南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

CnMed

CS 103 - 01

Introduction to AI

Jimmy Liu 刘江

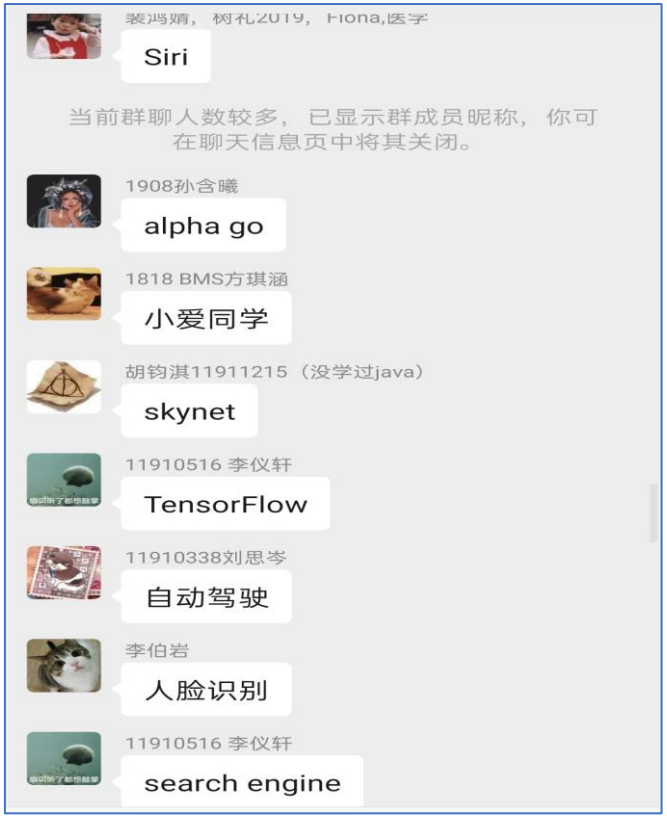
2021-09-10

Q1: What Is in Your Mind When You Talked about AI?

Q1: What Is in Your Mind When You Talked about AI?

CS103 人工智能导论21年
下午班

What Did Class 2020 Say?



Skynet 是一个基于C跟lua的开源服务端并发框架，这个框架是单进程多线程模型，使用skynet 节点，通过 master ，认识网络中所有其它skynet 节点，它们相互一一建立单向通讯通道。

skynet是我们游戏服务端的底层框架，当初在技术选型的时候仔细阅读过它的源码，发现它是一个C语言的工程典范。大多数游戏服务端，要么使用C++，要么使用java，使用C是非常少见的。但是skynet通过C和Lua的结合，实现了一个高效的游戏框架，C层没有多余的一堆三方库，只有紧凑的核心结构，提供最核心的消息处理框架；Lua层用来写游戏逻辑，降低了开发门槛。

What Did Class 2020 Say?

What Did Class 2020 Say?

到底啥是GPT-3?

GPT-3 是著名人工智能科研公司 OpenAI 开发的文字生成 (text generation) 人工智能，相关论文5月份已经发表，当时就以天文数字级别的1,750亿参数量引发轰动。

不过直到最近，公众才真正见识到它到底有多厉害……到底发生了什么？

原来，OpenAI 这次一反之前死守基础研究的思路，将 GPT-3 做成了一个服务，提供可以调用的 OpenAI API，并且向开放了少量体验资格，学术机构、商业公司和个人开发者都可以申请……

人工智能-GPT-3

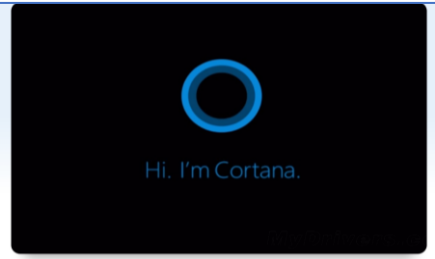
尚学堂人工智能学院

OpenAI在最近， 新提出的 GPT-3 在网络媒体上引起啦的热议。因为它的参数量要比 2 月份刚刚推出的、全球最大深度学习模型 Turing NLP 大上十倍，而且不仅可以更好地答题、翻译、写文章，还带有一些数学计算的能力。这样强大的深度学习，不禁让人产生一种错觉：真正的 AI 要来了吗？

What Did Class 2020 Say?

首先，GPT-3 最令人惊讶的还是模型体量，它使用的最大数据集在处理前容量达到了 45TB。根据 OpenAI 的算力统计单位 petaflops/s-days，训练 AlphaGoZero 需要 1800-2000pfs-day，而 OpenAI 刚刚提出的 GPT-3 用了 3640pfs-day。

研究者们希望 GPT-3 能够成为更通用化的 NLP 模型，解决当前 BERT 等模型的两个不足之处：对领域内有标记数据的过分依赖，以及对于领域数据分布的过拟合。GPT-3 致力于能够使用更少的特定领域，不做 fine-tuning 解决问题。



Cortana

由微软开发的人工智能助理

微软小娜 一般指本词条

本词条是多义词，共2个义项

Cortana （中文名：微软小娜）是微软发布的全球第一款个人智能助理。它"能够了解用户的喜好和习惯"，助用户进行日程安排、问题回答等"。[1]Cortana 可以说是微软在机器学习和人工智能领域方面的尝试。微

目录

A petaflop/s-day (pfs-day) consists of **performing 10^{15} neural net operations per second for one day**, or a total of about 10^{20} operations. The compute-time product serves as a mental convenience

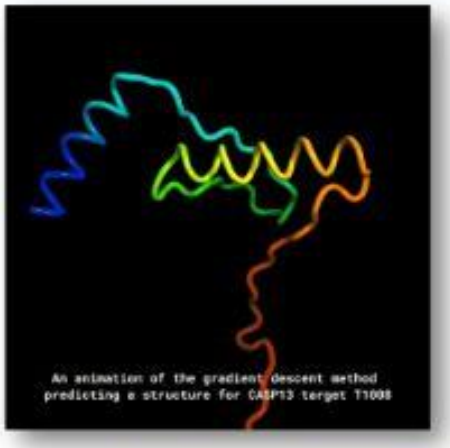
What Did Class 2020 Say?

