

Worksheet & Suggested Answers

In this assignment, you are required to finish the following tasks within 1 hour.

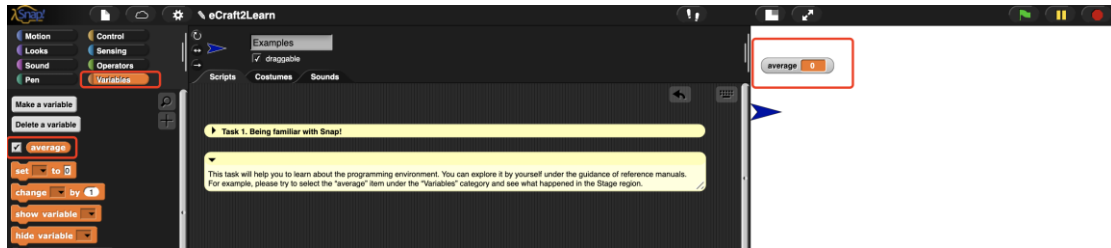
- **Task 1. Being familiar with Snap!**

This task will help you to learn about the programming environment. You can explore it by yourself under the guidance of reference manuals. For example, please try to select the “average” item under the “Variables” category and see what happened in the Stage region.



Suggested Answer:

If you select the “average” item under the “Variables” category, a button-like icon will be shown in the Stage region.



- **Task 2. NLP training using word embedding.**

Word embedding is a popular method to translate the human language into a language that machines can be recognized and processed. It first constructs a set of features from the text for each word, and then do distributed representations of that set of features. Here, we have provided training text which placing the word in a 300-dimensional space (i.e., the word will be reported in a list of 300 numbers)

- **Task 2-1. Generate a vector for "cat" and visualize it**

Please combine some blocks to generate a vector for "cat" and visualize it. The followings are some necessary blocks and an example to generate the vector for a word. Show your program below.

The screenshot shows a task instruction box with a yellow header: "Task 2-1. Generate a vector for 'cat' and visualize it". Below the instruction, there is a code block with the following blocks: "clear", "go to x: -150 y: 50", and "Draw features features of dog in language English with height 100".

Suggested Answer:

The screenshot shows the eCraft2Learn interface. On the left, the code block from the previous image is shown with a red box around it, indicating the suggested answer. The code block contains: "clear", "go to x: -150 y: 50", and "Draw features features of cat in language English with height 100". On the right, a waveform visualization is shown, representing the vector for the word "cat". The waveform is a blue line with a red arrow pointing to the right, indicating the direction of the vector.

➤ **Task 2-2. Calculate the distance from "dog" to "cat"**

The distance between two words can be calculated using word embedding. The block below returns the distance between "flower" and "honey". Please calculate the distance between "dog" and "cat". Show your program and give your answer.

▶ Task 2-2. Calculate the distance from "dog" to "cat"

The distance between two words can be calculated using word embedding. The block below returns the distance between "flower" and "honey". Please calculate the distance between "dog" and "cat". Show your program below and give your answer.

distance from features features of flower in language to features of honey in language

The distance between "dog" and "cat" is ____ (with two decimal places)

Suggested Answer:

▶ Task 2-2. Calculate the distance from "dog" to "cat"

The distance between two words can be calculated using word embedding. The block below returns the distance between "flower" and "honey". Please calculate the distance between "dog" and "cat". Show your program below and give your answer.

distance from features features of dog in language to 1.7875672826498035 features of cat in language

The distance between "dog" and "cat" is 1.79 (with two decimal places)

➤ **Task 2-3. Find the closest word to "cat"**

Please combine the following blocks to find the closest word to "cat". Show your program and give your answer.

▶ Task 2-3. Find the closest word to "cat"

Please combine the following blocks to find the closest word to "cat". Show your program below and give your answer.

features of dog in language

closest word to in language not including list dog dogs

The closest word to "cat" is _____.

