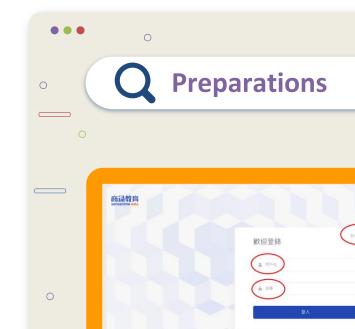


### SenseTime AI Education

Primary & Secondary School AI Curriculum

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**Training Notes Download:** 

https://cutt.ly/Un0sQV9

Login Platform Website:

https://hk.study.sensetime. com/course/login

Username: STtrial01 ~ STtrial20

Password: STtrial123

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### In today's lesson, you'll learn about:

- · what artificial intelligence is
- · play with artificial intelliaence on SenseStudy platform



# What is A.I.?

# Artificial Intelligence

# Artificial Intelligence

Made by humans

Perception and understanding

### What is A.I.?

A science that

teaches computers

how to behave like



humans.



# Alan Turing

Nickname: Father of Al

Who is Turing?

An English mathematician and computer scientist

→ He helped the allies win WWII with computers.

**So,** 

how did Turing define A1?

### The Turing Test

A test to see if a computer can trick a person into believing that the computer is a person too.

If a human could not tell the difference between another human and the computer...

= Human Intelligence!



## But Real Al doesn't exist ... yet.

but we humans still actively use AI to improve lives.

Let's take Siri as an example... you can easily recognize that Siri is not a human.



# However...

We are building smarter and smarter machines everyday to help us in different ways.

## In the Morning...

After waking up, you sleepily asked the phone

"Hey Siri, play me some music!"

Now, You can easily enjoy breakfast while

listening to some of your favorite tunes.





# Before leaving the house...

You asked the voice assistant in your phone about the weather conditions, and suddenly learned that it will rain today!

Let me grab a raincoat and an umbrella!

# And many more!

"Siri show."

Al in Mobile
Phones:
face unlocking,
beauty cameras for
selfies, automatic
album classification,
voice assistants,
intelligent
translations



At on the internet: search engine technology, machine translation systems



Artificial
Intelligence
Among Us

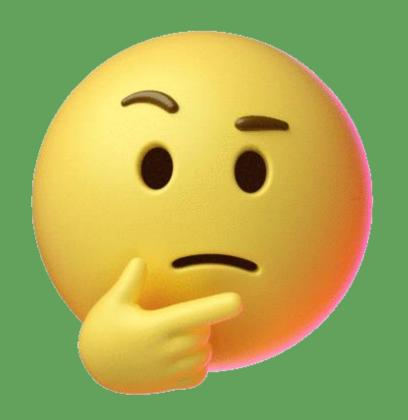


Al on vehicles: target detection, assisted driving, and automated driving



#### Discussion:

What other Al applications can you think of?



# Demo: flappy bird Al

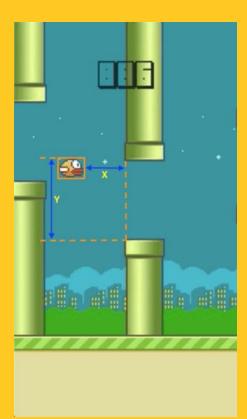
Let's watch how AI learns from trial and error and train the flappy bird to eventually beat the game!

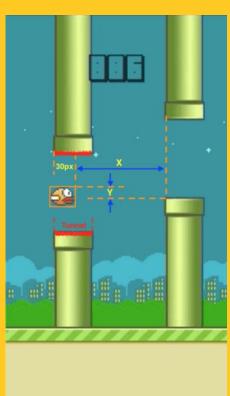


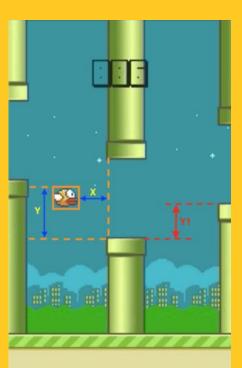




### So, how does it work?







X: Horizontal

distance to next

pipe

Y: Vertical distance

to next pipe

V: Current velocity

of the bird









**Experiment 1:** Fruit Detection



**Experiment 2:** Face Clustering





**Experiment 3: Image Style Transfer** 





在本課程中。我們將軟計算機如何識別水果的

首先。使用 load\_image 函数加輕默認的水果 画像,並將加載的圖像數據緊值到 img 變量。使用

結果應如下所示。

輸出

函數

(9) 選輯 ○ 循環

#### **SenseStudy Experiment**

🧇 trialO21 ▼ 🗿 重新開始 🕒 適出實驗









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Students can code using blocks similar to Scratch

and Blockly.