达芬奇机器人手术系统以麻省理工学院(原名斯坦福研究学院)研发的机器人外科手术技术为基础。Intuitive Surgical 随后与IBM、麻省理工学院和Heartport公司联手对该系统进行了进一步开发。FDA已经批准将达芬奇机器人手术系统用于成人和儿童的普通外科、胸外科、泌尿外科、妇产科、头颈外科以及心脏手术。达芬奇外科手术系统是一种高级机器人平台，其设计的理念是通过使用微创的方法，实施复杂的外科手术。

AI Preface– DeepMind

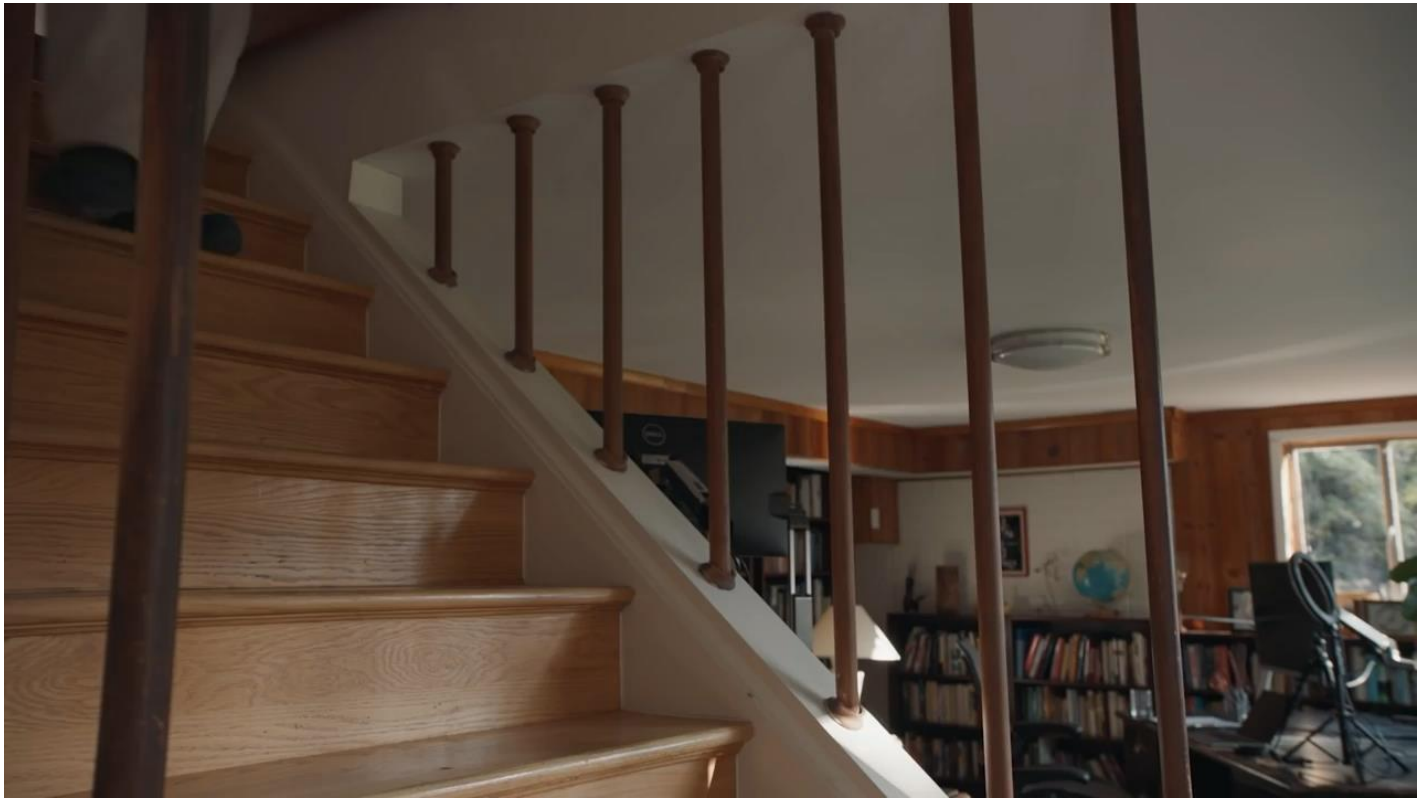
From 2016 AlphaGo to 2018/2021 AlphaFold

AlphaGo4:1击败李世石



AlphaFold靶点蛋白质三维结构预测

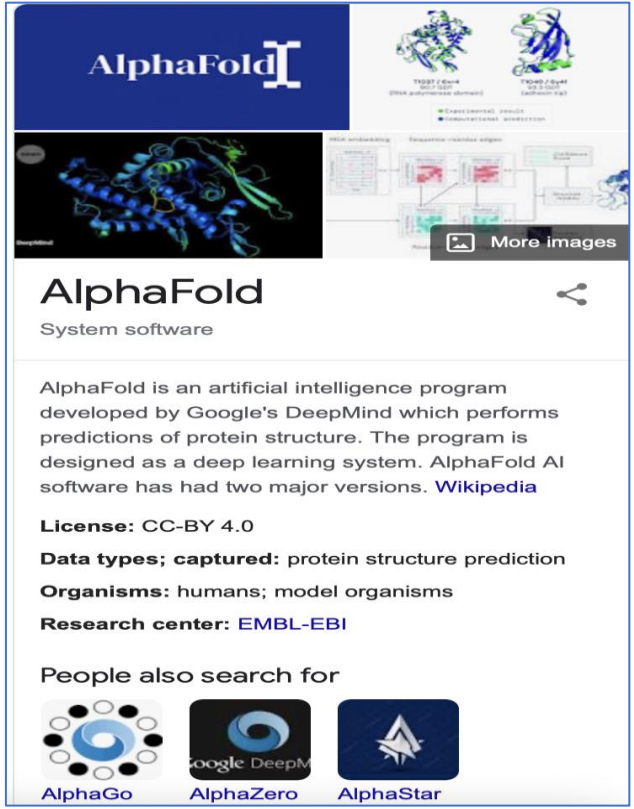
From “AI” to “AI”+ “AI+”



