

Local Lecture 1(LL1): Introduction to Artificial Intelligence Part 1: Intelligence, AI, Embodiment, IS

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Outline of LL1

- Overview of the 2021 ShanghAI lectures
 - Short presentations
 - Concepts or Terminologies
 - Embodied Intelligence
- Arrangement of our course
 - Schedule of our course
 - Group exercises and projects
 - Score or credit
 - Registration and group working issues
 - Koans project
- **Replay**
 - recording of 2015 SHAI lecture GL1
 - Talk by Rolf_Pfeifer_at_TEDxZurich-2017

Short presentation (3min) of each site
concise and 'emotional' presentations focusing
on what you really think makes you different.

- Greetings
- Who/where/what
 - who we are
 - where we are located
 - what our main topics of research are

2021 ShanghAI lectures

A Brief presentation from Northwestern Polytechnical University

Xi'an site: NPU, Xi'an, Shaanxi, China

Local lecturer: Xiaoan (Dustin) LI

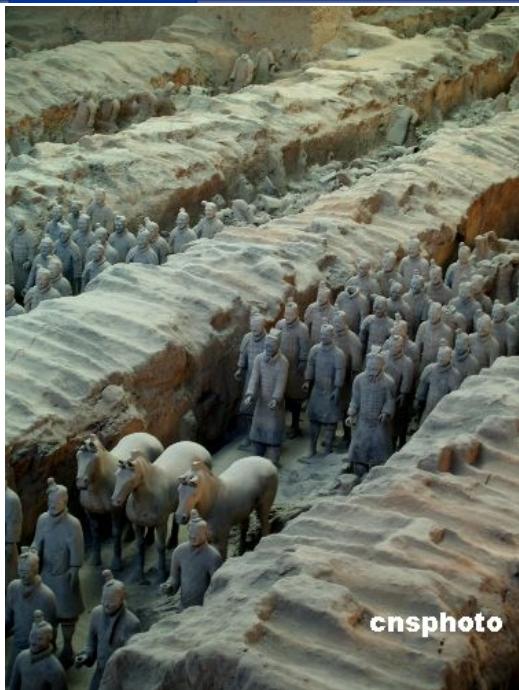
Home page: en.nwp.edu.cn



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Xi'an is **one of the origins of world civilization** with as long as more than 3000 years history and 13 dynasties set up their capitals here.

There are important sites and relics in this city. The Terracotta Horses and Warriors of the Qin Emperor is one of the eight wonders of the world. The Famen Temple, the City Wall, the Bell Tower, the Drum Tower and the Big Wild Goose Pagoda.

Xi'an is an attractive and popular city not only by its historical sites. It is also **a major center of industrial, manufacturing, and intellectual life of China**. It is the center of the greatest concentrations of higher learning institutions in China and has much to offer the students both academically and socially.

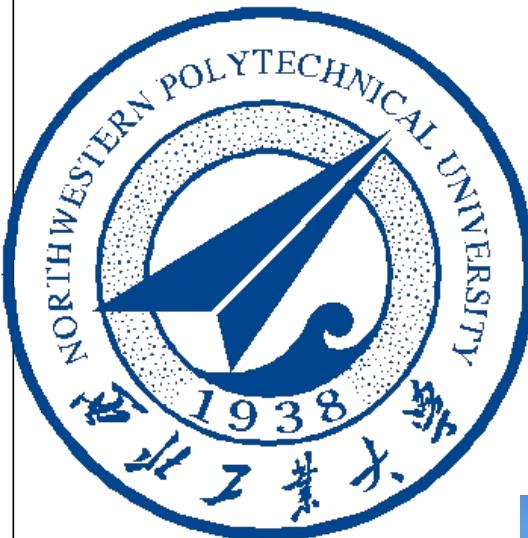


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**“Loyalty
Integrity
Courage
Perseverance”**

NPU was founded in 1938. NPU is a research-oriented, multi-disciplinary, international university of science and technology, and has strong capabilities and outstanding achievements in **aeronautics**, **astronautics** and **marine** technology, which makes it very unique and distinguished from other institutions. With special emphasis on science and technology, NPU also offers well developed programs in the humanities, economics, management and law.



