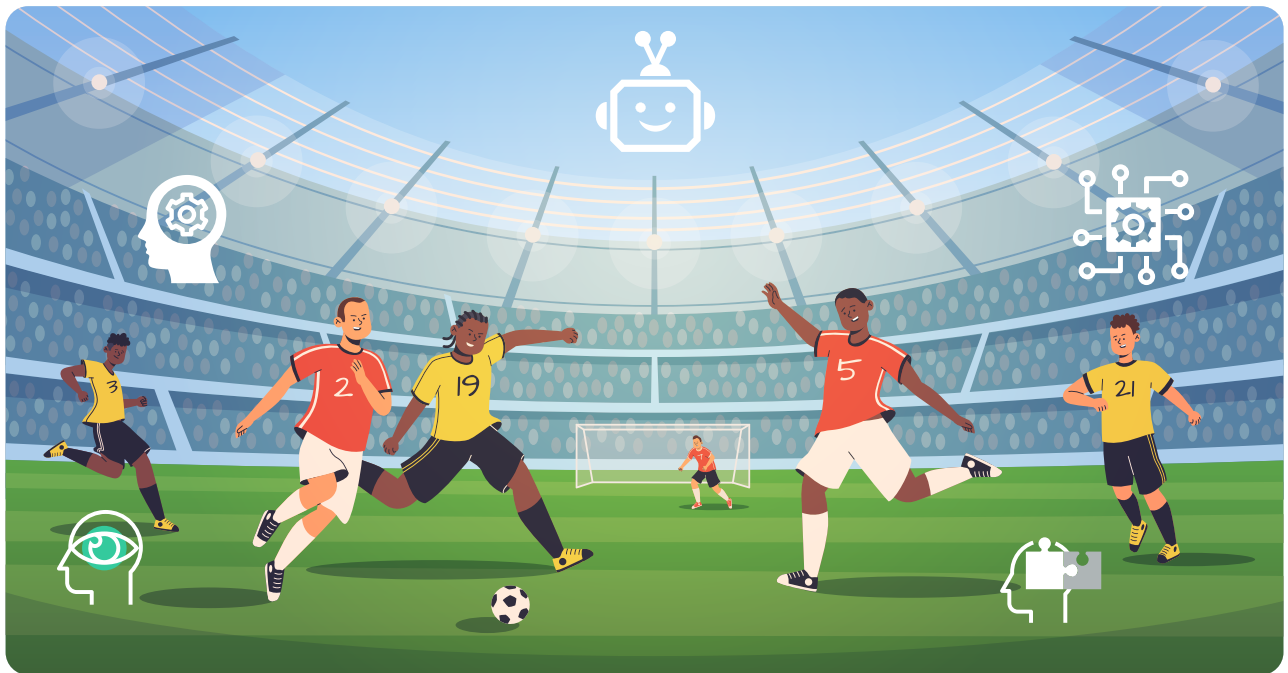
AI is already being used in soccer games to assist in various aspects of the game.

For example, AI is used to analyze the performance of the team and individual players.

AI algorithms can process large amounts of data and provide real-time feedback, which allows coaches and analysts to gain greater insights into players' movements, passing accuracy, and other metrics that can help make effective strategic decisions during a game.

AI can also be used to replay videos, helping referees to make accurate decisions about whether or not a foul has been committed or a free kick should be awarded.

Additionally, AI-powered cameras can be used to track the movement of the ball and players on the field, providing fans with a better view of the game and enabling a more immersive and interactive experience.

So while AI may not be able to replace human judges entirely, it plays an important role in assisting with certain aspects of the game.
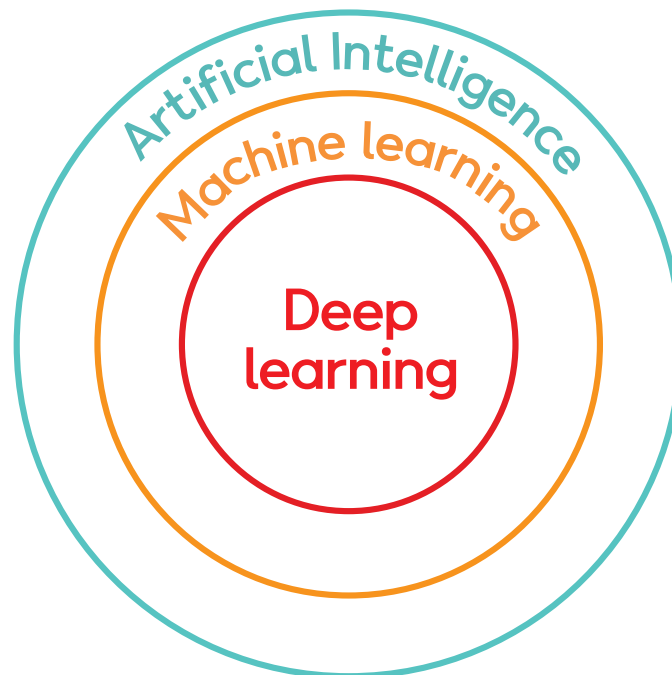
MEMO

What is learning for AI?

- Learning is essential for the improvement and development of AI.
- An AI without the capability to learn cannot perform its expected role.

Machine learning is a branch of artificial intelligence that involves teaching computers to learn from data, without being explicitly programmed. In other words, machine learning algorithms can improve their performance over time by learning from new data. Machine learning algorithms can be supervised (where the machine is trained on labeled data), unsupervised (where the machine learns patterns in the data without labels), or semi-supervised (where the machine learns from a combination of labeled and unlabeled data).

Deep learning is a subset of machine learning that involves training artificial neural networks, which are algorithms inspired by the structure and function of the human brain. Deep learning algorithms can automatically learn to recognize patterns and features in data by analyzing multiple layers of information. These algorithms are called "deep" because they often involve many layers of interconnected nodes, each of which performs a specific computation on the input data.

Let's discuss how we can utilize AI

How is AI being used in various fields?

AI is being used in many different fields, such as healthcare, transportation, and entertainment. In healthcare, doctors and scientists use AI to help them diagnose diseases and find new treatments. In transportation, engineers use AI to help design safer cars and planes that can drive or fly by themselves. And in entertainment, game developers use AI to create more realistic characters and develop better game features.
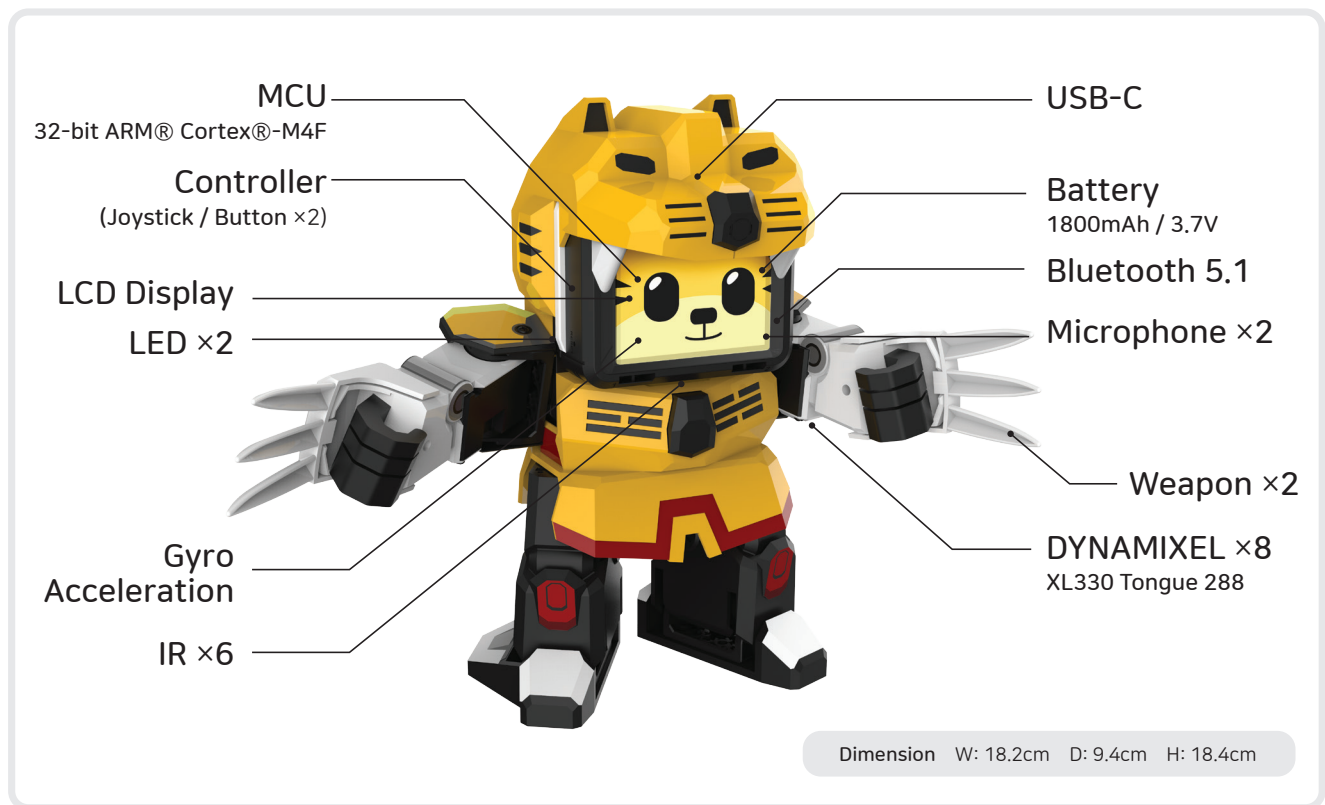
Let's discuss how we can utilize AI in the fields below

Education	Finance	Arts & Culture	Food

Introducing Tig and its features

1 Let's learn about Little Humanoid Tig.

MCU
32-bit ARM® Cortex®-M4F

Controller
(Joystick / Button ×2)

LCD Display

LED ×2

Gyro
Acceleration

IR ×6

USB-C

Battery
1800mAh / 3.7V

Bluetooth 5.1

Microphone ×2

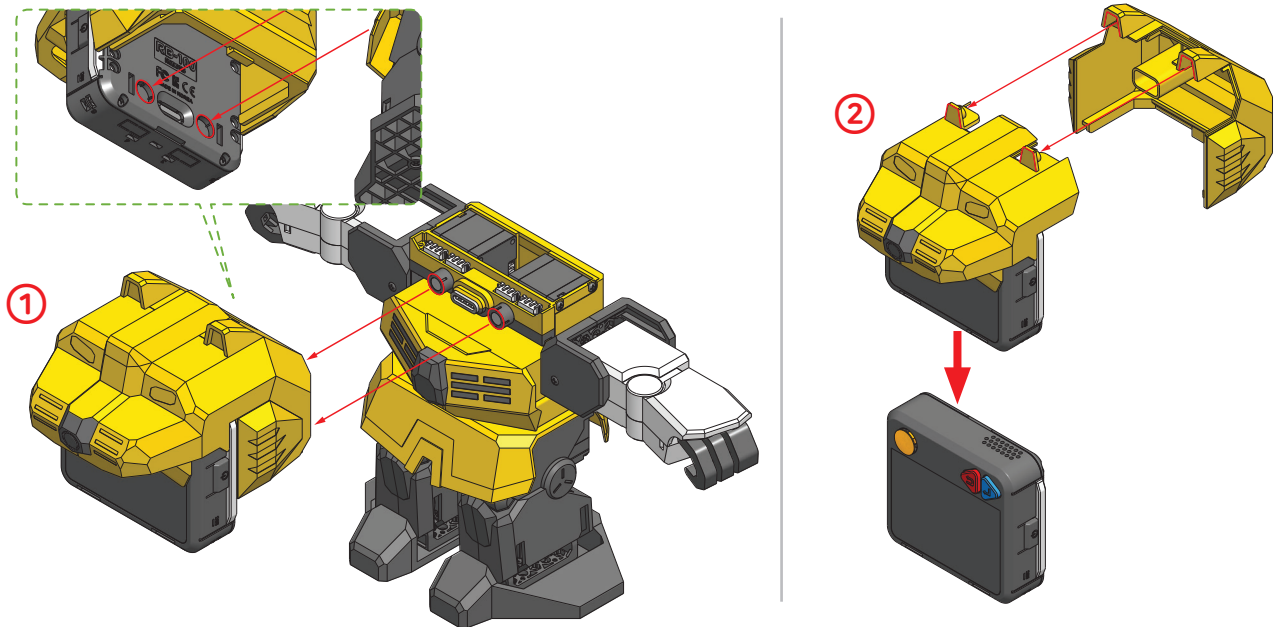Weapon ×2

DYNAMIXEL ×8
XL330 Tongue 288

Dimension   W: 18.2cm   D: 9.4cm   H: 18.4cm

Tig is a small humanoid robot designed for AI coding, featuring an LCD screen that supports various facial expressions and a robot body composed of eight joints, enabling it to perform a wide range of tasks, such as running, martial arts, and other performances. Moreover, Tig can be coded and controlled by not only personal computers but also smart devices, allowing users to use Tig anywhere, regardless of location. By utilizing coding, it is possible to control a variety of AI functions, including AI image recognition, motion recognition, voice recognition (STT), voice conversion (TTS), and translation, in addition to more straightforward controls like image, sound, and robot motion.
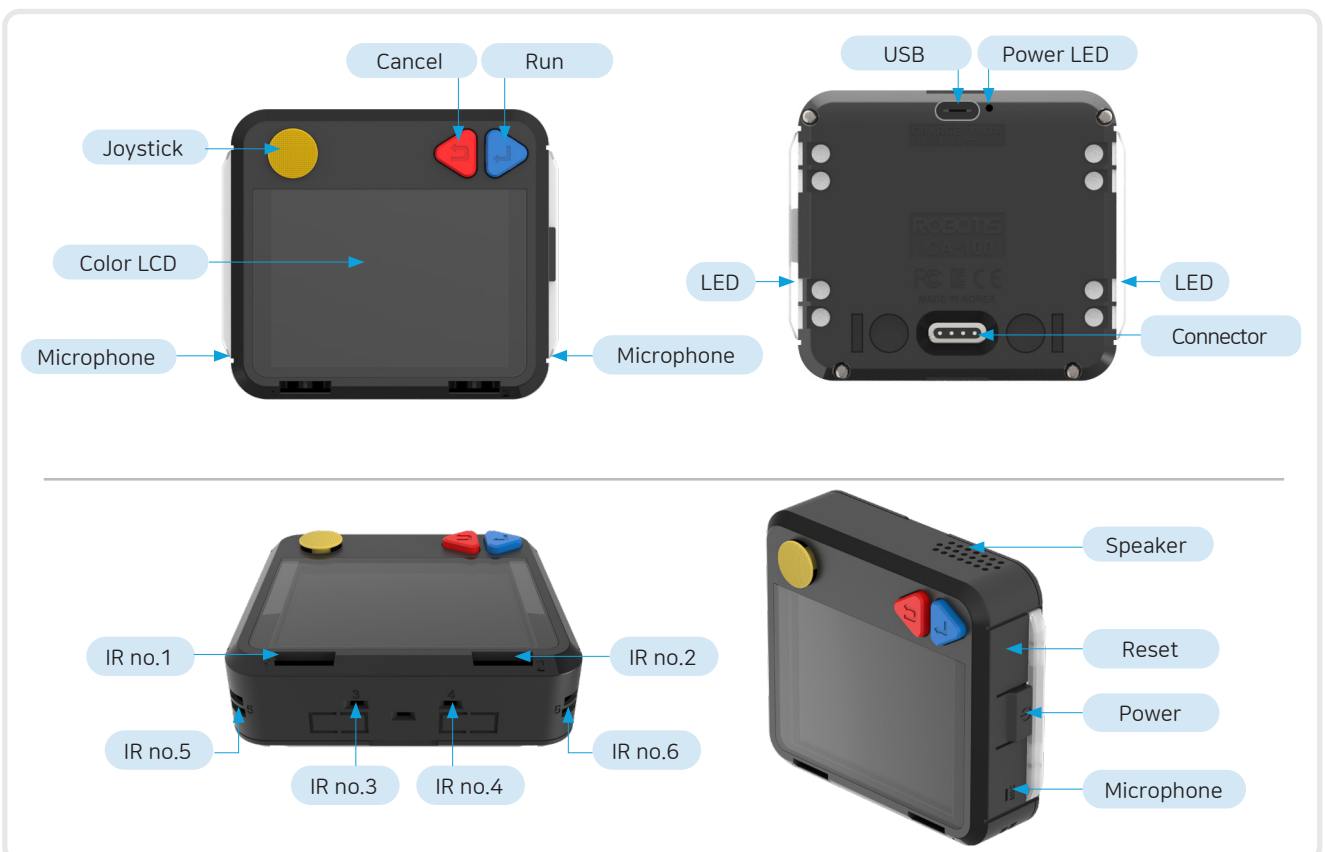
2 Separating the head and controller of Tig

First, remove the head of Tig from its body as shown in ①.

Next, pull the head frame backward as shown in ② to detach the controller from the head.

3 Let's look at the different functions in the controller (RB-100).

Cancel   Run

Joystick

Color LCD

Microphone   Microphone

USB   Power LED

LED   LED

Microphone   Connector

IR no.1   IR no.2

IR no.5   IR no.6

IR no.3   IR no.4

Speaker

Reset

Power

Microphone

4   How to change the controller setting to [Non-member mode].

For entry coding, the controller setting must be changed to [Non-member mode].

Press and hold the power button for 3 seconds to turn on the power of the controller.

When the barcode appears, proceed as follows.

joystick   cancel

Settings>APP Connect

Scan the QR code !

RB-100 (02BD)
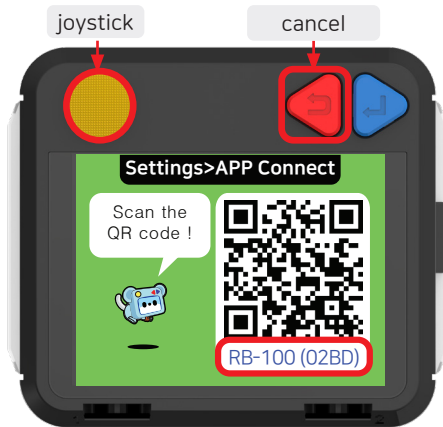
① Keep pressing the cancel button (◀)

② Move the joystick in the order of ↑ , ↓ , ← , →

③ The controller will be set to 'Non-member mode'.

> ✅ **How to check the settings of non-member mode**
>
> Screen Menu > Settings > Detailed Option Settings > Mode Change > Non-member mode check and press the [Cancel button] to return to the screen menu

5   Let's look at the 'sensor monitor' functions

① Use the joystick on the controller screen to navigate to 'coding'.

② Press the run button (▶) to enter the coding menu.

③ Select 'sensor monitor' from the list of options.

④ Choose a sensor from the list and observe the changes in the value.