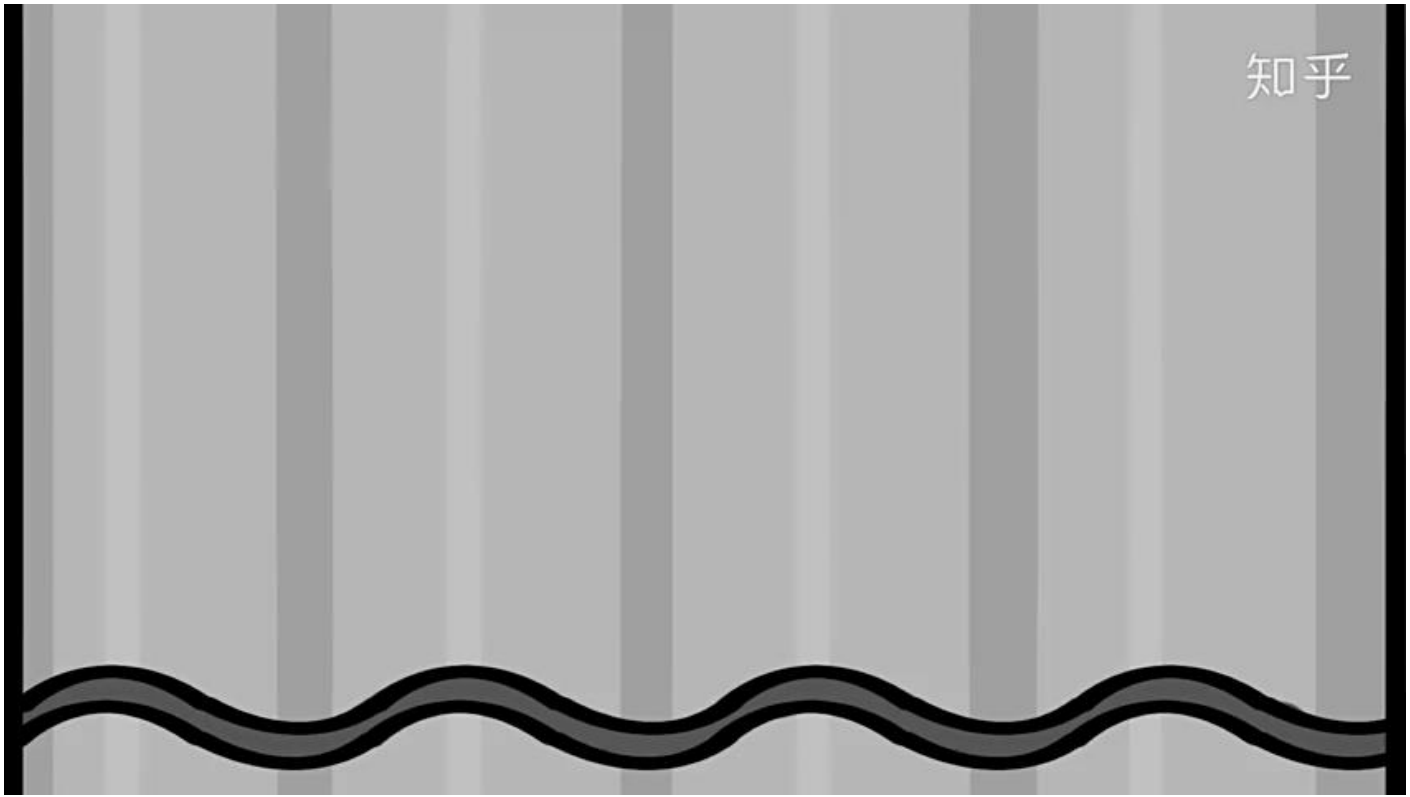
AlphaFold

问：DeepMind 创始人兼首席执行官德米斯·哈萨比斯（Demis Hassabis）说：“我们使用 AlphaFold 生成了人类蛋白质组最完整、最准确的图片。我们相信这是迄今为止人工智能对推进科学知识所做的最重要贡献，也是人工智能可以为社会带来的各种好处的一个很好的例证。”如何看待这一说法?

施一公：我认同这个说法，我认为这个判断没有言过其实，这的确是迄今为止人工智能对科学界做出的最重要的贡献。这也是 21 世纪截止目前人类在科学技术领域上的最大突破之一，也应该是人类有史以来在科学和技术领域最重要的突破之一。过去半个多世纪，人类一共解析了五万多个人源蛋白质的结构，人类蛋白质组里大约 17% 的氨基酸已有结构信息；而 AlphaFold 的预测结构将这一数字从 17% 大幅提高到 58%；因为无固定结构的氨基酸比例很大，58% 的结构预测已经接近极限了。这是一个典型的量变引起巨大的质变，而这一量变是在过去短短一年之内发生的，这是不可思议的革命。它带来的在生命科学各分支领域的革命，将在今后几年到十几年中逐渐显现出来。在我看来，这项突破堪比人类基因组完成测序，甚至更重要!



AlphaFold and CASP



CS 103 Will Cover AI Algorithms Like

Deep Learning

Attention

Graph

……

AI Preface– Elon Musk and WAIC

SPACE X, TESLA, OPEN AI

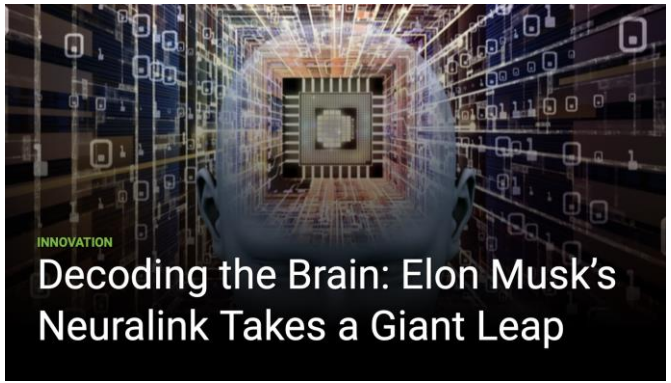
Elon Musk

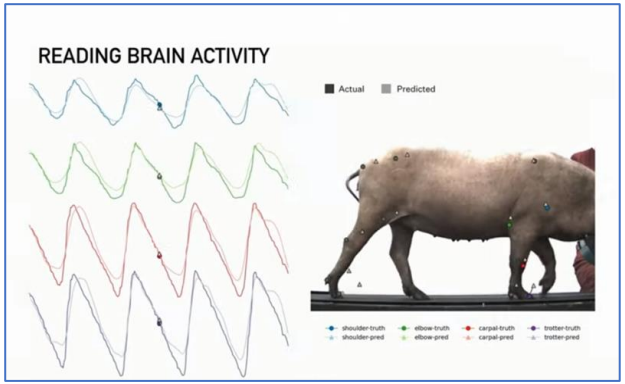
CEO of Tesla Motors

Elon Reeve Musk FRS is an entrepreneur and business magnate. He is the founder, CEO, and Chief Engineer at SpaceX; early stage investor, CEO, and Product Architect of Tesla, Inc.; founder of The Boring Company; and co-founder of Neuralink and OpenAI. A centibillionaire, Musk is one of the richest people in the world. Wikipedia

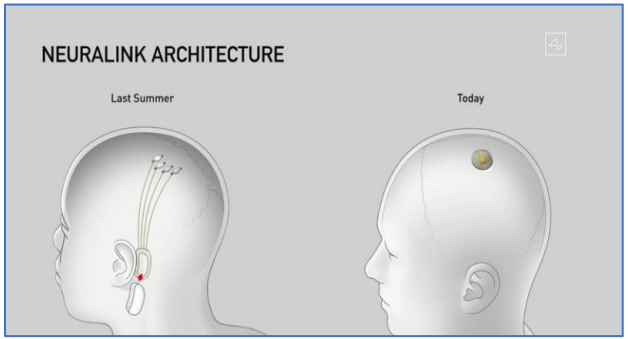
Net worth: 162.5 billion USD (2021) Forbes, Trending

AI around US- Symbiosis with AI





28-08-2020 , Elon Musk demonstrate its next-generation BMI Brain Man Interface that creates a digital link between the brain and computer. Founded by Musk in 2016, Neuralink designs and develops BMI to treat brain-related injuries and trauma. Musk aims to create BMI to enable humans to outpace AI.