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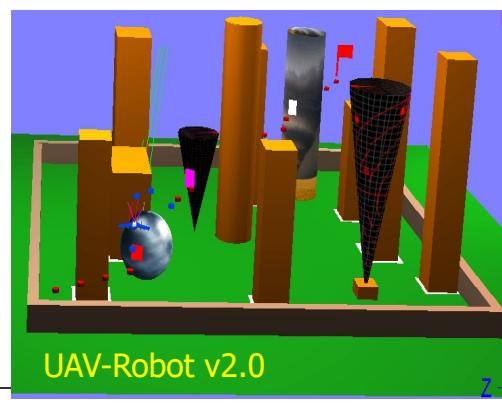


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- ❖ Multi-Agent Robot System
- ❖ Machine Learning
- ❖ Computational Intelligence
- ❖ Autonomous Developmental Robotics
- ❖ Real-time AI
- ❖ Embodied Intelligence
- ❖ Embodied Brain-Inspired Cognition



UAV-Robot v2.0



Fabio Bonsignorio
Prof, the BioRobotics Institute, SSSA
CEO and Founder Heron Robots
Santander - UC3M Chair of Excellence 2010



Research interests

- embodied intelligence, cognition/AI and robotics
- experimental methods in Robotics and AI
- Advanced approaches to Industry 4.0
- synthetic modeling of life and cognition
- novel technologically enabled approaches to higher education and lifelong learning



The ShanghAI Lectures
2013-2016





Thanks all!

Welcome to visit us via website
www.nwpu.edu.cn (in Chinese)
en.nwpu.edu.cn (in English)

Global Lecture 1: Artificial Intelligence: things can be seen differently

- 2021-10-28 15:00 to 17:00
- Artificial Intelligence: things can be seen differently.
- Relevant documents:
- Shane Legg, Marcus Hutter: A Collection of Definitions of Intelligence
- Lecturer: Rolf Pfeifer; Fabio P. Bonsignorio;
- Lecture Content:
 - **Introduction** by *Fabio Bonsignorio*
 - *Replay: Artificial Intelligence: things can be seen differently* by *Rolf Pfeifer*
- Site introductions and student challenges
- Tasks:

Arrangement of our IS International course

- Schedule
- How to study
- Score or credit
- Registration and group working issues
- Final Project
- Resources (past videos, ppts, PDFs; KOANS)

Content

- While in the **classical approach** “*intelligence*” was viewed essentially as information processing taking place in the brain, more recently the insight that the interaction with the environment is of central importance is gaining increasing acceptance. This has led to the metaphor of **embodiment**, i.e., that *intelligence is always a property of an entire organism*. This idea has far-reaching implications and often leads to surprising insights.
- The lecture series this year, consisting of **eight** videoconference sessions of roughly **1.5 hours** (including a short break) and the last session of about 2 hours, plus discussion sessions that take place in a virtual world, provides a systematic introduction to the **concept of embodiment** (“*Embodied Intelligence*”). The implications of an embodied view on intelligence are not only of a scientific nature but lead to a completely different way of how we view ourselves and the world around us. Examples and illustrations will be taken from humans, animals, and engineering (robotics in particular) and are intended to demonstrate that *things can always be seen differently from what we would normally expect*. **—a new view or way to learn and study AI(MI, IS)**
- Using the method of “**understanding by building**”, the lectures provide a set of design principles that on the one hand enable a better understanding of biological systems, and on the other hand provide **heuristics** for how to design artificial ones, in particular robots. The argument is based largely on the notions of **time scales**, **complex dynamical systems**, **self-organization**, and **emergence**.
- The theoretical ideas will be illustrated with many **examples and case studies** from academia and the private sector, and there will be hands-on exercises with computer simulations and real robots (depending on the respective university's participation mode).
- **Course for IS or AI**

Schedule

IS-2021

节次/周次	星期一	星期二	星期三	星期四	星期五	星期六	星期日
第一节							
第二节							
第三节		人工智能 (英) (U10M12018.01) (8-17, 长安校区 教学东楼B座教 东JB403)	GM, Rm. 234	人工智能 (英) (U10M12018.01) (8-17, 长安校区 教学东楼B座教 东JB403)			
第四节							
第五节 (中午)							
第六节 (中午)			EID (7- 16) Rm. 234				
第七节							
第八节							
第九节		智能系统(U10M11030.02) (8-17, 长安校区 教学东楼B座教 东JB408)	EID (7- 16) Rm. 234	智能系统(U10M11030.02) (8-17, 长安校区 教学东楼B座教 东JB408)			
第十节							
第十一节							
第十二节							
第十三节							

