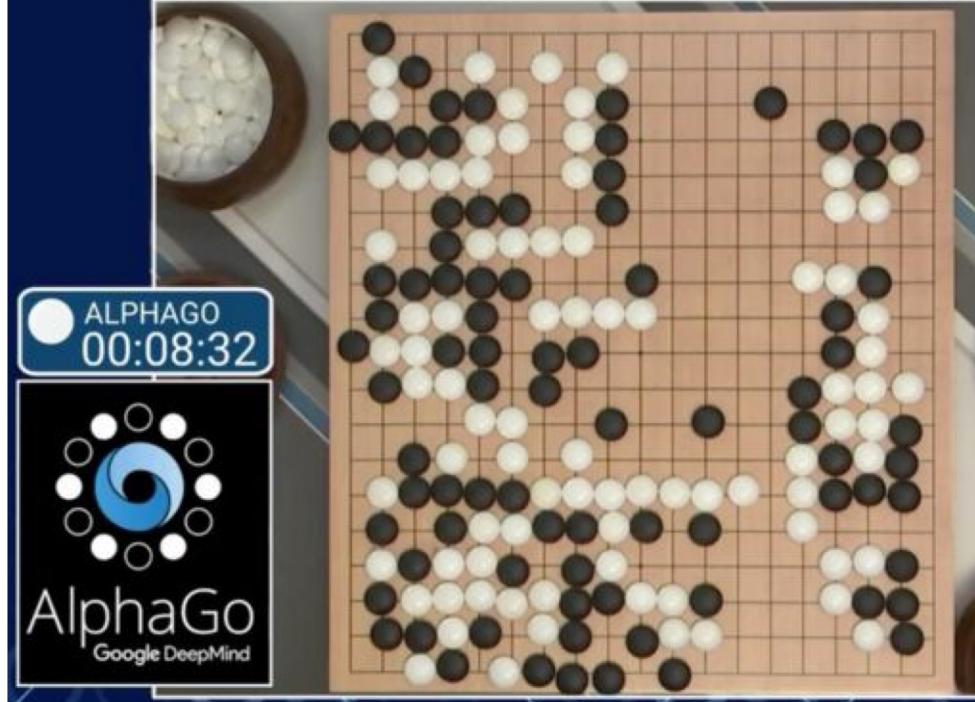


# Artificial Intelligence For NLP Lesson-01

人工智能与自然语言处理课程组

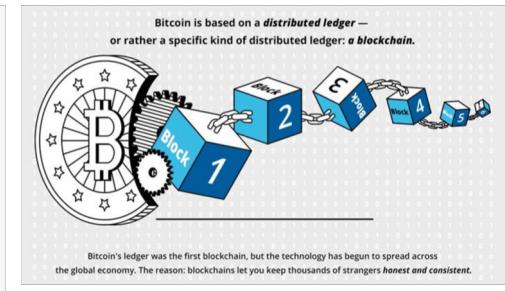
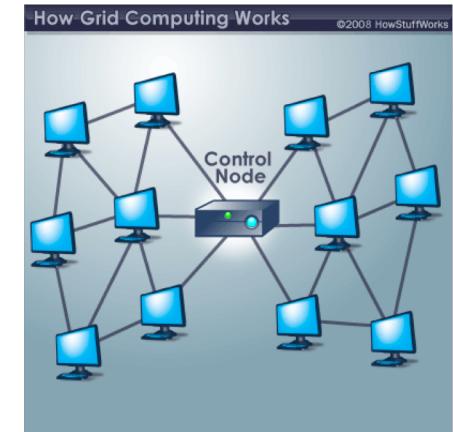
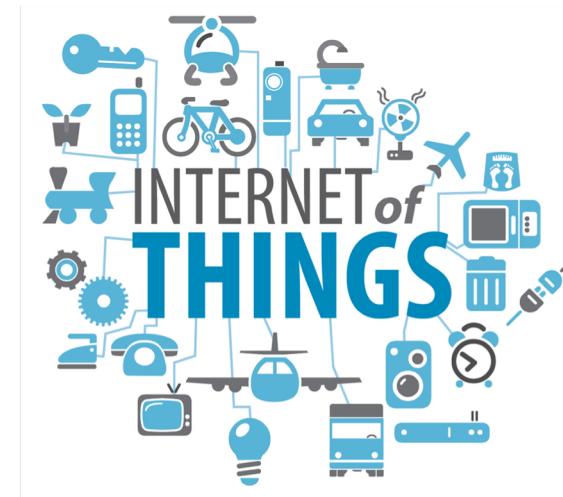
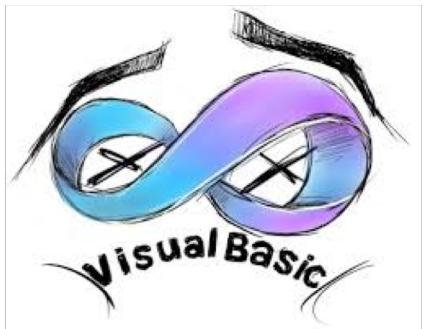
2019.March. 31



