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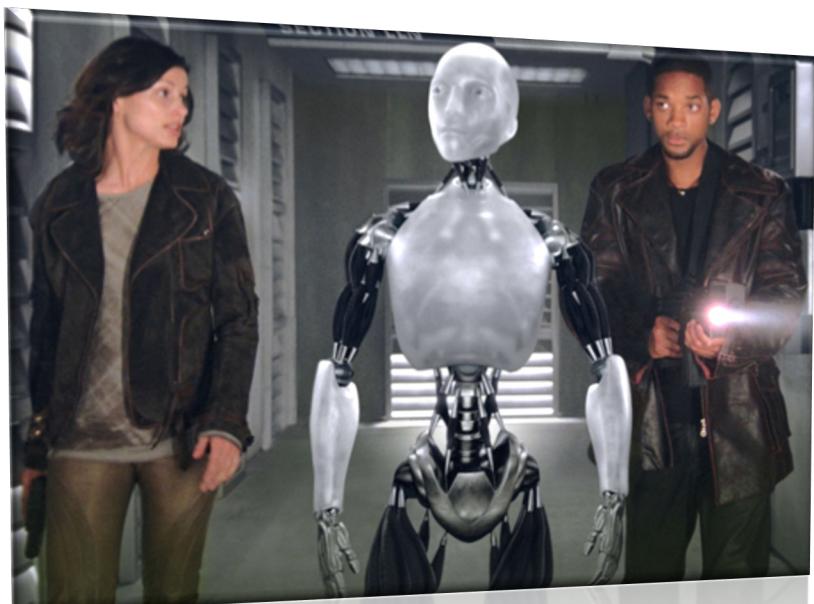
CRICOS PROVIDER 00123M

Faculty of SET / School of Computer Science  
**TECH 1004 AI Technologies**  
**What is AI?**  
**Dr. Yuankai Qi**

[adelaide.edu.au](http://adelaide.edu.au)

*seek* LIGHT

# What is AI?



# What is AI?

- AI is the intelligence demonstrated by machines, as opposed to the natural intelligence displayed by animals and humans<sup>[a]</sup>
- AI≈Technology that implements AI

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[a] Poole, David; Mackworth, Alan; Goebel, Randy (1998). Computational Intelligence: A Logical Approach. New York: Oxford University Press. ISBN 978-0-19-510270-3.

# What Can AI Do?

Tens of thousands of things!

Why?

