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SenseTime AI Education

Primary & Secondary School AI Curriculum

Preparations

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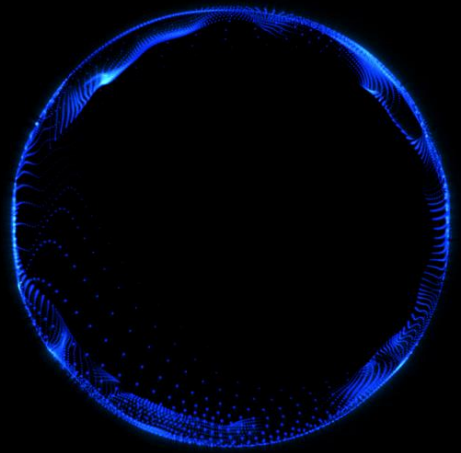
In today's lesson, you'll learn about:

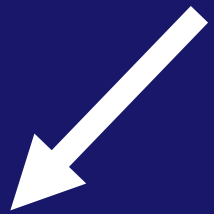
- what artificial intelligence is
- play with artificial intelligence on SenseStudy platform

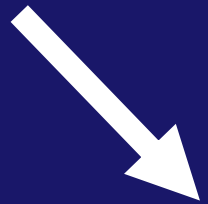


What is A.I.?

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 AI

Who is Turing?

An English mathematician and computer scientist

→ He helped the allies win WWII with computers.

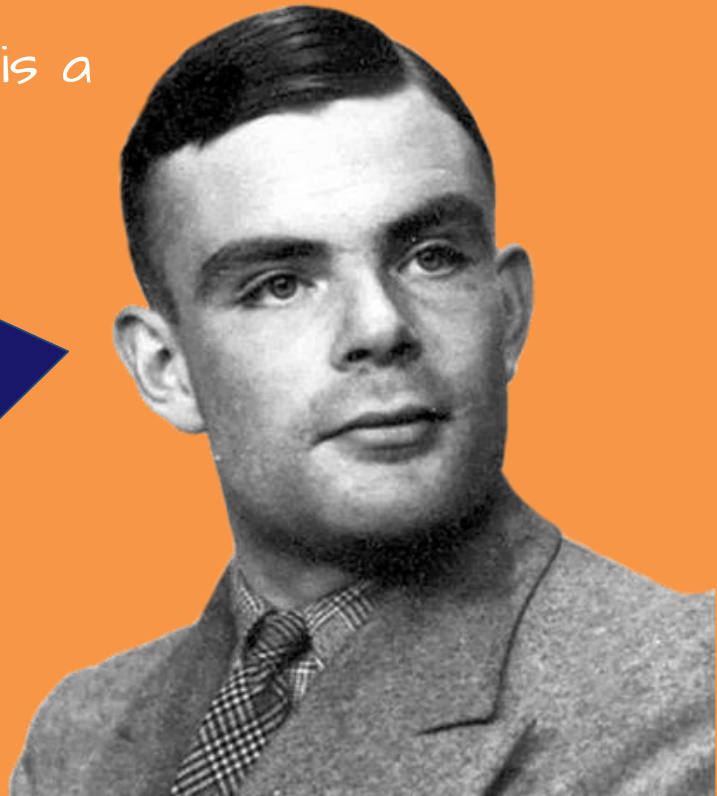
So,
how did Turing define AI?

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 AI 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.

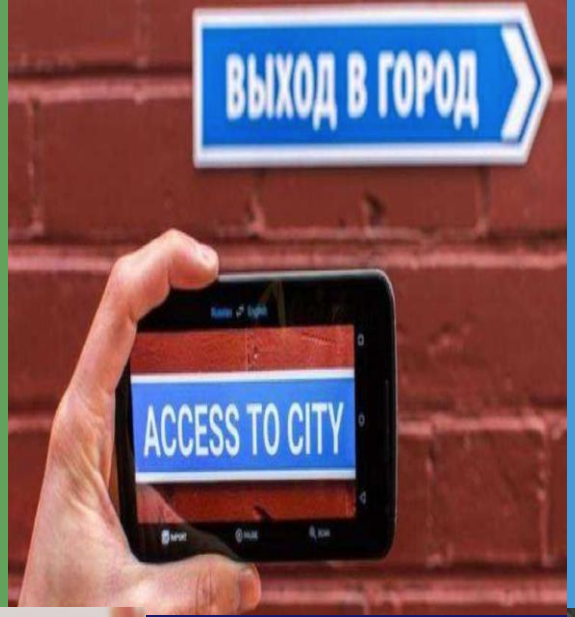
Before leaving the house...

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!