# Outline

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

1/5 Background



# Three problems we want to solve

- 1. Confidence
- 2. Capacity
- 3. Continuation



## Three problems we want to solve

- 1. Capacity:  
The solid and  
systematic  
background.



The farther backward you can look, the farther forward you are likely to see.

(Winston Churchill)

## Three problems we want to solve

- 2. Confidence: A job is the least requirement of a promising man.



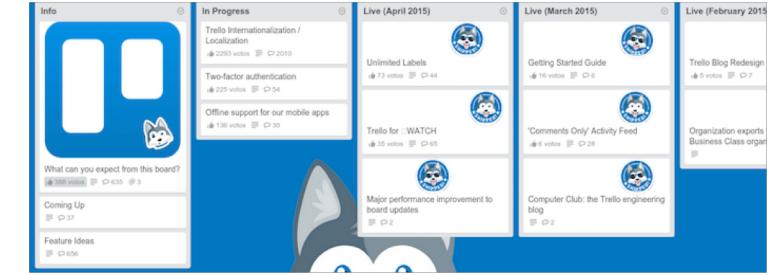
Three  
problems we  
want to solve

- 3. Continuation : Keep learning and solve the future unknow problem.



# What does our course contain?

- 1 Kernel Course *Artificial Intelligence for NLP*
- 2 Out Source Courses: *Computer Programming Design, Analysis and Design of Algorithm*
- 3 Platforms to collaborate: github, trello, slack
- 4. GPU Server, Nividia P100 \* 2
- 5. Profession Tuition



# TA and QA system

- 1. Post your question in trello
  - 2. Talk project or programming problems in slack
  - 3. Email your problem to me.
- 
- TA:
  - Zhouhan, Zju, Master of Computer Science, NLP
  - Li Xiao Ming, Master of Computer science, AI
  - Zhangnan, Whu, Master of Computer Science, 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.