**Input Side:**

- See the world
- Understand text/read
- Listen

**Middle: Reasoning**

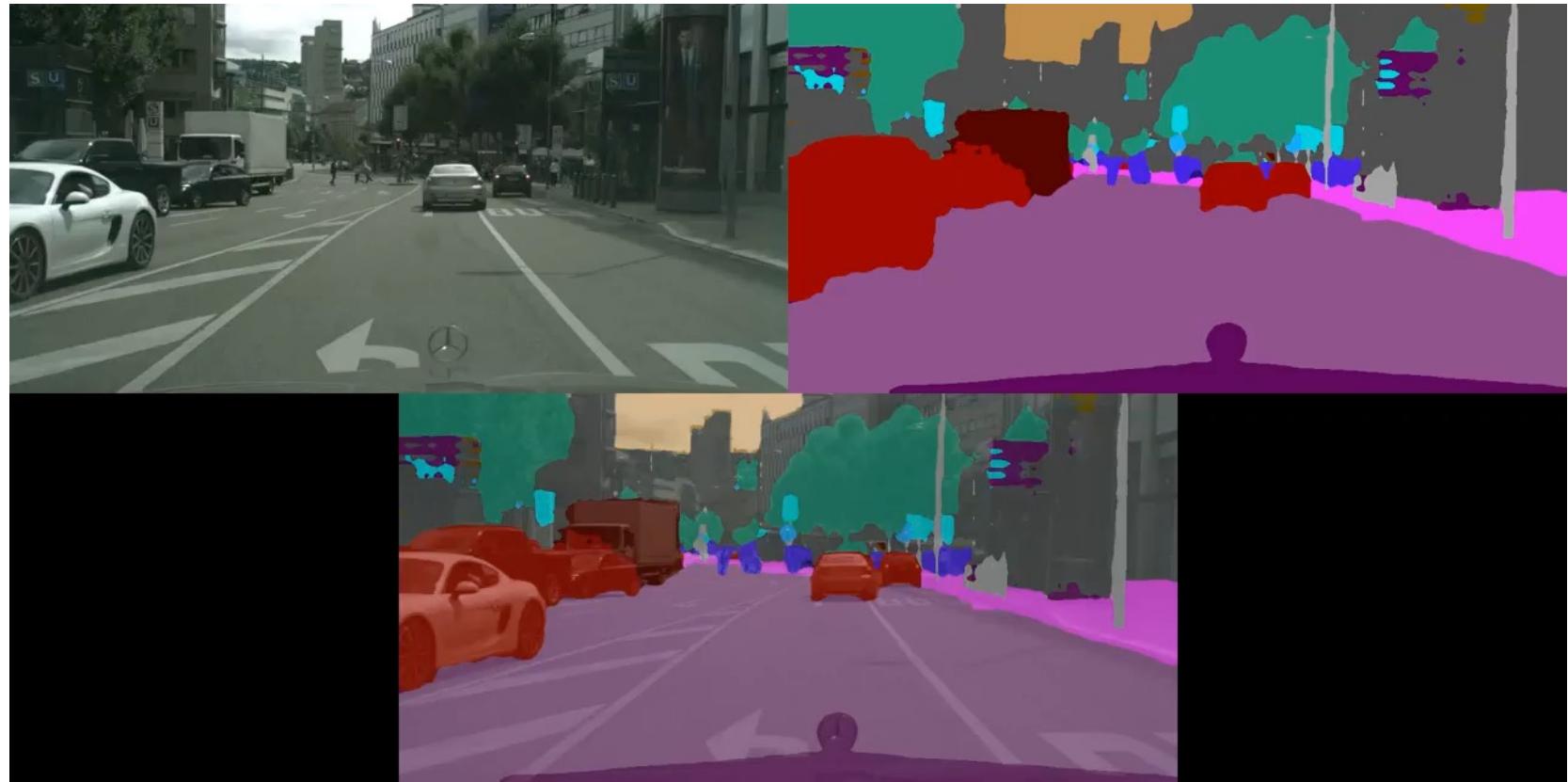
**Output Side:**

- Writing
- Drawing
- Speaking
- Execution



# Input: See the World

Semantic Segmentation of Autonomous Driving



# Input: Understand Text

## Visual Question Answering

**Question: what is the man doing**

**Predictions::**

- **snowboarding** (score:  $12.15 = 2.79$  [image] +  $9.36$  [word])
- **skateboarding** (score:  $10.75 = 1.44$  [image] +  $9.32$  [word])
- **skiing** (score:  $10.52 = 2.44$  [image] +  $8.08$  [word])



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\*<http://visualqa.csail.mit.edu/>

# Input: Listening

## Speech to Text

Voice Model:

US English broadband model (16KHz)

Keywords to spot:

IBM,admired,Al,transformations,cognitive,Artificial Intelligence,data,pre

Detect multiple speakers



Record Audio



Upload Audio File



Play Sample 1



Play Sample 2

Text

Word Timings and Alternatives

Keywords (0/9)

JSON

# Output: Draw

TEXT PROMPT

an armchair in the shape of an avocado....

AI-GENERATED  
IMAGES



“An astronaut riding a house in a photorealistic style”



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\*<https://openai.com/dall-e-2/#demos>

# Output: Writing

## **Input Prompt:**

“He stumbled forward. His eyes were bloodshot. He couldn’t believe what he was seeing.”

## **Output Generated:**

“What happened?” Vika asked.

“We were attacked by a soldier,” he said. “And now I’m in prison.”

Xu moved closer to the bars, unable to tear his eyes from the guards, whose thick clothing and vocal swagger told Xu they were probably high. In fact, everyone was drugged. A short distance away, his sister struggled to her feet, holding onto her injured leg, and holding a bandage against it.

“We were sent to another camp,” Xu said. “But the young ones are escaping.”