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



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

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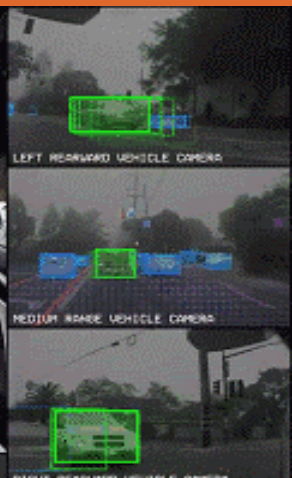
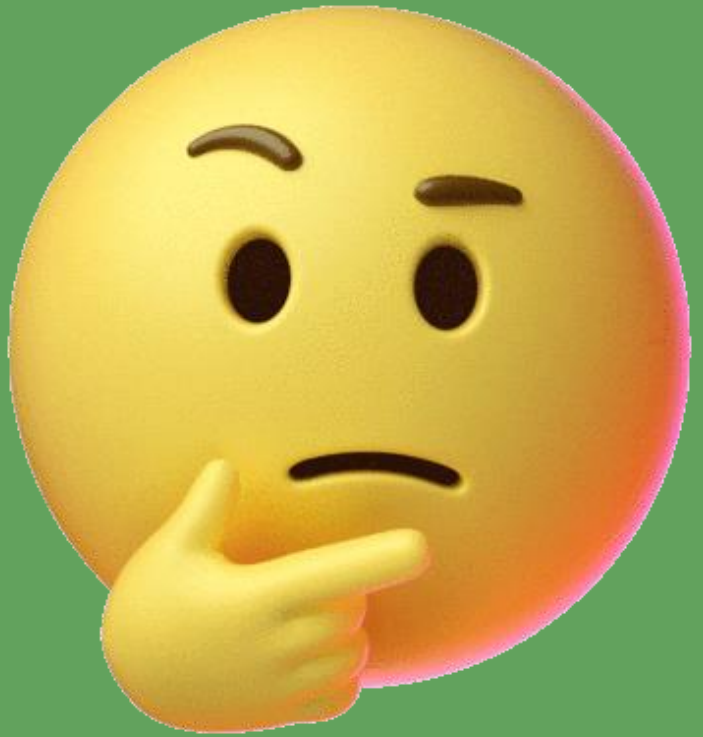
Artificial Intelligence Among Us

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



Discussion:

What other AI applications can you think of?

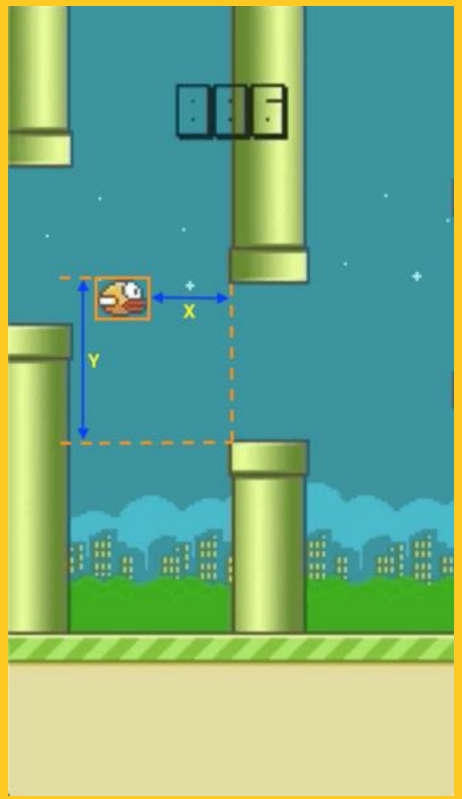


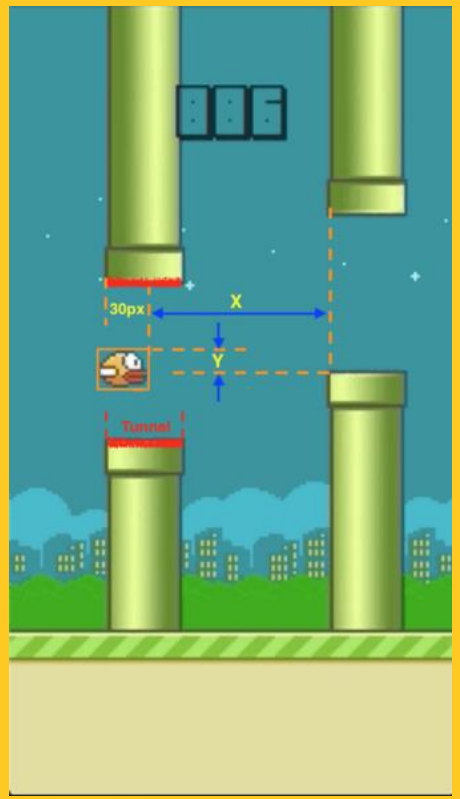
Demo: flappy bird AI

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?

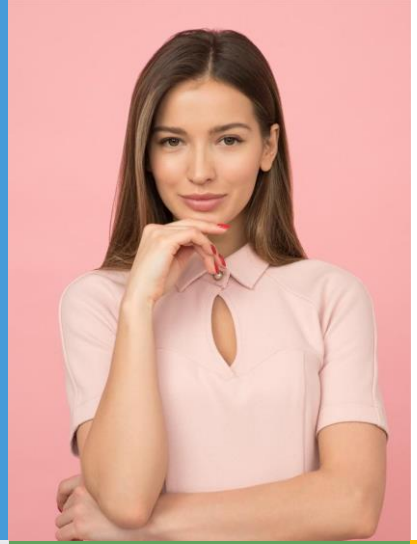




X: Horizontal distance to next pipe

Y: Vertical distance to next pipe

V: Current velocity of the bird



Let's Play!