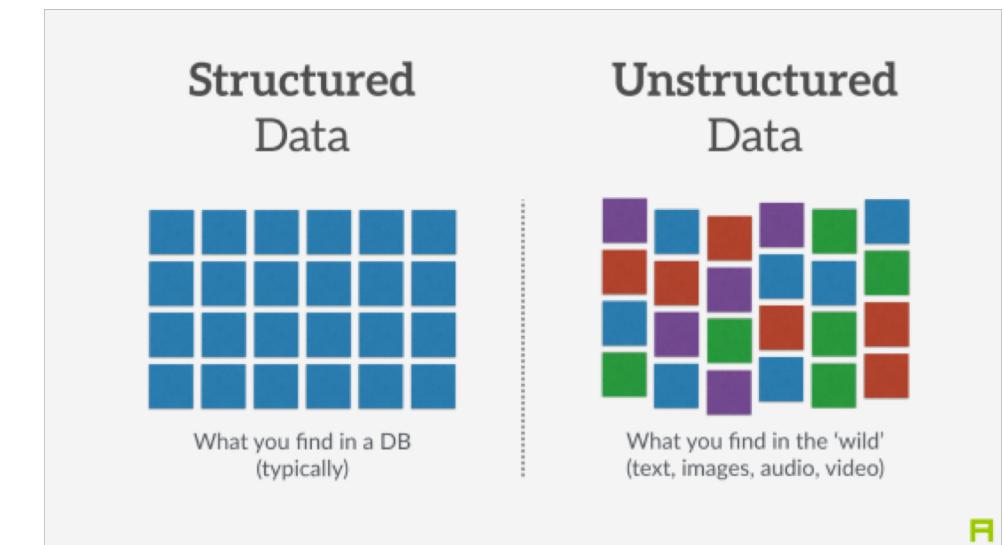
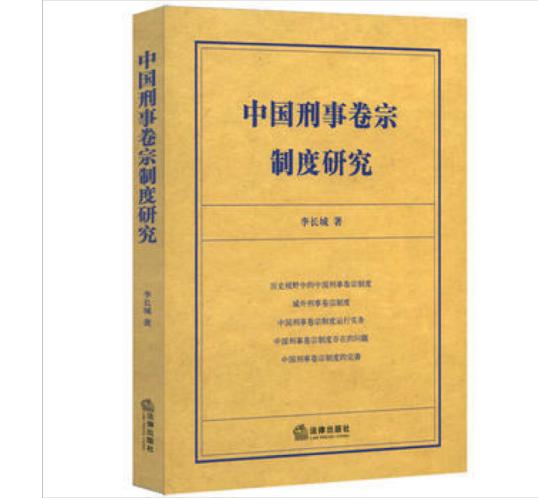
- [ ] Auto Composition
- [ ] Voice Recognition
- [ ] Stock Prediction
- [ ] Service Robot
- [ ] Anti Money Laundering

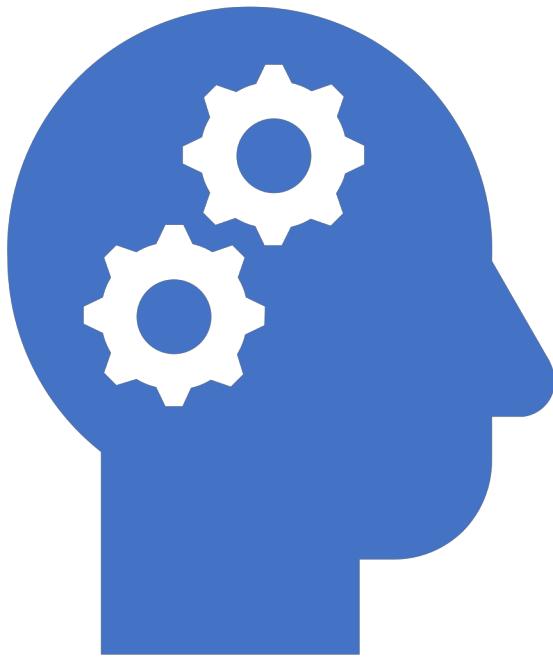


And, can you figure out some more?

# Why Natural Language is so hard?

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





# AI Paradigm

- 1. Search Policy Bases
- 2. Rule Based, From Rules to Data Driving
- 3. Mathematical or Analytic Based
- 4. Probability Based
- 5. Machine Learning (deep learning) Based

# 1. 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.



## 2. 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

'''

