Overview of Artificial Intelligence

School of Electronic and Computer Engineering
Peking University

Wang Wenmin

Contents

What is Artificial Intelligence (AI)

AI

the intelligence exhibited by machines or software
机器或软件所展现的智能

the name of the academic field of research
学术研究领域的名称

how to create computers and computer software that are capable of intelligent behavior.
如何创建计算机和计算机软件使之具有智能行为。

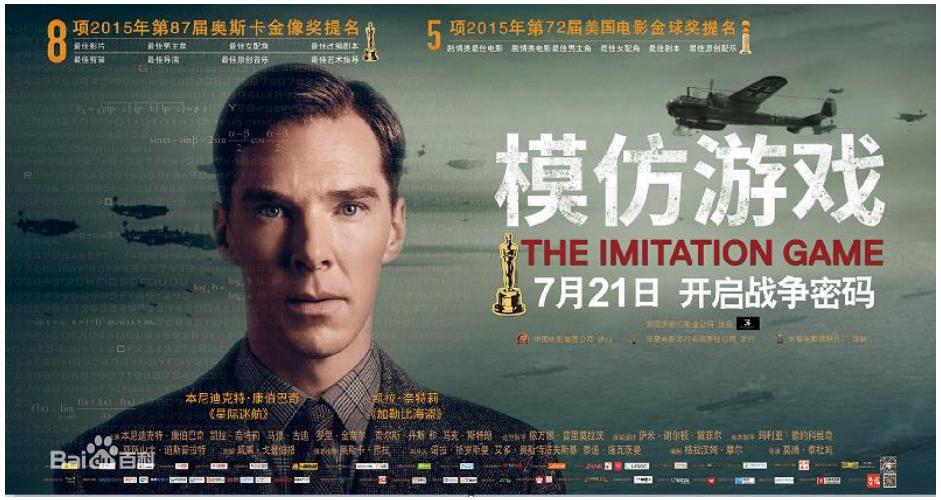
What is Artificial Intelligence (AI)

- The 1956 conference of “Dartmouth Summer Research Project on Artificial Intelligence” was the moment that AI gained its name, mission and major players, and is widely considered the birth of AI.
  1956年的“达特茅斯夏季人工智能研究计划”会议，是AI赢得其名称、使命和主要参与者的时刻，因此被广泛地认为是AI的诞生。

Turing Test

- Turing test was proposed by Alan Turing (1950) in his paper "Computing Machinery and Intelligence".
  图灵测试是由艾伦·图灵在1950年发表的"计算机器与智能"论文中提出的。
- It is designed to provide a satisfactory operational definition of intelligence.
  旨在提供一种令人满意的关于智能的可操作定义。

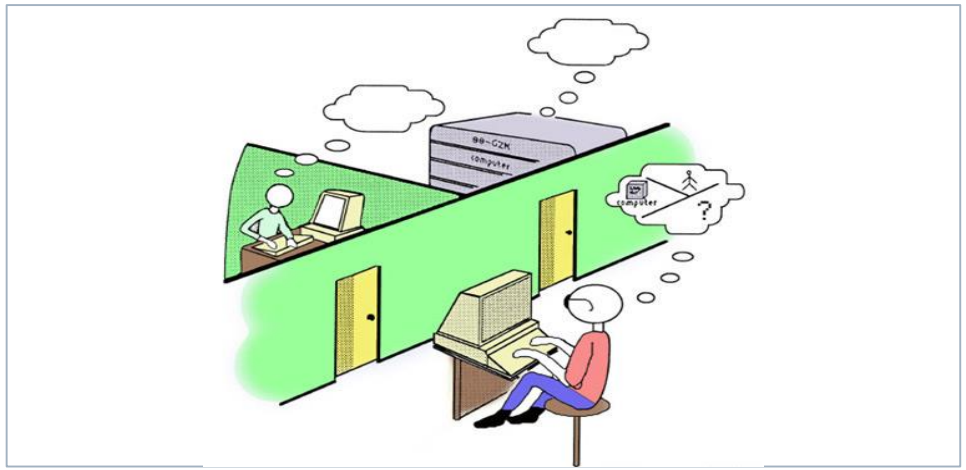
Alan M. Turing
艾伦·图灵
English mathematician, logician, computer scientist and cryptanalyst.
英国数学家、逻辑学家、计算机科学家和密码学家



