



# 人工智慧概論

## Introduction to AI

### 第0章 介紹

### Introduction

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# 歷史版本

版本	說明	日期	負責人
v1.0	初版	2020/02/18	蘇維宗

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# 教學大綱

108學年度下學期





## 課程規範(Class Protocol v1.2)

- 你(妳)可能獲得加分, 如果 ...
  - 在課堂上樂於討論
  - 在網路討論區上樂於討論
  - 其他
- 你(妳)將會獲得扣分, 如果 ...
  - 在禁止飲食的教室吃東西
  - 在課堂上大聲喧嘩
- 你(妳)一定會被當掉, 如果 ...
  - 考試作弊
  - 曠課超過5次
- You MAY get additional points if you ...
  - have any response in class
  - have any response in discussion board
  - others
- You WILL lose additional points if you ...
  - eat in no-food classroom
  - talk loudly
- You MUST be failed if you ...
  - cheat in any exams
  - absent more than 5 times





## 課程目標

本課程試圖探索**人工智慧(Artificial Intelligence, 簡稱AI)**領域的所有層面, 包括邏輯、機率和連續數學; 感知、推理、學習和行動等問題。

同學除了學習人工智慧的理論基礎外, 也會透過使用現有的AI服務以及自己撰寫基本的AI演算法來學習。

# 教科書

## 人工智慧導論(鴻海教育基金會/全華圖書)

### 作者群

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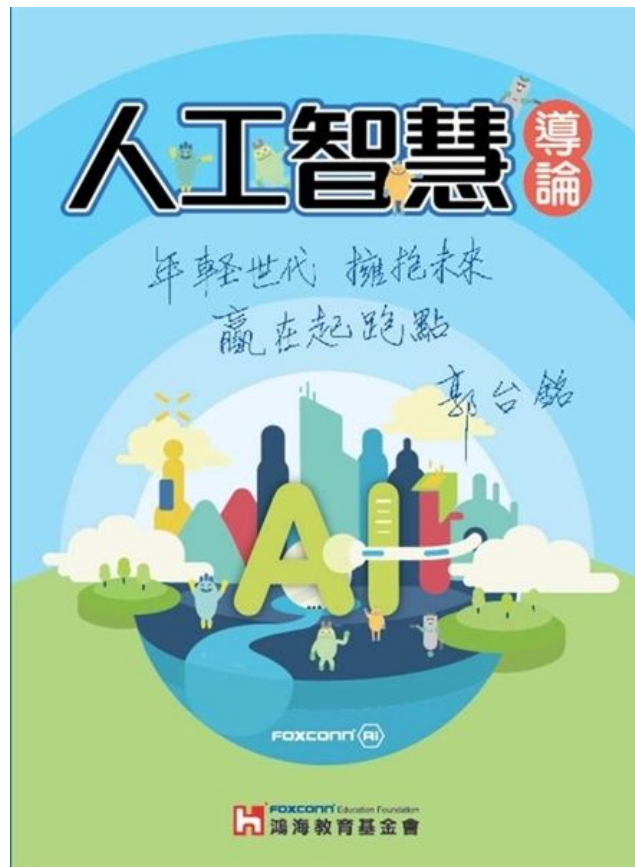
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# 教科書

## 人工智慧(全華圖書)

### 作者群

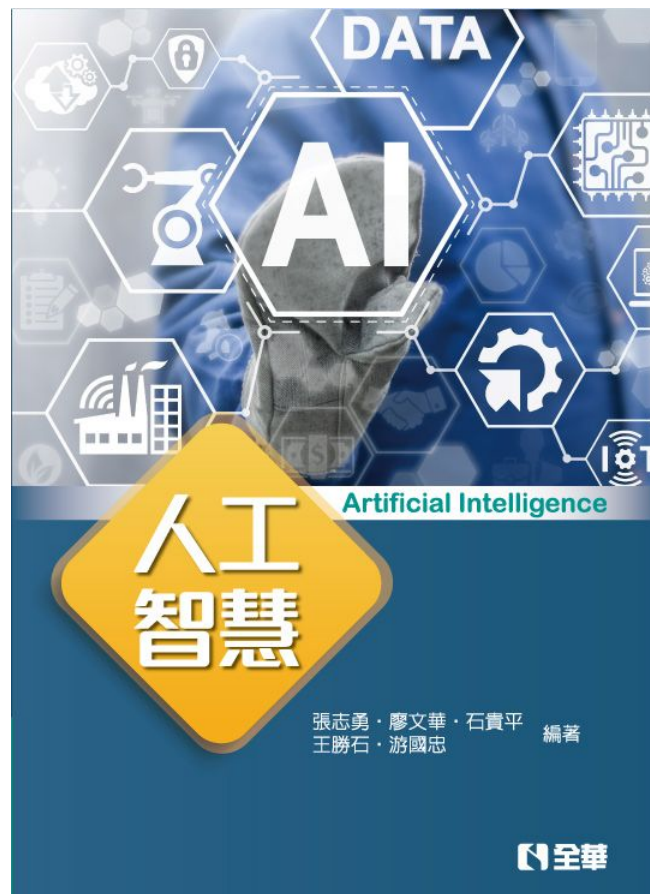
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## 參考書