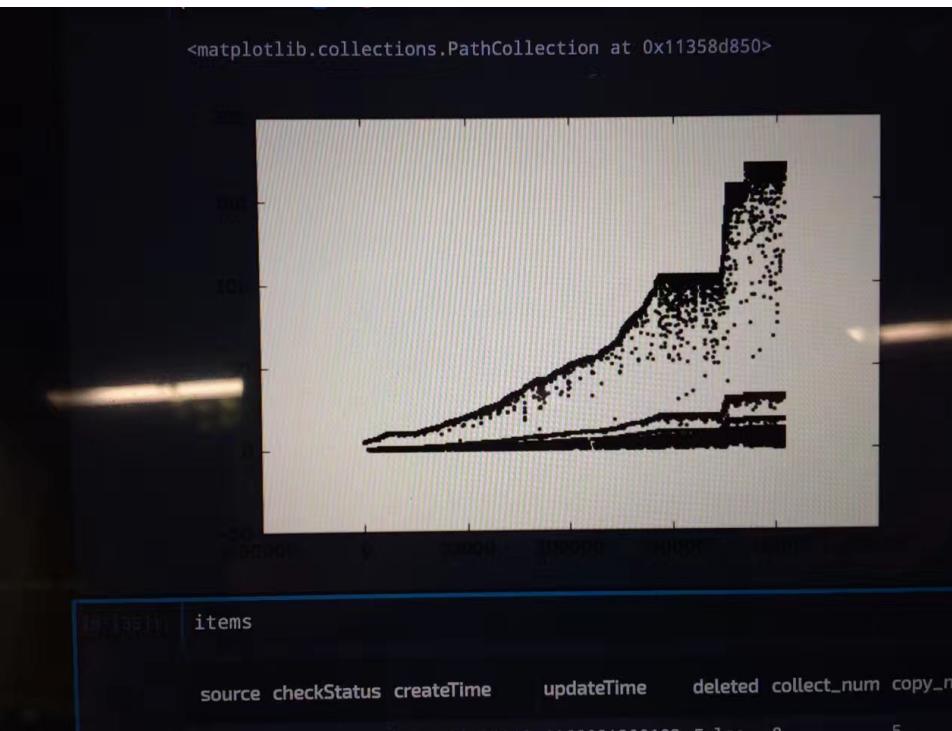
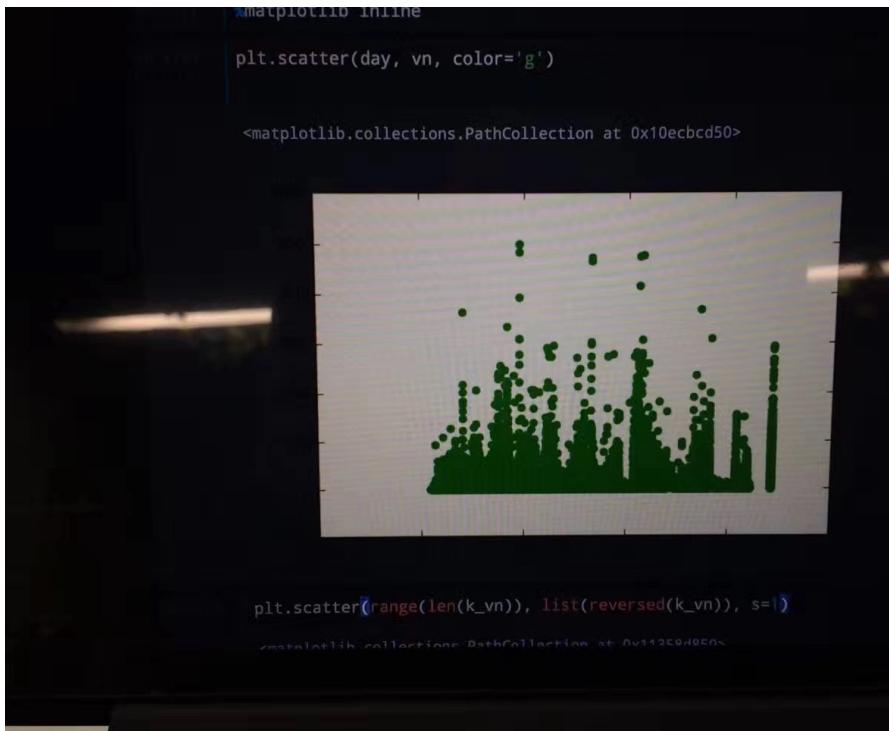
## Abstract this problem:

- 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.