# Output: Speaking

## Try our Text-to-Speech Demo

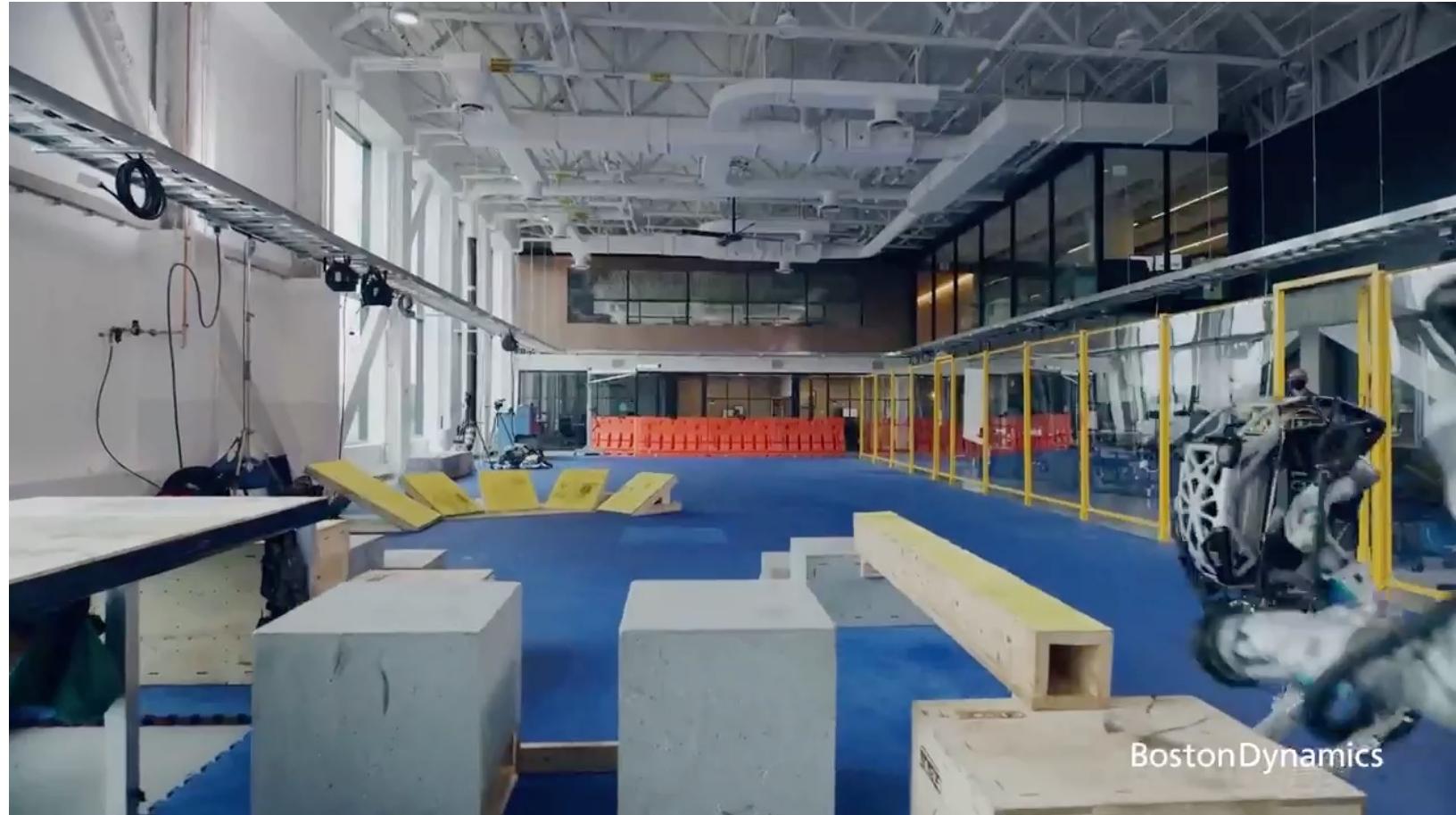
Select your options below to hear samples of ReadSpeaker's TTS voices

The screenshot shows a dark-themed web interface for a Text-to-Speech demo. At the top left, there is a dropdown menu labeled "SELECT LANGUAGE" with "English (13 Voice)" selected. To its right is another dropdown menu labeled "VOICE" with "Australian English - Mia (female)" selected. Below these dropdowns is a text area containing a sample sentence: "Hello, I'm one of the voices you can use to speech enable any content, for websites, documents, devices, applications, and more. When I read your text, it sounds like this." At the bottom left is a purple button with white text that says "Ready to Use Our Voices?". At the bottom right is another purple button with white text that says "▷ Listen", with a small cursor icon pointing to the right of the arrow.