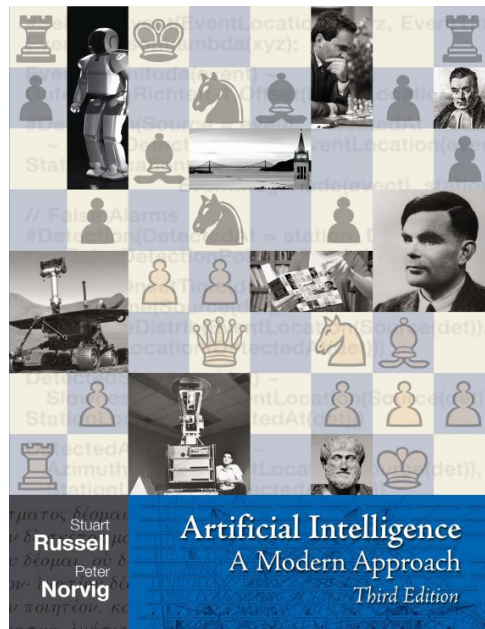
人工智慧: 現代方法(全華圖書)

作者

Stuart Russell and Peter Norvig

譯者

歐崇明、時文中、陳龍

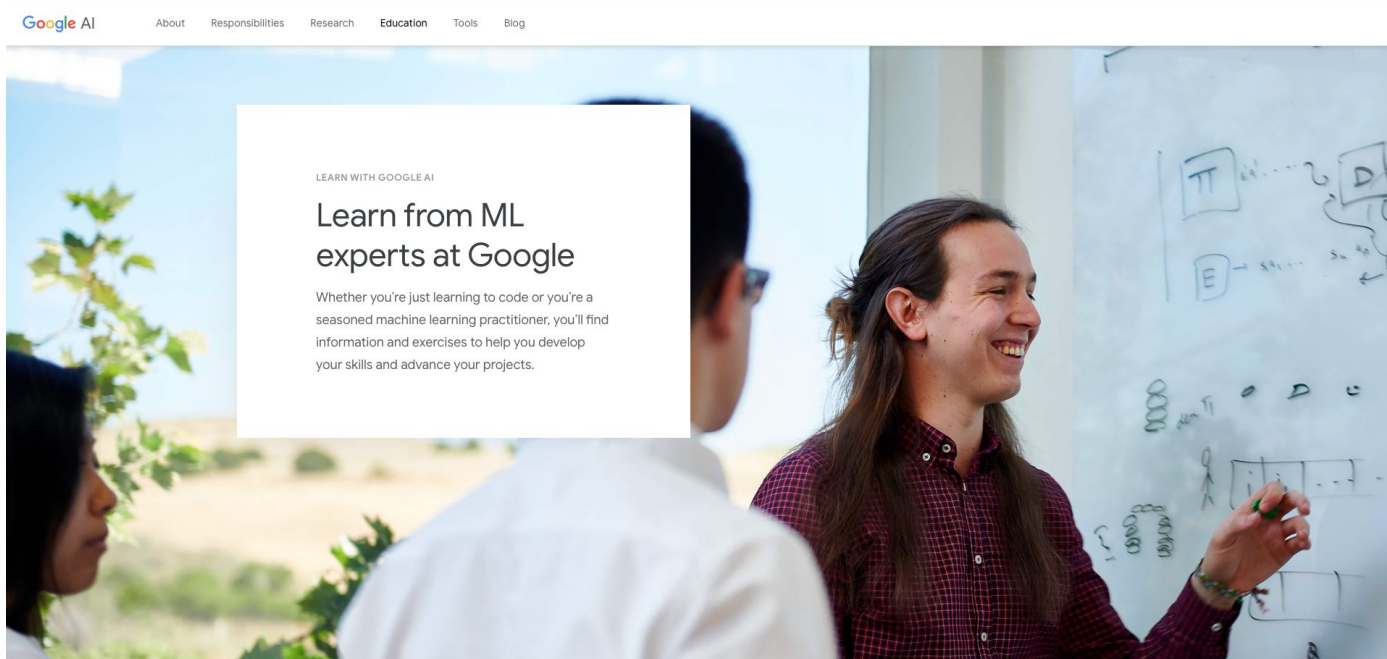


<http://aima.cs.berkeley.edu/>



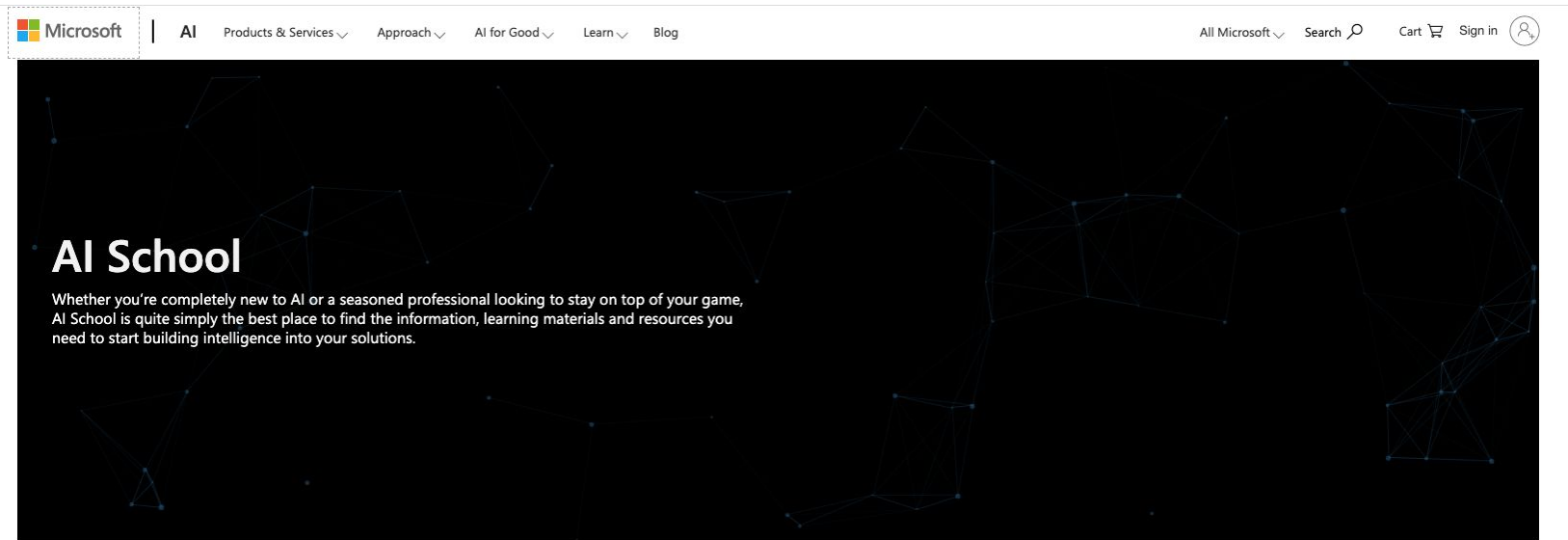


# <https://ai.google/education>





# https://aischool.microsoft.com/en-us/home



The screenshot shows the Microsoft AI School homepage. At the top is the Microsoft logo and a navigation menu with links: AI, Products & Services, Approach, AI for Good, Learn, and Blog. On the right side of the header are links for All Microsoft, Search, Cart, Sign in, and a user profile icon. The main content area has a dark background with a network diagram of blue nodes and lines. The text 'AI School' is prominently displayed in white. Below it, a paragraph reads: 'Whether you're completely new to AI or a seasoned professional looking to stay on top of your game, AI School is quite simply the best place to find the information, learning materials and resources you need to start building intelligence into your solutions.'



## 評分方式

期中考試: 25% (筆試)

期末考試: 25% (筆試)

平時作業: 40% (報告, 程式設計)

出席成績: 10%



# 程式語言(AI with Python)

為何使用Python?

- 語法簡單而且可以少量程式碼達到目的
- 內置許多AI相關的函式庫, 例如NumPy, SciPy, matplotlib, nltk, SimpleAI等

Python開發環境

- 自行安裝(請參考[AI with Python](#))
- Google Colaboratory (<https://colab.research.google.com>)

