

Artificial Intelligence For NLP Lesson-01

人工智能与自然语言处理课程组

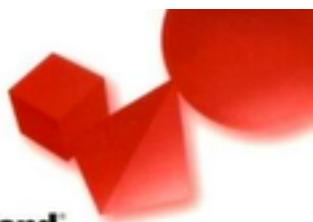
2019.Jun. 30



Outline

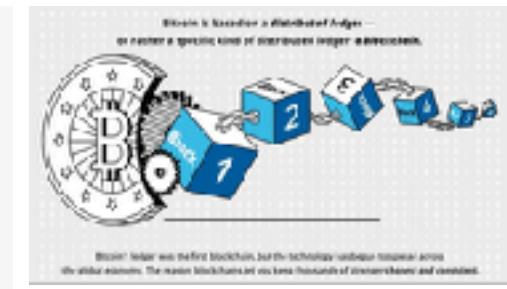
- i. Course Background
- ii. AI Introduction
- iii. Search Policy, Syntax Tree
- iv. Assignment

1/5 Background



Borland
Delphi
for Windows

AI



2/5 AI Introduction



What AI Solved?

- Sources:
 - <https://www.youtube.com/watch?v=vjSohj-lclc>
 - 大众点评 搜索海底捞 选择一家 拨打电话
 - Question: How many *AI methods they using. (split room and talking)*

Question

- Classify the applications or system based dimensions.

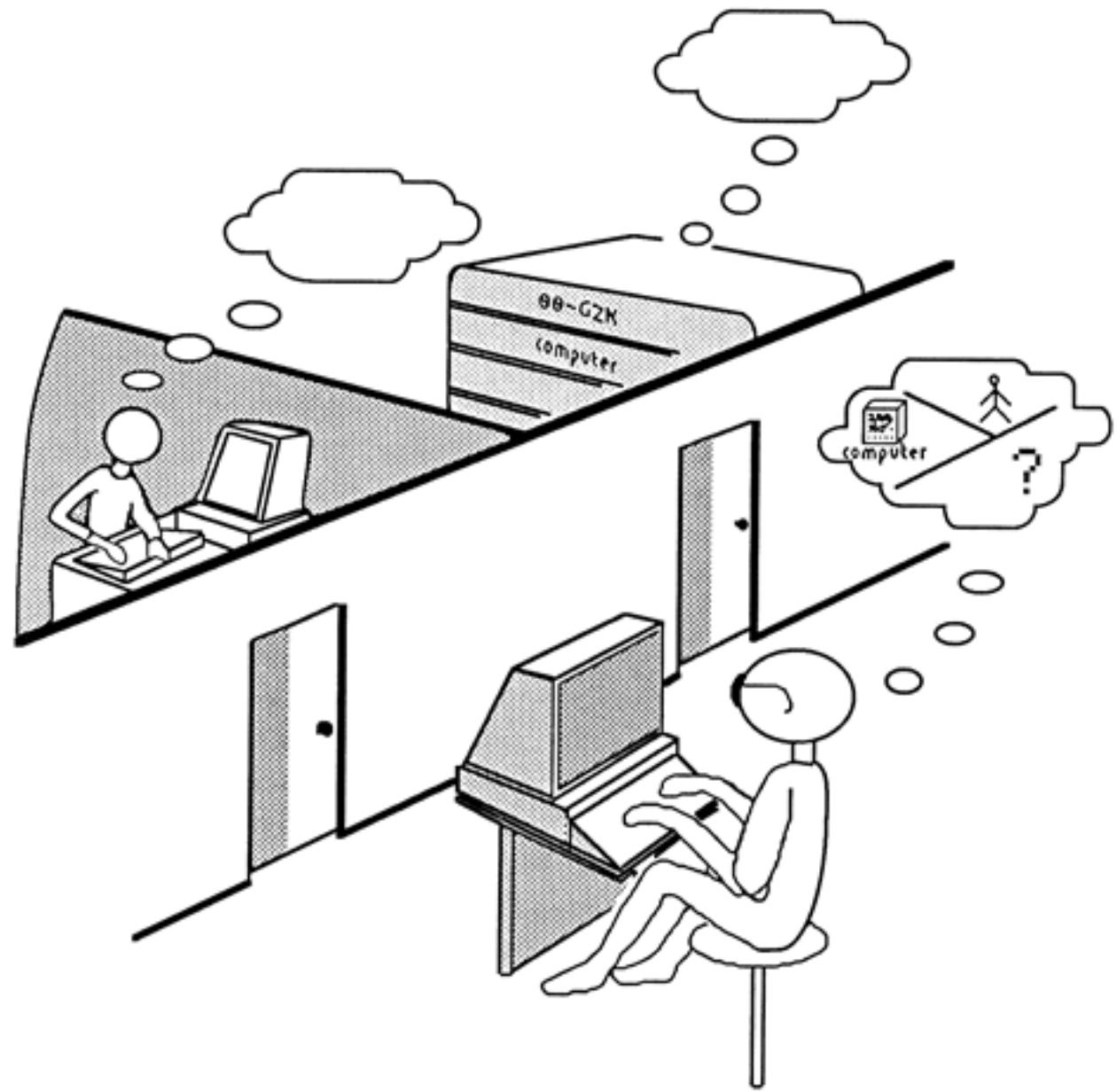
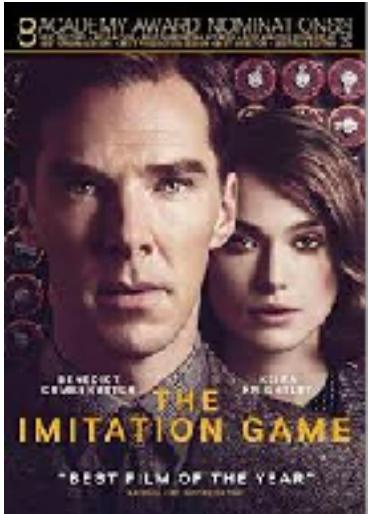
- Auto Composition
- Voice Recognition
- Stock Prediction
- Service Robot
- Anti Money Laundering