Coding>>IR Sensor
❶ 0 ❷ 0
❸ 78 ❹ 69
❺ 398 ❻ 16

100% 13:25

GAME   CODING   SET

Coding
⭐ R+Block Storage Box
〰️ Sensor Monitor
🔧 Function Test

Infrared Sensor
Acceleration Sensor
Gyro Sensor
Microphone Sensor
Motor Position Sensor
Controller Angle

Coding>>Accelerometer
Z : 32
X : -32   Y : 0

Coding>>Gyroscope
X : 0
Y : 0
Z : 0
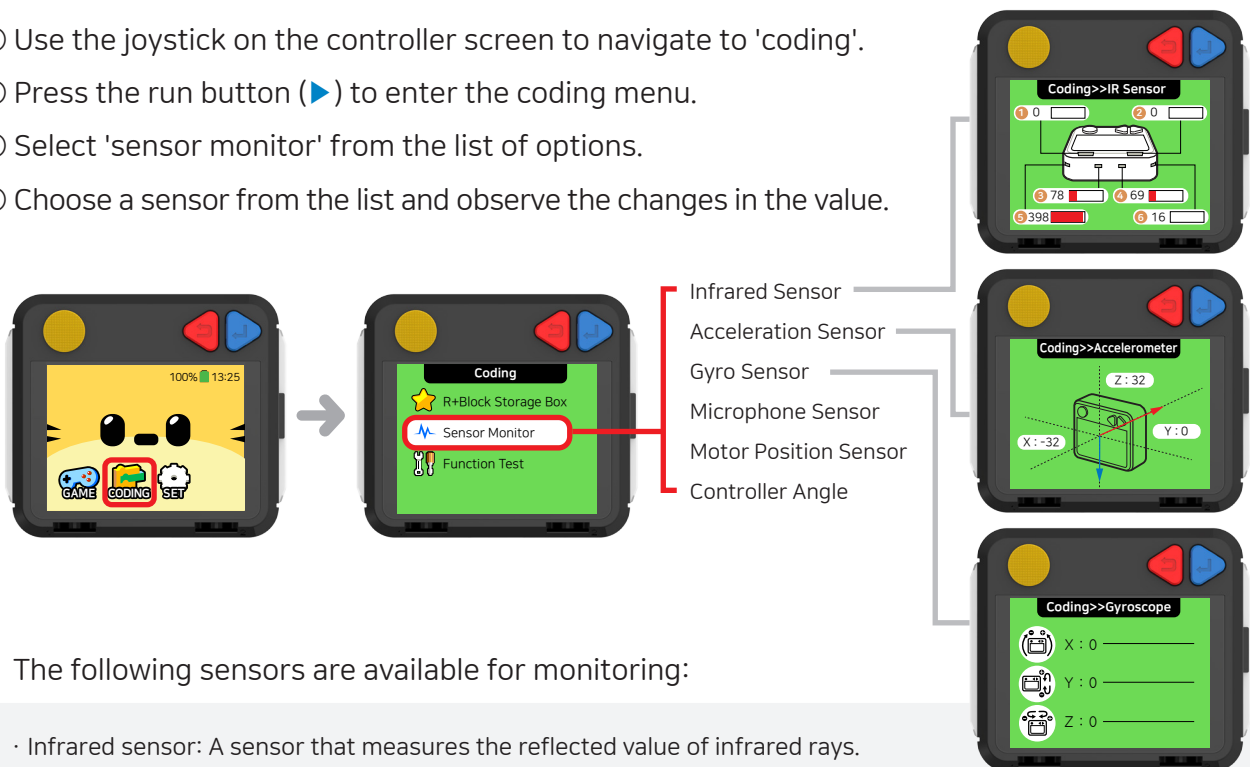
The following sensors are available for monitoring:

· Infrared sensor: A sensor that measures the reflected value of infrared rays.

· Acceleration sensor: A sensor that measures the magnitude of acceleration using the X, Y, and Z axes.

· Gyro sensor: A sensor that measures the rotating force of the controller using the X, Y, and Z axes.

· Microphone Sensor: A sensor that measures the loudness and direction of sound using two microphones.

· Motor position value: The position value of each motor is measured after attaching the controller to the body.

· Controller Angle: The degree of the controller's tilt in terms of Roll and Pitch is measured.
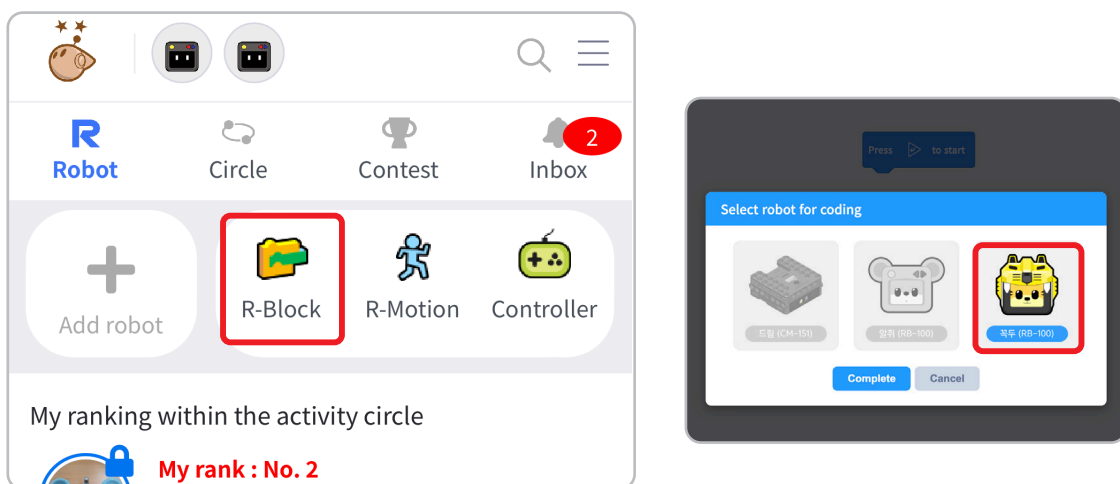
6 Let's check Tig's status through the action check function.

Follow the method below to check if Tig is working properly:
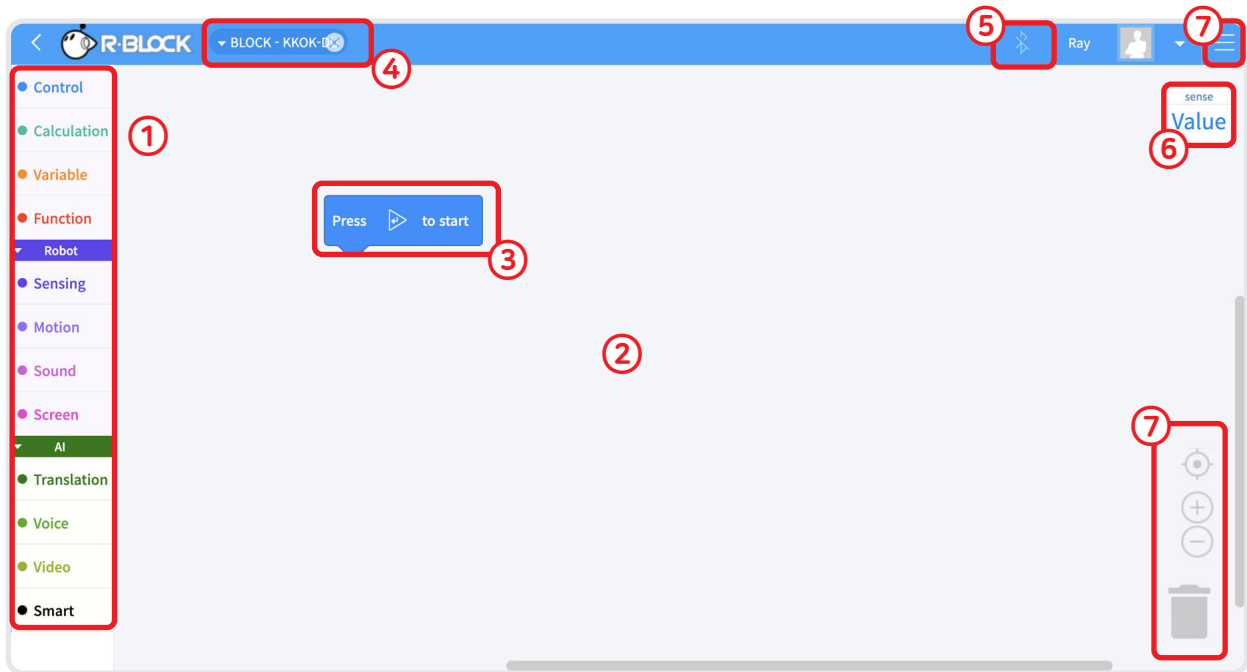

7 How to run R-Block.

① Open the Chrome browser and enter www.enjoy.steamcup.org in the search engine.

② If you have a STEAMCUP app ID, log in and select 'R-Block'.

③ When the screen changes, find and select Tig from the list and click 'Done'.

Note: R-Block can also be conveniently used in the STEAMCUP app on your smartphone.

⑧ Let's take a look at R-Block's usage environment.

① **Block category**

This is the place where you can find the command blocks for each function. You can find and drag a block from the 'block category' to place it on the 'starting block' or drag a block back to the 'block category' to delete it.

② **Work screen**

This is the space where blocks can be placed.

③ **Starting block**

Excluding 'function blocks', you must combine a 'command block' with a 'starting block' when coding for the code to work.

④ **List of Codes**

You can find a list of working codes at the top of the screen. You can import and work with multiple files.

⑤ **Bluetooth icon**

This icon is used when connecting communication with the robot. You can connect the robot with R-Block using the BLE number indicated on the controller.

⑥ **Sensor monitor**

This is a sensor monitor function supported by R-Block. If you select a 'value block', you can check the value of the corresponding sensor here in real time.

⑦ **Menu icon**

You can find various functions such as create, import, save, and AI monitor under menu. You must log in to STEAMCUP app to use functions such as save and import.

9 Let's connect the communication between R-Block and Tig.
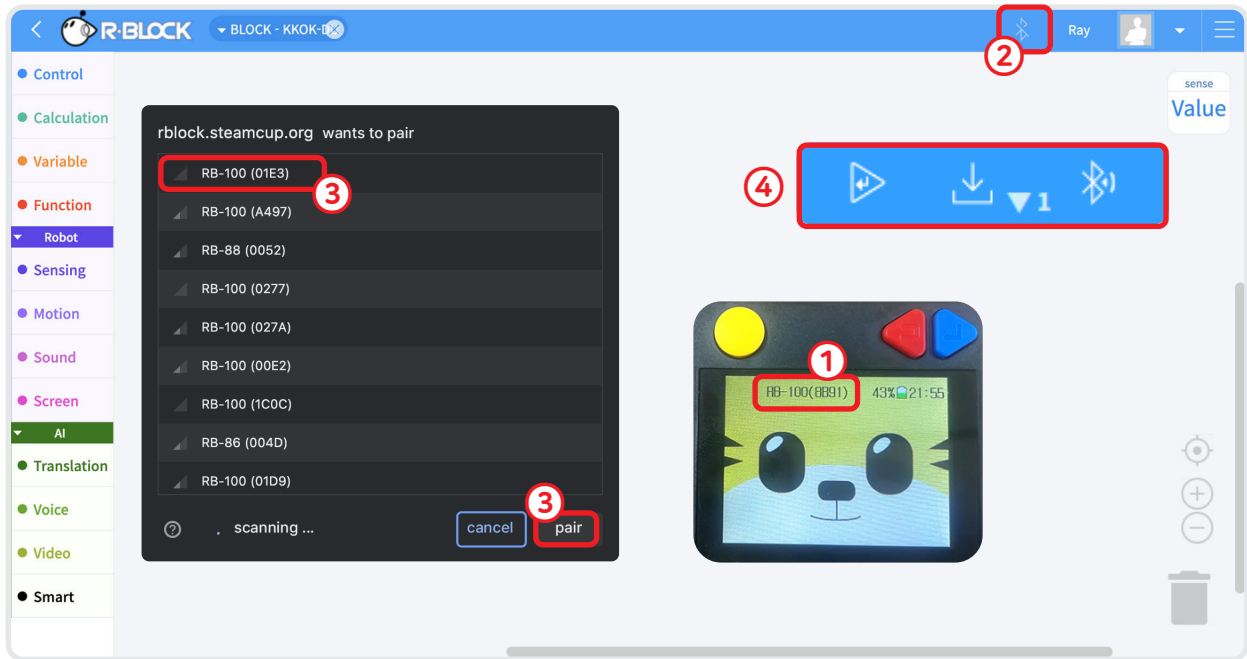
① After turning on the power of the controller, check the last 4 digits of the BLE address on the screen.

② Click the Bluetooth icon to open the pop-up window with the list of Bluetooth devices.

③ Find and select the name of the device with the same BLE address from the list. Then, click the [Pairing] button.

④ Once the robot is connected to the app, the [Execution] and [Download] icons appear on the left side of the Bluetooth icon after a 'beeping' sound, and a mobile phone icon appears on the left side of the controller screen.

10 Let's learn how to place and delete blocks.

Blocks can be placed and deleted by dragging and dropping them using the left click of the mouse.
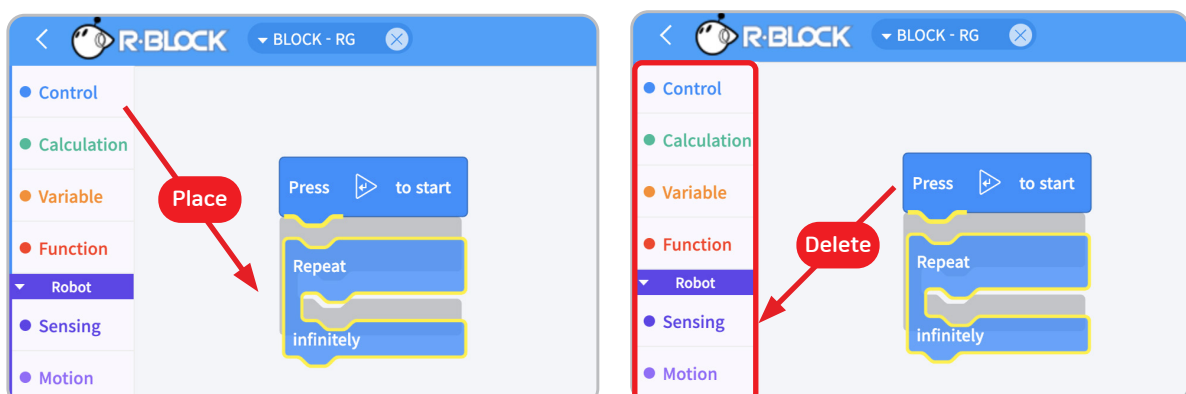
11 Let's learn how to replicate and combine blocks.

Press ▷ to start

RG Robot stand up ▼

Right click and select cop

Copy
Add Annotation
Contract block
deactivate block
Delete block
Help

Value block

⚠ IR Sensor 🔒 ▼ Value

Pick random 1 to 100

Timer ▼ Value   Variable ▼

Decision-making block

⚠ If IR Sensor 🔒 ▼ > ▼ 50

If the joystick is in the Center ▼

and ▼   0 = ▼ 0

Press ▷ to start

Repeat Variable ▼

if ⚠ If IR Sensor 🔒 ▼ > ▼ 50 then

RG Robot stand up ▼

12 Let's change Tig's expression.

After creating the code as shown below, download it by clicking the download icon.

You can see that Tig's expression has changed.

Download icon

▷ ↓ ▼1 ⁂

#Face #Picture #Animation #My Painting

Press ▷ to start

Repeat

Select the background screen with 🐱▼

Wait 1 seconds

Select the background screen with 🐱▼

Wait 1 seconds

infinitely

Repeat

infinitely

Control category

Wait 1 seconds

Control category

Select the background screen with 🐱▼

Screen category

13 Let's change the background of Tig's screen to an animation.

At the top, select the tab of the background block and choose either [#background] or [#animation]. Then, write each of the codes below and download them. If you also draw your own background and print your drawing on the screen by selecting [#My background], and saving it on the screen.

#Face	#Picture	#Animation	#My Painting

Press ▷ to start
Repeat
　Select the background screen with ▾
　Wait 1 seconds
　Select the background screen with ▾
　Wait 1 seconds
infinitely

#Face	#Picture	#Animation	#My Painting

Press ▷ to start
Repeat
　Select the background screen with ▾
　Wait 1 seconds
　Select the background screen with ▾
　Wait 1 seconds
infinitely

After coding, download or execute the program. When you place your hand on the infrared sensors labeled 1 and 2, the sound will be played.

Press ▷ to start
Select the background screen with ▾
Repeat
　Control if ⚠ If IR Sensor 🔋1 ▾ > ▾ 50 then
　　Sound Dog ▾ Play and wait
　if ⚠ If IR Sensor 🔋1 ▾ > ▾ 50 then **Sensing**
　　Dog ▾ Play and wait
infinitely

Operating Tig

1 Start a debate on whether or not AI has intelligence

Determining whether or not AI has intelligence is a complex issue, and there is no single definite answer. However, there are a few ways we can recognize whether or not AI has intelligence:
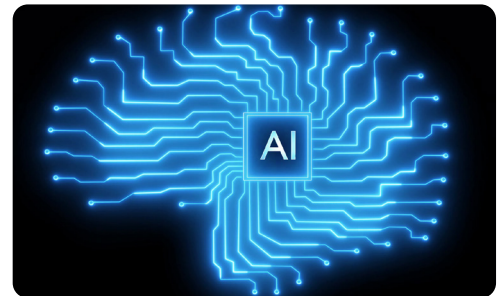
① Ability to learn: One of the hallmarks of intelligence is the ability to learn and adapt to new situations. If AI can learn to adapt and improve over time, then it may be considered intelligent.

② Ability to reason: Another key aspect of intelligence is the ability to reason and make logical decisions based on available information. If AI can make decisions based on data and logic, then it may be considered intelligent.

③ Creativity: Intelligence is not just about processing data and making decisions. It also involves creativity and the ability to come up with new ideas. If AI can generate new ideas and solutions to problems, then it may be considered intelligent.

④ Human-like behavior: Some researchers argue that AI can be considered intelligent if it can replicate human-like behavior, such as understanding language or recognizing emotions.

⑤ Passing the Turing test: The Turing test is a way of determining if a machine can exhibit intelligent behavior that is indistinguishable from that of a human. If AI can pass the Turing test, then it may be considered intelligent.

Why is it important to debate the development of AI?

Artificial Intelligence (AI) technology is a powerful technology that has the potential to significantly impact our lives and society as a whole. AI has the ability to automate many tasks, increase efficiency, and improve decision-making processes. However, it also raises important ethical, social, and economic concerns.

For example, some people worry that AI could replace jobs and result in unemployment for many people. Others are concerned about the possibility of AI being used to create autonomous weapons or used for surveillance purposes. There are also concerns about the potential biases that could be embedded in AI systems, which could lead to unfair or discriminatory decisions.

Considering all the pros and cons of the development of AI allows us to explore these important issues and come up with solutions that benefit everyone. It also ensures that we are using AI in a responsible and ethical manner and that we are taking steps to mitigate any negative impacts that AI could have on society.

AGREE	DISAGREE

② Let's run Tig's action motion.

After coding as shown below, click [Start] and press numbers 1-4 on the keyboard.

```
Press ▷ to start
Run  Forward ▼  humanoid motion.
Wait  2  seconds
Run  Backward ▼  humanoid motion.
Wait  2  seconds
```

```
Press ▷ to start
Select the background screen with [😺] ▼
Repeat
    Run humanoid etc motion  Raise Right hand ▼
    Run humanoid etc motion  Down Right hand ▼
    Run humanoid etc motion  Raise Left hand ▼
    Run humanoid etc motion  Down Left hand ▼
infinitely
```

③ Let's enable sound direction recognition.

Download/run the code and make a sound. Tig will recognize it and rotate in the direction of the sound.

```
Press ▷ to start
Select the background screen with [😺] ▼
Repeat
    if  If the sound direction is  Left ▼  then
        Run  Left Forward ▼  humanoid motion.
        Wait  1  seconds

    if  If the sound direction is  Right ▼  then
        Run  Right Forward ▼  humanoid motion.
        Wait  1  seconds
```

```
    if  If the sound direction is  Center ▼  then
        Run  Basic posture ▼  humanoid motion.
        Wait  1  seconds
infinitely
```

※ Tig can detect sounds such as speech and handclaps well. However, if the surrounding noise is loud, Tig may not recognize the direction of the sound accurately.