AI Dialogue between East and West-WAIC 2019

Elon Musk thinks AI is smarter than the smartest human, machine intelligence is the extension of human intelligence. Jack Ma thinks human is smart enough to counter the challenge of AI.

AI Dialogue between East and West -WAIC 2020

Tesla is approaching the level of L5, basic functions of L5 will be developed by 2020. AI technology is used extensively in Tesla Auto Pilot technology. According to Elon Musk, “cutting edge” AI is actually “far more dangerous than nukes.”

Jack Ma gives his talk from Xishuangbanna, Yunnan though holograph stating that human shall respect nature, digital technologies make our life better. Instead of worry about the difficulties in the future, we can take more responsibility and achieve early success.

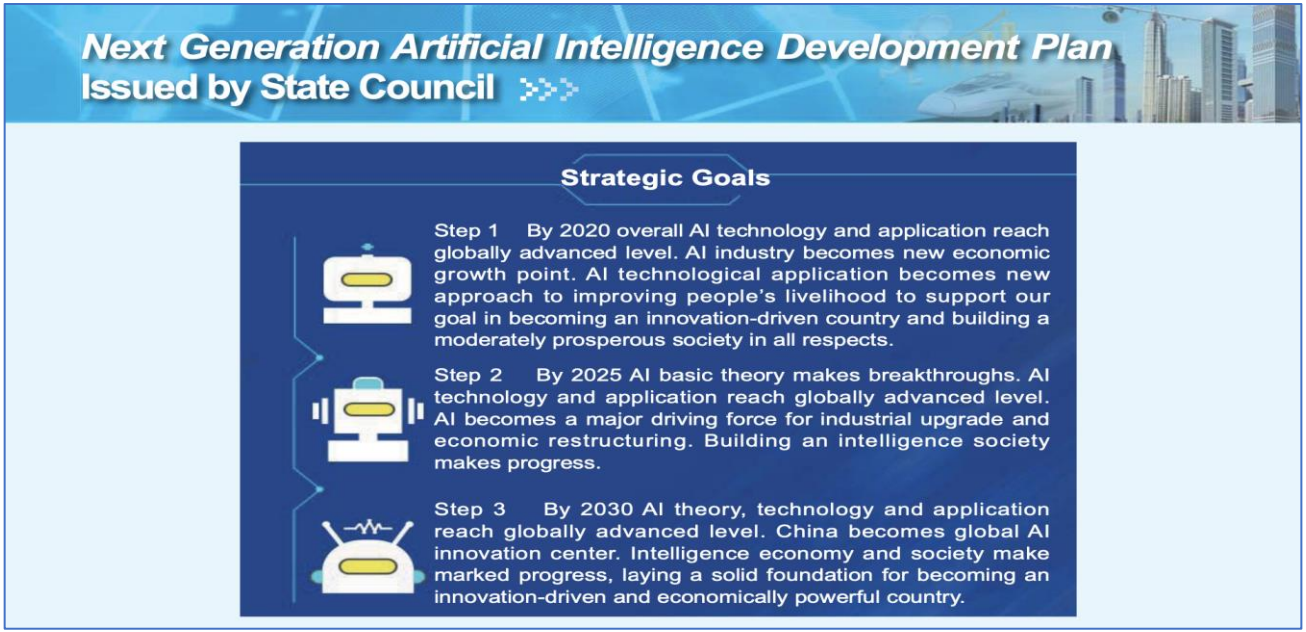
WAIC 2021


WAIC
2021世界人工智能大会
WORLD ARTIFICIAL INTELLIGENCE CONFERENCE
智联世界 众智成城
INTELLIGENT CONNECTIVITY INSPIRATIONAL CITIES
2021.07.08-07.10
中国 · 上海 SHANGHAI · CHINA

AI Preface– China AI

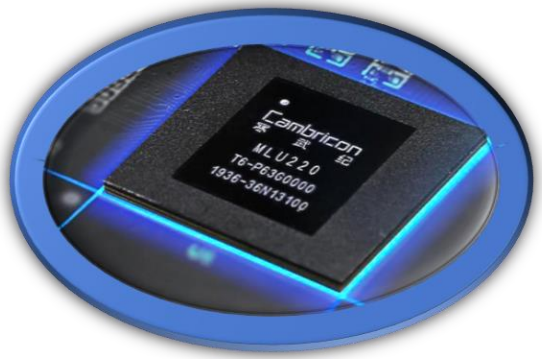
AI Policy in China

In 2016, China's State Council issued an ambitious policy blueprint calling for the nation to become "the world's primary AI innovation center" by 2030, by which time, it forecasts, the country's AI industry could be worth $150 billion. (Para. 1)