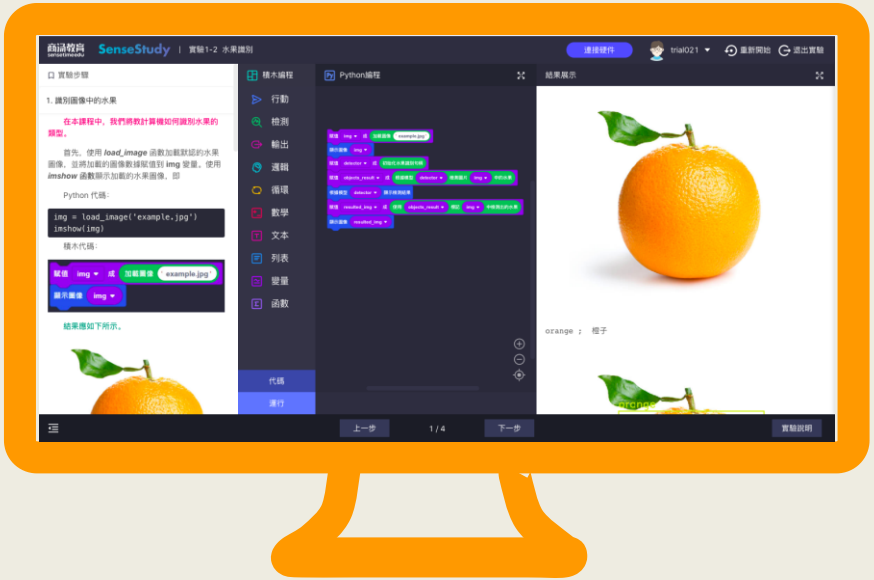
Experiment Time

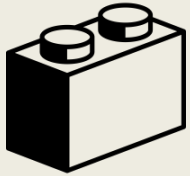
Experiment 1: Fruit Detection

Experiment 2: Face Clustering

Experiment 3: Image Style Transfer

SenseStudy Experiment





Students can code using blocks similar to Scratch and Blockly.

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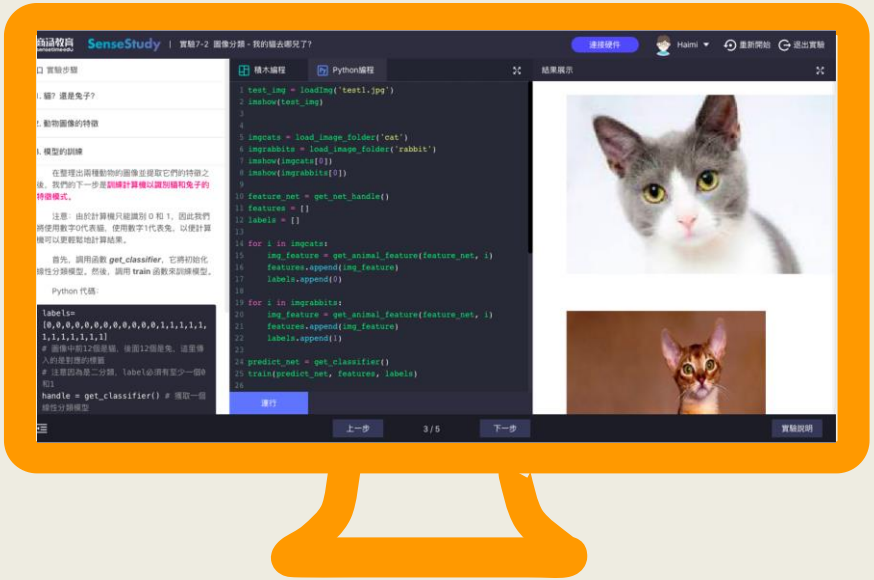
SenseStudy Experiment



Students can also code using Python on the SenseStudy platform.