4 Let's print and display a picture object on the screen.

After selecting [Create picture object] in the [Screen] category and inserting the name of the object, a picture object block will be added.
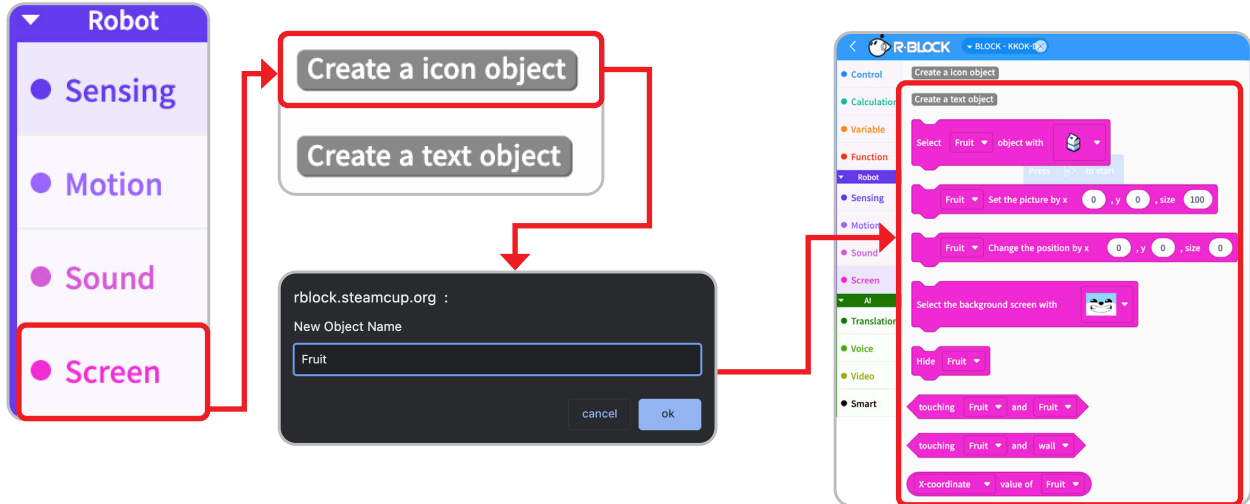
After coding as shown below, try recognizing infrared sensors No. 1 and No. 2.

You will see that the apple and orange objects are printed and displayed on the screen.
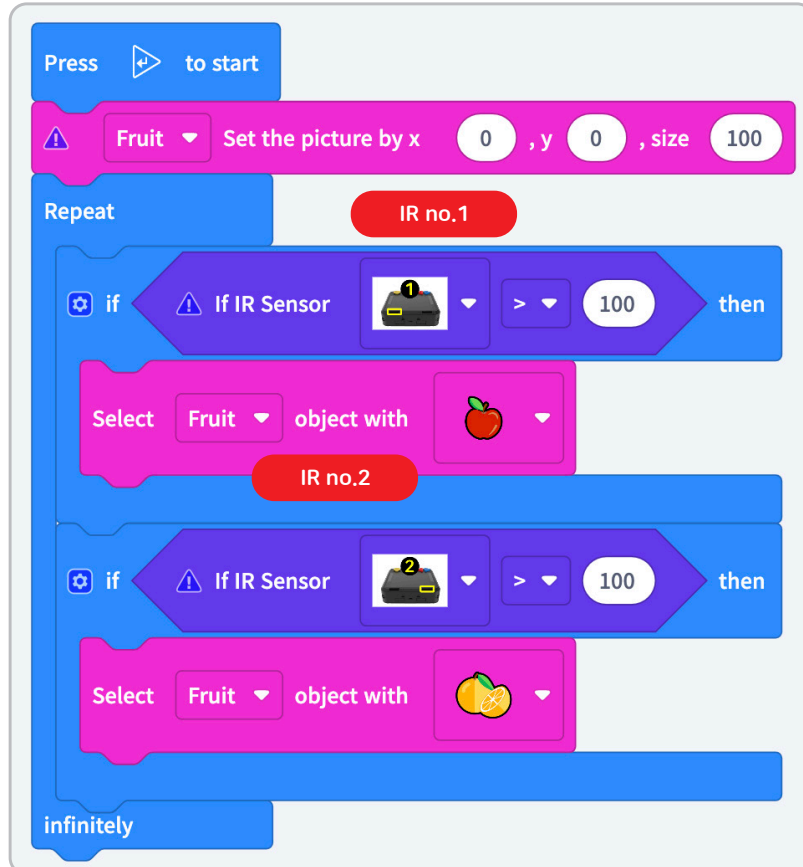
5 Let's move the objects on the screen.

After coding and executing the code below, you can use the joystick on the controller to move the picture object.

Press ⏵ to start

⚠ **Fruit** ▼ Set the picture by x `0` , y `0` , size `100`

Select **Fruit** ▼ object with 🍎 ▼

Repeat

⚙ if If the joystick is in the ← ▼ then

⚠ **Fruit** ▼ Change the position by x `-10` , y `0` , size `0`

⚙ if If the joystick is in the → ▼ then

⚠ **Fruit** ▼ Change the position by x `10` , y `0` , size `0`

⚙ if If the joystick is in the ↑ ▼ then

⚠ **Fruit** ▼ Change the position by x `0` , y `10` , size `0`

⚙ if If the joystick is in the ↓ ▼ then

⚠ **Fruit** ▼ Change the position by x `0` , y `-10` , size `0`

infinitely

6 Let's print and display a text object on the screen.

In the [Screen] category, create a text object in the same way as the picture object by selecting [Create text object].
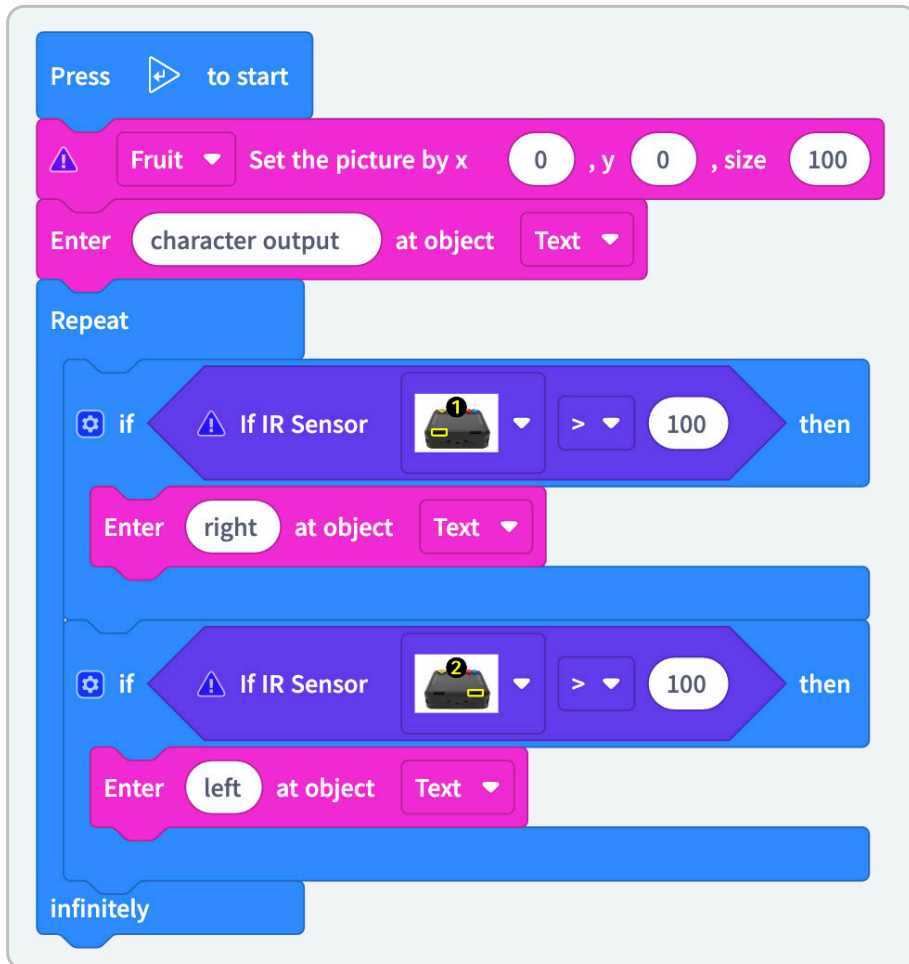
Let's display the timer value on the text object.
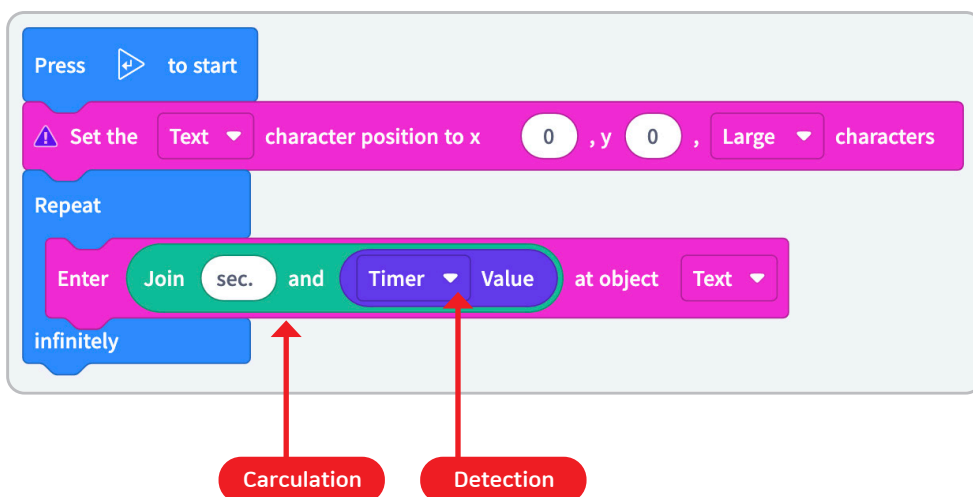
Tig Control Program

① Let's control Tig.

Let's look at the functions of the R-Block remote control.

If the remote control button is   Up ▼
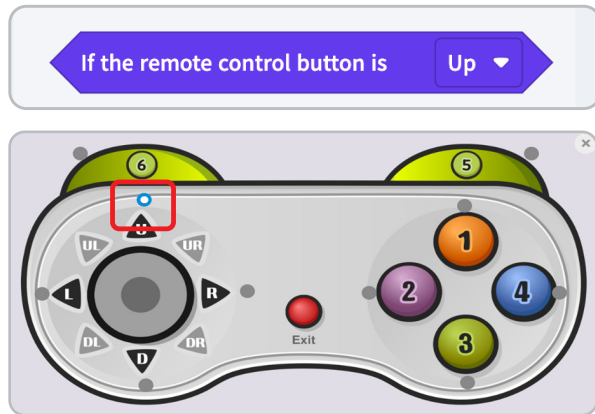
After calling up the remote control block from the 'Sensing' block category, click the down arrow and view the options.

You can set the key of the remote control by checking that part inside the red box.
(It is possible to select the same option more than once)

After downloading/executing the code below, select [Remote Control] from the menu at the top right.

Press ▷ to start

Select the background screen with

Repeat

⚙ if   If the remote control button is   Up ▼   then

Run   Forward ▼   humanoid motion.

⚙ if   If the remote control button is   Down ▼   then

Run   Backward ▼   humanoid motion.

infinitely

New
Save
Save as
Open Block
R-Block UI
AI Monitor
Remote Control
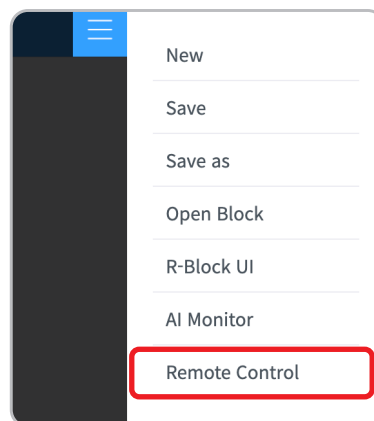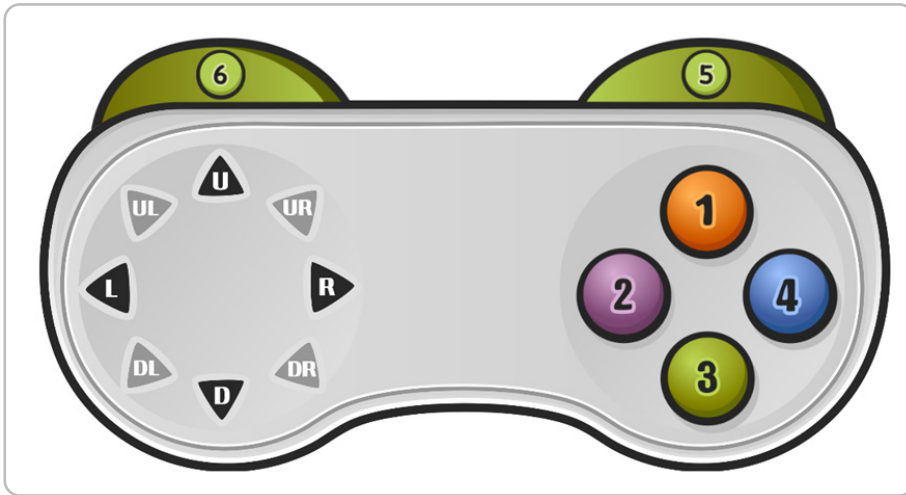
Move Tig by pressing the keys U and D.

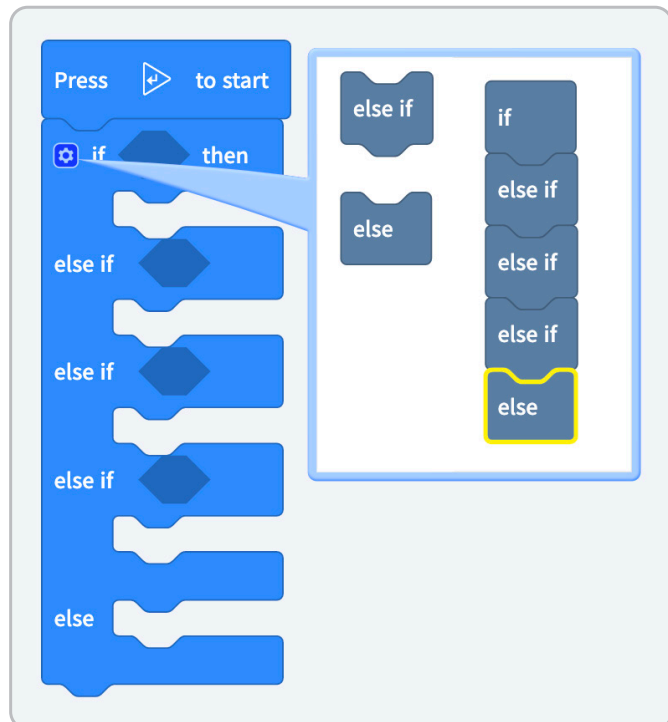| Key	Action Description
U	Up
D	Down
L	Left
R	Right

2 Let's make a Tig control program.

First, let's see how to add a condition to the 'if' command block. To do this, follow the steps below:
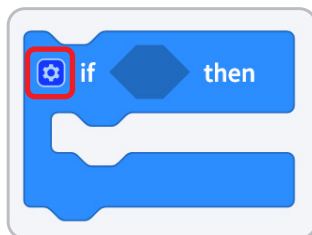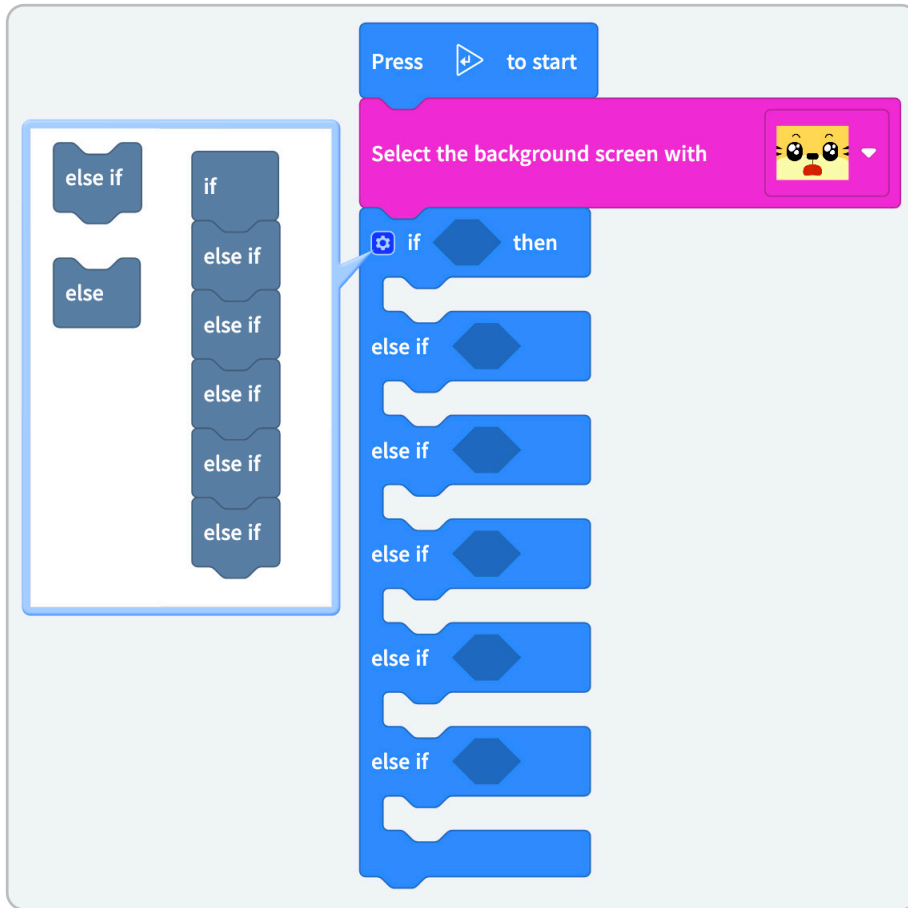

① Bring up [If Block] from the controller.
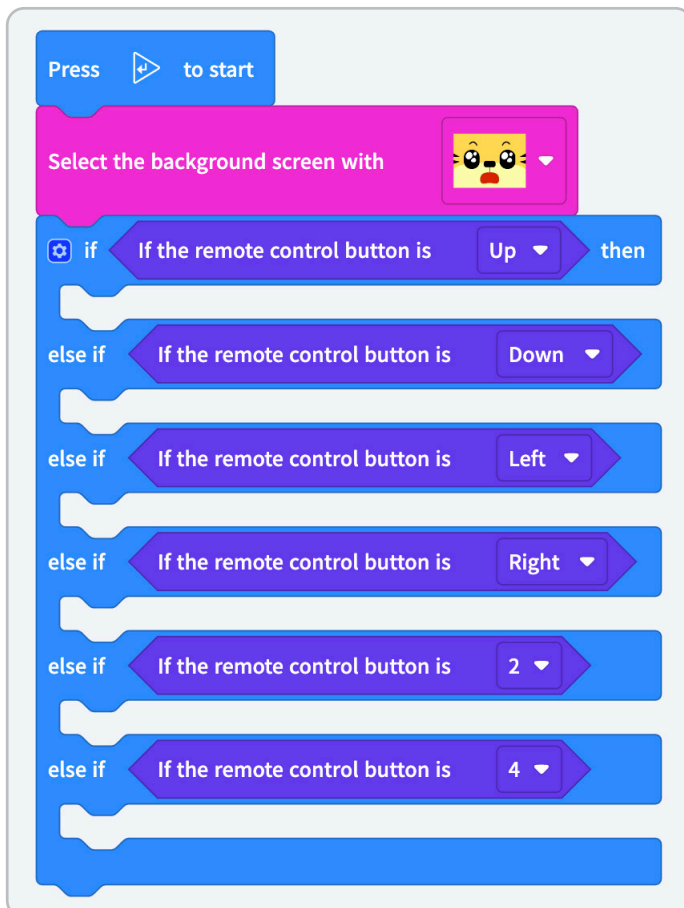② Press the Settings icon to access the condition settings.
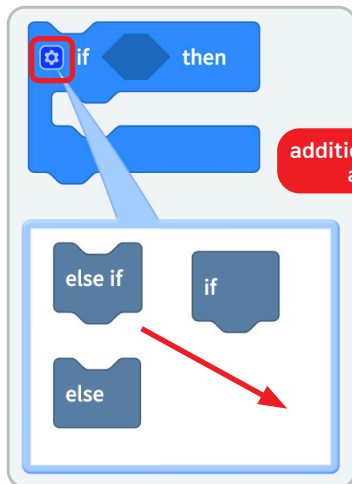

additional condition available

additional condition unavailable
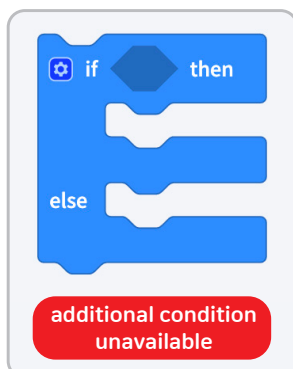
③ A condition can be added by dragging [else if] or [else] with the mouse and attaching it to the right. To delete a condition, simply reverse the process.