# Assignment-01

- 1. Self Review
- 2. Chat Bot Using Pattern

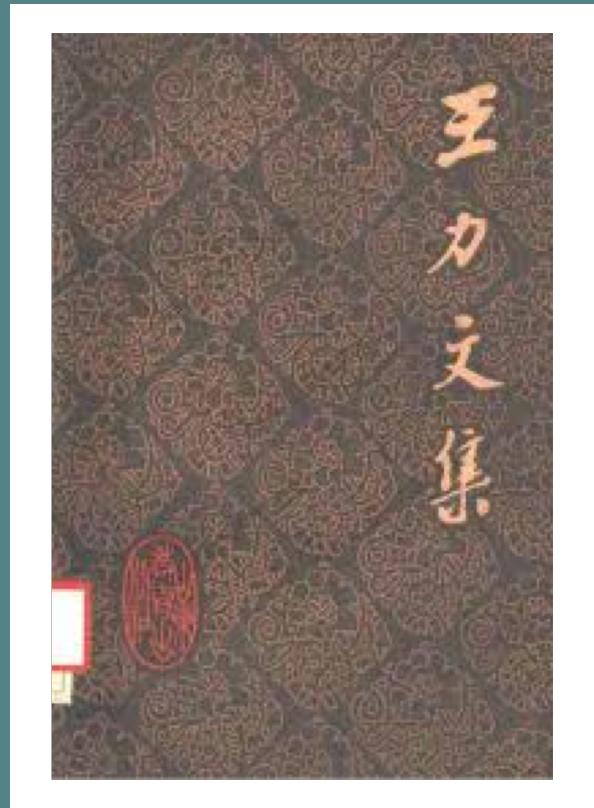
### 3. Mathematical or Analytic Based



# 4. 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

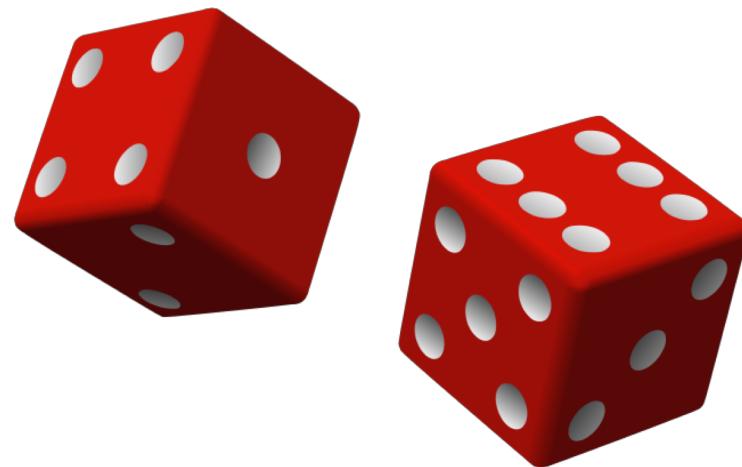
名称	定义	语法特点	类别	举例
(一) 名词	表示人或事物名称的词	①前面可以加数量词(一副对联) ②前面不能加不、很之类的副词(不能很联、很对联)。 ③后面不能加状态助词“了”(楹联了)	①具体名词 ②抽象名词	人、牛、山、水、对联 友谊、立场、观点、思想
(附) 方位词	中表示方向位置的词	常用在名词或名调性短语的后面		东、西、南、北、前、后、中间、下边
(二) 代词	具有替代或指示作用的词分	①能够替代或指示替代或各类实词。 ②一般不带修饰成分。	①人称代词 ②指示代词 ③疑问代词	我、你、他、我们、你们 这、那、这里、那边 谁、什么、哪、多少
		①前面可以加副词(刚走、很想)。	①不及物动词	醒、病、游行、觉悟