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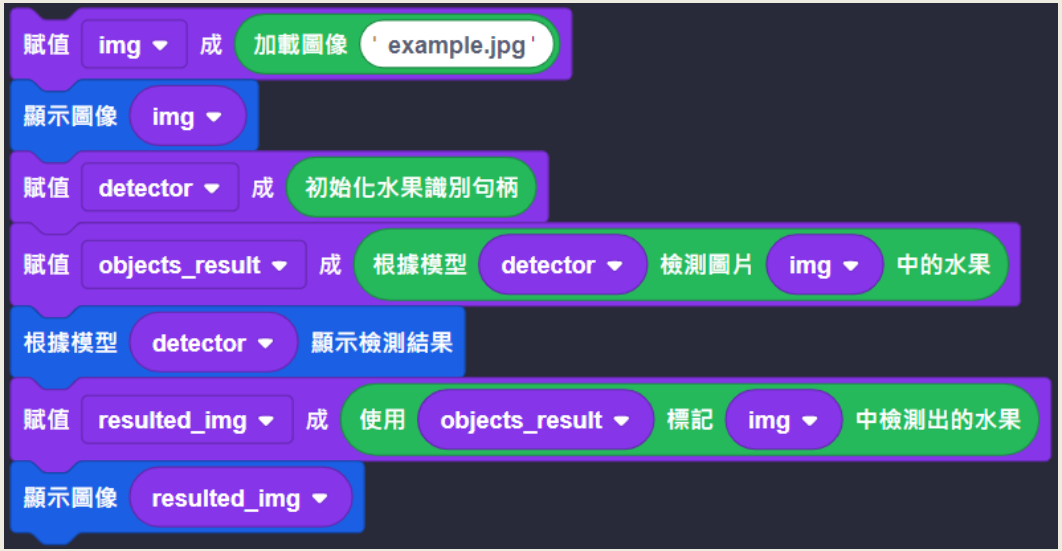
SenseStudy Experiment

Fruit Recognition (Elementary AI, Volume I 1.2)

Python Codes



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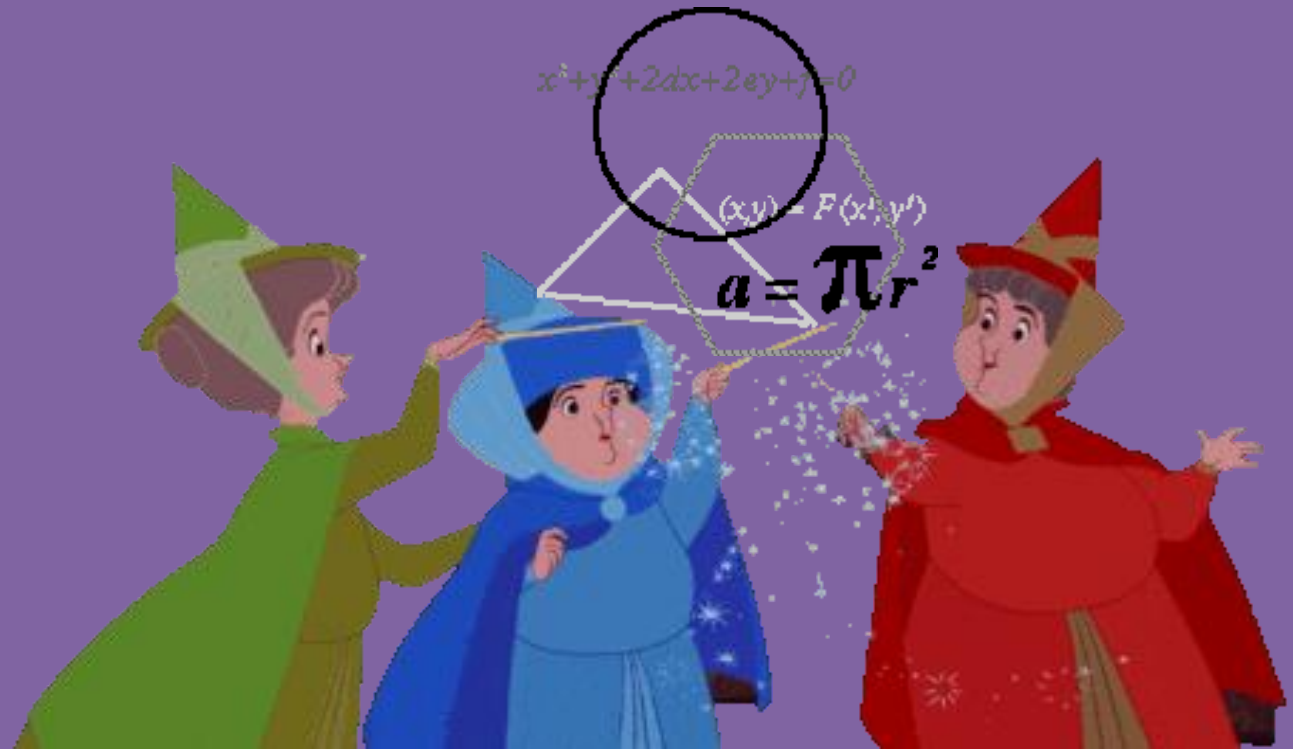
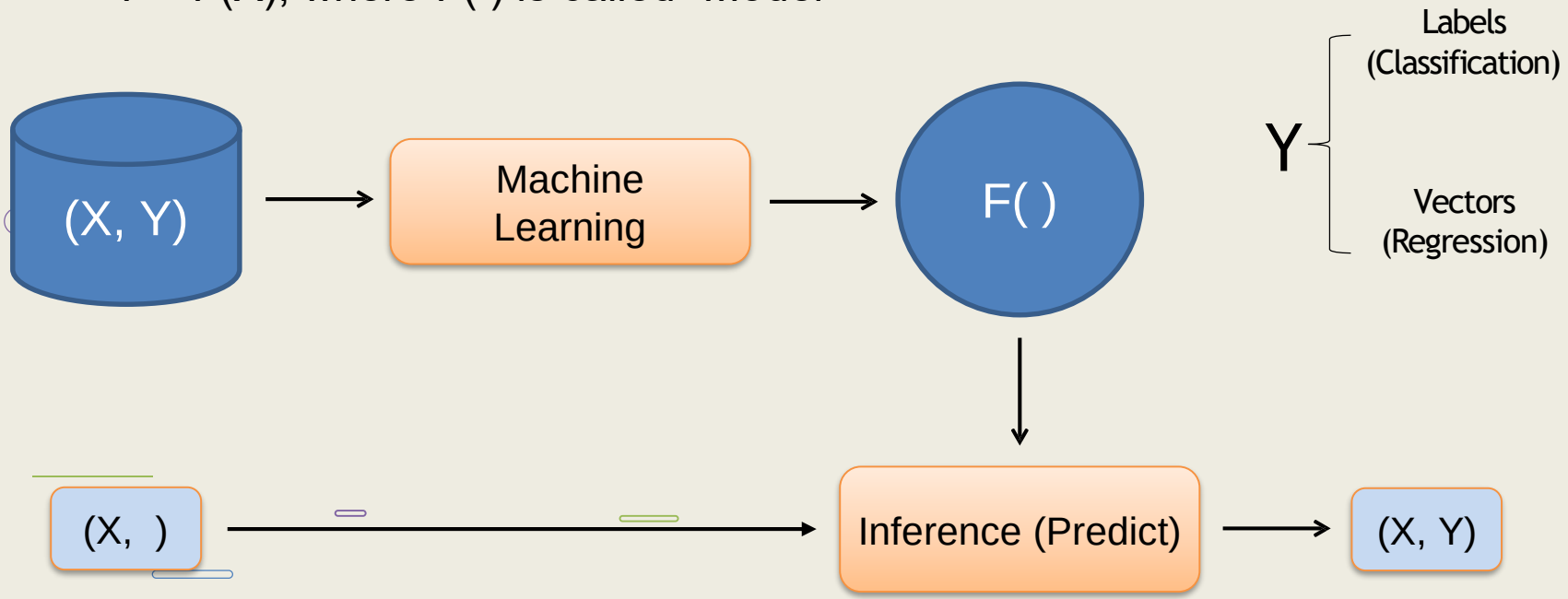
What you just witnessed was not magic...