Cambricon-AI Around US

2015, Cambricon was set up



2017, Kirin 970 used in Huawei Mate 10

2020, Cambricon listed valued at 100b RMB

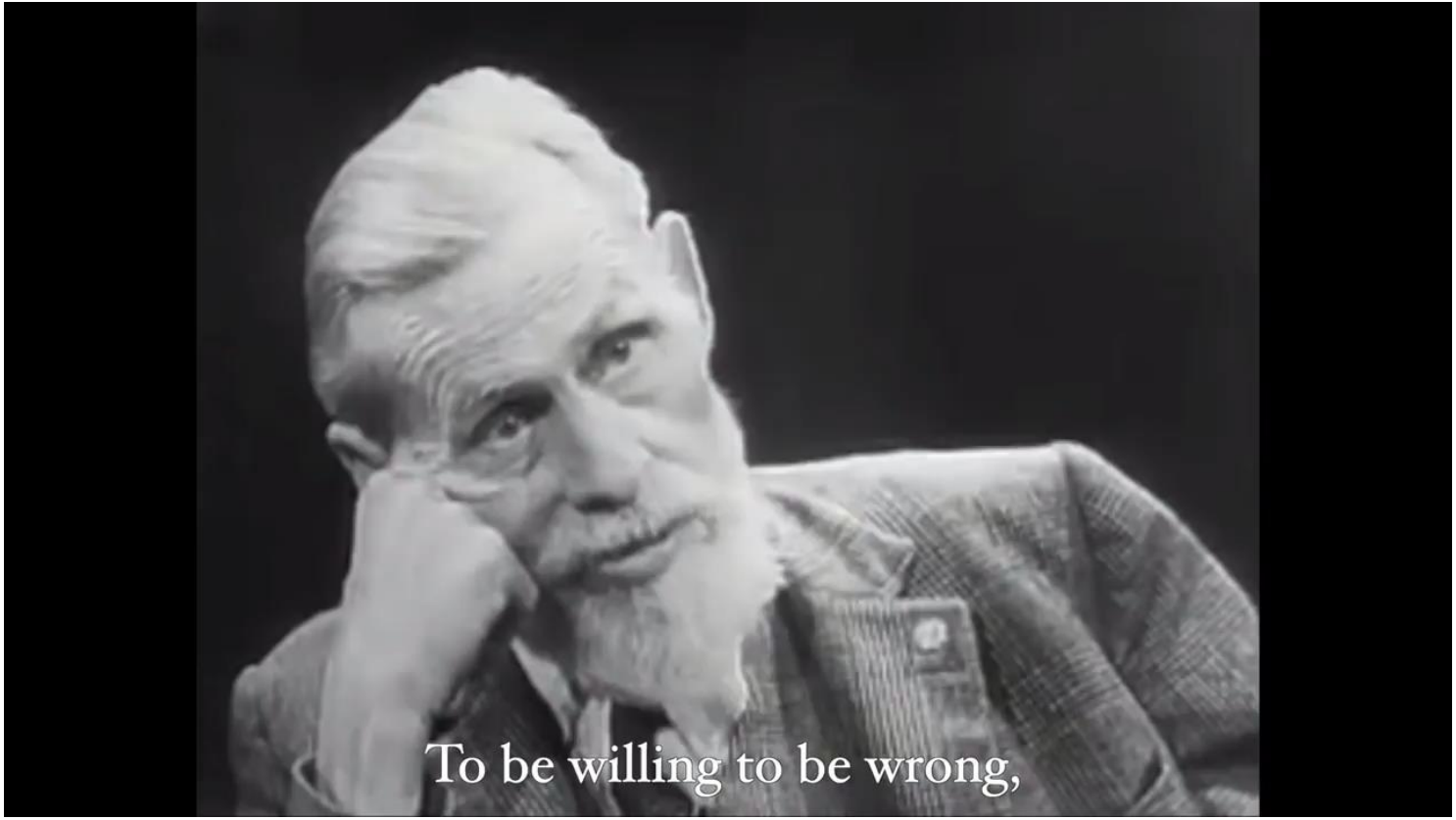
寒武纪是地质年代划分中属显生宙古生代的第一个纪，距今约5.7亿至5.1亿年，寒武纪是现代生物的开始阶段，是地球上现代生命开始出现、发展的时期。寒武纪对我们来说是十分遥远而陌生的，这个时期的地球大陆特征完全不同于今天。寒武纪常被称为"三叶虫的时代"，这是因为寒武纪岩石中保存有比其他类群丰富的矿化的三叶虫硬壳。

此外，寒武纪还产生了进化史上的一个重要事件"寒武纪生命大爆发"，在很短（地质意义上的很短，其实也有数百万年之久）时间内，生物种类突然丰富起来，呈爆炸式的增加。它意味着，生物进化除了缓慢渐变，还可能以跳跃的方式进行。当时出现了丰富多样且比较高级的海生无脊椎动物，保存了大量的化石，从而有可能研究当时生物界的状况，并能够利用生物地层学方法来划分和对比地层，进而研究有机界和无机界比较完整的发展历史。但澄江生物群告诉我们，如今地球上生活的多种多样的动物门类在寒武纪开始不久就几乎同时出现。

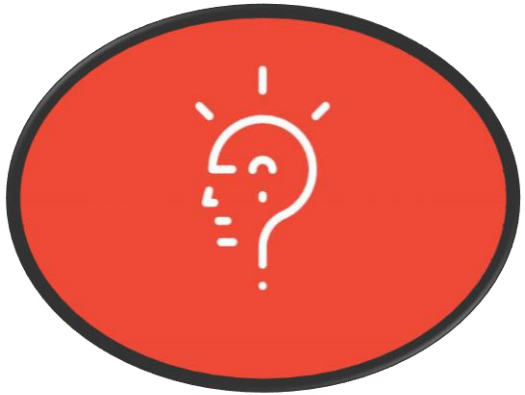
AI Preface– Turing Laureates

What Do The Turing Award Winners Think About AI?

What Do The 2018 Turing Award Winners Say?



Question From You?



Q2: What Do You Want to Learn from CS 103?

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CS103 人工智能导论21年
下午班

Topics To Cover

1. CS 103 Module Introduction And Class Rules
2. AI Concepts
3. AI Algorithms
4. AI Applications (AI+)

CS 103 Module Introduction And Class Rules

1 Module Coverage

2 Study Methods and Reference

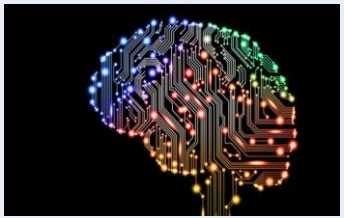
3 Study Objectives and Assessment

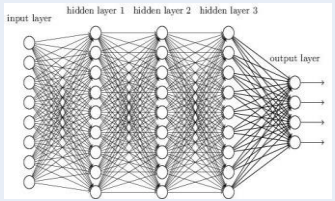
4 Lecturer AI Research Area

CS 103 Module Coverage

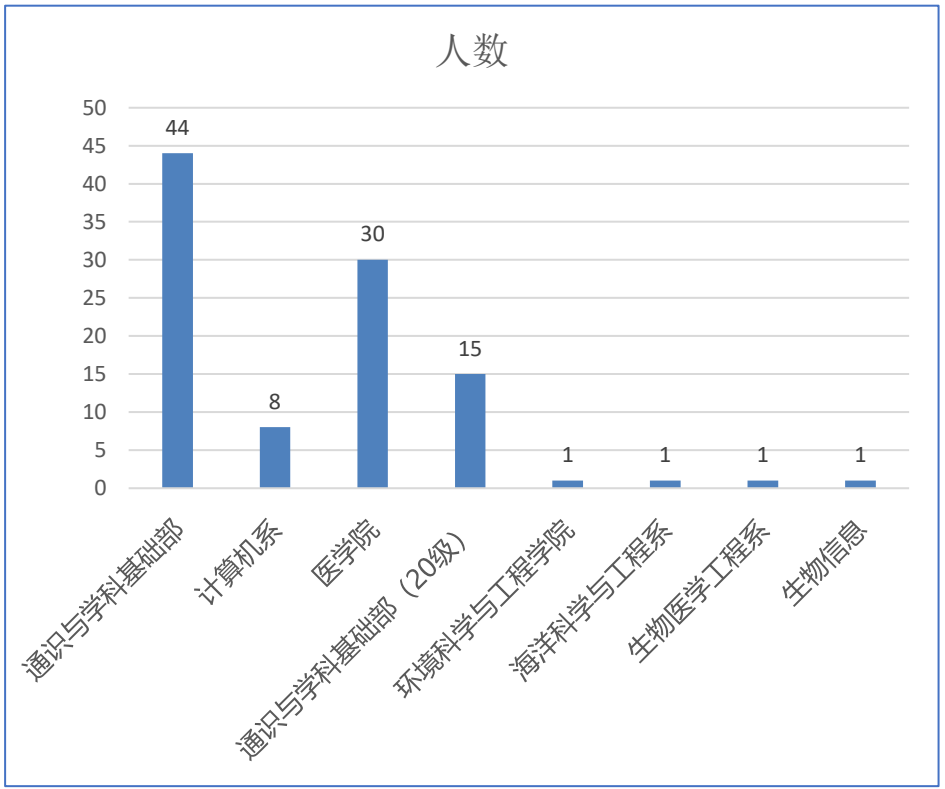
What CS 103 will cover?