## 4. Probability Based

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

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



## 5. Machine Learning (deep learning) Based

# 6. Plus. Logic Reasoning System

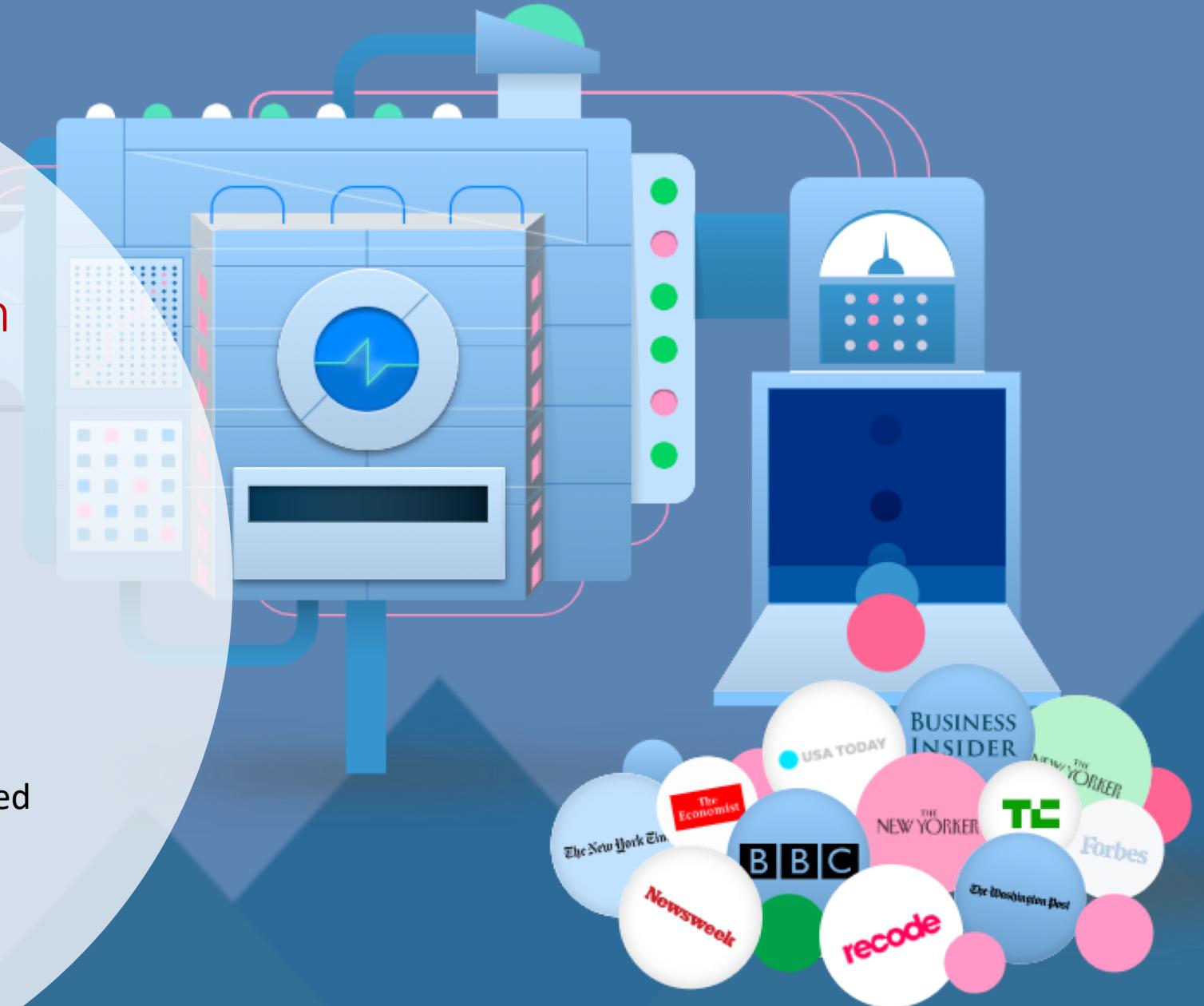
- Talk: Come up with a *new* scenario with AI methods.



