

Image Classification Game: Part 1

This **Snap!** game uses **Nvidia Jetson** capability to classify images.

Offline Snap! downloading

Please download and open Offline version of Snap! for our project. Go to <https://snap.berkeley.edu/offline> and follow the steps.

Snap! files' downloading

Please open the link [Classification Game](#) to download our project on your computer. Probably you would see the xml in raw format. Click the right button of your mouse and save it to the disk.



Web camera Image in Snap!

You can get picture from your web camera in Snap!

- **video capture** block to enable video capturing.



- Change value of **set video transparency** block to 0 for clear image.



- **video snap on stage** block reports picture from stage.



Connection to Jetson from Snap!

If you have not imported it yet, please download [jetson blocks](#) and import it to your Snap! project.



Enable **Javascript Extensions** for following blocks.

- Use **connect to Jetson url** block to connect Jetson.

connect to jetson url ws://ip_address:4040



You need **ip address** of Nvidia Jetson. You can use *ifconfig* command in a terminal to get **ip address**.

- Store the value of **jetson_name** in a variable.

set jetson_name to dev-kit-20



Users attending the conference through VPN must use the IP address instead of device host name.

- Store the value of **connect to Jetson url** block in a variable for later use.

set jetson to **connect to jetson url** join ws:// jetson_name 4040

Response from classification

Here we will send **video snap on stage** to Jetson for processing. Jetson will respond back class name, confidence value and class ID.



Only **class name** and **confidence value** will be used in this example. This project does not use **class ID**.

- Use **get response from Jetson** block to send **image** , and get **class name** and **confidence value**.

- First input slot is for **jetson** variable that stores websocket data.
- Second input slot is for **costume** you want to be classified by Nvidia Jetson.



Class name and confidence value

This section will demonstrate how to handle **response** variable to access **class name** and **confidence value**.

- **class name** is the 2nd item of 1st item of **response** block.



- **confidence value** is 2nd item of 2nd item of **response** block.



Multiply **confidence** value by 100 to get percentage of **confidence** .

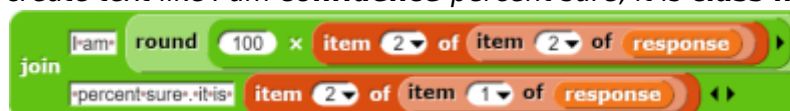


You can create custom blocks, to get **class name** *get class name from response* and to get **confidence** *get confidence from response* .

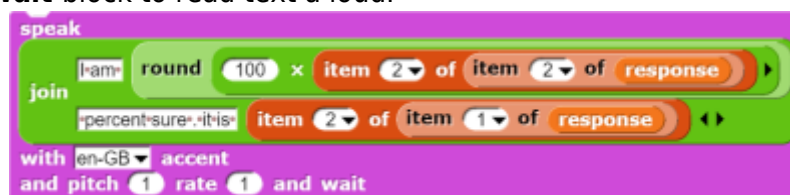
Speech functionality

Speech functionality is available as a library in Snap!. Select *export libraries* from settings then choose *speech module* .

- Use **join** block to create text like *I am **confidence** percent sure, it is **class name** .*



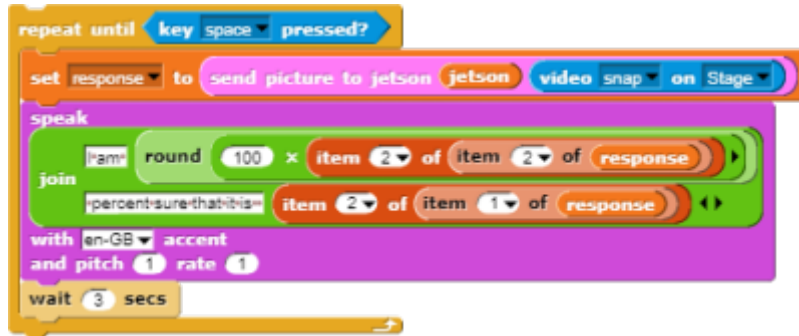
- Use **speak and wait** block to read text a loud.



Repeat block for game

Last step is adding loop for the game.

- Use repeat block and put script inside of it.



This example used **repeat until** block to break loop when space key pressed.
You can download full game from [Github page of EOLab-HSRW](#).

Image Classification Game: Part 2

Please open the link [Classification Game: Extended](#) to download the extended version of our project on your computer.

Start Camera

Drag and drop the **start video** custom block to start using web camera.



Connection to Jetson

Repeat the steps from Part 1 to connect to the Jetson Computer.



```
set jetson to connect to jetson url join ws:// jetson_name :4040
```

Game Initialization

Use **When flag clicked** , variable setting and our custom blocks for initializing the game

```
when flag clicked
  init variables
  set current_page to start page
  render current_page
  hide sprites
```

Game process control blocks

In the game process we use **when** block to catch the click event from the stage and change the current page and broadcasting to tell the other blocks that game is starting.

```
when start label is clicked
  set current_page to game page
  render current_page
  broadcast start_game to all
  wait until not mouse down?
```

Also we added additional blocks to resume the game after it was stopped.

```
when space key pressed
  set current_page to game page
  render current_page
  broadcast start_game
```

Main part: sending images to Jetson and having fun with our pets! :-)

We use familiar **when** block to listen to the start event. Then the block for receiving classification data is used in connection with **analyze** block


```
when I receive start_game
repeat until key q pressed?
set response to
send picture to jetson jetson video snap on my costume
set class_name to item 2 of item 1 of response
analyze found class
wait 3 secs
```

Inside **analyze** block we compare the class name with preset class names of food, that our pets consume, and broadcast to them. In case if the detected object is not suitable for any of them, we run **speak** block to pronounce the name of the object.

```
+ analyze + found + class +
if class_name = an1_food
broadcast rabbit_choice to Rabbit
else
if class_name = an2_food
broadcast monkey_choice to Monkey
else
if class_name = an3_food
broadcast mouse_choice to Mouse
else
if class_name = an4_food
broadcast squirrel_choice to Squirrel
else
if an5_food_list contains class_name
broadcast worm_choice to Worm
else
speak join I guess, it's class_name with en-GB accent
and pitch 1 rate 1
```

In the script part of each sprite there are already blocks, responsible for handling their choice events. We use **speak** , **play sound** , **animate** blocks to animate the sprites.

```
when I receive monkey_choice
speak join Oh, I think this is class_name with en-US accent
and pitch 1 rate 1
play sound monkey
animate
```

 You can download full game from [Github page of EOLab-HSRW](#).

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