# Q & A

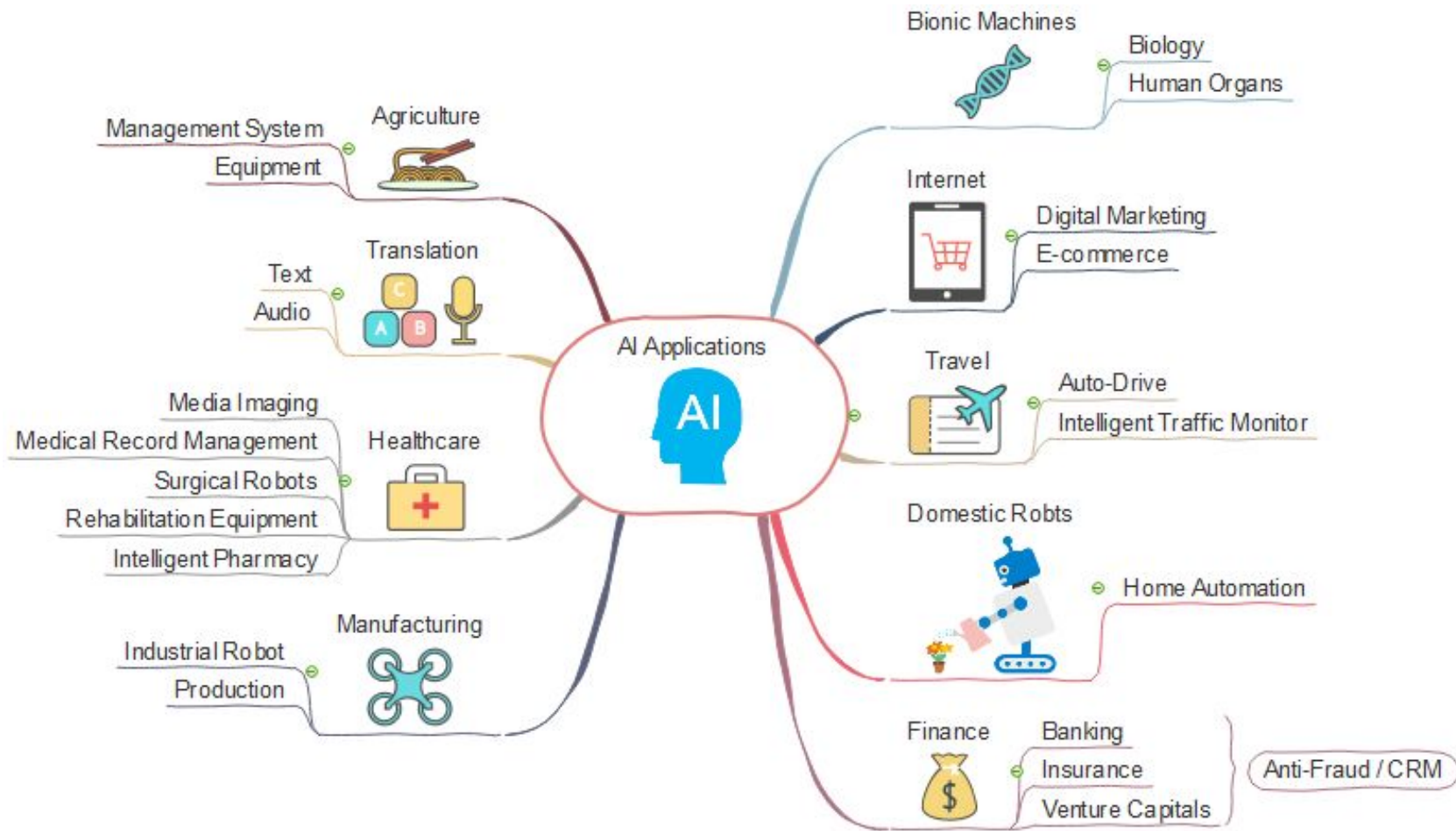
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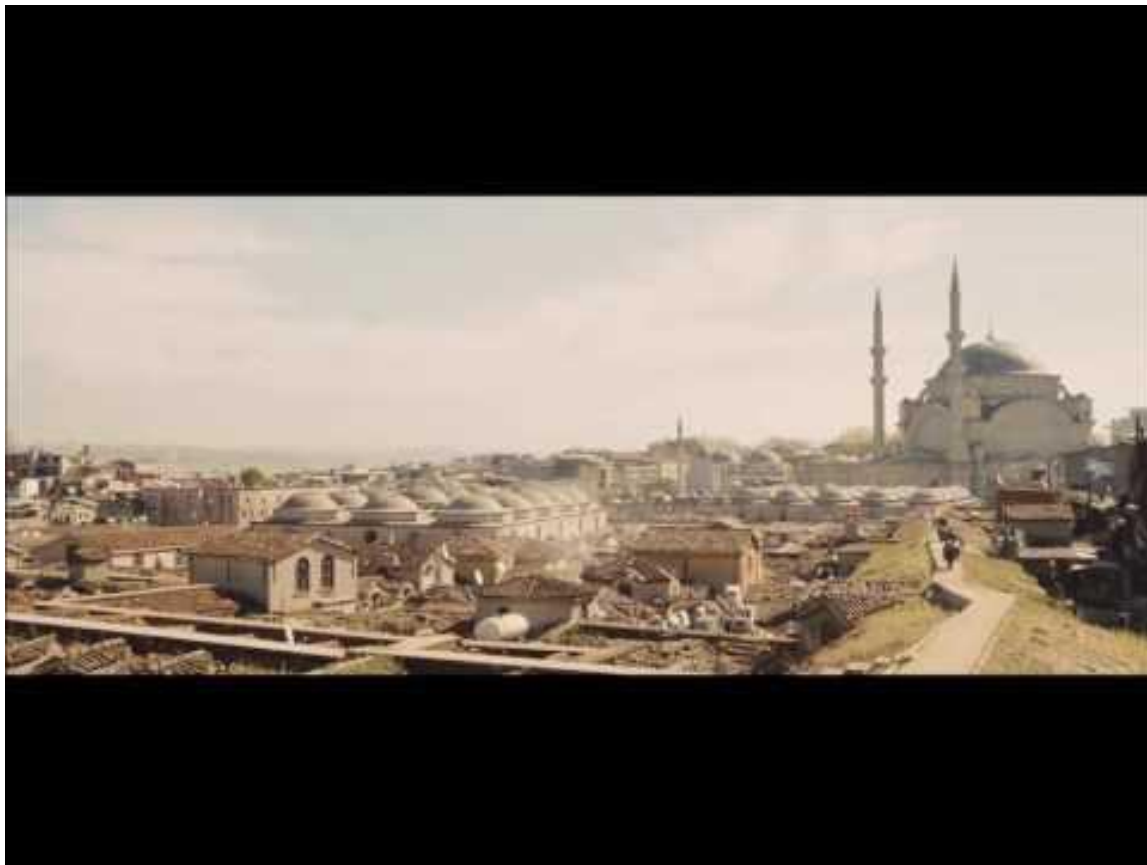
Computer History Museum, Mt. View, CA