- AI Concepts
- AI Algorithms
- AI Application

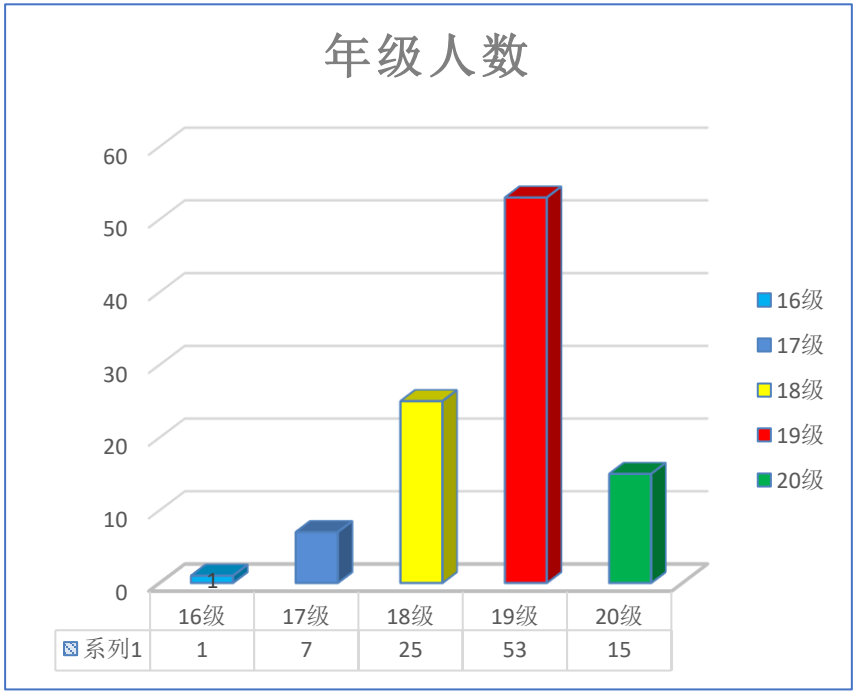


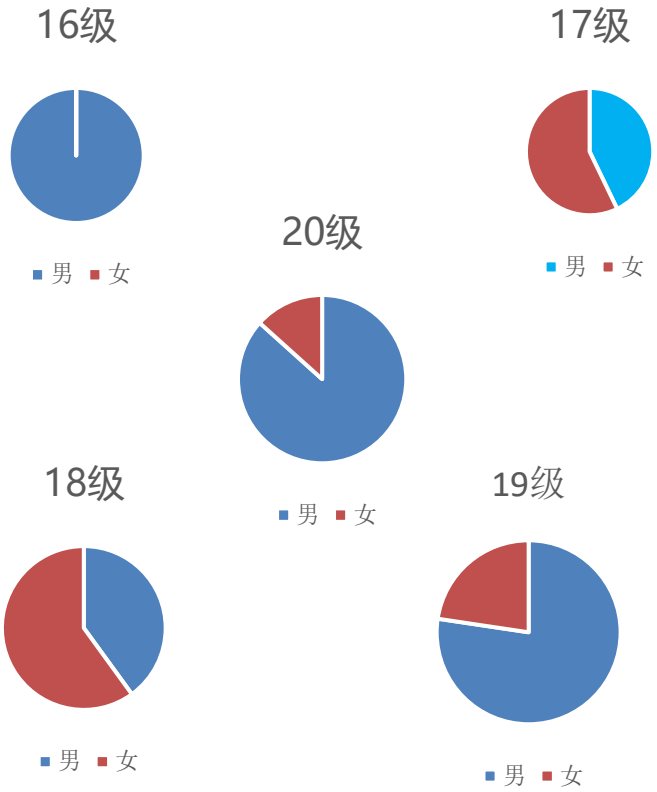


2020 CS 103 Student Distribution

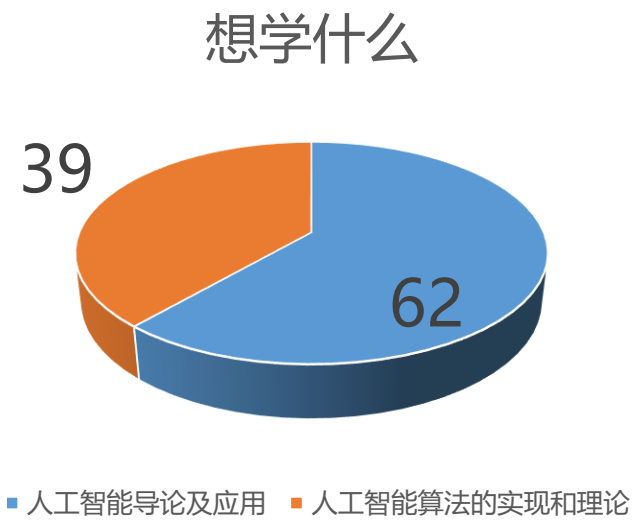


Year 2020 Student Seniority Distribution





Year 2020 Student Expectation Distribution



1. 希望学到AI的概念
2. 认识AI有一个较为全面的认识
3. 能够在未来有所帮助
4. 虚拟现实和全息投影
5. AI的历史发展和未来
6. 如何获得高分
7. 实践写代码
8. 博弈论
9. python
10. 自然语言处理
11. AI算法的案例
12. AI硬件
13. AI的python实现
14. AI的研究思路
15. AI产品如何诞生
16. AI代码实现
17. 就业前景
18. 需要的数学知识
19. 获得论文阅读能力
20. AI产品的安全性
21. AI伦理
22. 利用AI解决问题
23. 为什么要有AI
24. AI的局限性

- 医学院偏向人工智能应用和导论；
- 计算机系和打算进计算机系偏向算法原理和实现；
- 新生、未入系、其他院系学生总体保持中立。

CS 103 may NOT be suitable for ALL, Please Give Opportunities to Those Keen

Who should come and who should not come?