And, can you figure out some more?

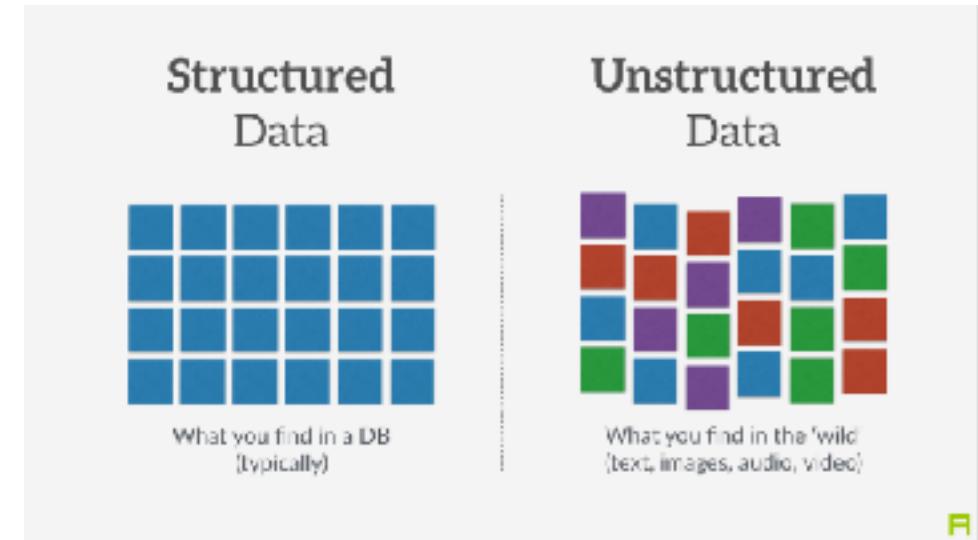
Turing test

- 1. Machine Intelligence
- 2. Imitation Game



Why Natural Language is so hard?

- 1. Text is Logic
- 2. Diversity
- 3. Unstructured
- 4. ...