# — AI簡介





圖片來源: <http://www.mindmapsoft.com/wp-content/uploads/2019/02/ai-application.png>

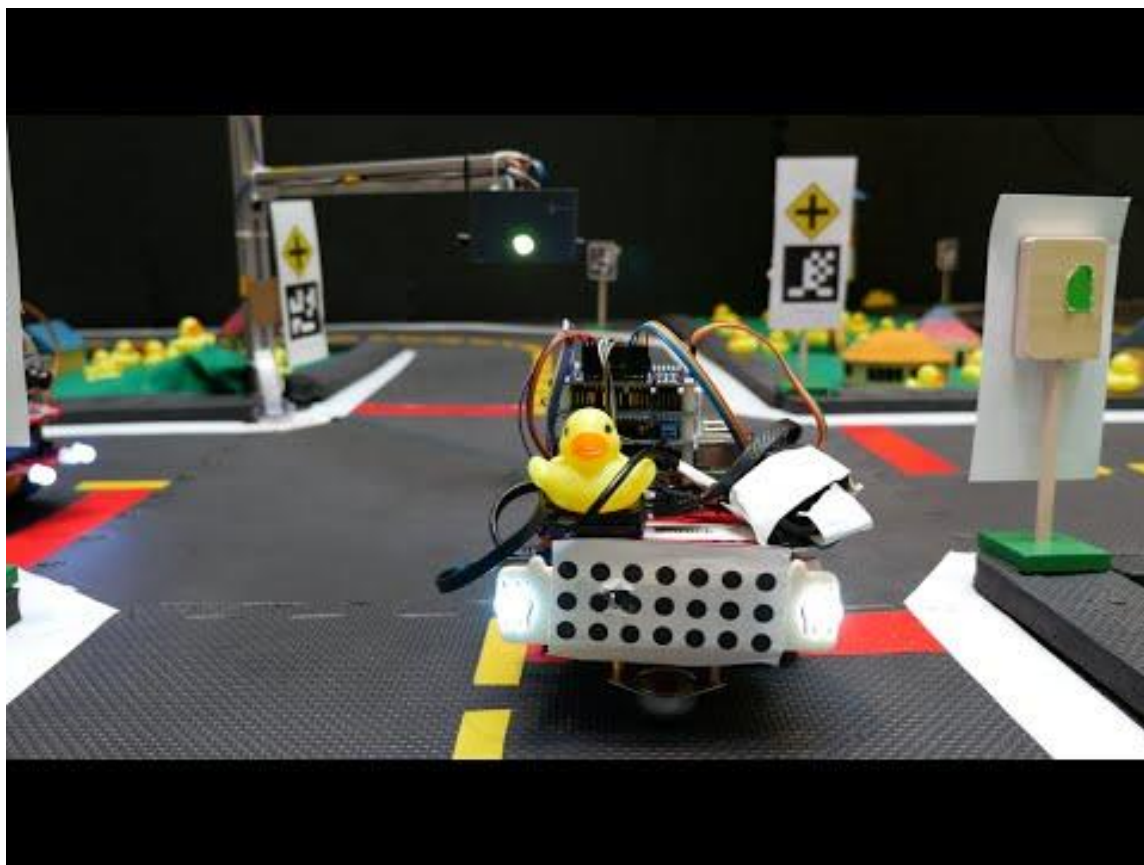


物件偵測與認知(Object Detection and Recognition)





微軟小冰與歌手合唱

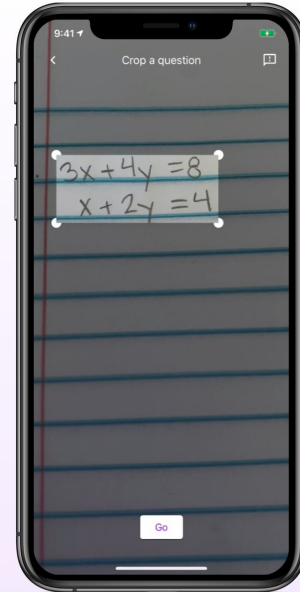


Duckietown (<https://www.duckietown.org/>)



<https://socratic.org/>

Get unstuck.  
Learn better.



<https://www.brain.fm/>

## Functional Music to Improve **Focus in 15 Minutes**

Our science-first approach creates music that sounds different—and affects your brain differently—than any other music.