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\*<https://www.readspeaker.com/>

# Output: Execution



BostonDynamics

When putting these abilities together,  
a machine can ...

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# What do you feel?

Awesome?

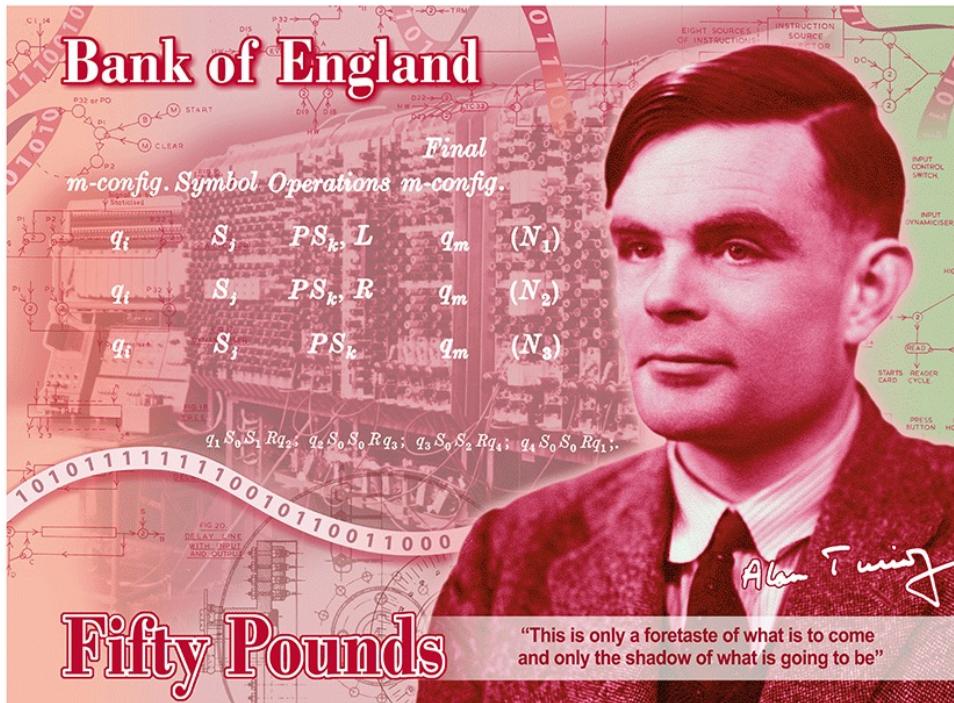
Scary?

## Ethics in AI

- It depends on who uses it and how to use it.
- New regulations and laws



# Brief History of AI

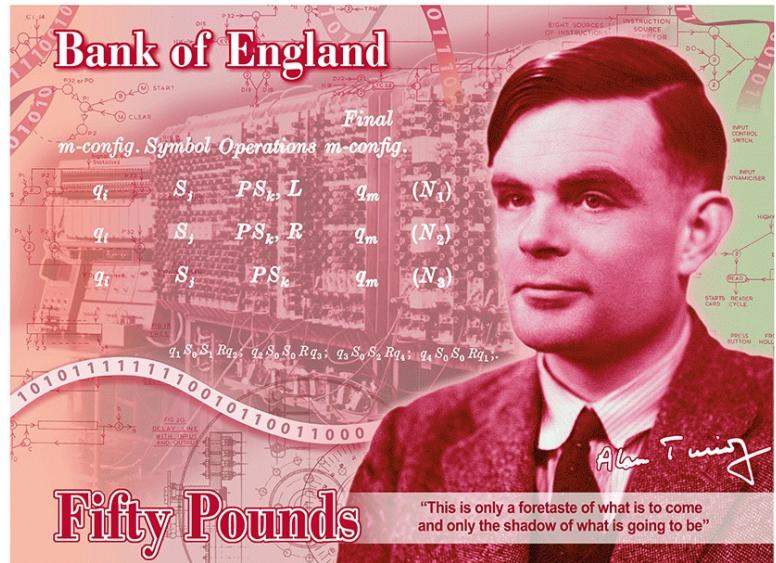


Who is this guy on £50 banknote?