AI Paradigm

- 1. Rule Based
- 2. Probability Based
- 3. Problem Solving: Search based
- 4. Mathematical or Analytic Based
- 5. Machine Learning (deep learning)
Based

1. Rule Based



```
simple_grammar = """""  
sentence => noun phrase verb_phrase noun_phrase => Article  
Adj* noun  
  
Adj* => null | Adj Adj*  
  
verb_phrase => verb noun_phrase  
Article => 一个 | 这个  
noun => 女人 | 篮球 | 桌子 | 小猫  
verb => 看着 | 坐在 | 听着 | 看见  
Adj => 蓝色的 | 好看的 | 小小的  
.....
```

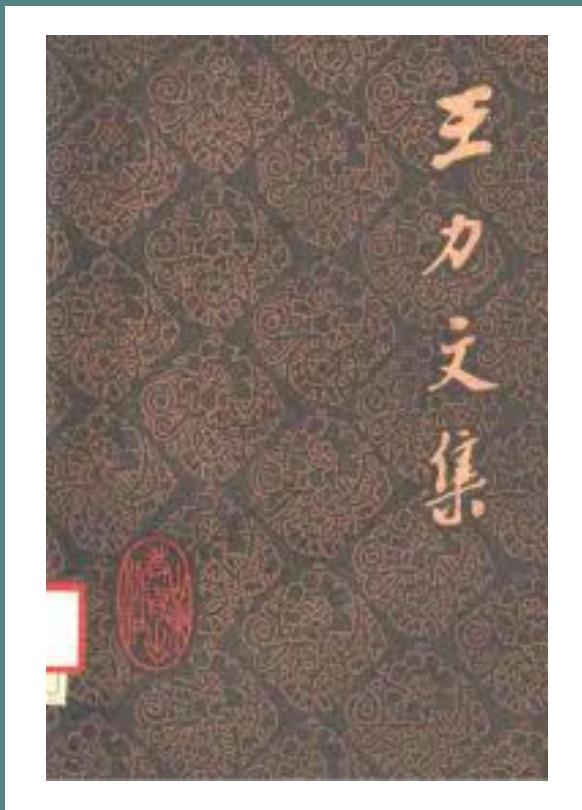
2. Probability Based

- A1. 前天早上吃晚饭的时候
- A2. 前天早上吃早饭的时候

- B1. 正是一个好看的小猫
- B2. 真实一个好看的小猫

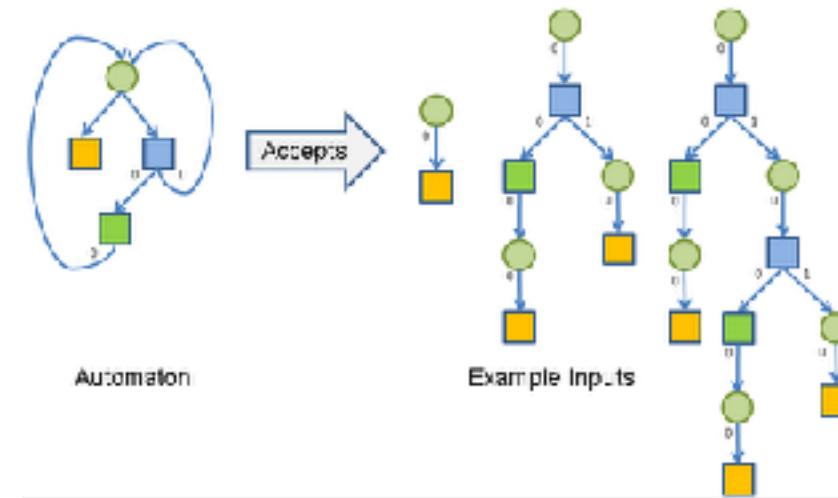
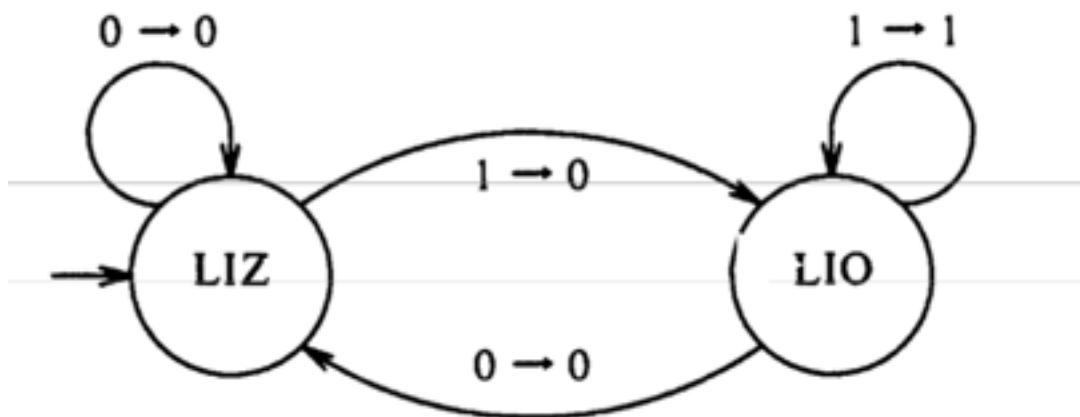
- C1. 我无言以对，简直
- C2. 我简直无言以对

