



Presentation on Turing machine

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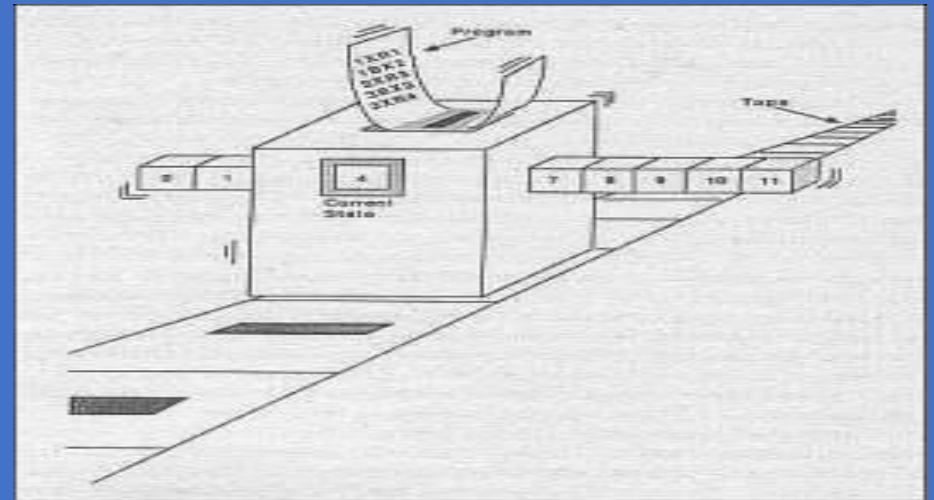




What is a Turing machine?

What is a Turing Machine(1)

- The so-called Turing machine is an abstract machine, it has an infinite length of paper tape, the paper tape is divided into a small square, each square has a different color. There's a machine head moving around on the paper tape. The machine head has a set of internal states and some fixed programs. At each moment, the head of the machine must read a grid information from the current paper tape, and then look up the program table according to its own internal state. According to the program output information, the machine head will change its internal state, and then move.



Turing's basic idea is to use a machine to simulate the process of mathematical calculation with paper and pen.

Human:

- 1. Writing or erasing a symbol on paper; ^[1]
- 2. Move your attention from one position on the paper to another.

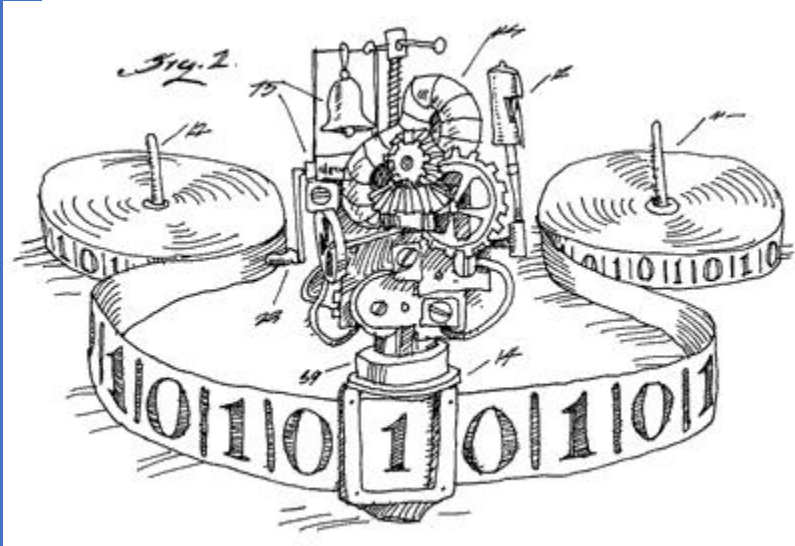
Turing machine

- 1. An infinitely long tape
- 2. A read-write head.
- 3. A set of control rules table
- 4. A status register



Can Turing Machine make it to AI?

AI: What is AI?