Syllabus IS International Course 2021

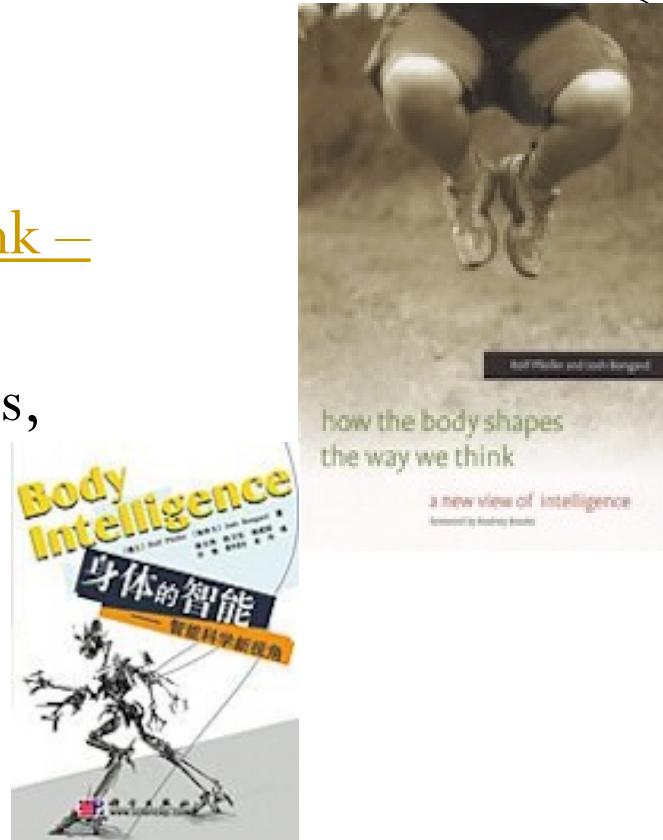
Date	Title	Comments
2021-10-19 W8	LL1: Introduction to Artificial Intelligence: Part 1	local site, NPU
2021-10-21 W8	LL2: An Introduction to AI or IS Part 2: TED Talk and GL1 by Rolf	local site, NPU
2021-10-26 W9	LL3: An Introduction to AI (3): Embodiment and EI	local site, NPU
2021-10-28 W9 15:30-17:00	Lecture 1: <i>Natural and Artificial Intelligence</i>	Global site
2021-11-02 W10 16:00-17:40	LL4: Artificial Intelligence: things can be seen differently +Site instructions & student challenges	local site, NPU
2021-11-04 W0	Lecture 2: Artificial Intelligence: things can be seen differently	Global site
2021-11-09 W11	LL3: Comments and discussions to Theory of Intelligent System	local site, NPU
2021-11-11 W11 16:00-17:40	Lecture 3: Intelligent Systems: Embodiment, Properties and Principles & 1 Guest lecture	Global site
2021-11-16 W12	LL4: Comments and discussions to Design principles I	local site, NPU
2021-11-18 W12 16:00-17:40	Lecture 4: Evolution: Cognition from Scratch & 1 Guest lecture	Global site

Syllabus IS International Course 2020(Cont.)

Date	Title	Comments
2021-11-23 W13	LL5: Comments and discussions to approaches for Intelligent Systems	local site, NPU
2021-11-25 W13 16:00-17:40	Lecture 5: Developmental Robotics & Guest lectures	Global site
2021-11-30 W14	LL6: Comments: Model based or Rule based?	local site, NPU
2021-12-02 W14	Lecture 6: Morphological Computation, Self-Organization of Behaviors and Adaptive Morphologies& 1 Guest lecture	Global site
2021-12-07 W15	LL7: Comments and discussions	local site, NPU
2021-12-09 W15	Lecture 7: Collective Intelligence: Cognition from Interaction & 1 Guest lecture	Global site
2021-12-14 W16 14:00-15:35	LL8: Comments and discussions: Machine Learning and Memory	local site, NPU
2021-12-16 W16	Lecture 8: Machine Learning and Deep Learning: an Embodied AI perspective & Guest lecture	Global site
2021-12-21 W17 14:00-15:00	LL10: Summary & Presentations for Projects	local site, NPU
2021-12-23 W17 16:00-17:35	Lecture 10: Future Trends: Grab Bag, Summary, Discussion	local site, NPU

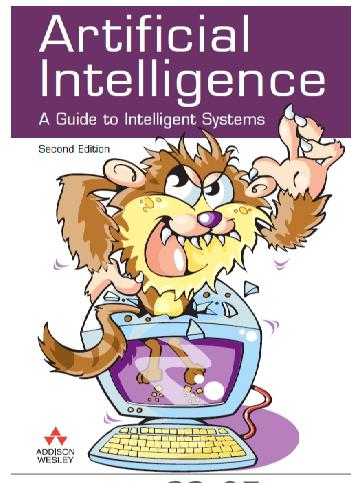
Textbook (mandatory)

- How the Body Shapes the Way We Think – A New View of Intelligence, by Rolf Pfeifer and Josh C. Bongard, MIT Press, November 2006, ISBN 0-262-16239
- Resources (past videos, ppts, PDFs)
 - <http://shanghailectures.org>
 - <http://axxt.nwpu.edu.cn>