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VICE

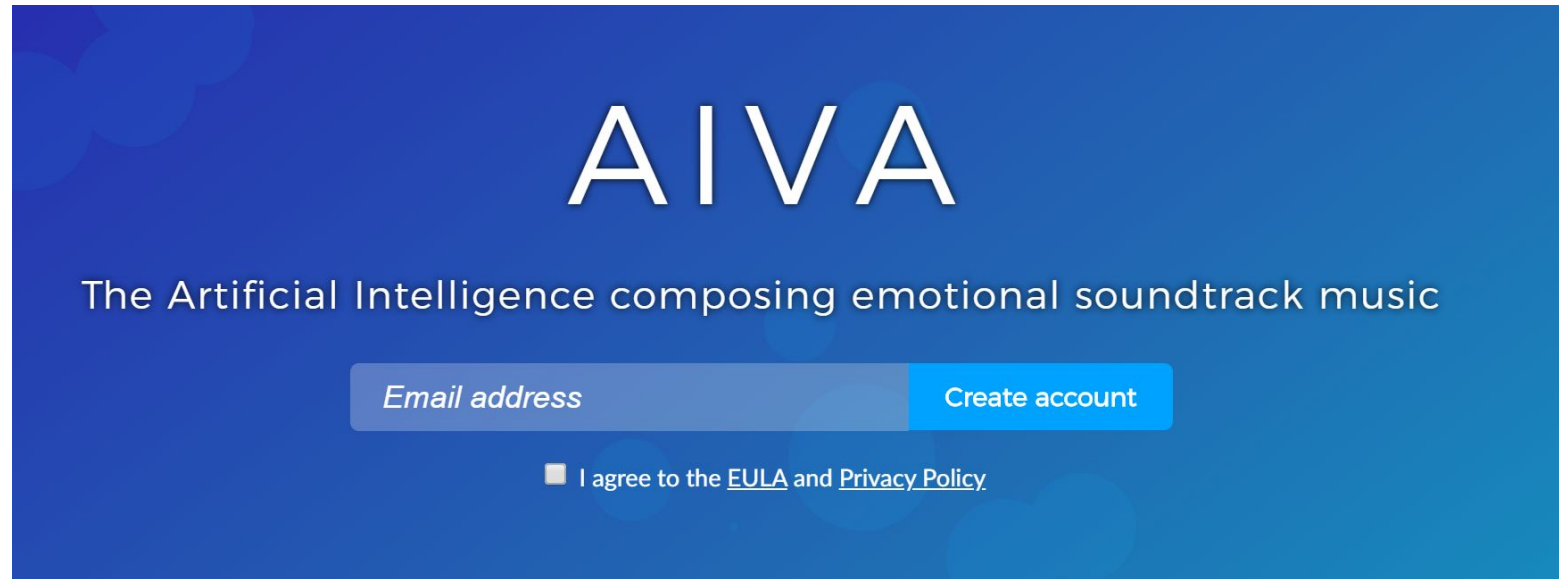
NBC NEWS

Try 5 free sessions





<https://www.aiva.ai/>



AIVA

The Artificial Intelligence composing emotional soundtrack music

*Email address* **Create account**

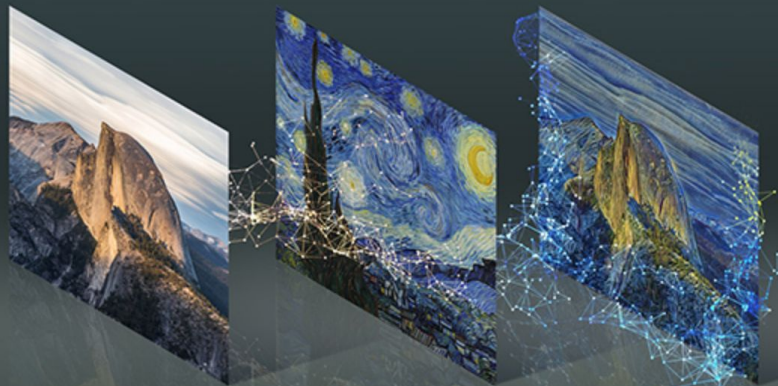
☐ I agree to the [EULA](#) and [Privacy Policy](#)



<https://www.nvidia.com/en-us/research/ai-playground/>

# NVIDIA AI PLAYGROUND

NVIDIA AI Research in Action





<https://replika.ai/>



## The AI companion who cares

Always here to listen and talk.  
Always on your side. Join the millions  
growing with their AI friends now!