Press ▷ **to start**

Select the background screen with 🐯

```
⚙ if        then
    else if
    else if
    else if
    else if
    else if
```

else if
if
  else if
  else if
  else if
  else if
  else if
else

① Create a code with 6 conditions as shown on the left.

Press ▷ **to start**

Select the background screen with 🐯 ▼

```
⚙ if    If the remote control button is    Up ▼    then

else if    If the remote control button is    Down ▼

else if    If the remote control button is    Left ▼

else if    If the remote control button is    Right ▼

else if    If the remote control button is    2 ▼

else if    If the remote control button is    4 ▼
```

② Set the option of each of the six remote control buttons to Up, Down, Left, Right, 2, and 4 as shown in the image.
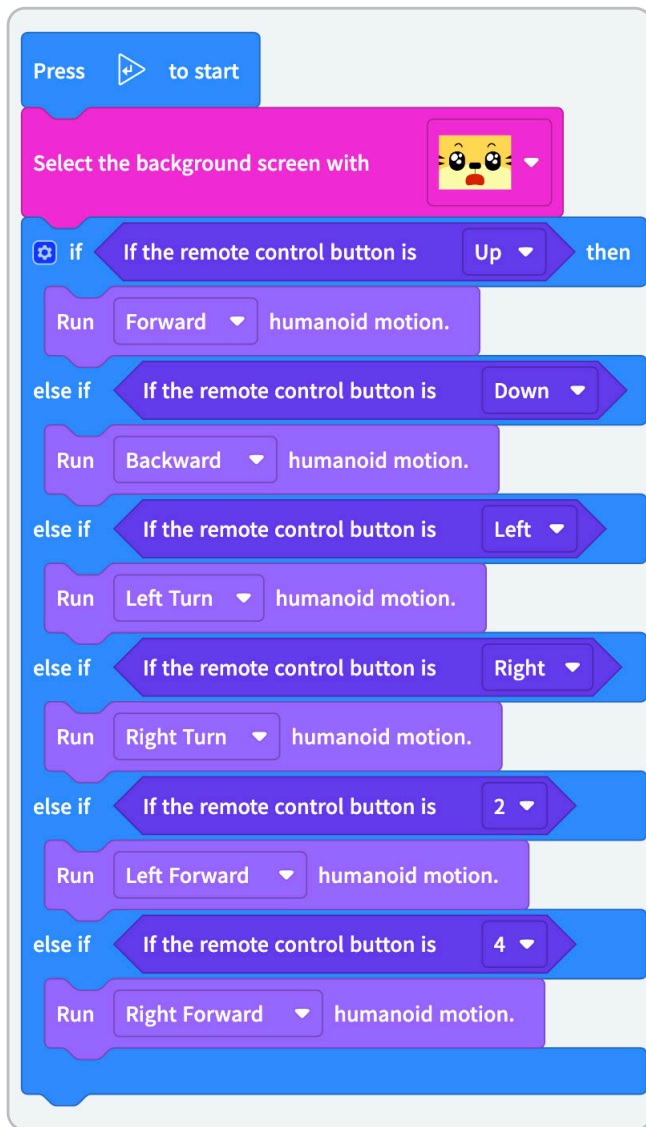
③ Select the option for the humanoid motion in the order of forward, backward, left turn, right turn, left, right, as shown on the left image.

④ Open the remote control page and control Tig.
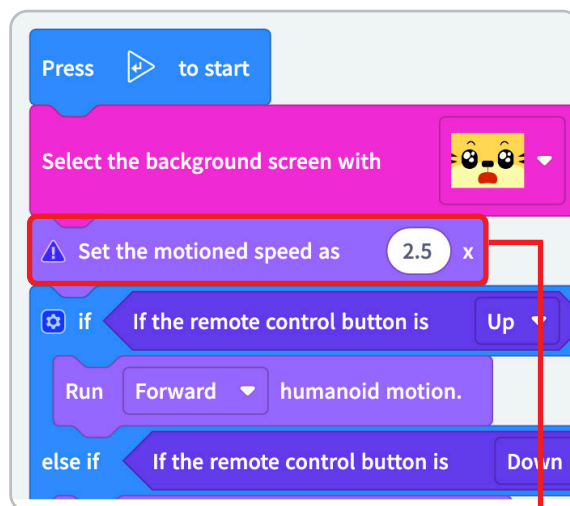
⑤ If you insert and download the motion speed, you can adjust the speed of Tig's movement and make it move faster. (Motion speed range is between 1 and 2.5)

---

③ Let's do a relay race using Tig.

Mark the starting point and returning point on the classroom floor. Also, prepare desks in advance for players to put their laptops on for controlling Tig.

Game Rules

① The relay race is composed of 2 teams with 2 players in each team. The two teams will compete to obtain the fastest record

② The 2 teams will decide which team will go first. After deciding the order, the players from the first team will set the two humanoid robots at the starting line.

③ Then, one player will start the race and control Tig to reach the halfway point and make a turn around the returning point before returning to the starting point.

④ Once the first humanoid robot returns, the second player will quickly control the robot to make its way around the returning point and return to the starting point. As soon as the second humanoid completes the race, the time is recorded.

⑤ The team going second will repeat the steps above and complete the race. The team with the shortest time record wins the relay race.
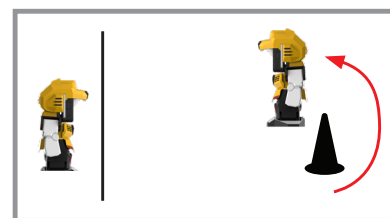
Review

💬 Let's discuss the advantages and disadvantages of AI that we learned about today.

💬 Let's discuss what we know about the intelligent agent from what we learned today.
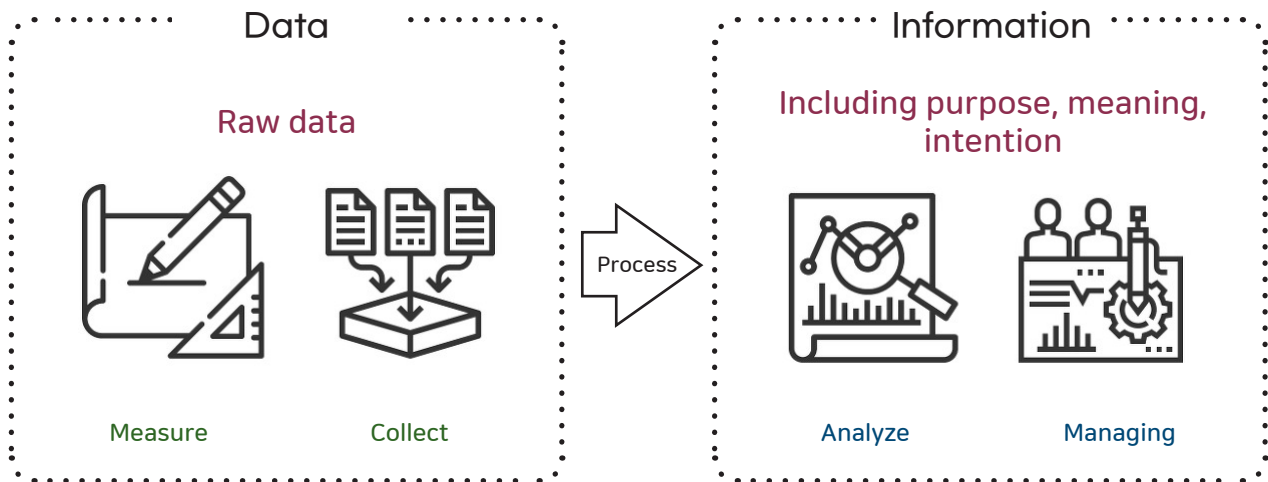
Part 2
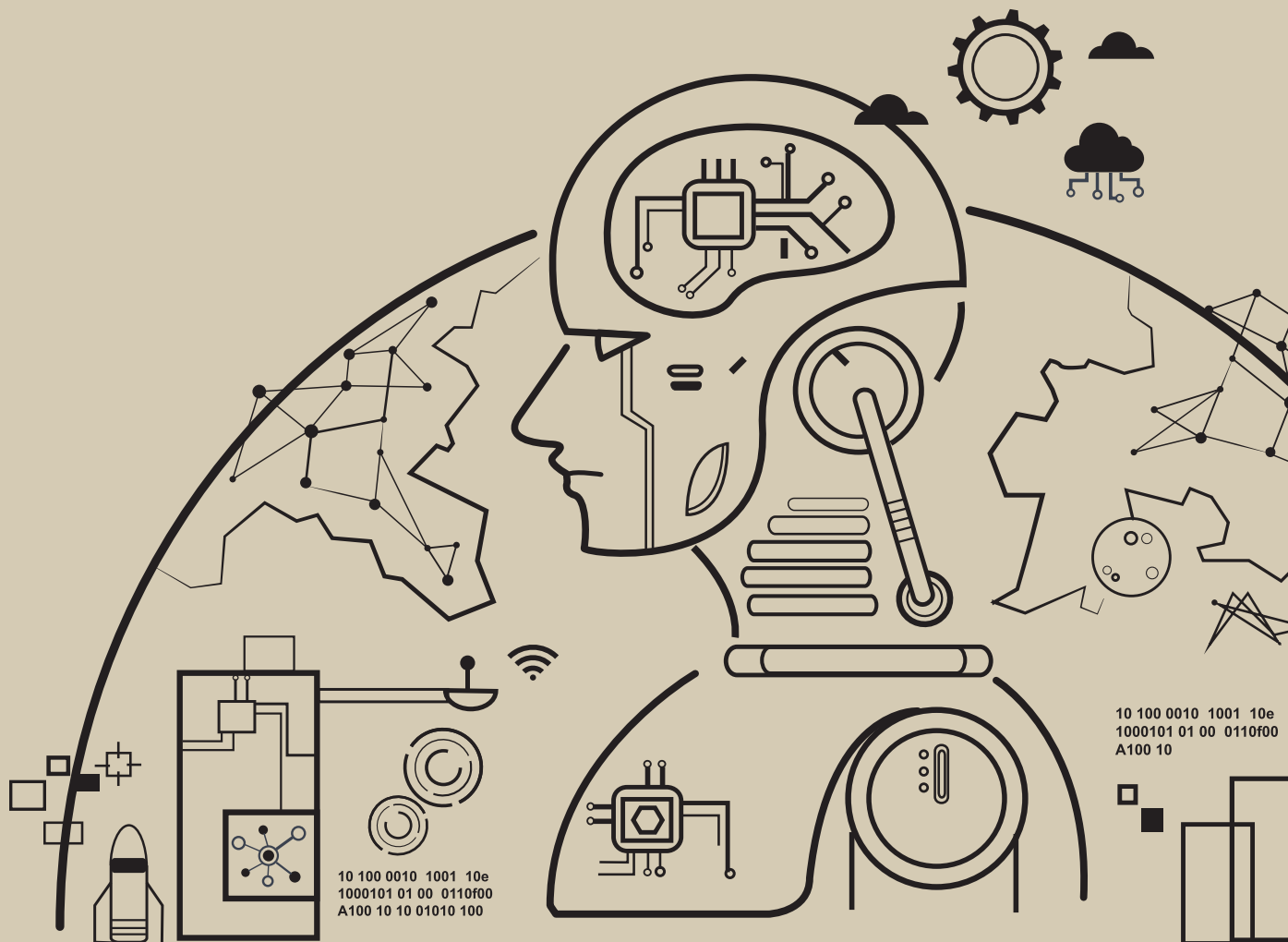
AI and Data

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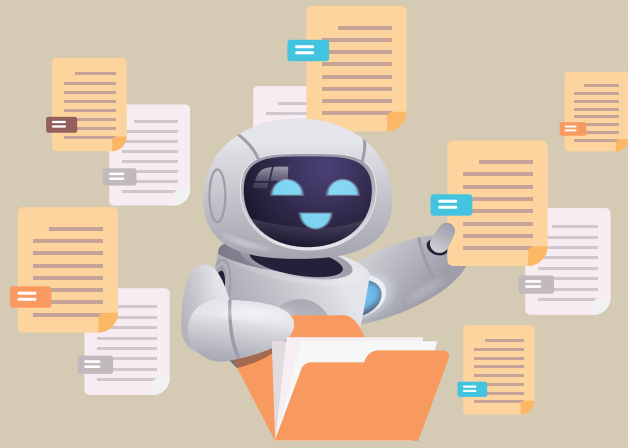
① AI's material, data

Data

Data is a representation of certain properties expressed in numbers, letters, symbols, images, etc. If you understand the role of data and the meaning of its properties, you can use it to find new information, predict the future, and solve a variety of problems.

Data — Raw data — Measure — Collect — Process — Information — Including purpose, meaning, intention — Analyze — Managing

Let's create information using the following data

Jacob's Library Book Loan Record

What information can you make out?

Mark's Internet Shopping Order List

What can we learn from this information?

Attributes of Data

Attributes of Data

Attributes of data are qualities that describe and distinguish data from other data.

It has the property of no longer being divided into smaller categories. For example, if you have data called students, you can classify that data by attributes such as name, grade, class, number, address, and phone number.

The properties of data are important information that we use to distinguish the data in our lives. In our daily lives, we often check the attribute values of data to choose something or decide on an action. We choose to take an umbrella, wear sunscreen, or select our attire suitable for the weather after looking at the attribute values of the weather data.

[Image] Personal Stylist APP

Why data is important for AI?

Data is extremely important for AI technology because it is the fuel that powers the technology. In order to learn and make decisions, AI systems need to be trained on vast amounts of data. This is known as "machine learning," a key component of AI.

① Training: In order to train an AI system to perform a specific task, such as recognizing and classifying objects in images or translating languages, the system needs to be trained on large datasets. This allows the system to learn from examples and improve over time.

② Accuracy: The more data an AI system has to work with, the more accurate it can be. By training on large datasets, AI systems can identify patterns and make more accurate predictions or decisions.

③ Bias: AI systems are only as biased as the data they are trained on. If the data on which the AI is trained is biased, then the AI system may make biased decisions or predictions. By using large and diverse datasets, AI systems can help mitigate bias and improve accuracy.

④ Innovation: By collecting and analyzing large amounts of data, AI can help identify new patterns and insights that may not be apparent to humans. This can lead to new discoveries and innovations in fields such as healthcare, finance, and transportation.
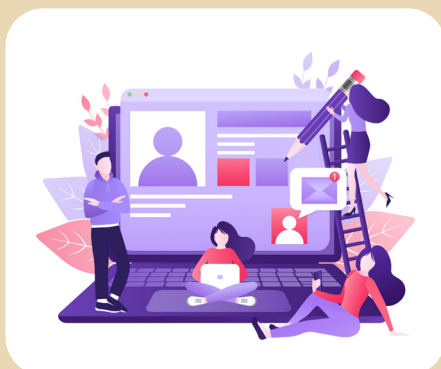
③ How to create a dataset?

💬 What is a dataset?

A dataset is a collection of data that is organized and structured in a particular way. It can be thought of as a spreadsheet or table that contains rows and columns of information. Each row represents a single data point or observation, while each column represents a specific feature or attribute of that observation.

In the context of AI, datasets are crucial for training and testing machine learning models. The more diverse and representative the dataset, the better the model is likely to perform in the real world. Properly labeled and structured datasets can help ensure that the model is accurate, unbiased, and able to generalize to new situations.

💬 How to collect data?

There are many ways to collect data, depending on what kind of data you need and what your goals are. Here are a few common methods:

SURVEYS

OBSERVING

SEARCHING ONLINE

USING DEVICES

COUNTING

How to collect data?

Datasets can be created in a number of ways, such as by collecting data from sensors, surveys, or social media. They can also be generated synthetically, for example, by using computer programs to simulate data for testing or training purposes.

Let's discuss how we can collect data.

4 Machine Learning

Machine Learning

Just as humans learn knowledge through trial and error, computers can find common patterns in the given data when we provide them with sufficient data. Types of machine learning include supervised learning, unsupervised learning, and reinforcement learning.

Label

Can!

Answer

Cannot!!

supervised learning

unsupervised learning

PEMBROKE WELSH CORGI	AFGHAN HOUND	GRIFFON BLEU DE	PORTUGUESE PODENGO	KANNI

Lable
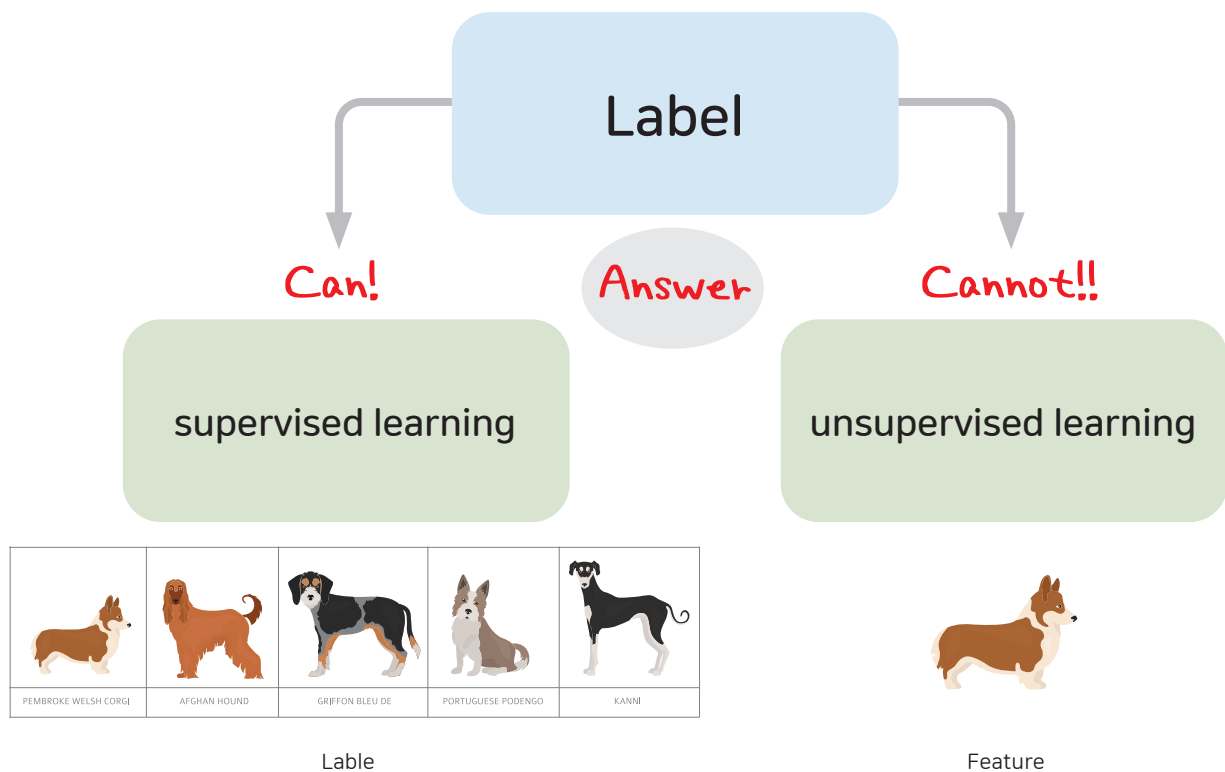
Feature

MEMO

How can a computer distinguish between a cat and a dog?