Definition of AI

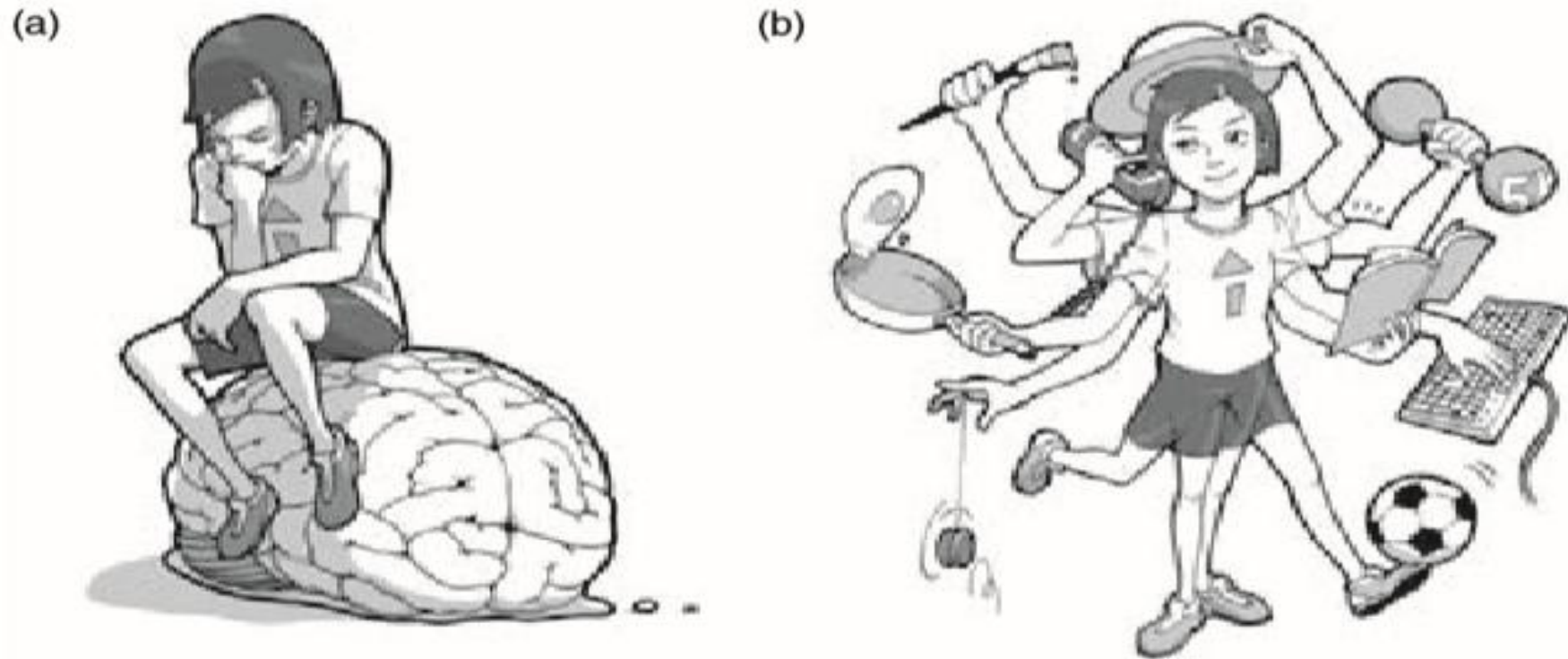


Figure 2.1

Two ways of approaching intelligence. (a) The classical approach. The focus is on the brain and central processing. (b) The modern approach. The focus is on the interaction with the environment. Cognition is emergent from the system-environment interaction, as we will argue throughout the book.

Link between Turing machine and AI

- computability; calculability?
- David Hilbert:
- Given a Diophantine equation with any number of unknown quantities and with rational integral numerical coefficients: To devise a process according to which it can be determined in a finite number of operations whether the equation is solvable in rational integers. (from Wikipedia)

Calculate-----→thinking

1. The value of Turing machine is that although it has a simple structure, *it can describe any logical reasoning and calculation process that human can complete.* Previously, "computing" ability was regarded as a human abstract ability similar to "thinking".
2. Inspirations from Turing machine
 - With the conception of computability, computers and what we call AI today was born.
 - *The deep research and discussions on Turing machine will be helpful for development of AI.*



Problems



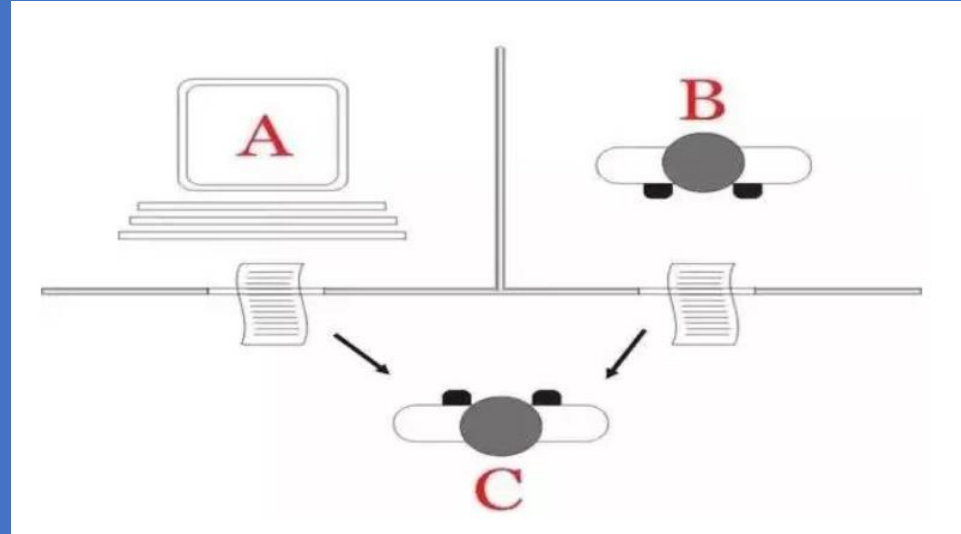
Some problems

- 1. Halting problem:

Halting problem is the problem of determining, from a description of an arbitrary computer program and an input, whether the program will finish running or continue to run forever.

- Which tells us some intelligence which owned by human can't be owned by machine.

- 2. Turing test



- ->the exact definition for AI? --->DL, embodied



Comments and conclusions

Conclusions

- 1. Turing machine set the basis of today' s conception of AI
- 2. Nowadays, many machines which uses the conception of machine let us see more about what AI can do.
- 3. Whether what AI can do in the future is hard to predicted.



T H A N K Y O U F O R W A T C H I N G