Cryptanalyst

Turing Test

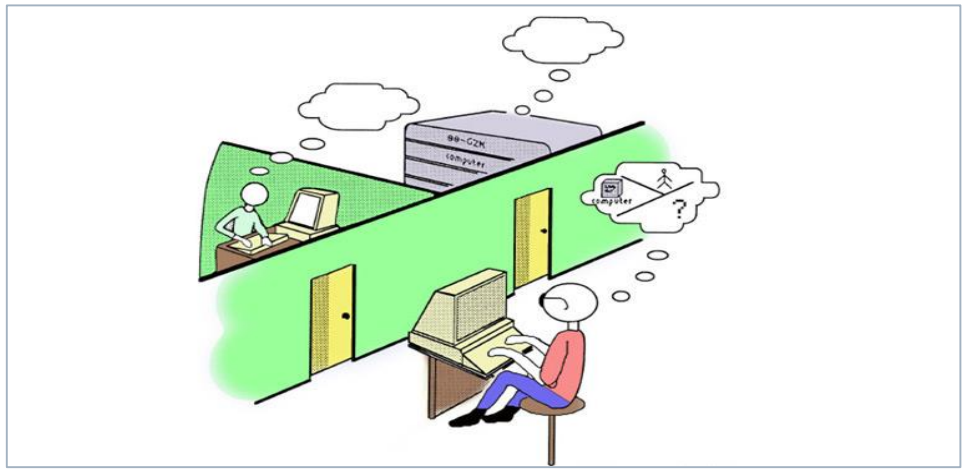
- A computer passes the test if a human interrogator, after posing some written questions, can not tell whether the written responses come from a person or from a computer.
  如果一个人类的提问官，在提出一些书面问题之后，无法分辨这些书面回答究竟是来自于人还是一台计算机，则认为计算机通过了该测试。



Turing Test

Turing Test

- Turing's prediction: by the year 2000, machines would be capable of fooling 30% of human judges after five minutes of questioning.
  图灵预言，2000年之前，经过5分钟的问题测试之后，机器将能够蒙骗30%的人类裁判。



Turing Test

Visual Turing Test

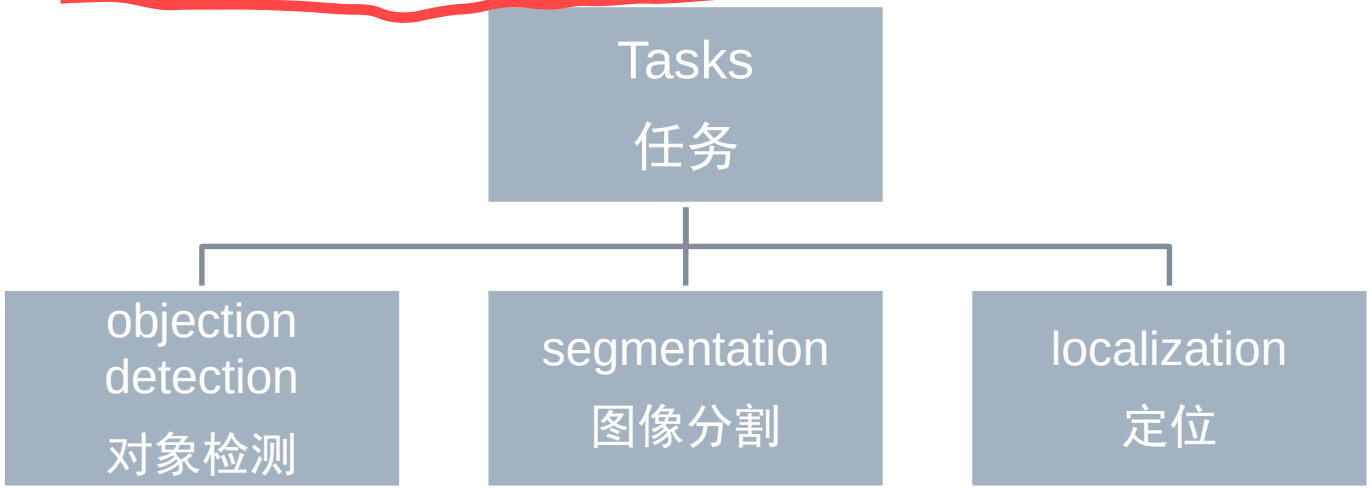
- It was introduced by Donald Geman *et al* in 2014.
  视觉图灵测试是由唐纳德·杰曼等人于2014年提出的。
- An operator-assisted device that produces a stochastic sequence of binary questions from a given test image.
  是采用一个操作员辅助设备、根据给定的图像产生随机的二元问题序列。