When we see a picture of a cat or a dog, we can tell them apart because we know what features make a cat look different from a dog, like the shape of their ears or the size of their body. AI works in a similar way - it learns what features make a cat look different from a dog by looking at a lot of pictures of them. Then, when it sees a new picture of an animal, it can tell if it's a cat or a dog by looking for those same features. It's like having a really smart friend who knows all about cats and dogs and can tell them apart by simply looking at them!

1. Crop the image along the line

2. Shuffle the cropped images
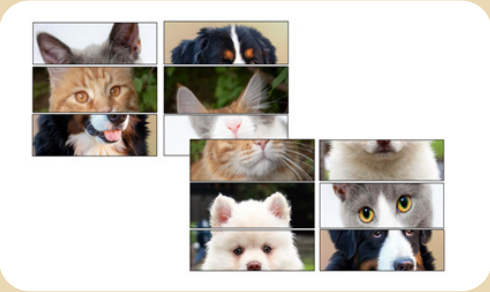
3. Group similar parts together
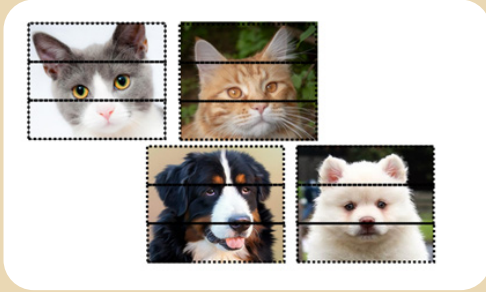
4. Organize and compare the features

	Features	
	Cats	Dogs
Ears		
Eyes		
nose		

5. Put the pieces together to make a face and rate how similar it looks to the animal

6. Gather only the faces with a score of 8 or higher

Deep learning will remember only combinations of the animal parts with high scores and will repeat the process countless times to increase accuracy.
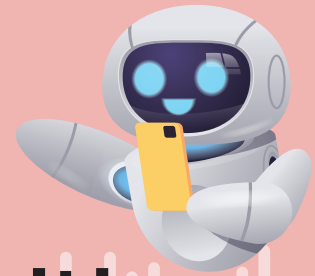
AI and Voice Recognition

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1 Let's look at the voice and text functions of AI.

If you select [Import AI Block] in the [AI] category, you can look at the AI functions.

Say TTS [Text] and wait

Speech Synthesis TTS (Text To Speech)

AI technology that converts text data into voice data.

Start STT audio recognition

Speech Recognition STT (Speech To Text)

AI technology that converts voice data into text data.

Value translated from [Korean ▼] [Text] to [English ▼]

Text Translation

AI technology that translates text into text in another language.

Let's download/execute the code after coding as shown below.

Press ⏯ to start

Say TTS [My name is Tom] and wait

Say TTS [I like Hambergers] and wait

2 Let's launch AI Monitor.

AI monitor is a function that uses AI voice recognition and image recognition, and [AI monitor] automatically pops up when a related command block is used in the code and the code is executed. You can also run it manually by looking at the method below.

① Select the menu icon (≡) at the top right of R-Block.
② Select [AI Monitor] from the list.
③ When loading is complete, [AI Monitor] is executed.
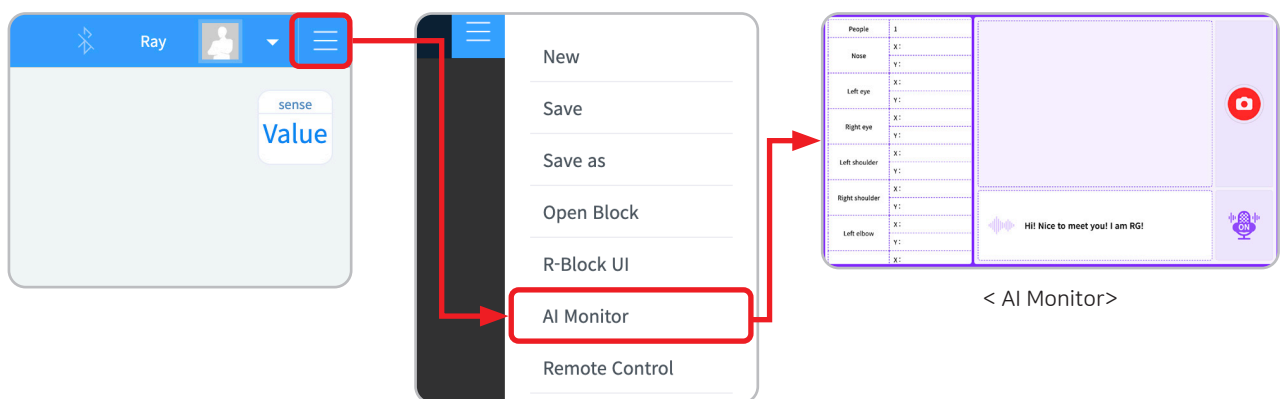
< AI Monitor>

MEMO

3 Functions of AI monitor

People	1	
Nose	X : 230	
	Y : 243	
Left eye	X : 257	
	Y : 208	
Right eye	X : 205	
	Y : 209	
Left shoulder	X : 329	
	Y : 364	
Right shoulder	X : 118	
	Y : 363	
Left elbow	X :	
	Y :	
	X :	

Hello
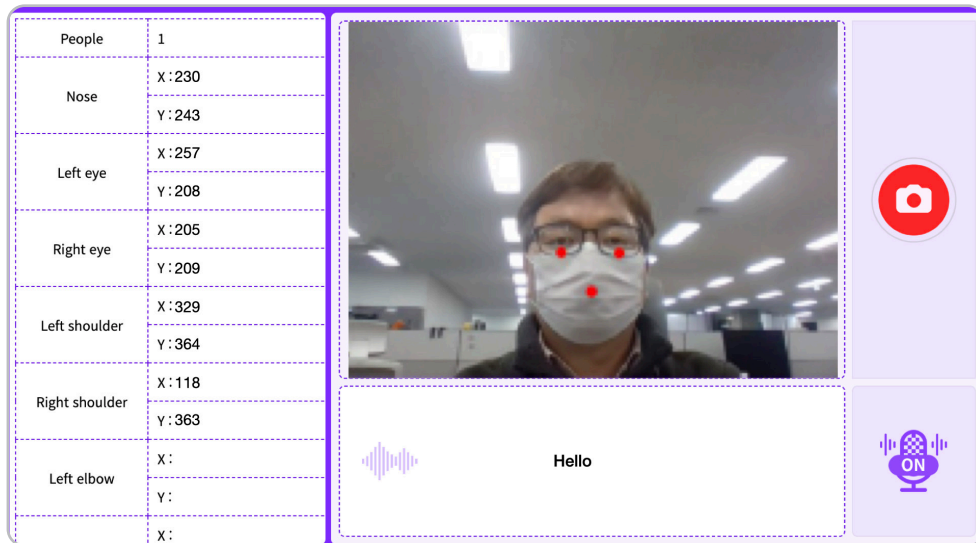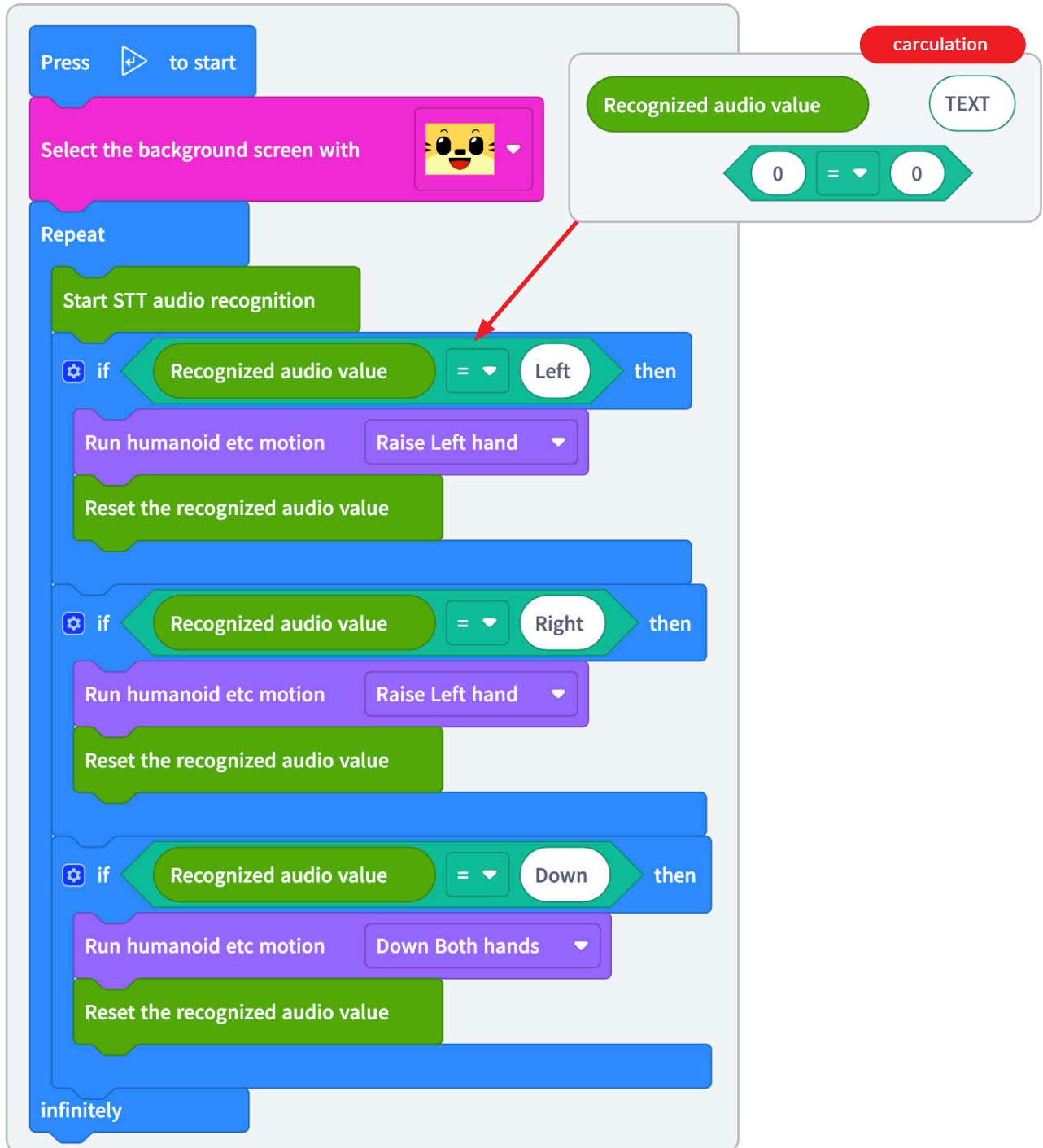
① Microphone button: This button is used to start and stop voice recognition.

② Voice Recognition Window: This window displays the text of the recognized voice.

③ Camera button: This button is used to start and stop image recognition.

④ Image recognition window: This window displays the image recognized by the camera.

⑤ Recognition coordinates window: This window displays the coordinates of the object recognized in the image.

4 Let's check if the recognition function is working properly by pressing the camera and microphone buttons.

Nice to meet you

Have a nice day
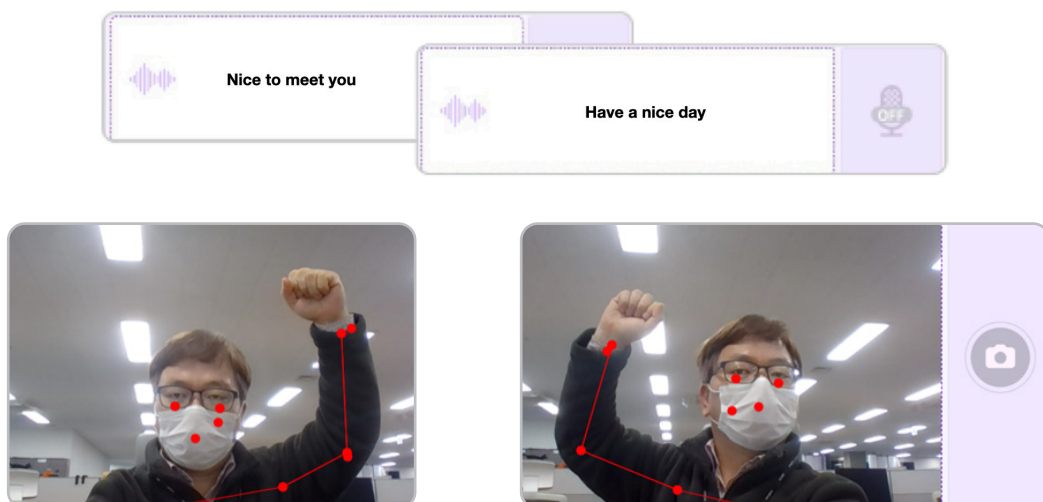
5 Using Speech Recognition (STT)

Let's download/execute the code after coding as shown below. When the AI monitor appears, press the microphone button and see if Tig recognizes 'Left', 'Right', and 'Down'.

Let's try the voice recognition function after using other commands and motions.

6 Let's code Tig to repeat your words.

After executing the code below, perform voice recognition and place your hand on Tig's face. It will recognize your words and repeat them.

```
Press ▷ to start

Select the background screen with [tiger face] ▼

Repeat
    if  ⚠ If IR Sensor [sensor] ▼ > ▼ 50 then
        Start STT audio recognition
        Wait 1 seconds
        Say TTS Recognized audio value and wait
        Reset the recognized audio value
infinitely
```

```
Recognized audio value
        ↓
Say TTS Text and wait
```

Let's program Tig to translate the words from one language to another.

```
Press ▷ to start

Select the background screen with [tiger face] ▼

Repeat
    if  ⚠ If IR Sensor [sensor] ▼ > ▼ 50 then
        Start STT audio recognition
        Wait 1 seconds
        Say TTS Value translated from English ▼ Recognized audio value to Korean ▼ and wait
infinitely
```

7 Let's make a voice recognition remote control.

Create a voice remote control by referring to the code below.

```
Press ▷ to start

Select the background screen with [😮] ▼

Repeat
    Start STT audio recognition
    ⚙ if   Recognized audio value = ▼ Forward   then
        Run   Forward ▼   humanoid motion.
    else if   Recognized audio value = ▼ Backward
        Run   Backward ▼   humanoid motion.
    else if   Recognized audio value = ▼ Left Turn
        Run   Left Turn ▼   humanoid motion.
    else if   Recognized audio value = ▼ Right Turn
        Run   Right Turn ▼   humanoid motion.
    else if   Recognized audio value = ▼ Left Forward
        Run   Left Forward ▼   humanoid motion.
    else if   Recognized audio value = ▼ Right Forward
        Run   Right Forward ▼   humanoid motion.
infinitely
```

Creating Humanoid Motions

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① AI and Future Jobs

What jobs will AI take over?

It is said that the development of AI will have a great impact on the job market.

Futurist Thomas Frey, director of the Da Vinci Institute, predicts that half of the existing jobs worldwide will disappear by 2030.

However, there will be jobs that survive these changes, and new jobs will be created in the process.
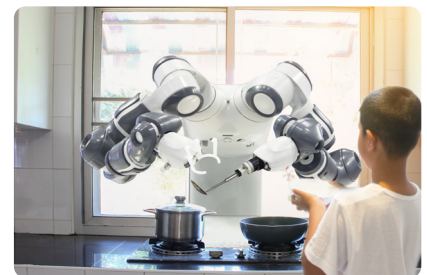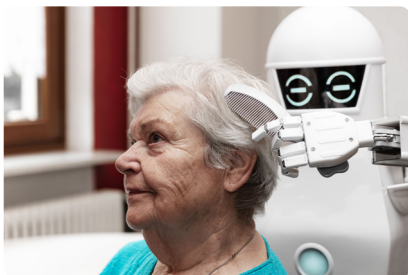
Robot Engineers

Robot engineers do research on technology such as AI, sensors, software, and hardware to develop robots. Additionally, they work to create robots that can be used in various fields such as home and personal service, rescue and lifesaving, medical service, education, and space exploration. Robot engineers also manage and supervise robots to see if there are any problems when in use or any technical defects. Robot engineers can enter various vocational fields such as robot development research institutes, robot-related product manufacturing companies, and robot education-related companies.

Big Data Experts

Big data experts manage and analyze large amounts of big data to predict people's behavior patterns or changes in the market. They collect, store, and analyze large amounts of data to predict consumer behavior and market trends. Data analysis results are used not only in corporate marketing, but also in various fields such as economics, medical care, and education to help people make decisions. Big data experts can enter a company's big data management department, marketing department, work in an Internet portal company, or data analysis company.

Robot Ethicist

Robot ethicists explore the ethical aspects of the relationship between robots and humans and study the behavioral norms that robots must follow. Additionally, they create moral and legal criteria to determine whether problems caused by operating robots are due to mechanical defects or intentional harm to humans. Robot ethicists require advanced knowledge of robots, ethics, and law, and can work as university professors or in robot-related research institutions.

When I grow up, I want to be a/an

_____ .

2 Using AI correctly

How to use AI correctly?

We should use AI correctly because it is a powerful tool that can help us do many things more effectively and accurately. But just like any tool, we need to be careful about how we use it. For example, if we use a hammer to hit things that we shouldn't, we could hurt ourselves or break something important. Similarly, if we use AI in ways that are harmful or unethical, we could cause problems for ourselves and others.

That is why we need to think carefully about how we use AI and make sure that we use it to help people and make the world a better place. We also need to be aware of the potential risks and drawbacks of AI and work to address these issues so that everyone can positively benefit from this technology. By using AI responsibly and ethically, we can create a better future for ourselves and the world.

Let's see the ethical principles for using AI

> Fairness: AI should be designed and implemented to avoid unfair bias and discrimination.

> Transparency: AI should be transparent in terms of its operation and decision-making process.

> Privacy: AI should respect and protect the privacy rights of individuals.

> Robustness: AI should be designed to be robust and secure against attacks and errors.

> Accountability: Those responsible for developing and deploying AI should be accountable for its impact and should take proper measures.

> Societal benefit: AI should be developed and deployed for the benefit of society as a whole, and not just for individual or corporate gain.

Creating Rules for Using AI

The following are the ethics that should be observed when using AI. Please read them carefully to establish rules for using AI properly.

First, the purpose of using AI must be clearly defined. The use of deepfake technology to slander or harm others has become a social problem. This is an example of a problem that occurred because the purpose of using AI was inappropriate. Therefore, it is important to use AI for the right purposes.

Second, AI must be used responsibly. It is essential to keep in mind that depending on how AI is used, it may cause negative consequences. Therefore, we must strive to use AI correctly.

Rules for using AI

Rules for using AI are essential

③ To make the robot move using R-Motion, follow these steps:

① Open the Chrome browser and enter enjoy.steamcup.org in the address bar.