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#### SenseStudy Experiment











Students can also code using Python on the SenseStudy platform.

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Fruit Recognition (Elementary AI, Volume I 1.2)

**Python Codes** 

```
加載圖像 ' example.jpg '
    img ▼
顯示圖像
        img ▼
    detector ▼
                  初始化水果識別句柄
    objects_result ▼
                      根據模型
                                         檢測圖片
                                                        中的水果
                               detector ▼
根據模型
        detector ▼
                  顯示檢測結果
    resulted_img ▼
                     使用
                                          標記
                           objects_result ▼
                                                      中檢測出的水果
                                               img ▼
顯示圖像
        resulted_img ▼
```

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# What you just witnessed was not magic... But Maths and Science!

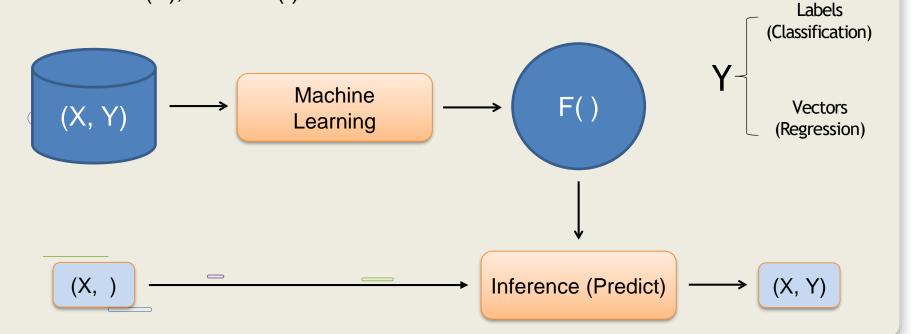


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### Q

#### **AI** is Function

- The world is composed by (observation, recognition) = (X, Y)
- Y = F(X), where F() is called "Model"



### Q

#### **Function is everywhere**

F(		) = "is face" / "Ada" ————————————————————————————————————	+	Facial Detection / Recognition
F(	18	) = "Dog"	<b>+</b>	Object Classification
F(		) = "Hellow"	<b>→</b>	Acoustic Speech Recognition
F(	"Hellow"	) =	<b>→</b>	Text-To-Speech,TTS
○ <sub>F(</sub>	Question	) = Answer	<b>+</b>	Chat Robot
F(		) = (Brake, throttle, direction)	<b>→</b>	Autonomous Driving
F(		) = Next position	<b>+</b>	AlphaGo
F(		) = (Liquidity, volatility, trend)	<b>+</b>	Stock Prediction









#### **Supervised Learning**

Given a set of input/output pairs, learn to predict the output when given a new input.

= Learn by using model answers!

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#### Τ,



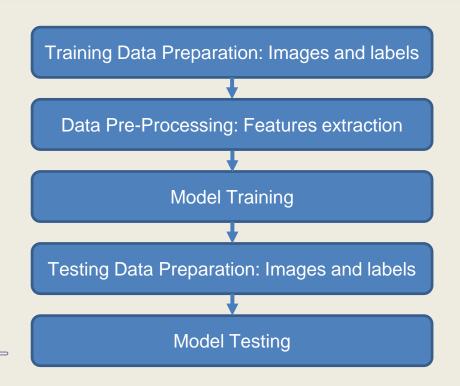
#### **Unsupervised Learning**

Given data without labels, model learns to group data with similar features together without knowing the true label of each group

= Learn by grouping similar things together!