Donald Geman
唐纳德·吉曼
Prof. of Applied Mathematics,
Johns Hopkins University
美国约翰-霍普金斯大学
应用数学系教授

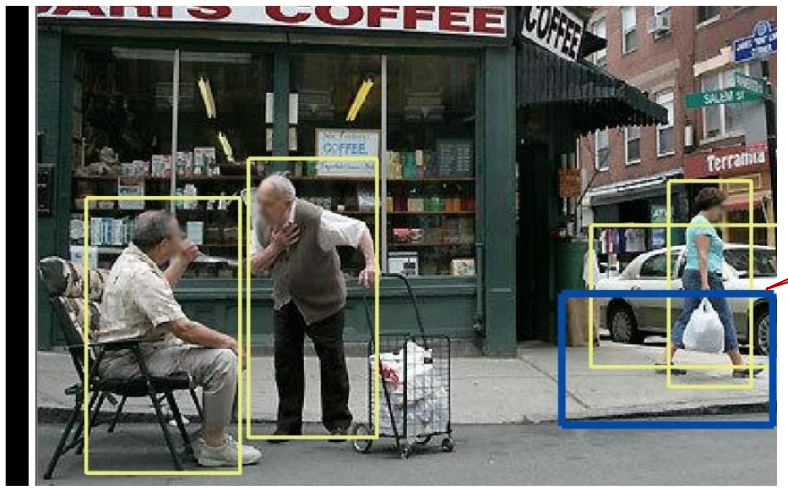
Visual Turing Test

- Current computer visual systems were tested by their accuracy for tasks, including objection detection, segmentation and localization. But still not close to the way humans do.
  目前的计算机视觉系统是测试任务的精度。这些任务包括对象检测、图像分割和定位。但仍然与人类的行为方式有差距。

- Visual Turing test was motivated by the ability of human to understand images.
  视觉图灵测试是受人类理解图像能力的启发而提出的。



Visual Turing Test



1. **Q:** Is there a person in the designated region?	**A:** yes
2. **Q:** Is there a unique person in the designated region?	**A:** yes (person1)
3. **Q:** Is person1 carrying something?	**A:** yes
4. **Q:** Is person1 female?	**A:** yes
5. **Q:** Is person1 walking on a sidewalk?	**A:** yes
6. **Q:** Is person1 interacting with any other object?	**A:** no

Chinese Room

- Chinese Room is a thought experiment, also called Sherle's Chinese Room Argument.
  "中文屋"是一个思想实验，也被称为希而勒的中文屋论证。
- It was first published by American philosopher John Searle in a paper "Minds, Brains and Programs" in the journal *The Behavioral and Brain Sciences*, in 1980.
  它是由美国哲学家约翰·希而勒早在1980年发表在《行为与大脑科学》杂志上的论文"智力、头脑与规划"中提出的。

Chinese Room

- It attempts to show that computer can never be properly described as having a “mind” or “understanding”, regardless of how intelligently it maybe have.
  试图揭示计算机绝不能描述为有“智力”或“知性”，不管它多么智能。

John R. Searle
约翰·希而勒
Slusser Prof. of Philosophy,
UC Berkeley.
“斯拉瑟”哲学教授
UC伯克利大学

Chinese Room

- He imagines himself alone in a room following a computer program for responding to Chinese characters slipped under the door.
  他设想他独自在一个房间，操作一套计算机程序来应付从门缝下塞进来的中文字符。