② On the screen, select R-Motion.
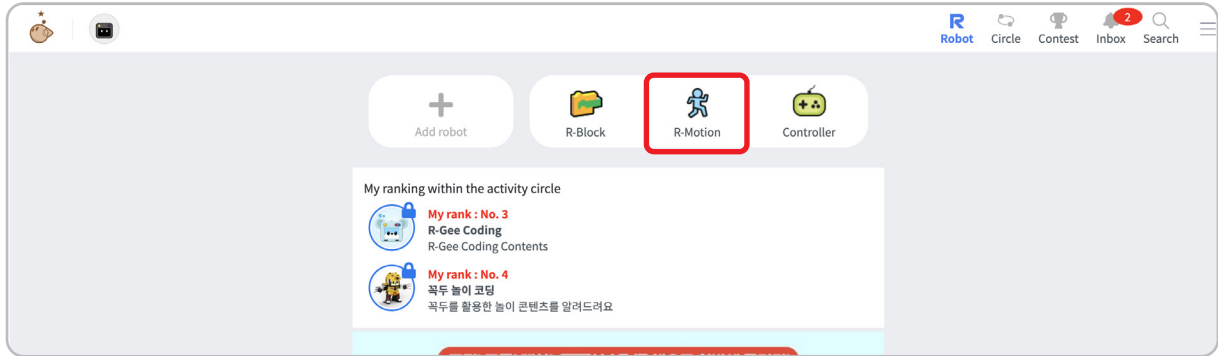
③ Once the window opens, click the Bluetooth icon on the upper right corner and find the matching BLE address to connect.
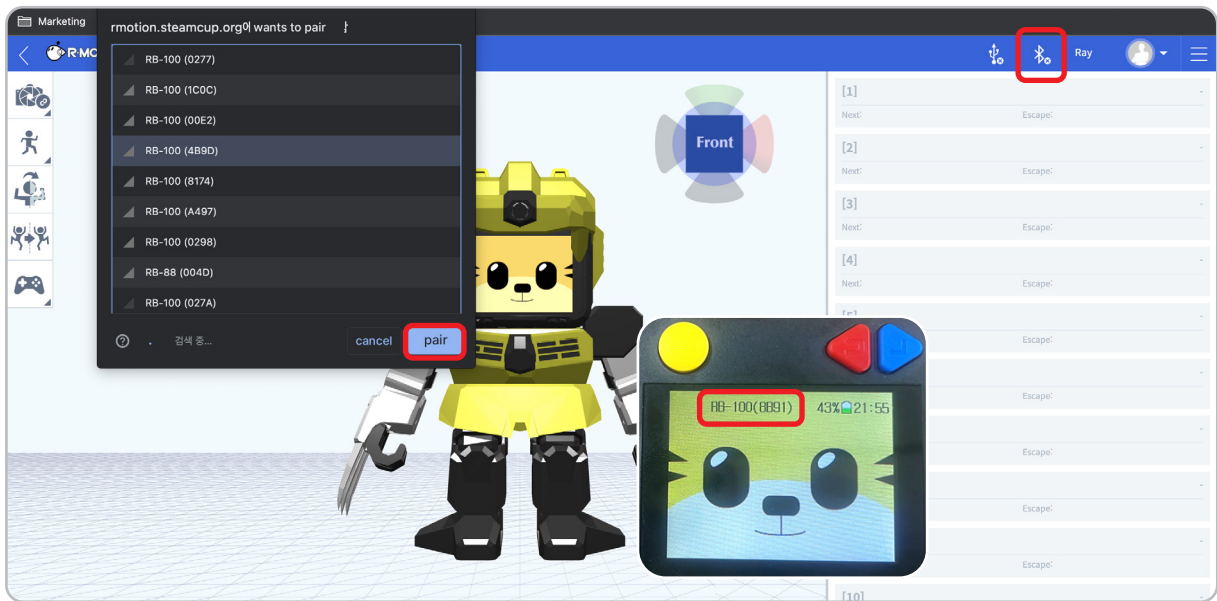
④ When the communication is successfully established, the indicator in the marked area will move to indicate the connection status.
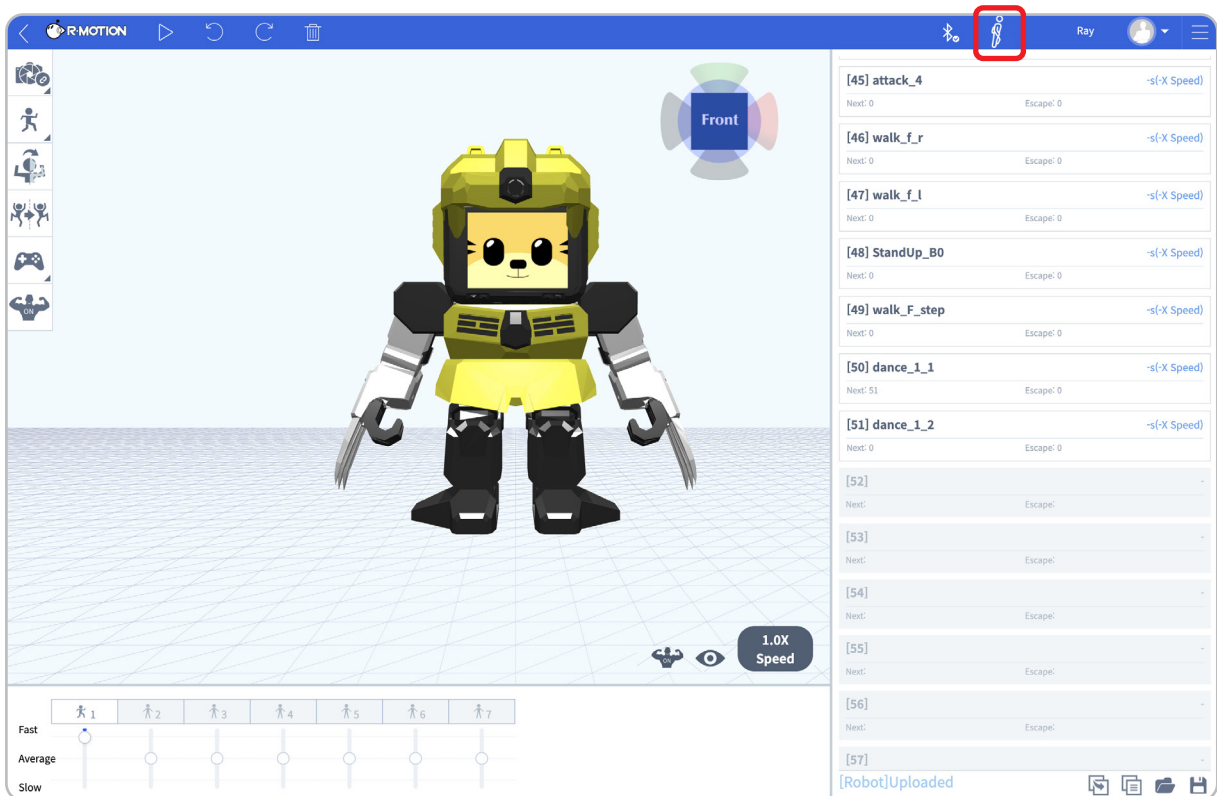
④ Let's make the robot move.

To create a new action without modifying the already saved actions, follow these steps:

Scroll down the list of actions on the right until you find an empty action (motion) number, and select it.

When the window below appears, enter the action name as "Test1".
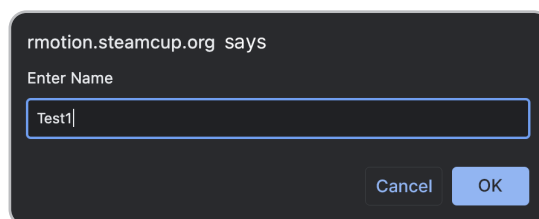
Select the posture window 1 located in the lower left corner.
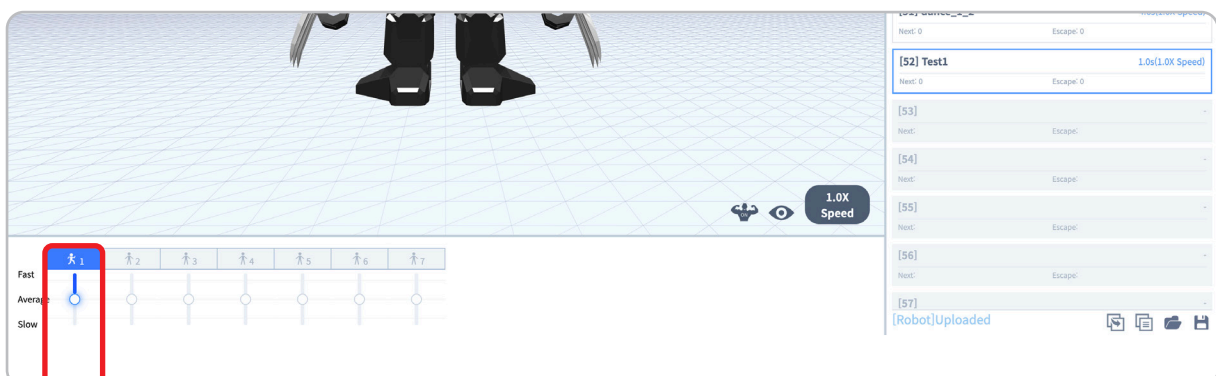
To perform a specific action on the robot, select the right shoulder (motor No. 3) by clicking it with your mouse. This will cause the following window to appear, allowing you to configure the settings for that particular motor.
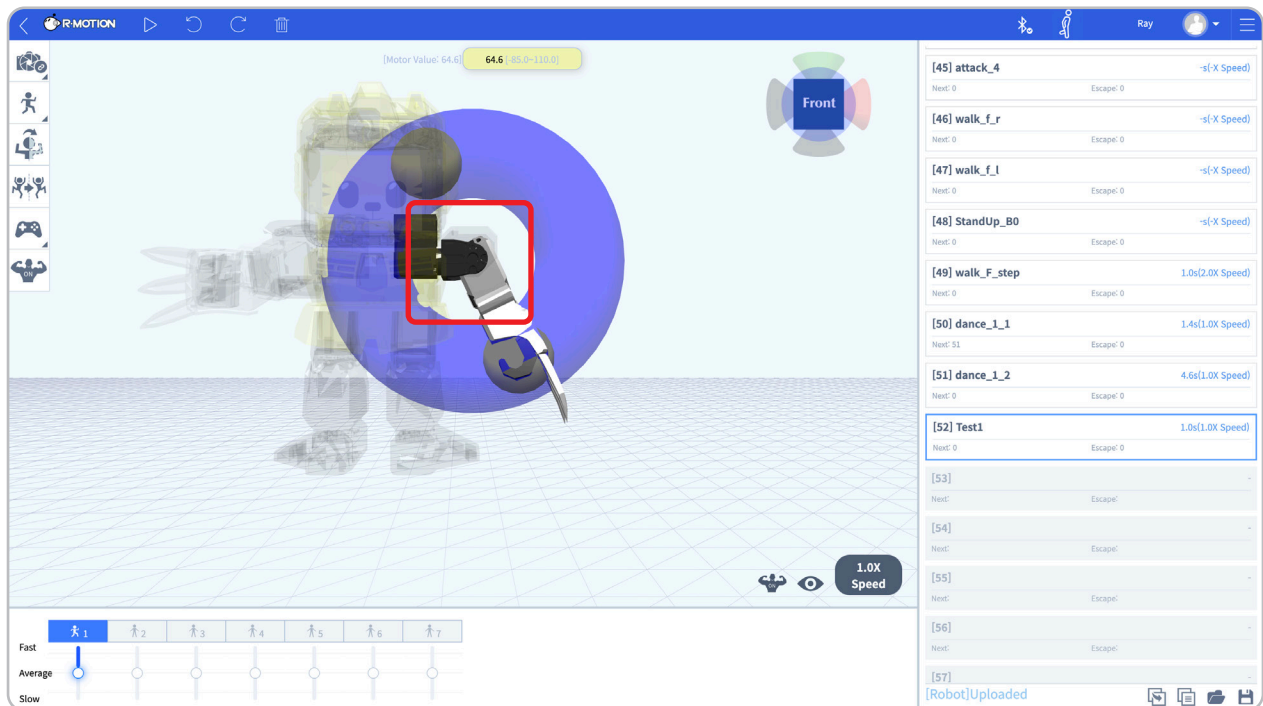
Drag the arm with your mouse to change its posture.
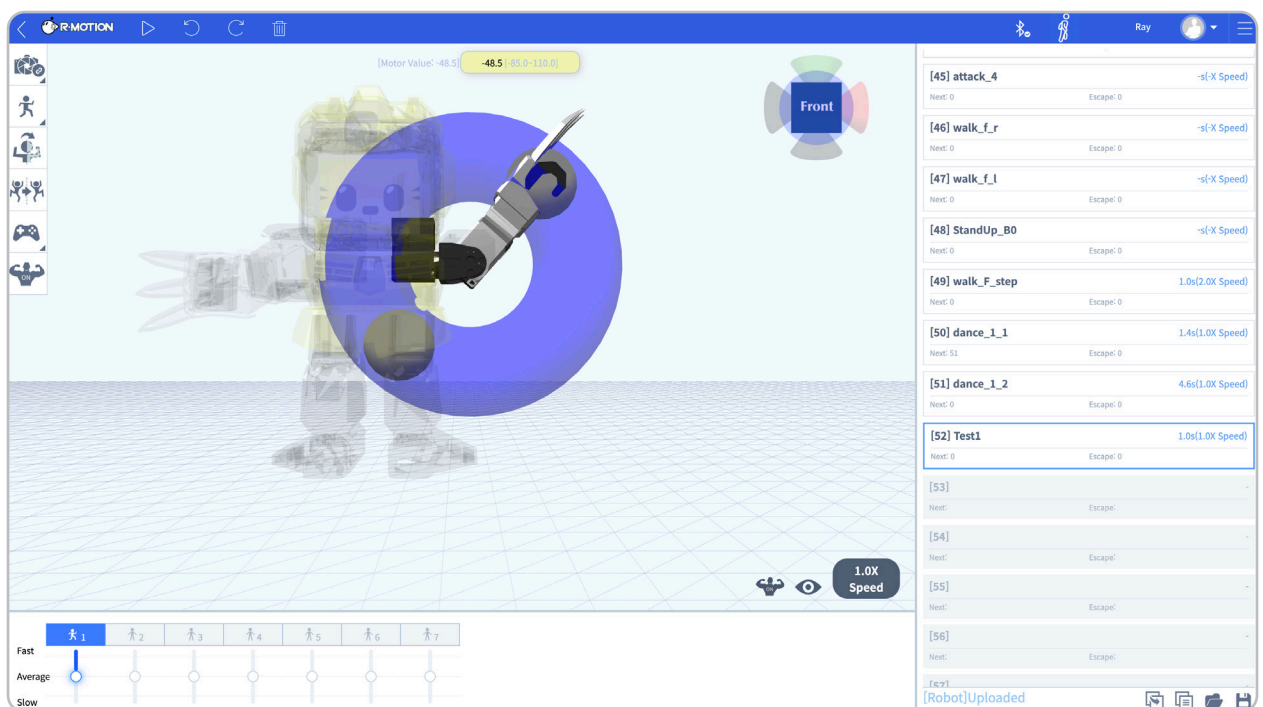
After selecting posture window No. 2, lower the arms again.
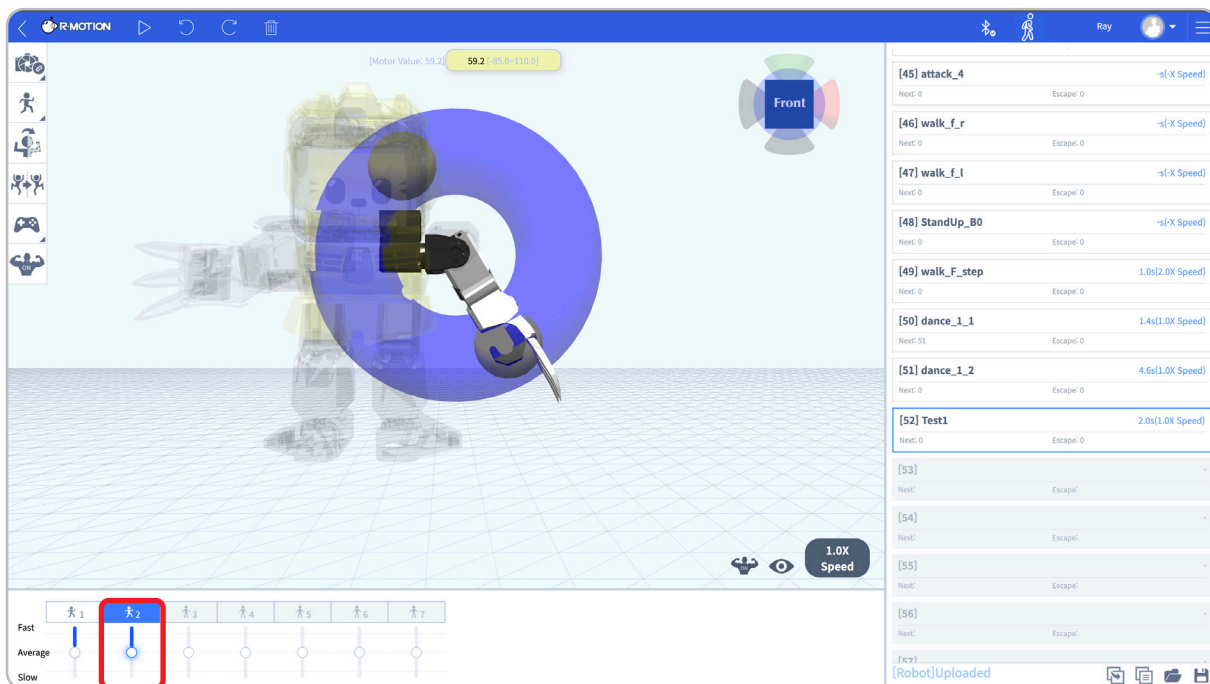
After selecting posture window No. 3, raise the arms mid-level.
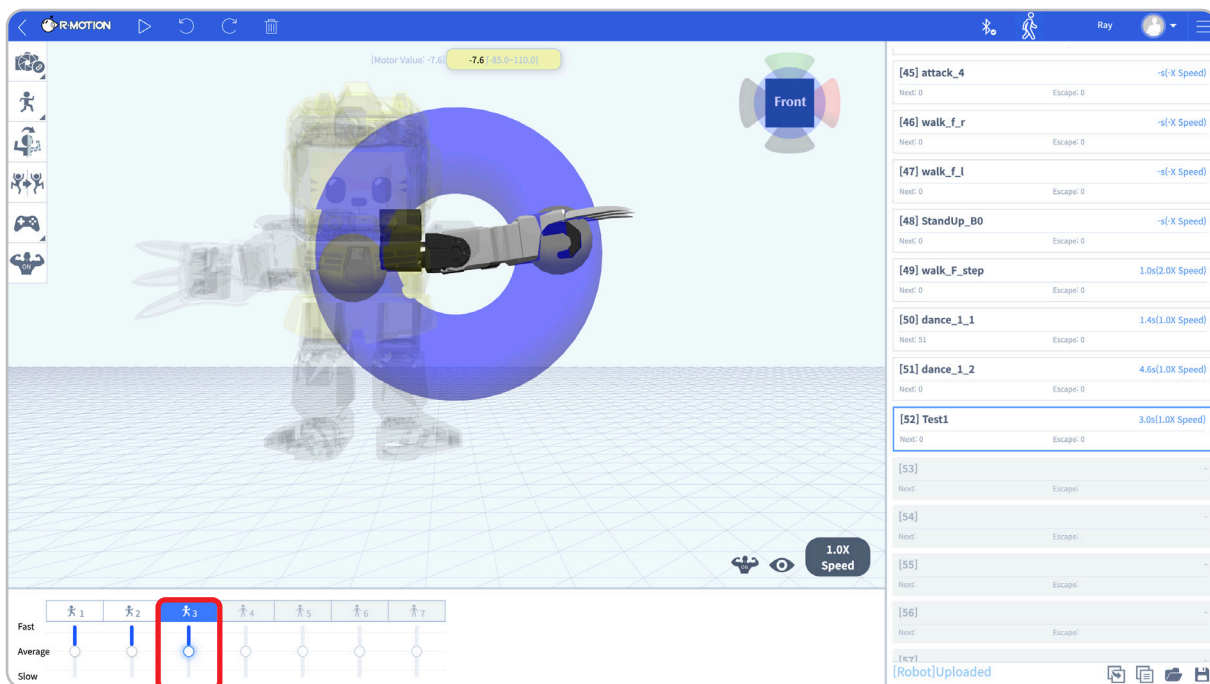
Select an empty area on the screen to close the edit function. Click the run (▷) icon to observe the robot's motion and ensure that it is working properly.
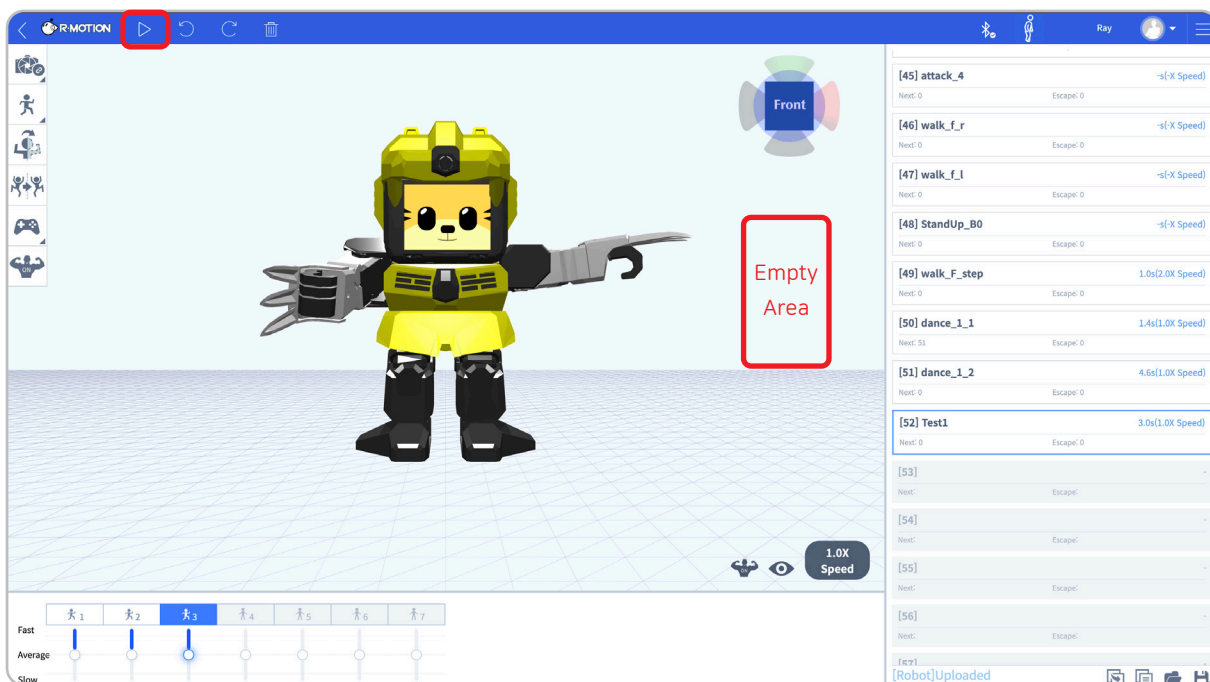
If everything is working correctly, click the save button located at the bottom right corner of the screen to save the edited motion to the robot.
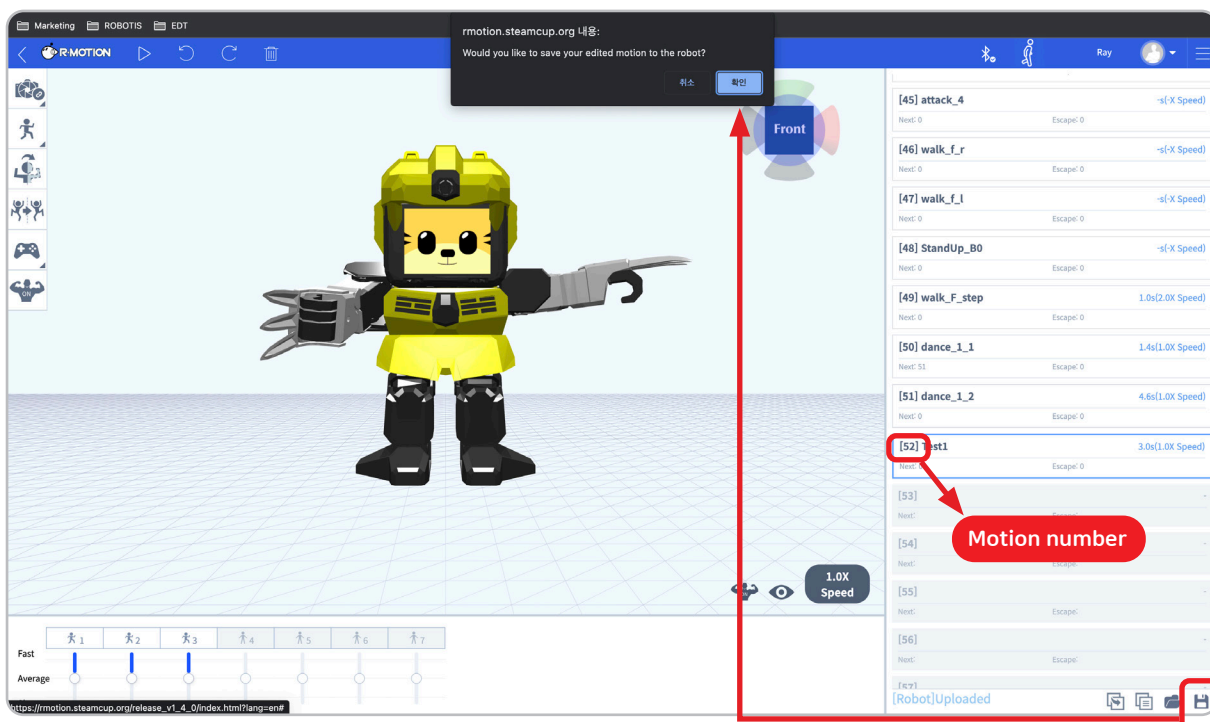
No.52 action (motion) has been saved in the robot.