But Maths and Science!



AI is Function

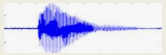
- The world is composed by (observation, recognition) = (X, Y)
- Y = F(X), where F( ) is called “Model”

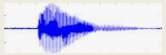


Function is everywhere

F() = “is face” / “Ada” → Facial Detection / Recognition

F() = “Dog” → Object Classification

F() = “Hellow” → Acoustic Speech Recognition

F(“Hellow”) =  → Text-To-Speech,TTS

F(Question) = Answer → Chat Robot

F() = (Brake, throttle, direction) → Autonomous Driving

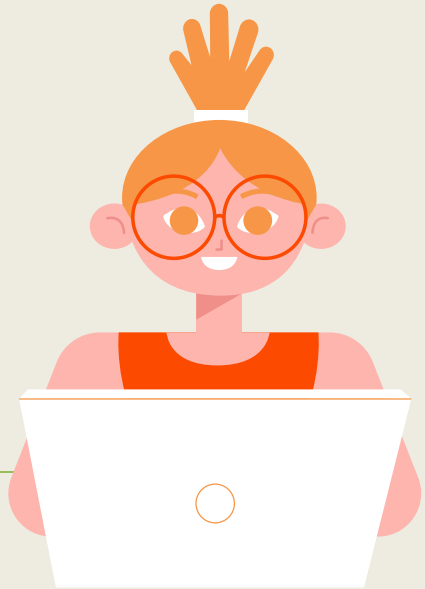
F() = Next position → AlphaGo

F() = (Liquidity, volatility, trend) → 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!