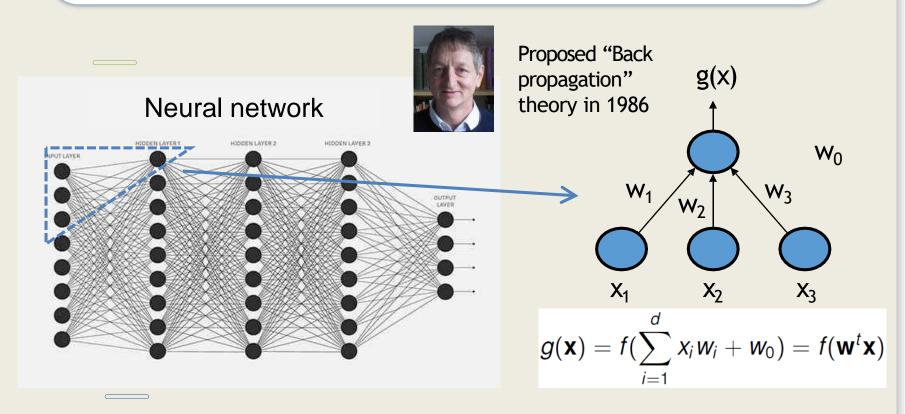


#### **Procedure of Supervised Learning**



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#### **Neural Network**

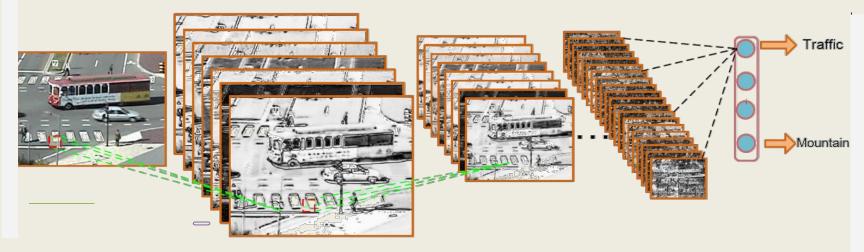




#### **Convolutional neural network**



Proposed "Convolutional neural network" theory in 1998





#### **Q** What is Deep Learning?

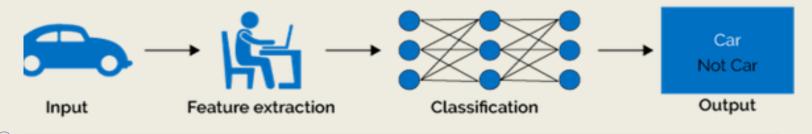




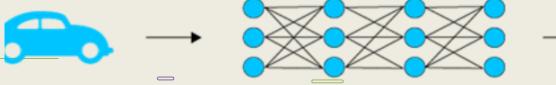




#### **Machine Learning**



#### Deep Learning



Feature extraction + Classification

Car Not Car

Output

Input

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#### Two Animals Classification (Elementary AI, Volume I 2.2)

#### **Python Codes**

1. Training data preparation

```
animal_1 ▼
set
                         cat'
      animal_2 ▼
                         rabbit'
set
                   to
                      load images from folder
                                               animal_1 ▼
      imgs_1 ▼
set
                      load images from folder
                                               animal_2 ▼
set
      imgs_2 ▼
                 to
display image
                            get value at
                imgs_1 ▼
display image
                imgs_2 ▼
                            get value at
```

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#### SenseStudy Experiment (Cont'd)



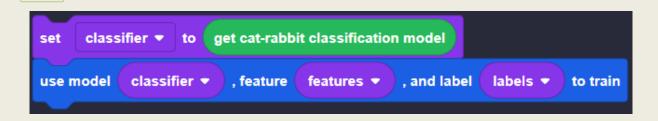
2. Data pre-processing for image features and labels

```
feature_net ▼ to get cat-rabbit detector model
     features ▼ to create an empty list (+)
     labels ▼ to create an empty list 🛨
for each item item in list imgs_1 ▼
         img_feature ▼ to use model feature_net ▼
                                                       to extract features from
                           to list features •
             img_feature ▼
                 to list labels ▼
    append
for each item in list imgs_2 ▼
         img_feature ▼ to
                            use model
                                       feature_net 🔻
                                                       to extract features from
                                   features ▼
             img_feature ▼
                            to list
    append
                  to list labels ▼
    append
```





3. Model training





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#### SenseStudy Experiment (Cont'd)









4. Model testing

```
test_imgs ▼ to load images from folder
for each item in list
                            test_imgs ▼
    display image
                    item ▼
          img_feature ▼ to
                              use model
                                                          to extract features from
                                           feature net ▼
                                                                                   item •
                      use model
                                   classifier ▼
                                                and feature
                                                             img_feature ▼
                                                                              to predict
                                     do
      print 'This is a'
                           animal_1 ▼
    else
      print 'This is a'
                           animal_2 ▼
```

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### SenseTime AI Education

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The End

Thank you for listening!