名格	义类	语义特点	真 假	举 例
主 语	人及事 物名词	①背诵可以加数量 例(一副对联)	①具体 名词	人、牛、山、 水、对联
【一】 名 词		②背面不能加不， 比如美的刺猬(不 能刺，很舒服)。	②抽象 名词	光亮、太阳、 风力、思想
		③后面不能加对叠 名词“了”(连阴了)		
【时】 名 词	时间及 空间的词	普遍在名词后名 词性形容词的后面		左、右、南、 北、前、后、 中间、下边
【人】 代 词	凡有 变化的 名词	①能够替代或指代 变化着各处实词。 ②一般不要替换成 别的词	①人称 代词	我、你、他、 我们、你们
		③前面不能加不， 比如不能说“不 好”。	②指代 代词	这、那、这 里、那里
		④后面不能加对叠 名词“了”(连阴了)	③疑问 代词	谁、什么、 哪、多少
		⑤前面可以加时间 (过去、已经)。	⑥否定 代词	假、不、非 得、不得



Automata

- Input: 011010111
- Output: 001000011

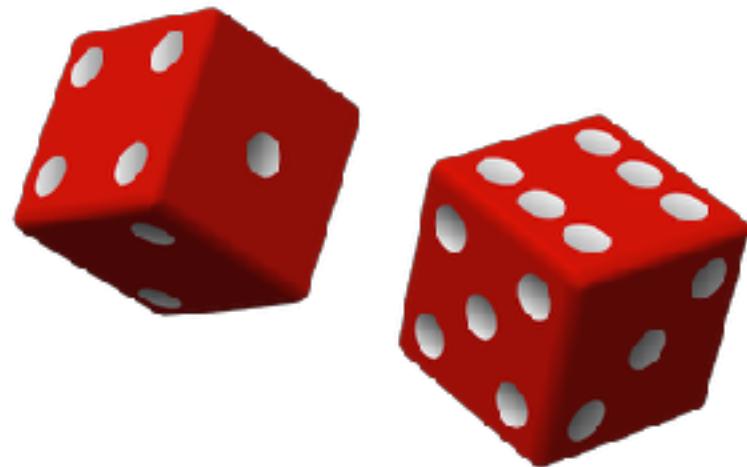


- LIZ: Last Input Zero, LIO: Last Input One

2. Probability Based

- "Every time I fire a linguist, the performance of the speech recognizer goes up"

----- Frederick Jelinek (18 November 1932 - 14 September 2010)



Assignment-01

- 1. Self Review
- 2. Build Sentence Generation System Using Syntax Tree and Language Model
- 3. (Optional) Chat Bot Using Pattern
- 4. (Optional) Reading Turing's Machine Intelligence Paper:
See in our github

3. Problem Solving: Search Based

1. Map Application

2. Decision System

3. Expert System

Online Programming



Decision Problem

Action: **Drive-son-to-school**

Pre Condition: **Son at home, car works**

Post Condition: son-at-school

Remove Condition: son-at-home

Action: **Drive-son-to-school**

Pre Condition: **Son at home, car works**

Post Condition: son-at-school

Remove Condition: son-at-home

Action: **Drive-son-to-school**

Pre Condition: **Son at home, car works**

Post Condition: son-at-school

Remove Condition: son-at-home



Map / Routing



Decision Problem

Get-successors:

For **current state**, given an operation **op**:

new states = current state | op.add-list – op.remove_list

For example:

current state: son at home, car works

For **op** drive-son-to-school

New state = some at home | son at school – son at home

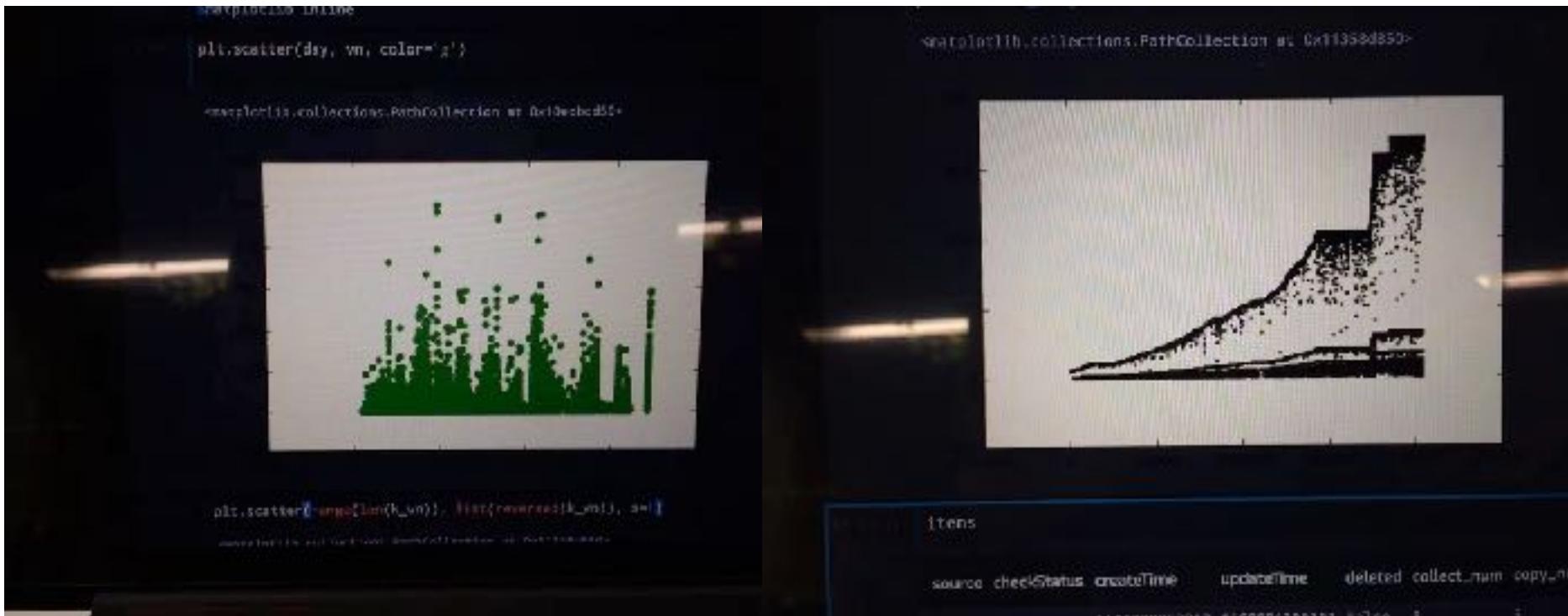
We could build this as a graph. Just like the previous map.



Abstract this problem:

- In the simplest case, choose one of those at random
- In some cases, when the symbol has rewrites, we will pick one that is a list of symbols, and try to generate from that.

4. Mathematical or Analytic Based



5. Machine Learning (deep learning) Based

6. Plus. Logic Reasoning System

- Talk: Come up with a new scenario with AI methods.



AI Paradigm & Data Driven

- 1. Rule Based
- 2. Search Based
- 3. Mathematical or Analytic Based
- 3. Probability Based
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Based