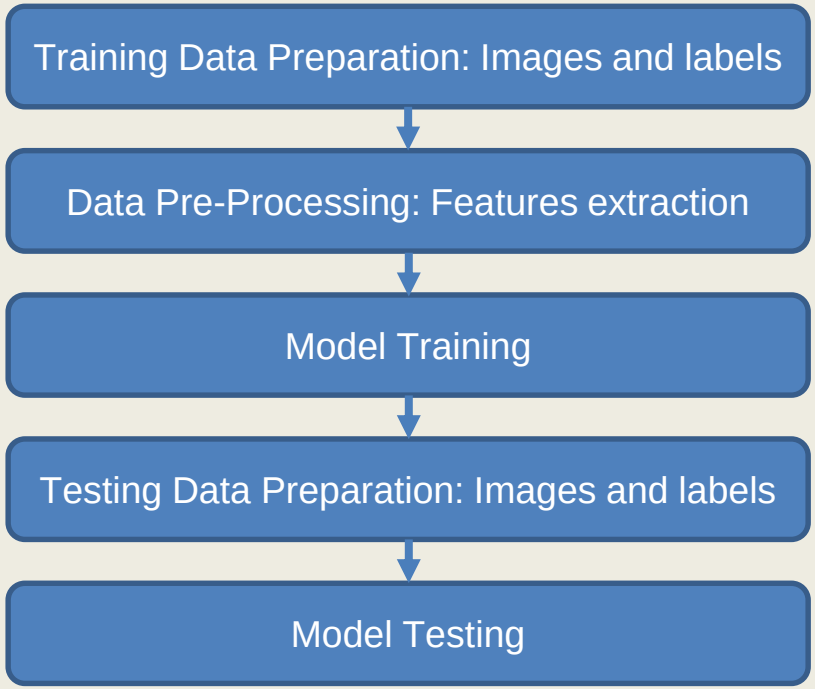


Unsupervised Learning

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

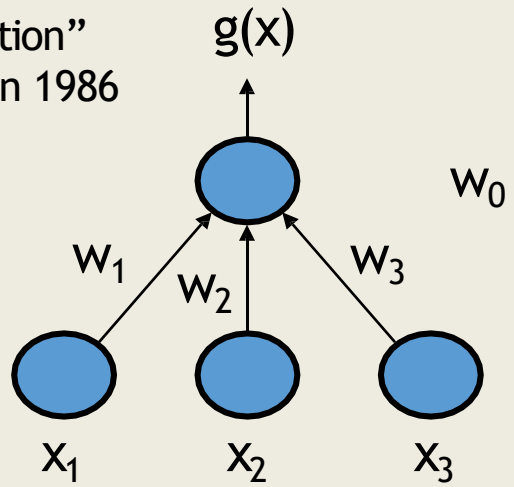
= Learn by grouping similar things together!