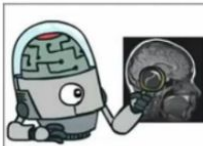



Create your Replika

Log in

# AI是什麼?

AI的定義可分類成以下四種

- Think Humanly
- Act Humanly
- Think Rationally (理性思考)
  - 自我修正
- Act Rationally (理性行為)
  - 找最佳解

Think Humanly	Think Rationally
	
	
Act Humanly	Act Rationally

圖片來源:

<https://rushalverma.wordpress.com/2016/08/29/what-is-ai-and-what-can-we-do-with-it/>

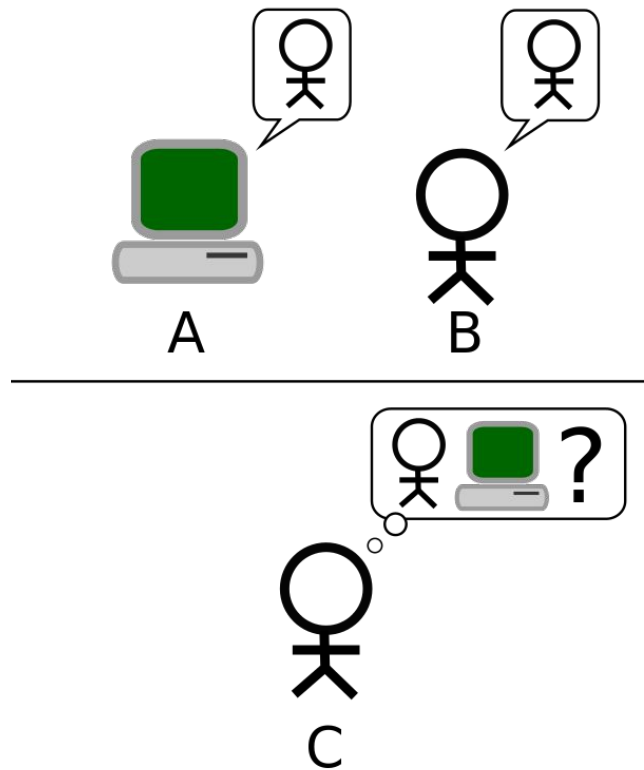


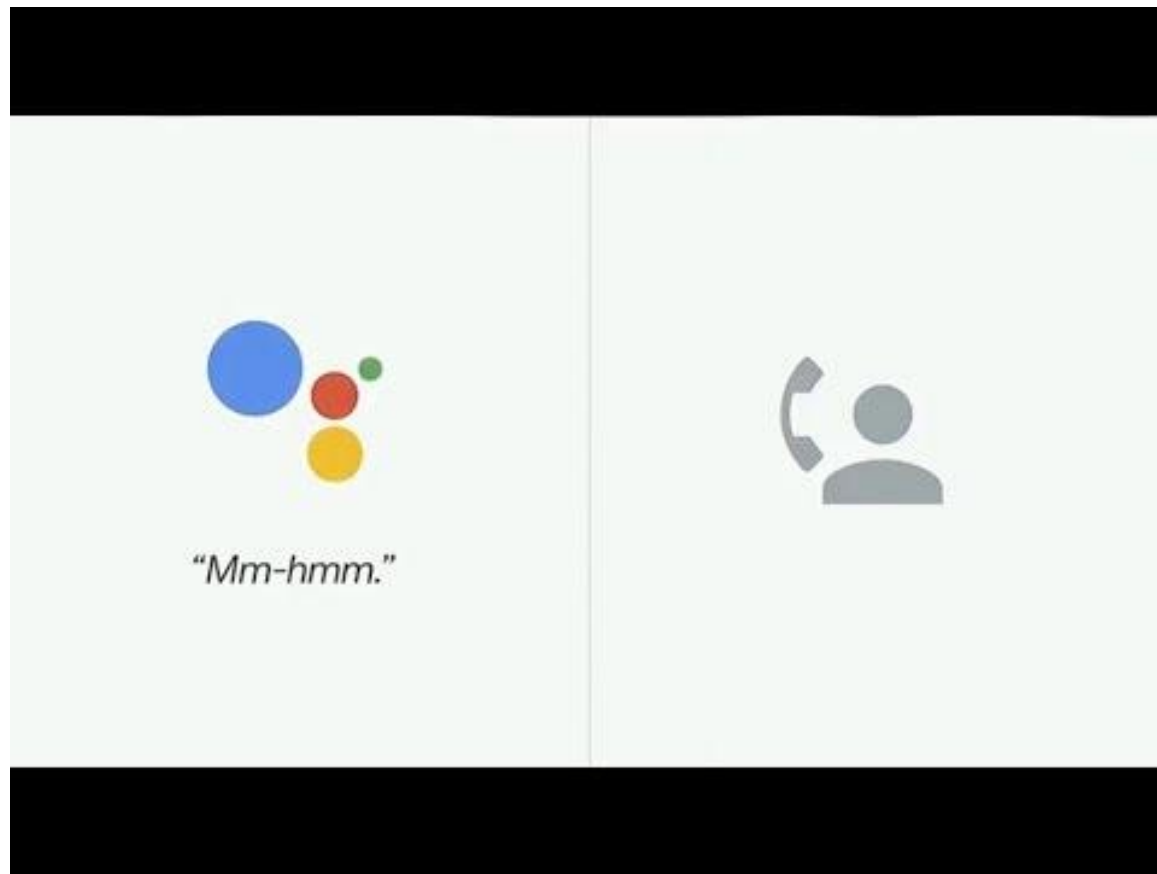
## 圖靈測試(Turing Test)

圖靈於1950年提出的一個關於判斷機器是否能夠思考的著名思想實驗，測試某機器是否能表現出與人等價或無法區分的智慧型。(Wikipedia)

想想看圖靈測試代表AI可以

- a. Think Humanly?
- b. Act Humanly?
- c. Think Rationally?
- d. Act Rationally?