(your interest to AI = “Low”) OR
(your knowledge to AI = “Enough”) OR
(your expectation to CS 103 = “EASY”)

You do not need to attend this class

You are welcomed

CS 103 Module Introduction And Class Rules

1 Module Coverage

2 Study Methods and Reference

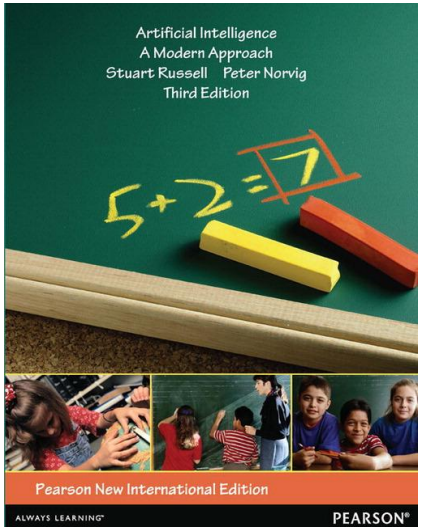
3 Study Objectives and Assessment

4 Lecturer AI Research Area

Study Methods and Reference

Active learning: It is about how much you think and learn

Collective study: Let us study together



CS 103 Course Reference Book

已附加文件: Artificial_Intelligence_-_A_Modern_Approach,_3rd_.pdf (19.91 MB)

Artificial Intelligence – A Modern Approach (AIMA) (Russell/Norvig)

This is a very comprehensive textbook in AI, the PDF version of the book is attached and and much information about the book can be found at:

Web site: http://aima.cs.berkeley.edu/

Enjoy reading

Study Methods and Reference- TAs

曾鸣

周心怡

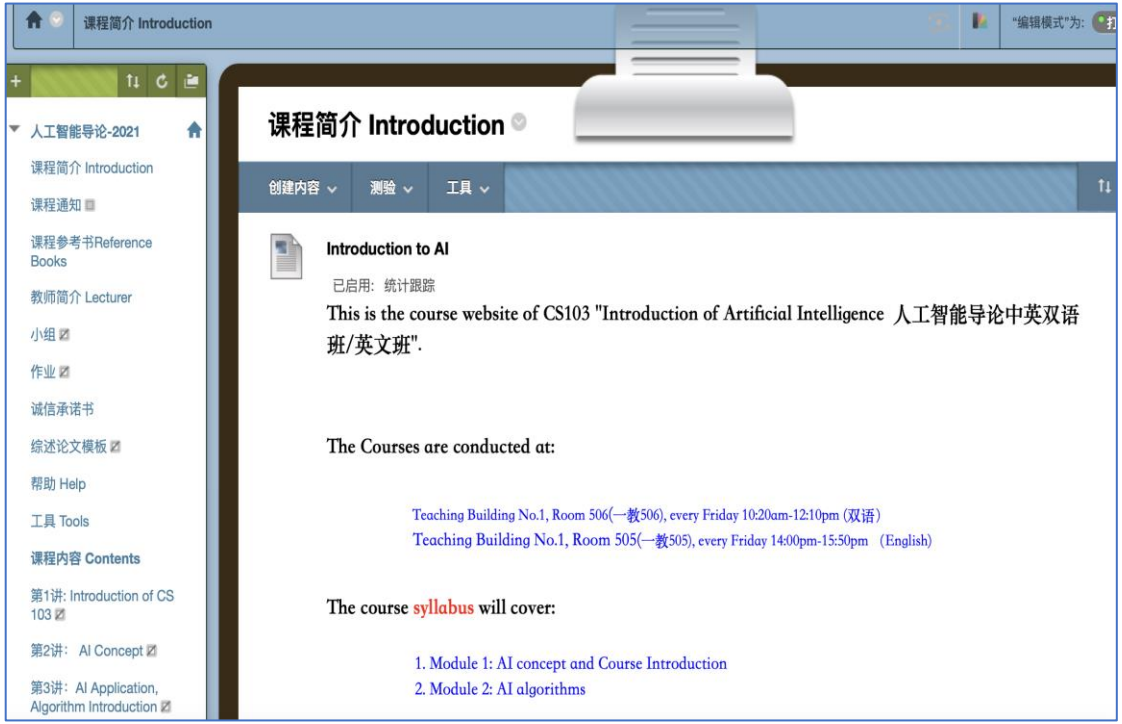
刘浩峰

杨冰

章晓庆

Study Methods and Reference - Blackboard

- Lecture slides and additional notes
- Course Notice
- Assessments, coursework and exam
- Textbooks, reading list
- Other resources
- ….
- Please look at the site every week



Study Methods and Reference - Syllabus

AI concept and Course Introduction

AI algorithms

AI Algorithms and Foundation

AI Machine Learning algorithm

AI Deep Learning Algorithms

AI applications & project presentation

Study Methods and Reference – Detail Syllabus

1

First Half Term: AI Concepts and Algorithms

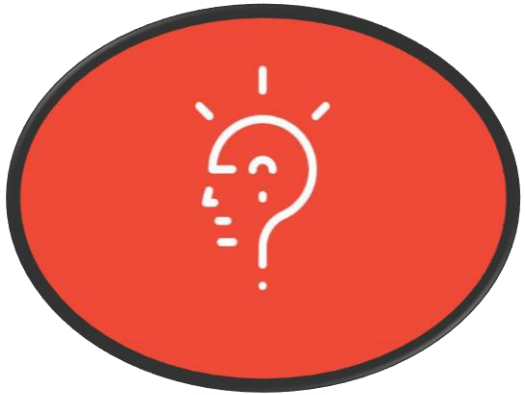
- 1. Introduction to AI and CS 103 Study Methods
- 2. AI Concepts and Course Group Projects
- 3. AI Algorithms and Application Introduction
- 4. AI Algorithm's Neurological Foundation
- 5. Perceptron Algorithm and Perceptron Learning Rule
- 6. Python and Machine Learning Framework Introduction
- 7. Group Project Update and Mid-Term Exam
- 8. ADALINE Algorithm

2

Second Half Term: Advanced AI algorithms and Applications

- 9. Back Propagation Algorithm
- 10. Sports Game Week
- 11. BP Learning Rule
- 12. SVM and Machine Learning Algorithm s
- 13. Machine Learning Algorithms
- 14. Student Project Presentation and Machine Learning Algorithms
- 15. Student Project Presentation, Knowledge Graph and Deep CNN Learning
- 16. Student Project Presentation, Deep Learning Multimedia Applications and Course Review

Question From You?



Q4: What do You Want to BE after Learning CS 103 ?

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CS103 人工智能导论21年
下午班

CS 103 Module Introduction And Class Rules

1 Module Coverage

2 Study Methods and Reference

3 Study Objectives and Assessment

4 Lecturer AI Research Area

Study Objectives and Assessment – Objective 1

Highlight fundamental AI concepts and importantly physiological and psychological foundations behind AI development.