Procedure of Supervised Learning

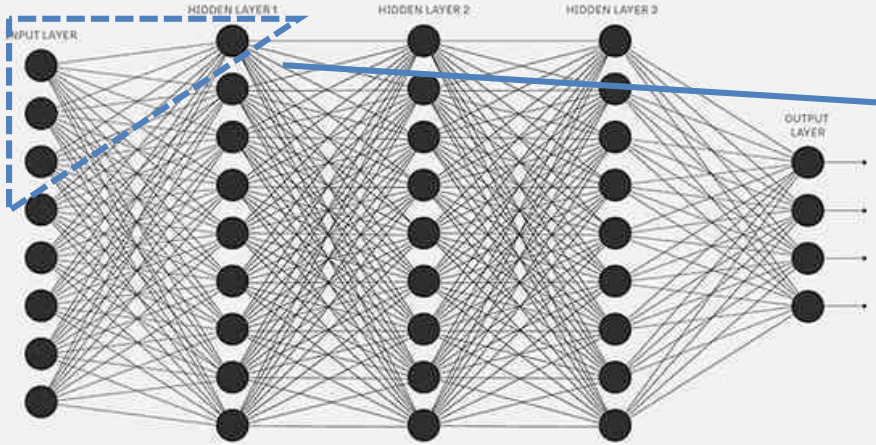


Neural Network

Proposed "Back propagation" theory in 1986



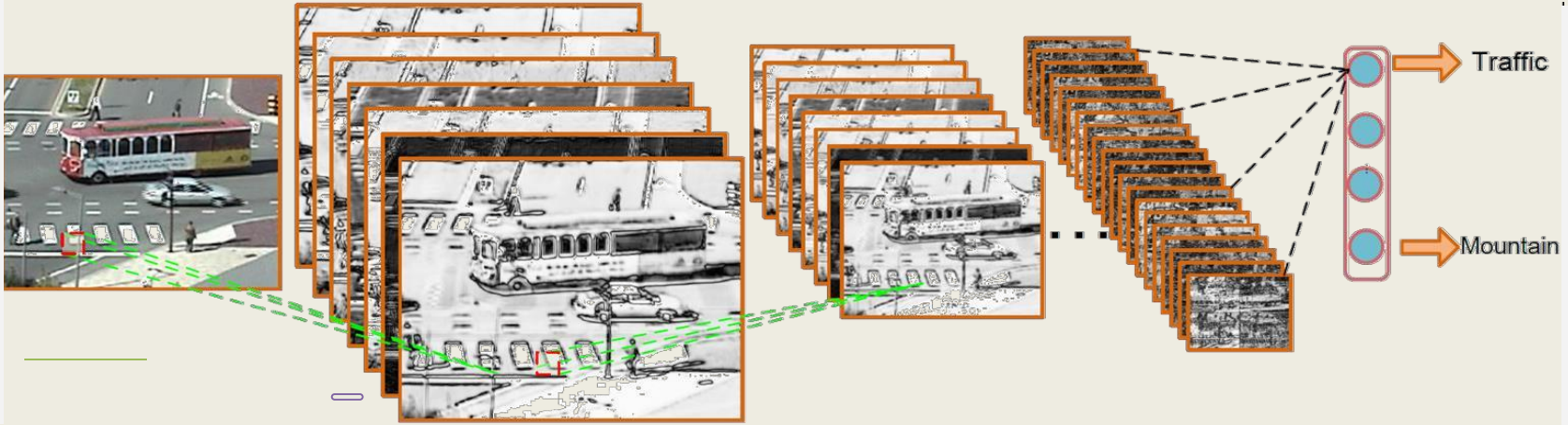
Neural network



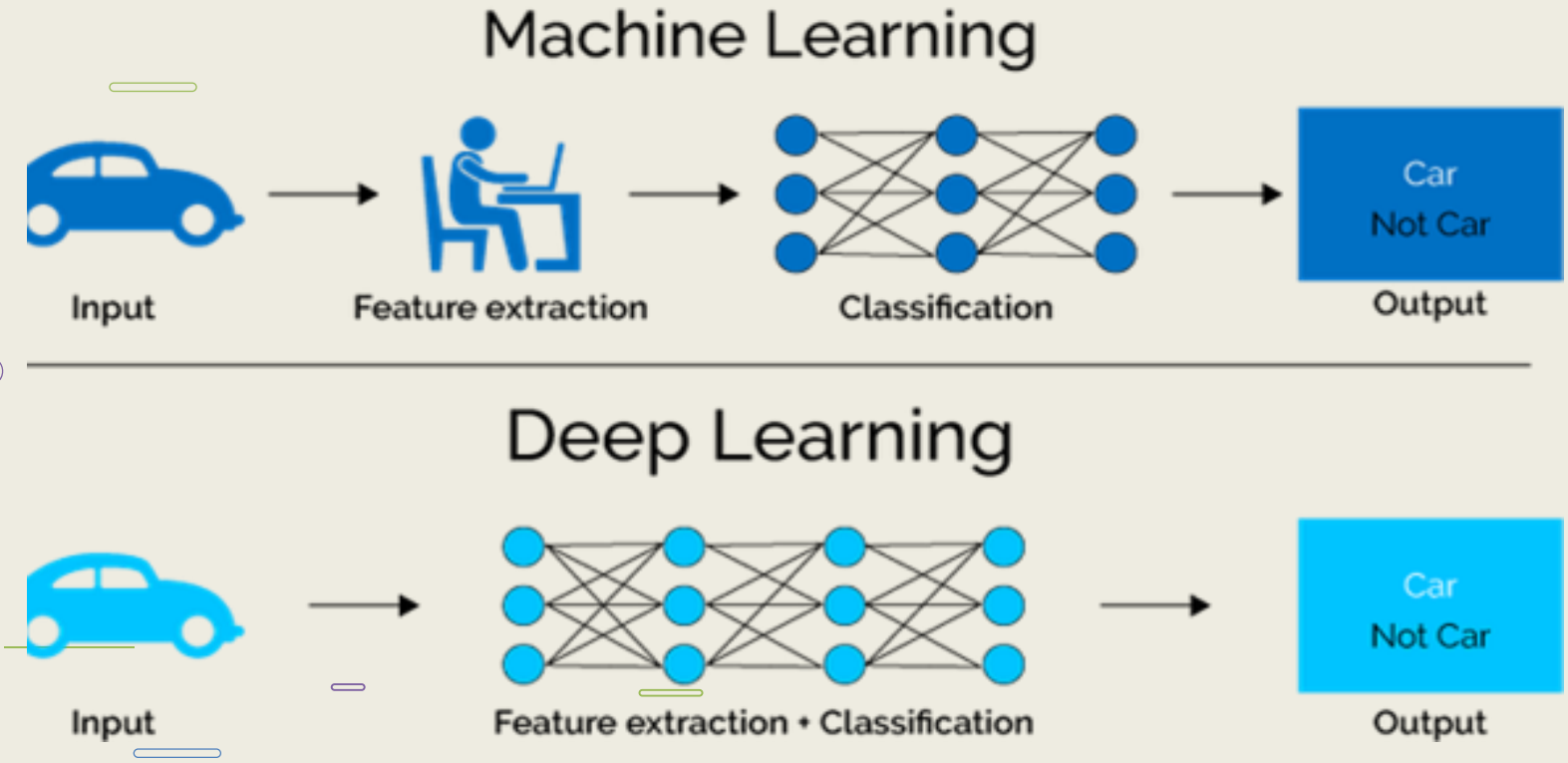
$$g(\mathbf{x}) = f(\sum_{i=1}^{d} x_i w_i + w_0) = f(\mathbf{w}^t \mathbf{x})$$