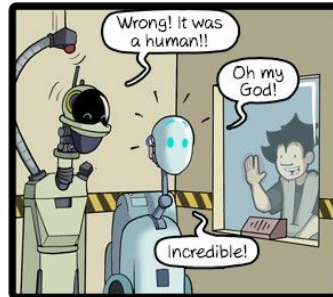
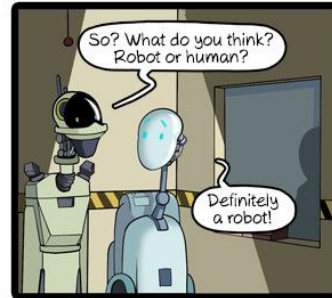
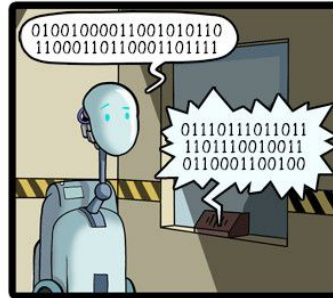
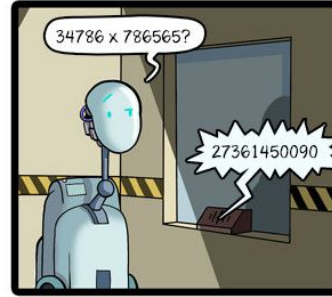
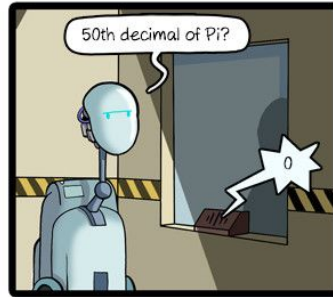




Google Duplex通過圖靈測試?

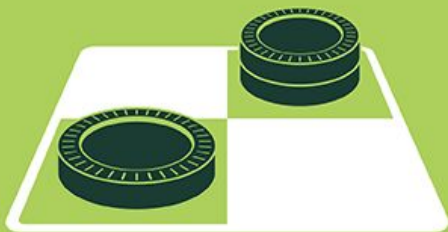
<https://chinese.engadget.com/2019/05/22/google-duplex-is-made-of-people/>





# ARTIFICIAL INTELLIGENCE

Early artificial intelligence stirs excitement.



## MACHINE LEARNING

Machine learning begins to flourish.



## DEEP LEARNING

Deep learning breakthroughs drive AI boom.



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

# Pre-Built AI



## Vision

Computer vision  
Face  
Emotion  
Content Moderator  
Video  
Video Indexer



## Speech

Text analytics  
Spell check  
Web language model  
Linguistic analysis (NLP)  
Translator



## Language

Speaker recognition  
Speech  
Speech to text  
Text to custom speech



## Knowledge

Web search  
Image search  
Video search  
News search  
Autosuggest



## Search

Academic knowledge  
Entity linking service  
Knowledge exploration  
QnA maker

微軟AI服務平台



## Use your own data to train models



TensorFlow



Cloud Machine  
Learning Engine

## Ready to use Machine Learning models



Cloud  
Vision API



Cloud  
Speech API



Cloud  
Jobs API



Cloud  
Translation  
API



Cloud Natural  
Language API



Cloud Video  
Intelligence API



Coming  
soon

Google AI服務平台



## 作業1-1

### Hello! 人工智慧

繳交期限: 03/17/2020

## 作業說明

尋找一個關於人工智慧應用的影片、產品、或文章並說明你覺得它很酷的地方在哪裡?

# Q & A

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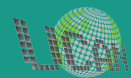


Computer History Museum, Mt. View, CA



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# Python基礎





# 學習Python

<https://www.python.org/>

<https://www.learnpython.org/>

<https://www.w3schools.com/python>





# 迭代式搜尋演算法(Iterative Search Algorithm)

- 如何透過迭代式搜尋演算法解決問題？
  - Start at a random configuration. (**initial value**)
  - Repeatedly consider various moves. (**step function**)
  - Accept some & reject some (**evaluation function**)
  - Repeat above steps until the stop condition is satisfied (**stop condition**)
- For examples,
  - Hill climbing



## 爬山法(Hill Climbing)

- 問題: 找出 $y = -x^2 + 6x + 10$ 的最大值
- Initial value obtained by
  - 0, random value, or a specific function
- Step function
  - $x$  is increased by 1 and decreased by 1
- Evaluation function
  - Accept new  $x$  if new  $y$  is better solution.
- Stop condition
  - If no new  $x$  outputs better  $y$ , or reach maximum iterations (e.g. 1,000 times).



# Q & A

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