Reference textbooks

- 《人工智能——智能系统指南》（英文版第3版），Artificial Intelligence: A Guide to Intelligent Systems, Third Edition, 原著作者：Michael Negnevitsky, 译者：陈薇等，机械工业出版社，2011年9月出版。



How to Study: local site

- Ways for study in classroom
 - **Questions provided for discussion**
 - **Reading and Preparing**
 - **Presentations and Discussion**
 - **Summary**
- Requirements
 - Reading textbook and review the recordings of GL
 - Each student need to give a 1-minutes presentation at least one time in classroom
 - Score or credit: based on presentations, exercises, project, and final exam

Discussions

- **GL1: replay recording 2015**

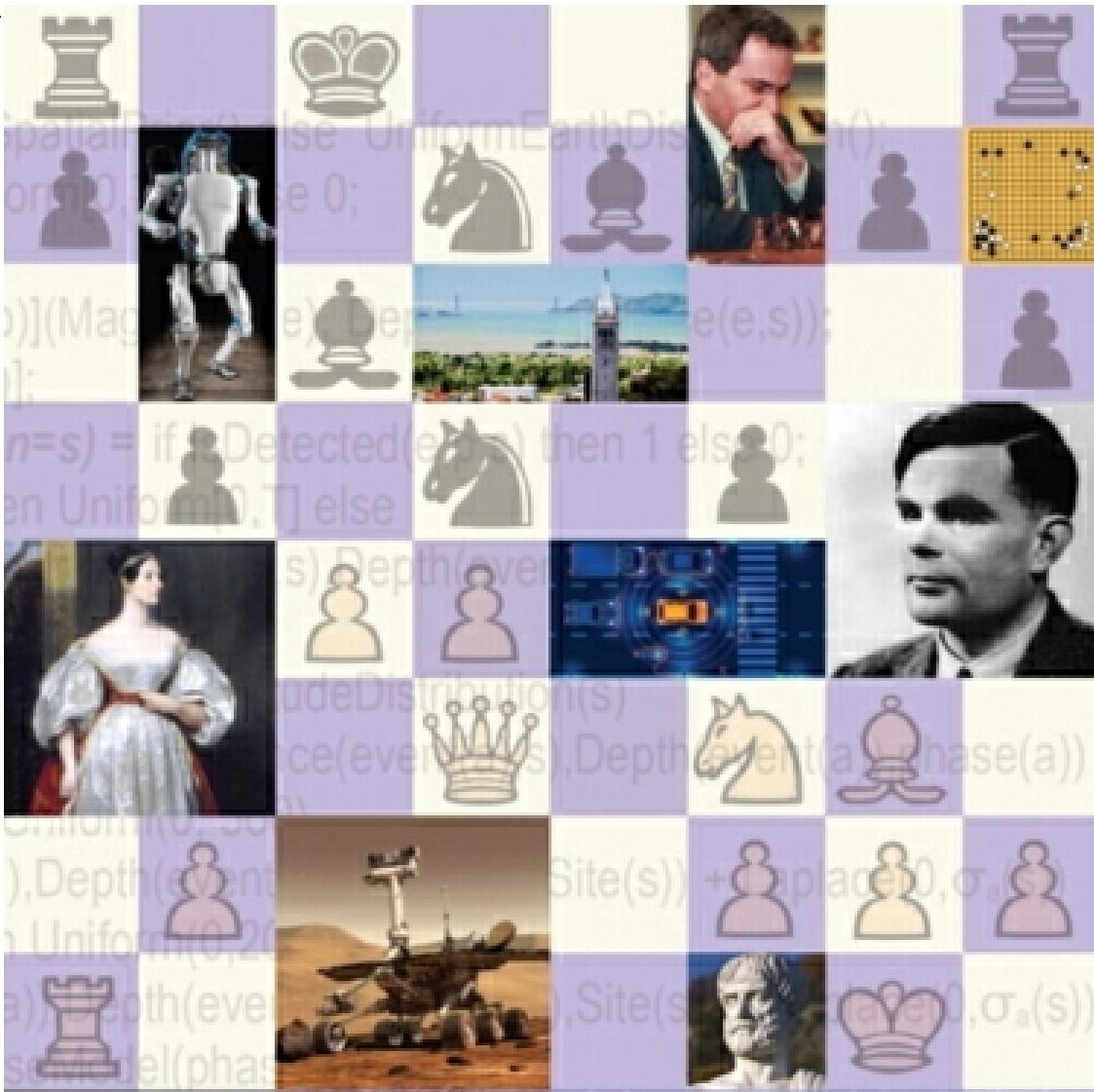
<http://axxt.nwpu.edu.cn/resource.html?cateid=180&stationID=3&resourceid=3945&ispirvate=false>

- Talk by Rolf Pfeifer at TEDxZurich-2017

- What have we learnt from chap 1 and chap 2?
- What are your questions and your comments?
- Discussions

AI & IS: overview

- What is AI?
- AI's Hall of Fame
- Discussions



Artificial Intelligence

A Modern Approach

Fourth Edition

Stuart
Russell
Peter
Norvig



- Deep Blue vs Garry Kasparov
- WATSON
- AlphaGO vs Lee Sedol
- Atlas
by Boston Dynamics
- Self-driving car
- Alan Turing

.....