Convolutional neural network

Proposed “Convolutional neural network” theory in 1998



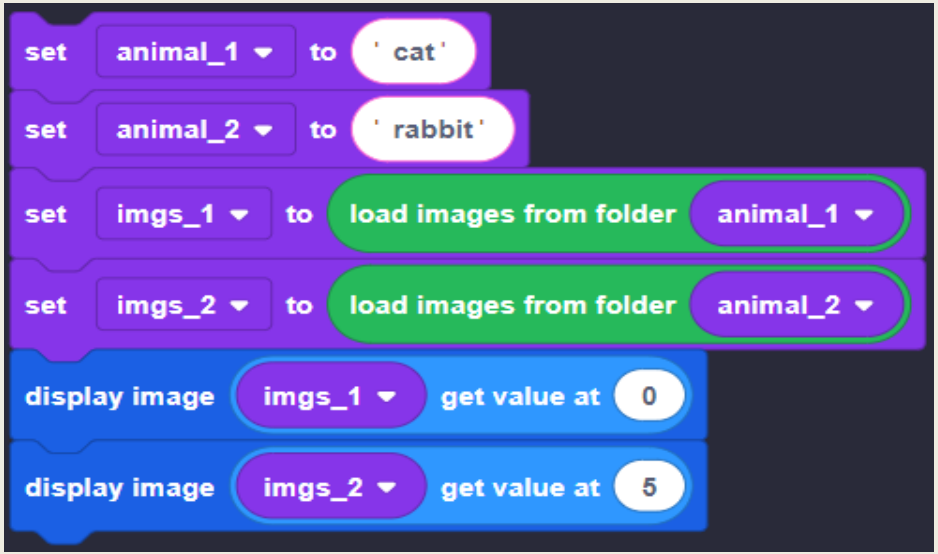
What is Deep Learning?



Two Animals Classification (Elementary AI, Volume I 2.2)

Python Codes

1、Training data preparation

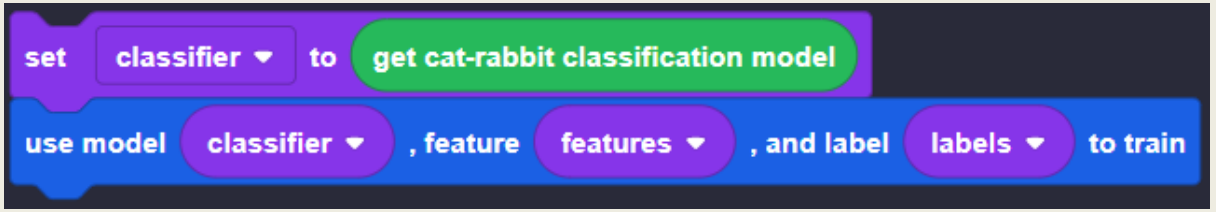


SenseStudy Experiment (Cont'd)

2、Data pre-processing for image features and labels

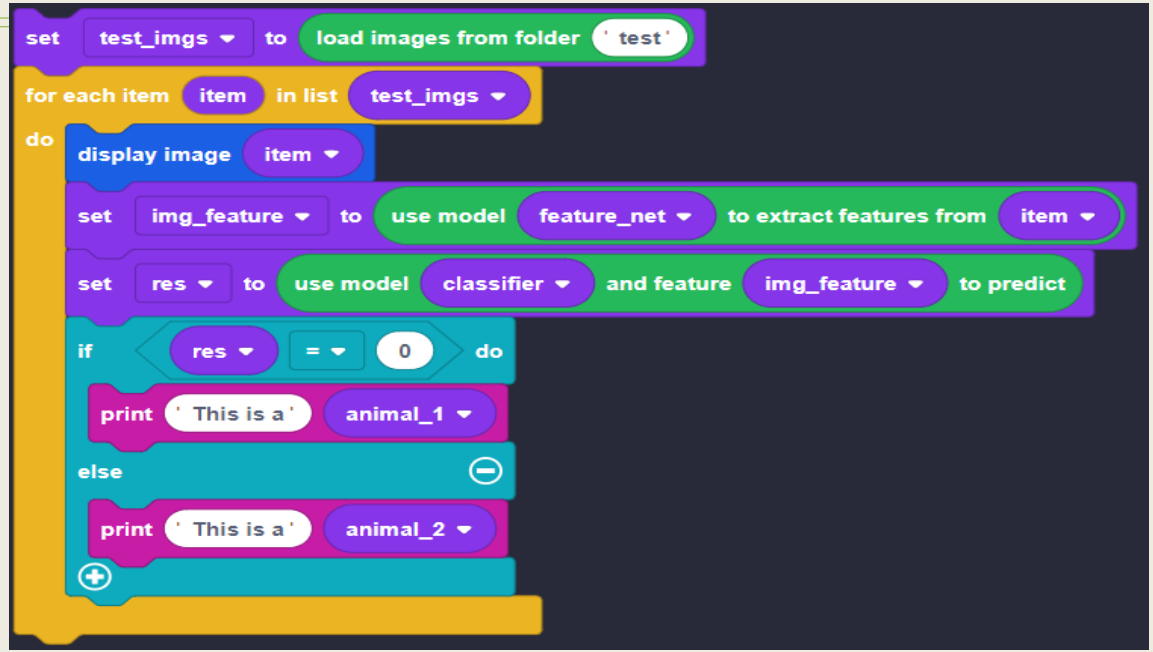
SenseStudy Experiment (Cont'd)

3、Model training



SenseStudy Experiment (Cont'd)

4、Model testing



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The End

Thank you for listening!