Select the saved motion in R-Motion and execute the motion by clicking the ($\triangleright$) icon or by retrieving the motion number through the custom motion block in the R-Block Motion-See More.
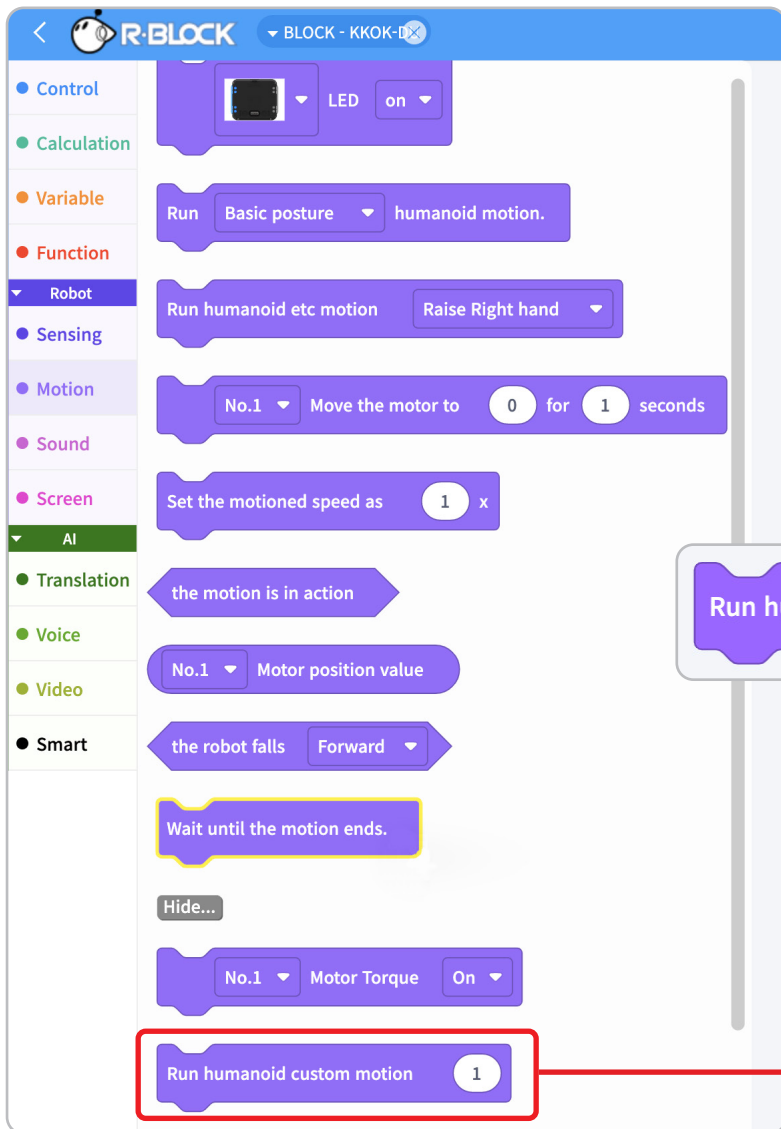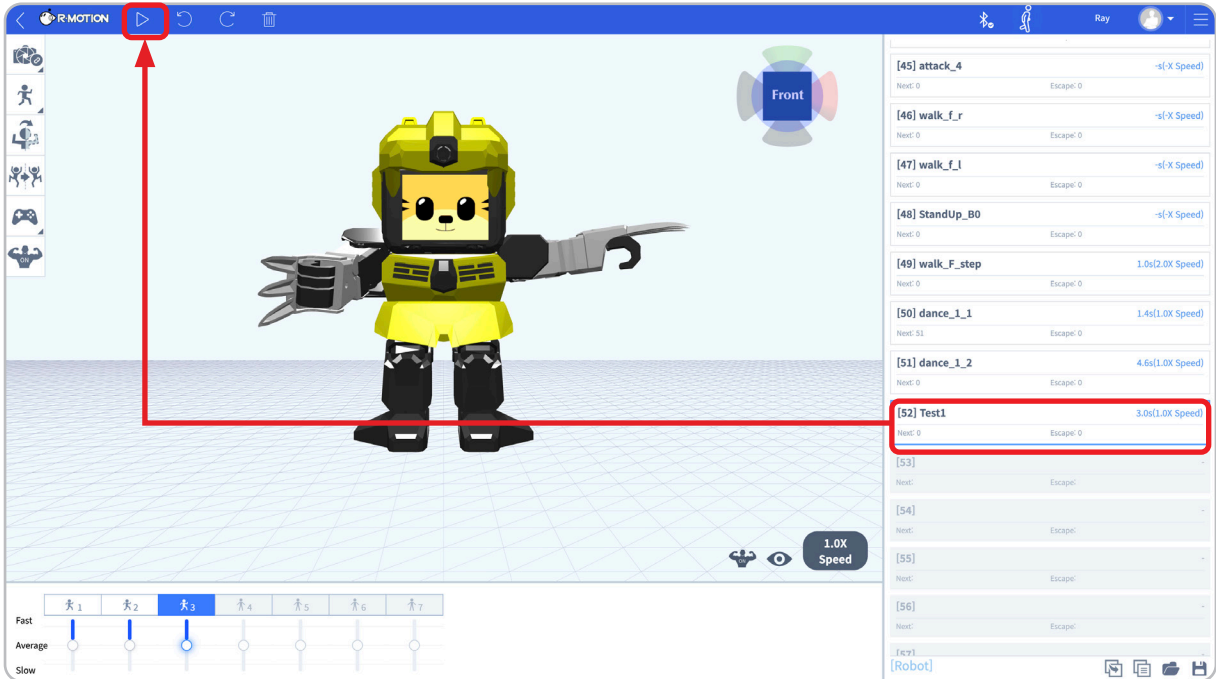
In the same way, create another motion on an empty action number.
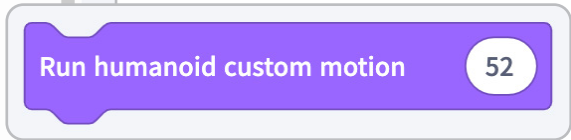
MEMO

Creating a Robot Dance

① Explore R-Motion's Features

The main functions of R-Motion screen are as follows.
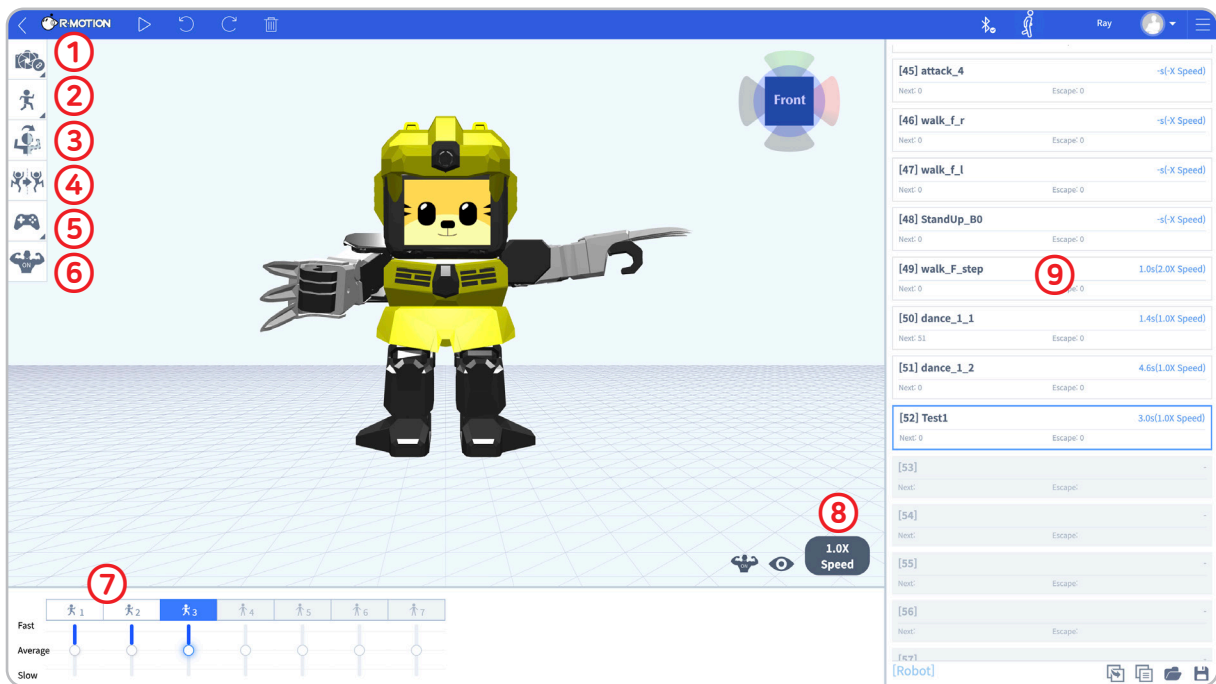
① Save the posture of the 3D motion screen to the posture window.

② Set Tig's posture as the initial posture.

③ Copy the posture identically to the robot's left and right sides using the symmetric copy function.

④ Reverse the posture of the robot's left and right sides using the reverse function.

⑤ Use the remote control functions or assign motions to remote control keys, which can be done by pressing for a long time the options "Launch remote control" or "Edit remote control".

⑥ Release the torque (force) of the robot's motor to move it by hand. Press again to lock the torque.

⑦ Use the posture window to save up to seven robot postures.

⑧ Adjust the speed of Tig's motion.

⑨ Save multiple postures in the action window, and note the motion number displayed at the front of the window.