AlphaGo
versus Lee
Sedol



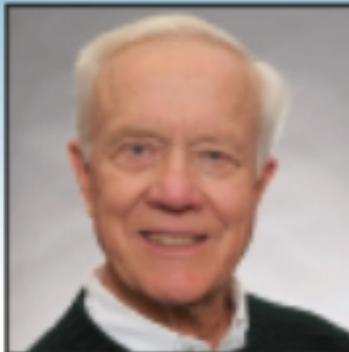
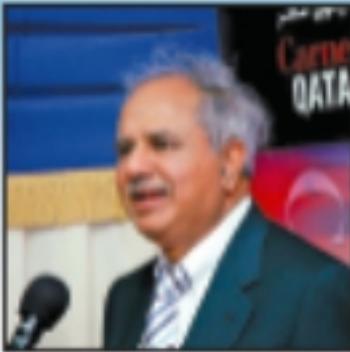
AlphaGo Zero

Master

AI vs BI



Waterfall: Natural vs Artificial



AI's Hall of Fame

Edward Albert Feigenbaum /



HALL OF FAME

Edward Feigenbaum

Edward Albert Feigenbaum is a professor emeritus of computer science at Stanford University and a cofounder of three start-up firms in applied AI: IntelliCorp, Teknowledge, and Design Power. Often called the “father of expert systems,” he founded the Knowledge Systems Laboratory at Stanford University, where the first expert system, DENDRAL, was developed. Feigenbaum completed his BS and a PhD at Carnegie Mellon University. In his 1959 PhD thesis, carried out under the supervision of Herbert Simon, he developed EPAM, one of the first computer models of how people learn. He helped establish Stanford’s SUMEX-AIM national computer facility for applications of AI to medicine and biology. He has been a member of the Board of Regents of the National Library of Medicine and was a member of the Board of Directors of Sperry Corporation. He was the second president of the American Association for Artificial Intelligence. Feigenbaum has received the ACM Turing Award and the Feigenbaum Medal of the World Congress on Expert Systems. From 1994 to 1997, he served as US Air Force Chief Scientist, and he won a US Air Force Exceptional Civilian Service Award. He is a member of the National Academy of Engineering and American Academy of Arts and Sciences.

Engineering Knowledge



HALL OF FAME

John McCarthy

John McCarthy is an American researcher in computer science and pioneer in the field of AI. Now a professor emeritus at Stanford University, he was previously a professor of computer science, the Charles M. Pigott Professor in the School of Engineering, and director of the Artificial Intelligence Laboratory at Stanford University. McCarthy has a BS in mathematics from the California Institute of Technology and a PhD in mathematics from Princeton University. McCarthy was responsible for coining the term *artificial intelligence* in his 1955 proposal for the 1956 Dartmouth Conference. He founded MIT's AI laboratory (with Marvin Minsky) in 1957 and Stanford's AI laboratory in 1963. In 1958, he proposed the *Lisp programming language*. He was also one of the first to propose and design time-sharing computer systems, and he pioneered *mathematical logic to prove the correctness of computer programs*. From 1978 to 1986, he developed the *circumscription method of nonmonotonic reasoning*. He has received the Turing Award for Computing Machinery, National Medal of Science in Mathematics and Computer Science, Benjamin Franklin Medal in Computer and Cognitive Science, the first Research Excellence Award of IJCAI, and the Kyoto Prize of the Inamori Foundation. He is also a member of the American Academy of Arts and Sciences, National Academy of Engineering, and National Academy of Sciences.