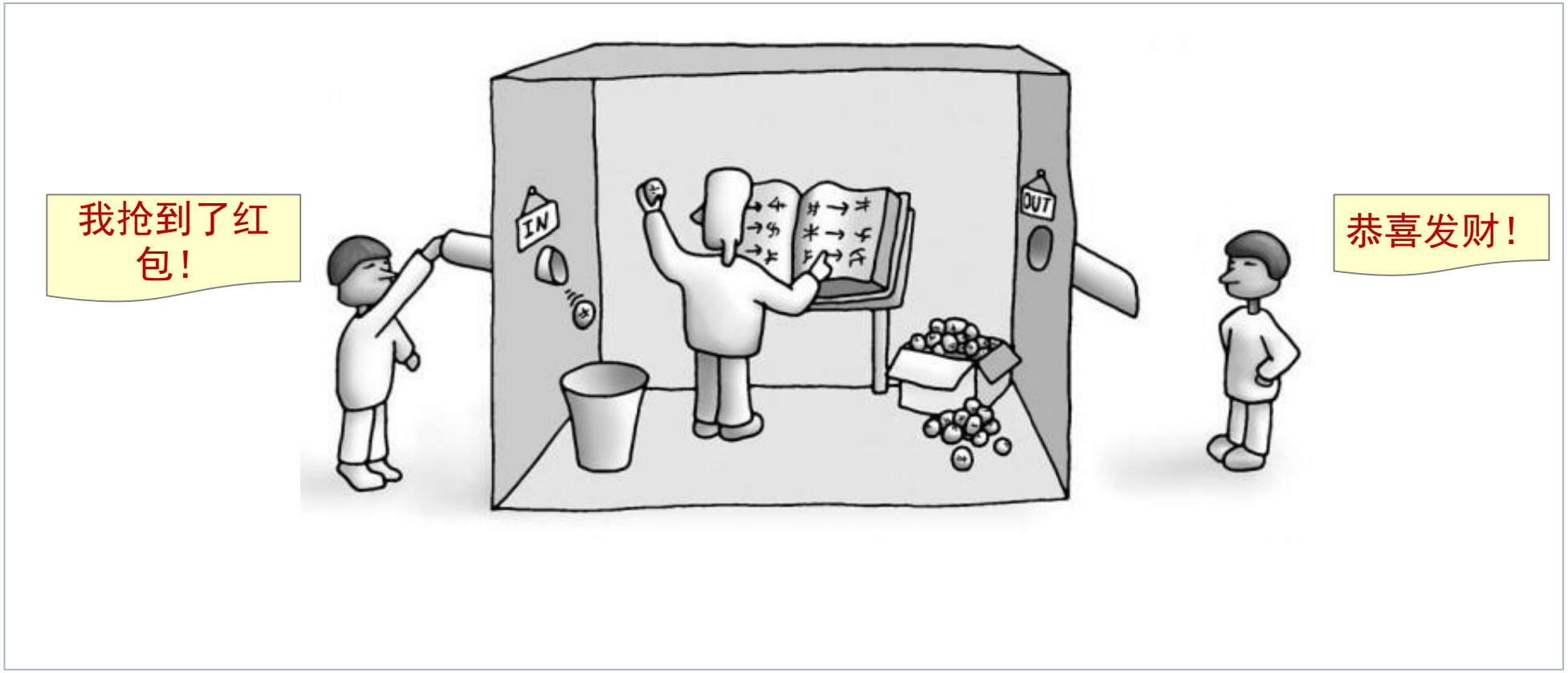
Chinese Room

- He understands nothing of Chinese, and yet, by following the program for manipulating symbols and numerals just as a computer does, he produces appropriate strings of Chinese characters that fool those outside into thinking there is a Chinese speaker in the room.
  他对中文一窍不通，然而，正如同计算机所做的那样，通过操作处理符号和数字，他生成了合适的中文字符串，从而蒙骗了屋外的人，以为屋内有一个精通中文的人。

Chinese Room

- The narrow conclusion is that programming a digital computer may make it appear to understand language but does not produce real understanding.
  唯一的结论是，按程序运行的计算机可以使它看起来理解了语言，但并没有产生真正的理解。
- Hence the “Turing Test” is inadequate.
  由此他断定，图灵测试的结论是不充分的。

Chinese Room



Whoever or whatever is in that room is an intelligent Chinese speaker!

不管是谁、无论如何，在房间里的一定是个聪明的精通中文的人！

Thank you for your attention!