2 Let's make Tig movements manually

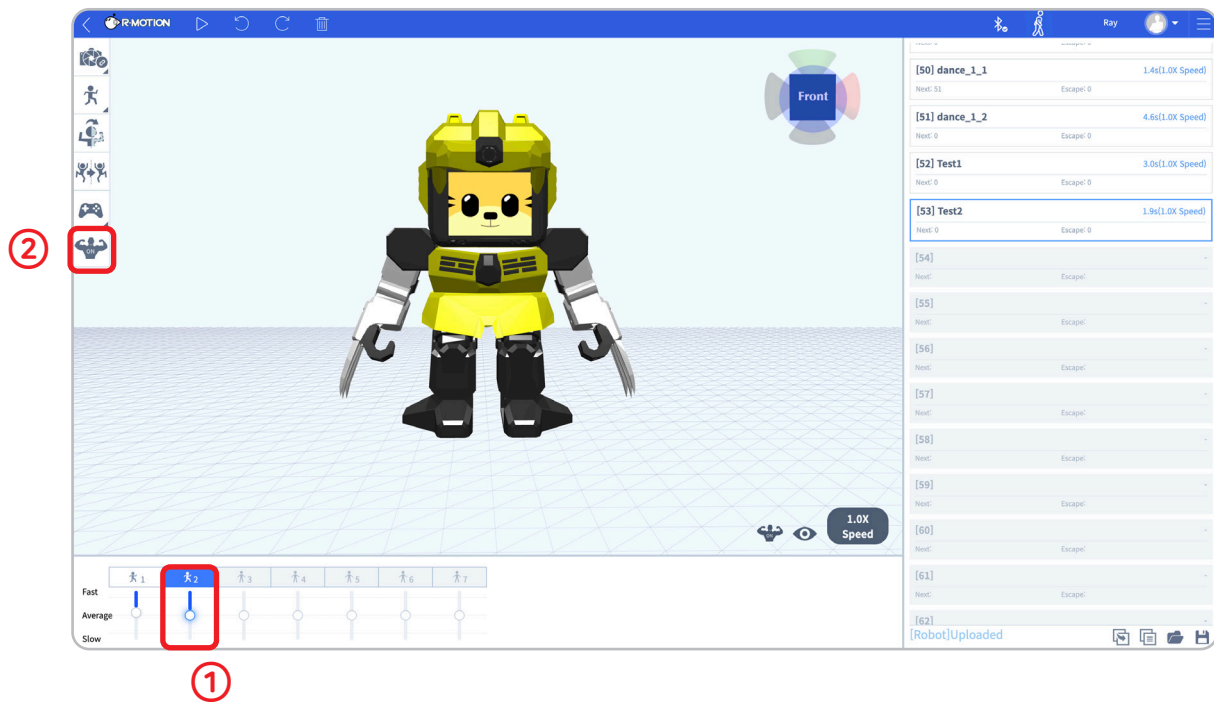After finding and selecting an empty action number, make it [Test 2].
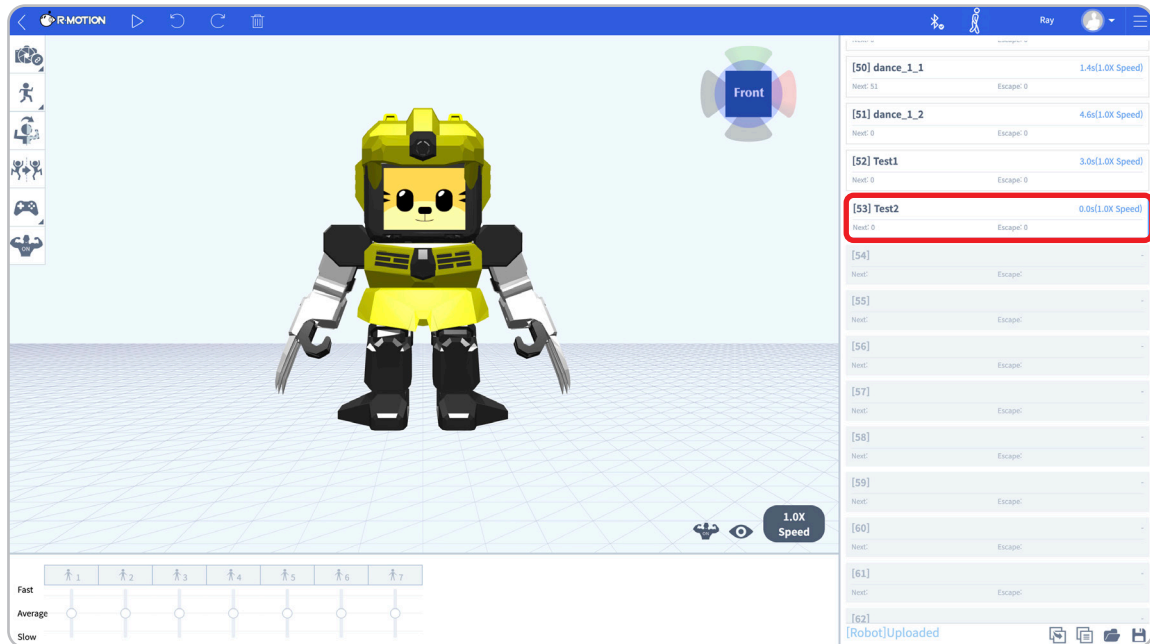
After selecting ①, press ②Initial posture and press ③ to save the posture.
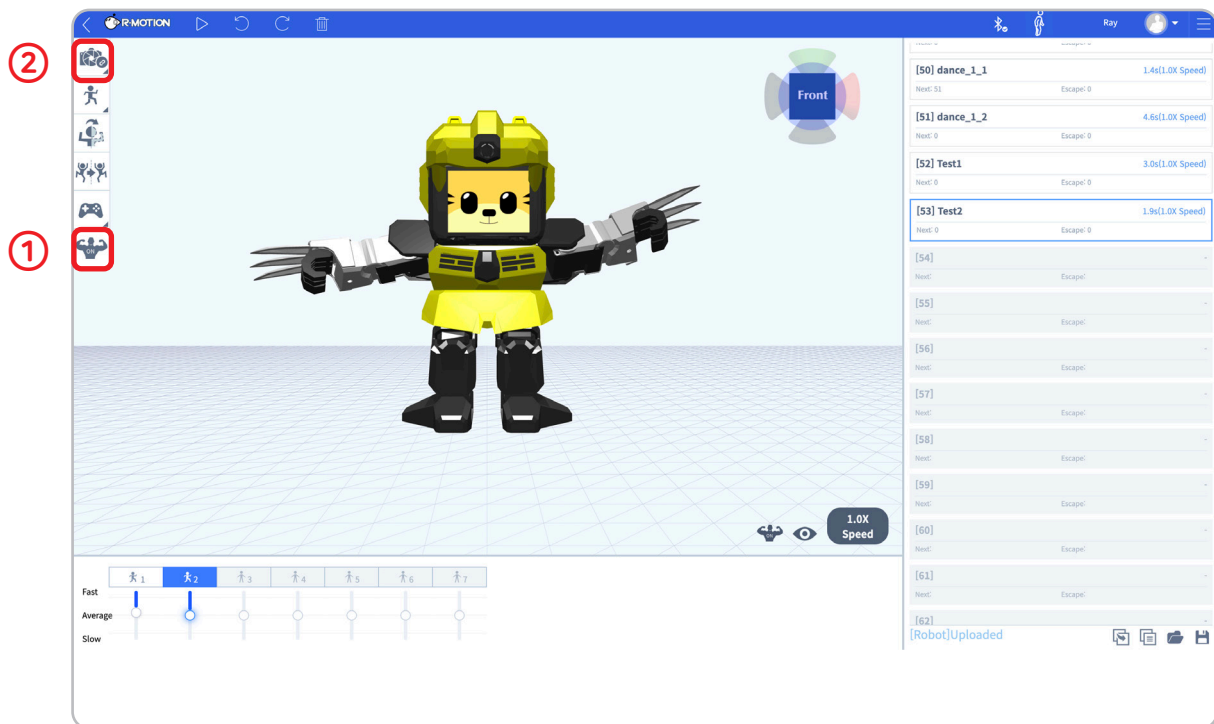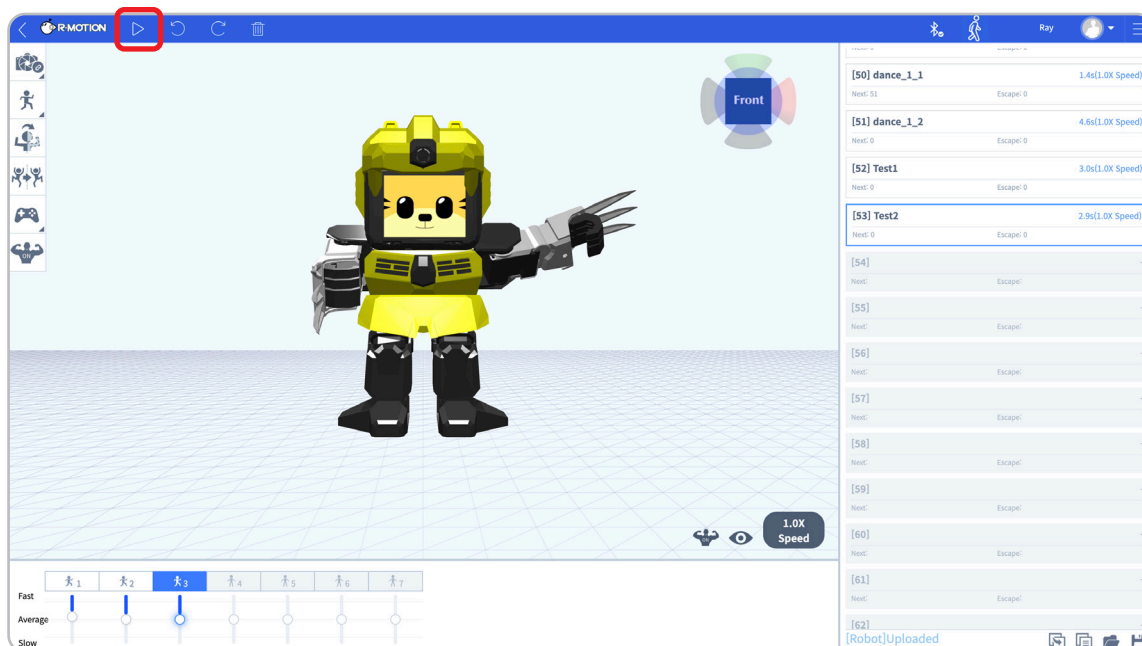
Find and select an empty action number and name it [Test 2].

After creating the desired posture by moving the Tig by hand, fix the torque and save the posture.

After adding more postures in the same way, when the addition is complete, press the run (▷) icon at the top to check the operation.

If you want to speed up the motion, adjust the gauge on the posture window upward to make your stance move faster.
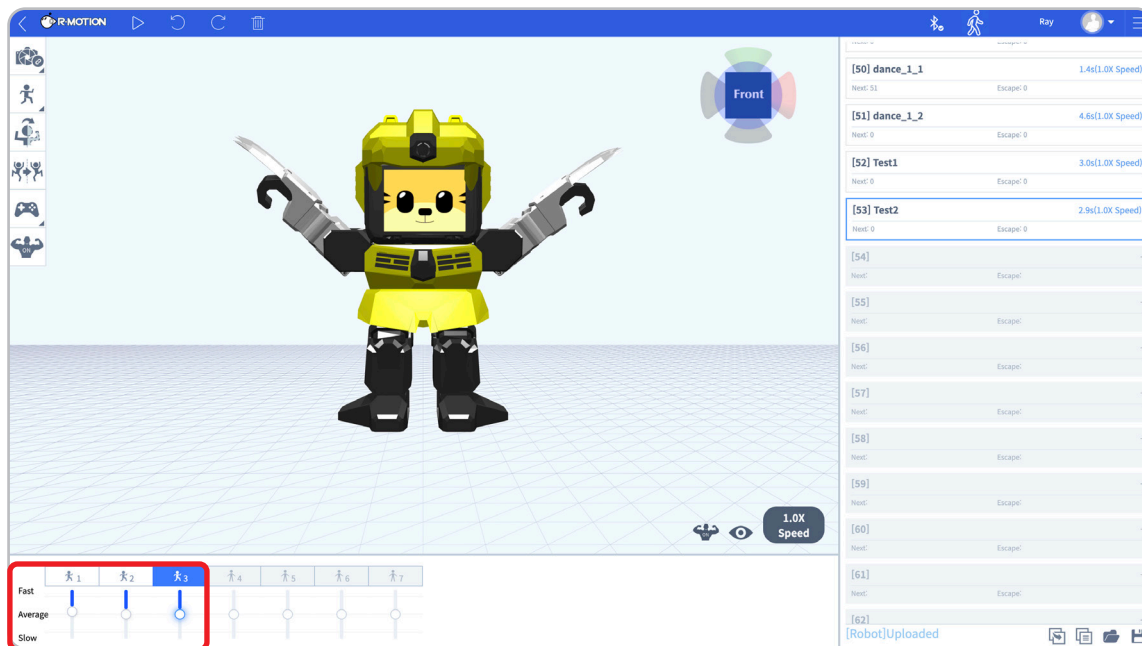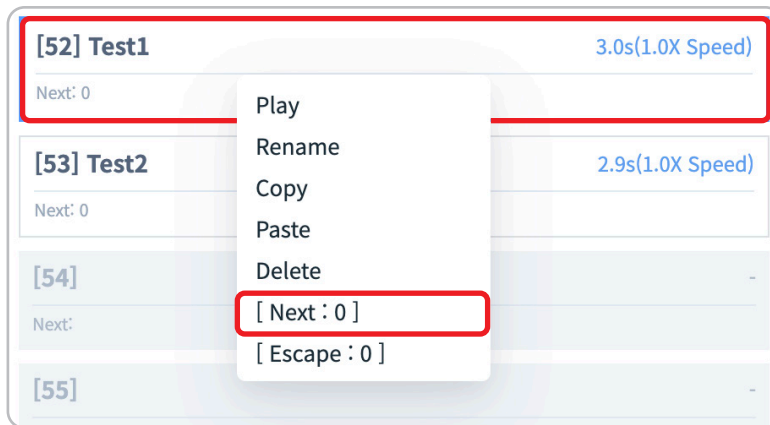
Let's add more actions to the empty action slots using the method we've learned.
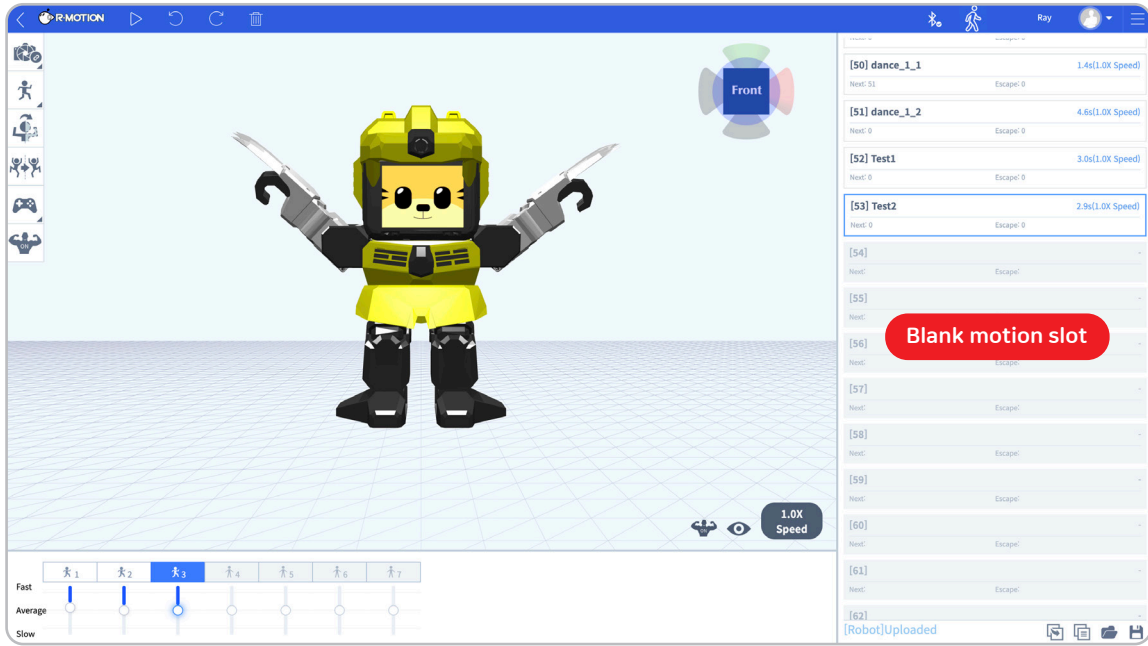
3 Let's run the motion we created in series.

Select the first action in the sequence that you want Tig to perform. Right-click on the selected action to bring up a menu, and then select "Next action" from the menu.


In the window that appears, enter the motion number for the action that you want Tig to perform next in the sequence.

Click "OK" to confirm the selection. Tig will now perform the first action in the sequence, and then automatically transition to the next action when it is finished.
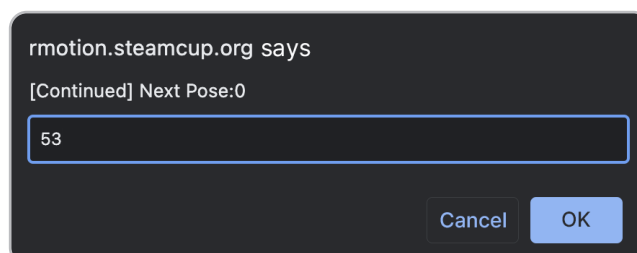
Select the first motion that you want Tig to perform in response to the music. Right-click on the selected motion to bring up a menu, and then select "Next action" from the menu.
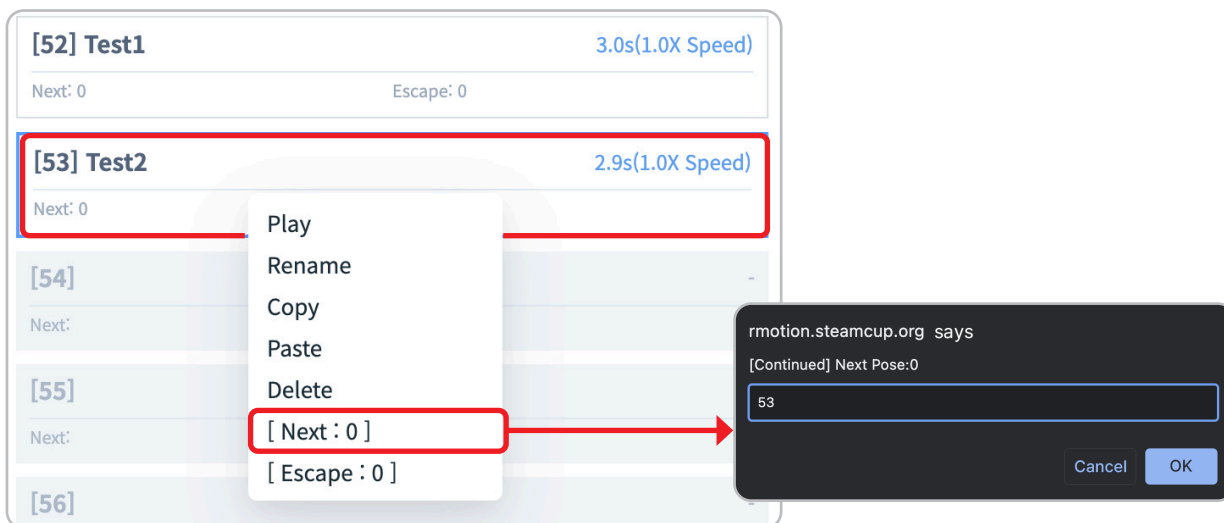
Once you have created a sequence of motions, click "Execute" (▷) to start the performance. Tig will perform the motions in response to the music continuously, according to the designated sequence of motion numbers.
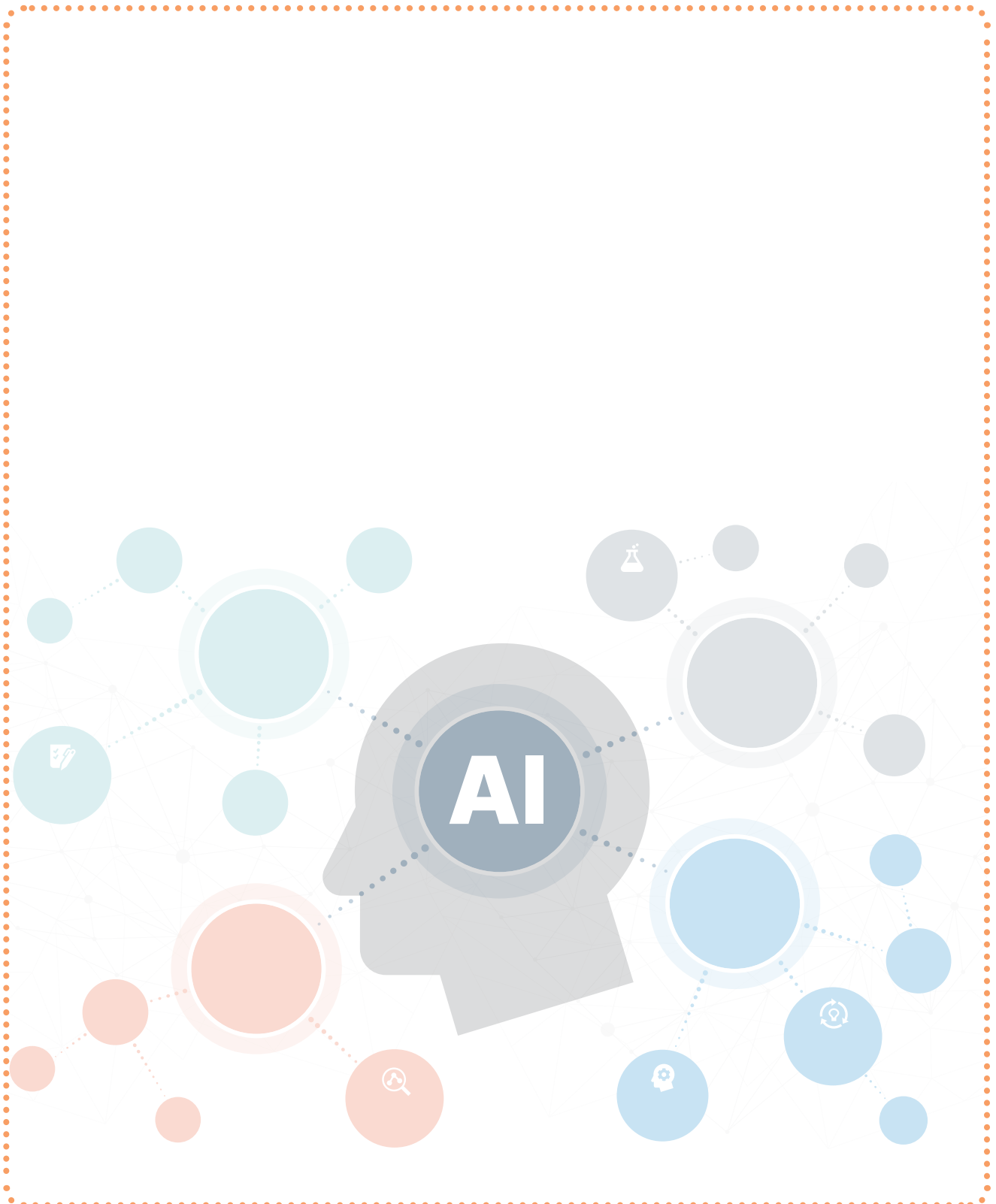

④ Let's put on a performance by making Tig dance to the music.

Review

💬 Draw a mind map of what you have learned today and share it with your friends:

Let's Google more data about AI:

MEMO