Logic and Common Sense

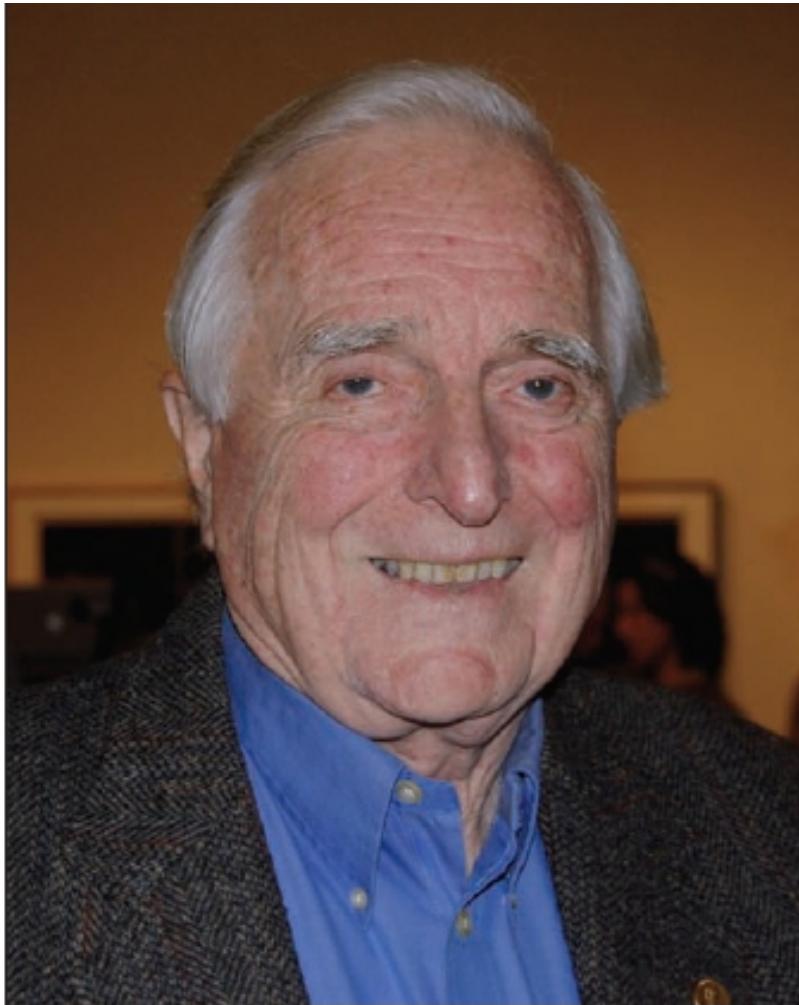


HALL OF FAME

Marvin Minsky

Marvin Minsky is a pioneer for his work in AI and cognitive science, which includes key forays into mathematics, computational linguistics, robotics, and optics. He is currently the Toshiba Professor of Media Arts and Sciences and a professor of electrical engineering and computer science at the Massachusetts Institute of Technology. After serving in the US Navy from 1944 to 1945, Minsky received a BA from Harvard University and a PhD from Princeton University, both in mathematics. In 1959, he and John McCarthy founded what is now known as the MIT Computer Science and Artificial Intelligence Laboratory. In the early 1970s at the MIT Artificial Intelligence Lab, Minsky and Seymour Papert started developing what came to be called the Society of Mind theory. In 1985, Minsky published *The Society of Mind*, a comprehensive book on the theory written for a general audience. In 2006, Minsky published *The Emotion Machine*, which proposes theories that could account for human higher-level feelings, goals, emotions, and conscious thoughts in terms of multiple levels of processes, some of which can reflect on the others. He has received the ACM Turing Award, Japan Prize, and Benjamin Franklin Medal. He is also a fellow of the American Academy of Arts and Sciences and a member of the National Academy of Engineering and National Academy of Sciences.