BANK OF ENGLAND

## Alan Turing Banknote Concept



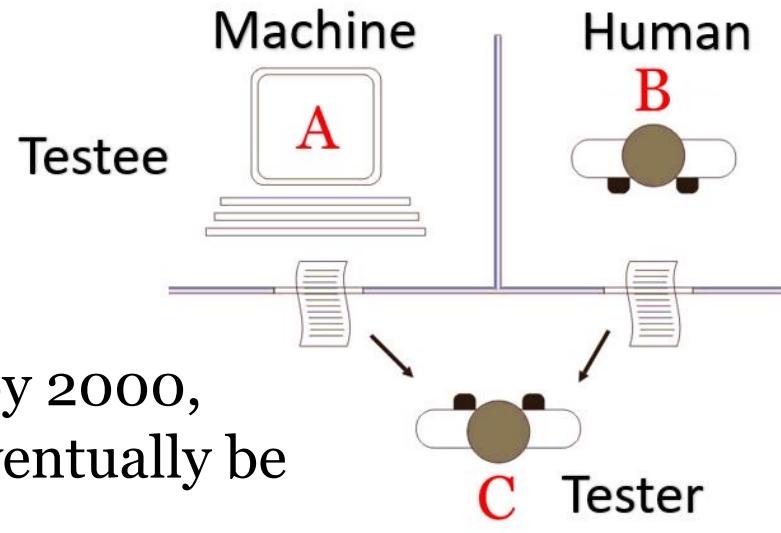
©The Governor and Company of the Bank of England 2019

**Alan Turing**, mathematician, computer scientist, logician, cryptanalyst...

Considered as “**the father of theoretical computer science and Artificial Intelligence**”.

# Alan Turing, “The Father of AI”

- Alan Turing, 1912---1954
  - 1950, Turing's paper “Computing Machinery and Intelligence” considers the question “Can machines think?”
  - The paper introduced his concept of Turing test.
  - Turing test is to test a machine’s ability of exhibiting intelligence.