Agent

Knowledge

Learning

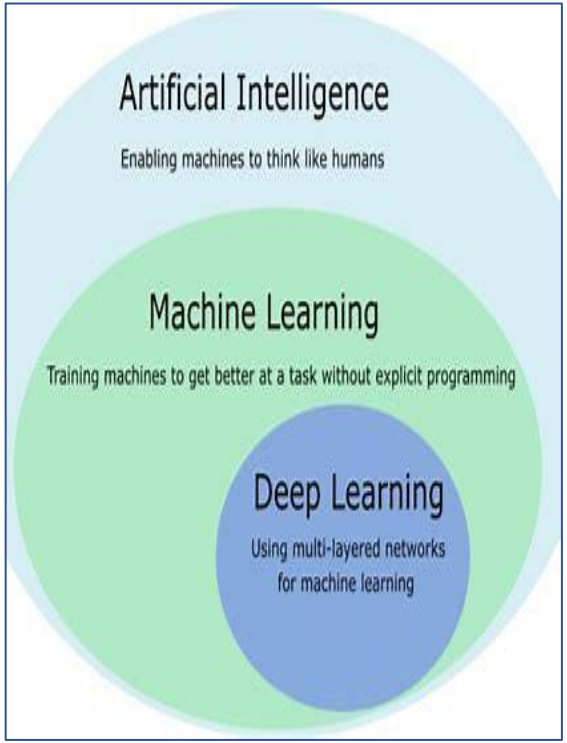
Neuron

Intelligence

Study Objectives and Assessment– Objective 2

Analyze Machine Learning Algorithms and the current data driven deep learning AI models, algorithms and platforms: including the development of deep neural network and various popular deep learning network structures and development platforms.

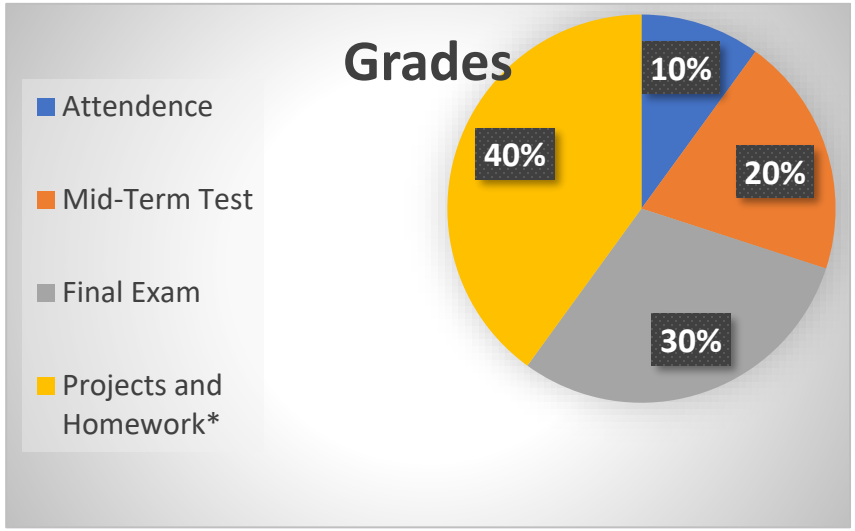
Algorithms

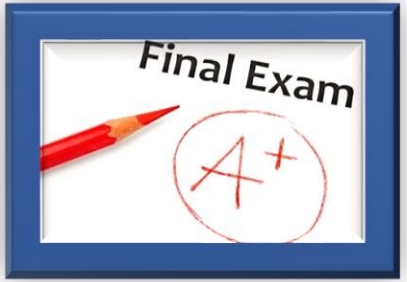


Study Objectives and Assessment– Objective 3

Inspire student's interest in AI: Encourage students to engage AI in their future careers and study, various AI applications will be introduced and discussed. Students are asked to work on AI application projects, group project presentation will be graded.

Study Objectives and Assessment





Extra Bonus up to 10% maybe given to students done excellent in the project or homework

* Late submission will not be accepted.

Study Objectives and Assessment –Attendance and Schedule

CS 103 Introduction to AI

Week 1-16 Friday

- Teaching Building No.1, Room 506(一教506), every Friday 10:20am-12:10pm (双语）
- Teaching Building No.1, Room 505(一教505), every Friday 14:00pm-15:50pm （English)

Study Objectives and Assessment - Project and Homework

- Project and Homework will be graded
- They should be submitted On Time, On Time , On Time

Study Objectives and Assessment –Plagiarism

1. No Plagiarism is allowed
2. If plagiarism on project is found for the first time:
   - the plagiaristic part is graded as 0 and
   - warning is given to the students
3. If plagiarism is found for the second time
   - the course is graded as 0

Study Objectives and Assessment – Plagiarism

4

For project report, any sentence that is copied from other paper or article should cite the original source as the reference, otherwise, the report is considered as plagiarism

5

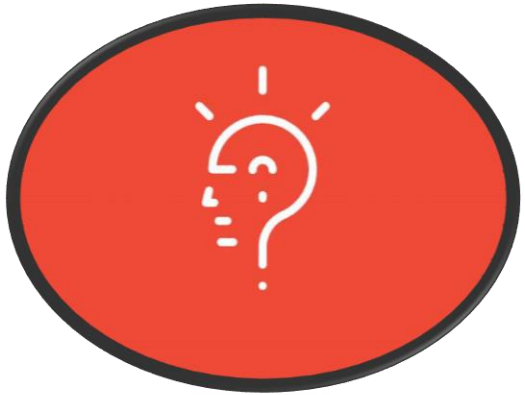
Please read the computer science department document on the Blackboard CS 103 Course Website, we adopt this rule in our class.

Rules on Plagiarism

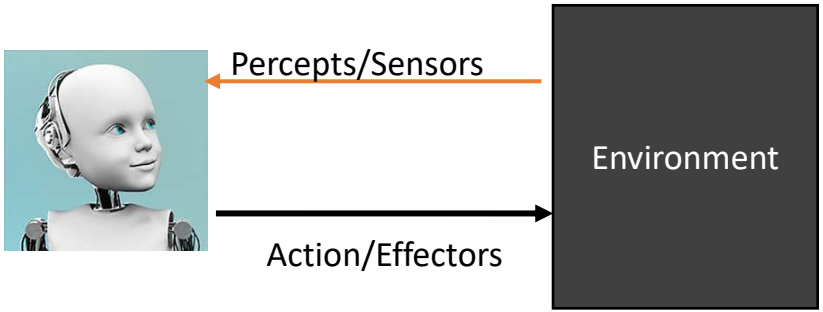
已附加文件: 计算机系本科生作业和学位论文抄袭认定标准及处理办法.docx (87.098 KB)

Please read the rule on plagarism of this course

Question From You?



Next Lecture : AI Concept



Homework 01 (PPT) – By Next Wednesday

1. What you like to learn from the class

2. Tell me about yourself and suggestion to my class to make it YOURS

南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

CnMed

CS 103 - 01

Introduction to AI

Jimmy Liu 刘江

2021-09-10