Cognitive Science and AI

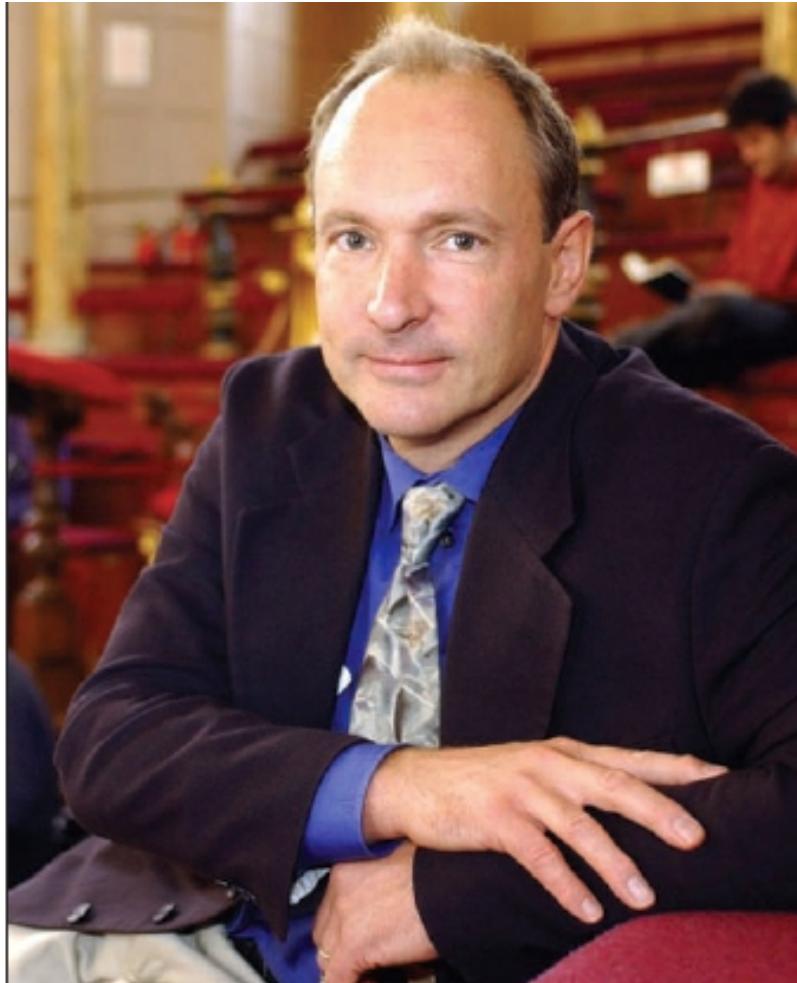


HALL OF FAME

Douglas Engelbart

Douglas Engelbart is an American inventor and early computer and Internet pioneer. He received a BS in electrical engineering from Oregon State University, after which he worked for the National Advisory Committee on Aeronautics (NACA) Ames Laboratory—the precursor to NASA. Subsequently, he earned a PhD in electrical engineering from the University of California, Berkeley. In 1963, Engelbart formed his own research lab at the Stanford Research Institute (SRI) that developed an elaborate hypermedia-groupware system called NLS (Online System). Pioneering firsts in human-computer interaction included a new point and click device (the mouse), natural language commands, and a GUI windowing environment. NLS also integrated word processing, hyper-email, computer-supported software engineering and meeting support, telecommuting, and a shared desktop; it also was first to demonstrate onscreen video teleconferencing. While developing NLS with ARPA funding, Engelbart was involved in the network ARPA was building and started the Network Information Center (NIC) to support the first distributed online community. In 1989, Engelbart founded the Bootstrap Institute to foster high-performance organizations. He has received the ACM Turing Award, Lemelson-MIT Prize, the Benjamin Franklin Medal, and the National Medal of Technology. He is also a fellow of the American Academy of Arts and Sciences and a member of the National Academy of Engineering.

AI and Interactive Computing



HALL OF FAME

Tim Berners-Lee

Tim Berners-Lee is the 3Com Founders Professor of Engineering in the School of Engineering with a joint appointment in the Department of Electrical Engineering and Computer Science at the Laboratory for Computer Science and Artificial Intelligence at the Massachusetts Institute of Technology, where he also heads the Decentralized Information Group (DIG). He is also a professor in the Electronics and Computer Science Department at the University of Southampton, UK, and the director of the World Wide Web Consortium (W3C). He is a founding director of the Web Science Trust (WST), which was launched in 2009 to promote research and education in Web Science, the multidisciplinary study of humanity connected by technology. He is also a director of the World Wide Web Foundation, launched in 2009 to fund and coordinate efforts to further the potential of the Web to benefit humanity. A graduate of Oxford University, Berners-Lee invented the World Wide Web at CERN, the European Particle Physics Laboratory, in 1989. He wrote the first Web client and server in 1990. His specifications of uniform resource identifiers (URIs), HTTP, and HTML were refined as Web technology spread. In 2009, Berners-Lee also advised the UK government's "Making Public Data Public" initiative. He is the author of *Weaving the Web*. He has received the Japan Prize. He is also a foreign associate of the National Academy of Science and the National Academy of Engineering and a member of American Academy of Arts and Sciences. In 2004 he was knighted by H.M. Queen Elizabeth, and in 2007, he was awarded the Order of Merit.

Collective Knowledge



HALL OF FAME

Lotfi Zadeh

Lotfi Zadeh is a mathematician, electrical engineer, computer scientist, professor of computer science, and the director of the Berkeley Initiative in Soft Computing (BISC) at the University of California, Berkeley. He received an MS in electrical engineering from the Massachusetts Institute of Technology and a PhD in electrical engineering from Columbia University. He published his seminal work on fuzzy sets in 1965, in which he detailed the mathematics of fuzzy set theory. In 1973, he proposed his theory of fuzzy logic. Zadeh is also credited, along with John R. Ragazzini, with having pioneered the development of the z-transform method in discrete time signal processing and analysis in 1952. These methods are now standard in digital signal processing, digital control, and other discrete-time systems used in industry and research. In 1991, Zadeh introduced the concept of soft computing, which highlights the emergence of computing methodologies in which the accent is on exploiting the tolerance for imprecision and uncertainty to achieve tractability, robustness, and low solution cost. He has received the Benjamin Franklin Medal, IEEE Richard W. Hamming Medal, ACM Allen Newell Award, and AIM Information Science Award. He is also a member of the National Academy of Engineering and a foreign member of the Russian Academy of Natural Sciences.