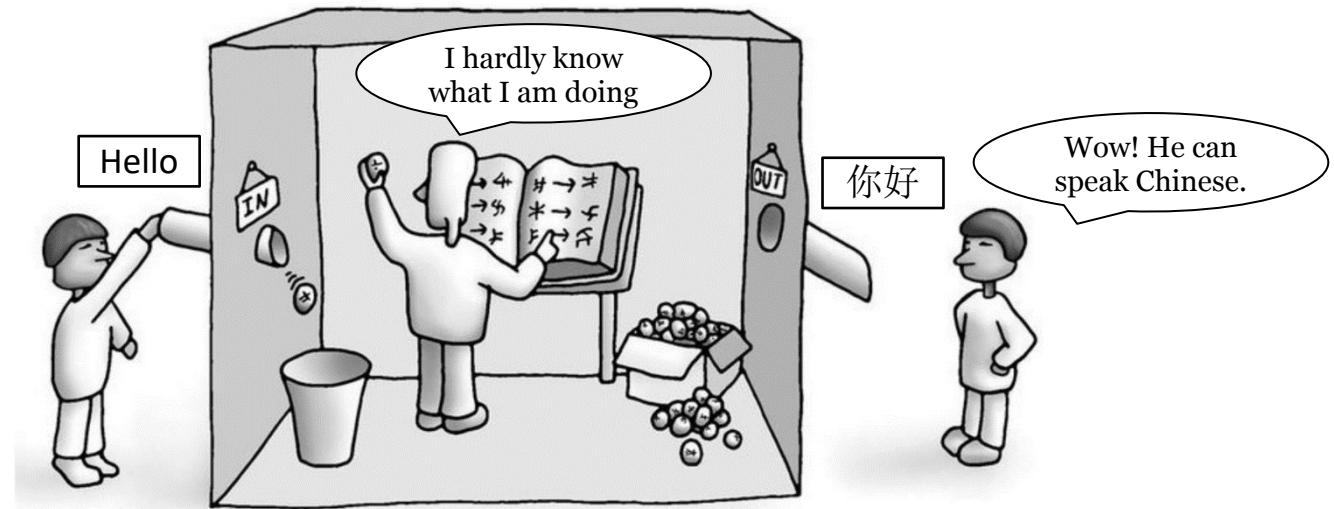


- Turing estimated that by 2000, that machines would eventually be able to pass the test.

Image source from [here](#)

# Chinese Room

- John Searle, 1932-
  - 1980, Chinese room argument



- If entity cannot understand, it is not intelligent.

Image adapted from Wikicomms

# A. M. Turing Award

- The “A. M. Turing Award” is considered the Nobel Prize in computer science.
  - 2018 Yoshua Bengio, Geoffrey Hinton, Yann LeCun



“For conceptual and engineering breakthroughs that have made Deep neural networks a critical component of computing”

# John McCarthy



- Computer Scientist and Cognitive Scientist
- He coined the term “Artificial Intelligence”

# What is Artificial Intelligence?

- AI is "the science and engineering of making intelligent machines." -- John McCarthy
- Other names: computational intelligence, synthetic intelligence or computational rationality.

# What is Artificial Intelligence?

- AI is the science of making machines do things that require intelligence when done by humans.
- AI studies the nature of knowledge and intelligence.
- AI researchers experiment with executable models of intelligent behavior.
- AI theories can be empirically grounded in implementation.

# AI Research

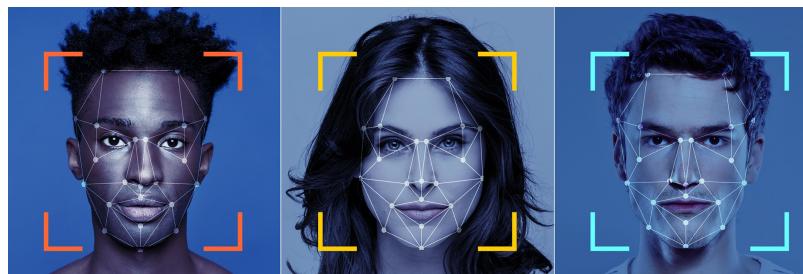
- Learning
  - Example: A weather forecast program that may learn from past weather data to predict the weather in the future.
- Reasoning
  - Example: John is either in the car or in the house. He isn't in the car, therefore he is in the house.
- Problem-solving
  - Example: Finding a winning move in a game.
- Perception
  - Example: A robot that is sensing and then for example cleaning your room.
- Language-understanding
  - Example: A program that answers natural language questions about high-school algebra problems stated in natural language.

# Milestones of AI

Year	Milestones
1956	Turing's "Computing Machinery and Intelligence"
1956	John McCarthy coined the term “Artificial Intelligence” on Dartmouth Conference
1950s	Early AI programs, including Samuel's checkers program, Newell & Simon's Logic Theorist, Gelernter's Geometry Engine
1966	ELIZA by MIT, the first ChatBot.
1969	Perceptrons, a feed-forward two-layered structure
1969-79	Early development of knowledge-based Systems; Expert Systems (e.g, MYCIN)
1970	Backpropagation
1979	The first computer-controlled, autonomous vehicle by Stanford.
1980s	Neural Networks becomes widely used.
1997	IBM Deep Blue defeat Gary Kasparov
2009	Google autonomous car
2011-2014	Apple's Siri, Google's Google Now, Microsoft's Cortana
2017	Transformer

# State of the Art

- AI Bots in video games
- Speech recognition
- Robotic vacuum cleaners
- Face recognition
- Self-driving cars
- Robot assisted surgery and medical imaging
- ...
- More?



# Summary

- Key Course Information
- What is AI
- What can AI do
- Brief history of AI
- Finish the quiz on MyUni