## AI Paradigm & Data Driven

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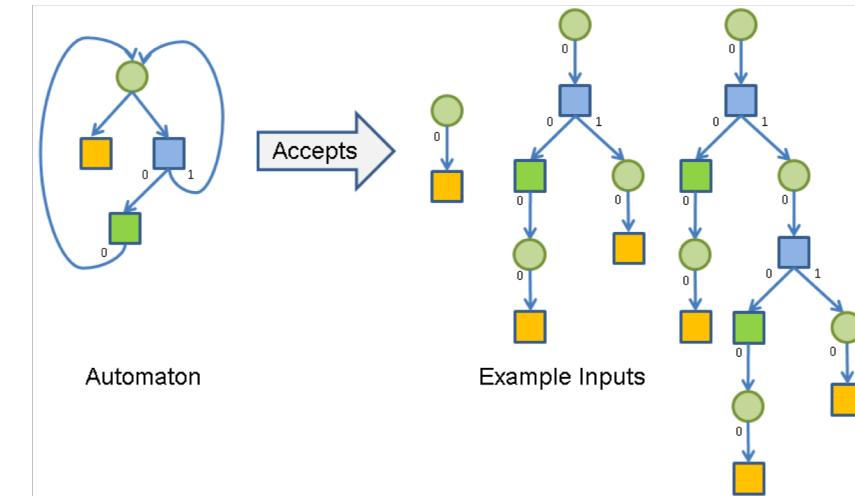
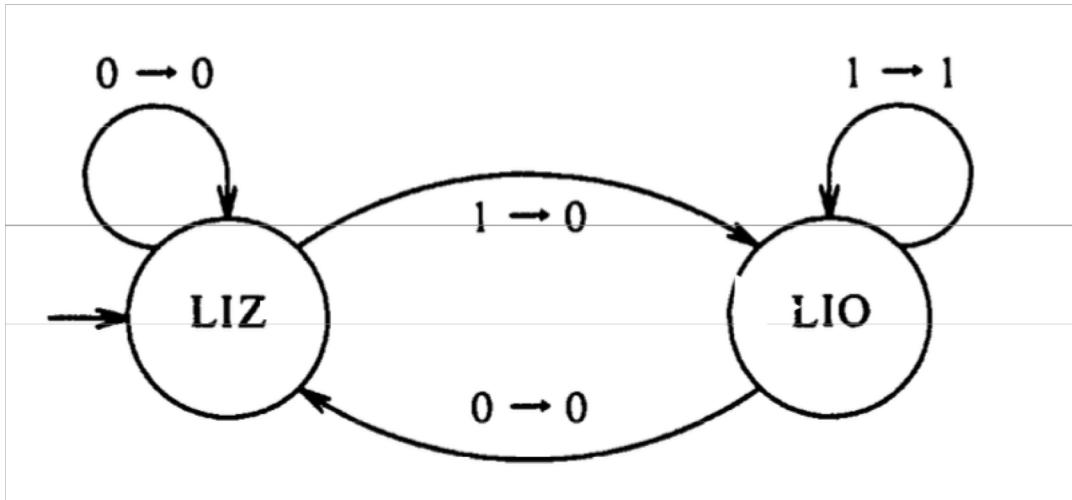
- 1. Rule Based
- 2. Search Based
- 3. Mathematical or Analytic Based
- 3. Probability Based
- 4. Machine Learning (deep learning) Based



# 3/5 Automata And Syntax Tree

# Automata

- Input: 011010111
- Output: 001000011



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

4/5 Assignment

- As the requirement reading the paper
  - Set up the python data intelligent environment
  - Try to pull and merge request to github group.
- 
- Net course:
    - Syntax Tree Parser
    - Search Problem start

5/5 Q&A