Suggested Answer:

▶ Task 2-3. Find the closest word to "cat"

Please combine the following blocks to find the closest word to "cat". Show your program below and give your answer.

closest word to features of cat in language feline

in language not including list cat cats

The closest word to "cat" is feline.

➤ **Task 2-4. Find the 5 closest words to "cat"**

Please combine the following blocks to find the 5 closest words to "cat". Show your program and give your answer.

▶ **Task 2-4. Find the 5 closest words to "cat"**

Please combine the following blocks to find the 5 closest words to "cat". Show your program below and give your answer.

features of **dog** in language **English**

closest words to **cat** in language **English** and include distances

The 5 closest words to "cat" is (_____)

Suggested Answer:

▶ **Task 2-4. Find the 5 closest words to "cat"**

Please combine the following blocks to find the 5 closest words to "cat". Show your program

closest words to **features of cat** in language **English** in language **English** and include distances

The 5 closest words to "cat" is (**cat** , **cats** , **feline** , **kitten** , **dog**)

20000	items
1	cat
2	cats
3	feline
4	kitten
5	dog
6	pet
7	kittens
8	mouse
9	dogs
10	pets
11	puppy
12	animal

➤ **Task 2-5. Use the word embedding method to answer which of the following words is closer to “mouse”**

Please review the blocks you’ve learned, try to answer which words (“fox”, “cow”, and “lion”) is closer to “mouse”. Show your program below and give your answer.

▶ Task 2-5. Use the word embedding method to answer which of the following words is closer to “mouse”.

Please review the blocks you’ve learned, try to answer which words is closer to “mouse”. Show your program below and give your answer.

A:“fox”
B:“cow”
C:“lion”

The closest word to “mouse” is ____ (A or B or C).

Suggested Answer:

▶ Task 2-5. Use the word embedding method to answer which of the following words is closer to “mouse”.

Please review the blocks you’ve learned, try to answer which words is closer to “mouse”. Show your program below and give your answer.

A:“fox”
B:“cow”
C:“lion”

distance from features features of mouse in language to features of fox in language

distance from features features of mouse in language to features of cow in language

distance from features features of mouse in language to features of lion in language

The closest word to “mouse” is B (A or B or C).

- **Task 2-6. Modify the program to calculate the distance between “man” and “king”**
Vectors can be added and subtracted, please modify the program to calculate the distance between “man” and “king”. Show your program below and give your answer.

▶ Task 2-6. Modify the program to calculate the distance between “man” and “king”

▼

Vectors can be added and subtracted, please modify the program to calculate the distance between “man” and “king” and give your answer.

map on each element of

features of good in language English and

features of flower in language English

Suggested Answer:

▶ Task 2-6. Modify the program to calculate the distance between “man” and “king”

▼

Vectors can be added and subtracted, please modify the program to calculate the distance between “man” and “king” and give your answer.

map on each element of

features of man in language English and

features of king in language English

➤ **Task 2-7. Use the word embedding method to compare the relationships between word groups**

Please try to compare the relationship between word groups. Show your program below and give your answer to which two groups of words are closer. The followings are some blocks you might need.

Task 2-7. Use the word embedding method to compare the relationships between word groups.

Please try to compare the relationship between word groups. Show your program below and give your answer to which two groups of words are closer.

A: "king-queen" and "man-woman"
B: "king -woman" and "queen - man"
C: "man-king" and "wowan-queen"

The followings are some blocks you might need.

The closer word groups is ____ (A or B or C).

Suggested Answer:

Task 2-7. Use the word embedding method to compare the relationships between word groups.

Please try to compare the relationship between word groups. Show your program below and give your answer to which two groups of words are closer.

A: "king-queen" and "man-woman"
B: "king -woman" and "queen - man"
C: "man-king" and "wowan-queen"

The followings are some blocks you might need.

The closer word groups is C (A or B or C).