Fuzzy Logic and Computational Intelligence

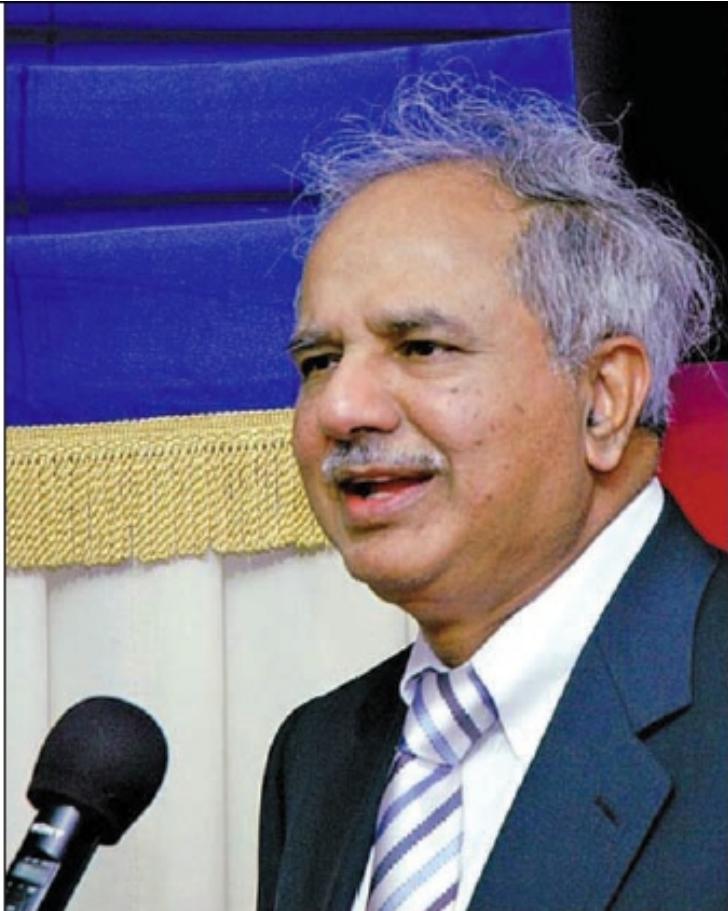


HALL OF FRAME

Noam Chomsky

Noam Chomsky is an American linguist, philosopher, cognitive scientist, and activist. After receiving a BA, MA, and PhD in linguistics from the University of Pennsylvania, Chomsky remained on the staff of the Massachusetts Institute of Technology for approximately 19 years. He is now an institute professor and professor emeritus of linguistics at MIT. He is well known in the academic and scientific community as one of the fathers of modern linguistics and a major figure of analytic philosophy. Chomsky developed a theory of transformational (sometimes called generative or transformational-generative) grammar that revolutionized the scientific study of language. He first set out his abstract analysis of language in his doctoral dissertation (1955) and his book *Syntactic Structures* (1957). His work on formal languages (as used in mathematics and logic) and on the acquisition and processing of language has greatly affected AI research as well as computerized language translation, evolutionary psychology, and even immunology. He has received the Kyoto Prize, Helmholtz Medal, Dorothy Eldridge Peacemaker Award, and Ben Franklin Medal in Computer and Cognitive Science. He is also a member of the American Academy of Arts and Sciences, National Academy of Sciences, and American Philosophical Society.

Computational Linguistics and Cognitive Science



HALL OF FAME

Raj Reddy

Raj Reddy is the Mozah Bint Nasser University Professor of Computer Science and Robotics in the School of Computer Science at Carnegie Mellon University. After receiving a BE from the Guindy Engineering College of the University of Madras, India, an MTech from the University of New South Wales, Australia, and a PhD in computer science from Stanford University, Reddy served on the faculties of Stanford University and Carnegie Mellon University for more than 40 years. He was the founding director of the Robotics Institute and the dean of the School of Computer Science at CMU. His AI research has concentrated on perceptual and motor aspects of intelligence such as speech, language, vision, and robotics. In speech, he and his colleagues developed large vocabulary connected speech recognition systems (including Hearsay and Harpy) as part of the DARPA speech understanding research program. Reddy served as the chief scientist of the Centre Mondial Informatique et Ressource Humaines and was awarded the Legion d'Honneur by French President Mitterrand in 1984. He has received the ACM Turing Award, Okawa Prize, Honda Prize, and Vannevar Bush Award. He is also a member of the National Academy of Engineering and American Academy of Arts and Sciences.

AI and Societal Impact

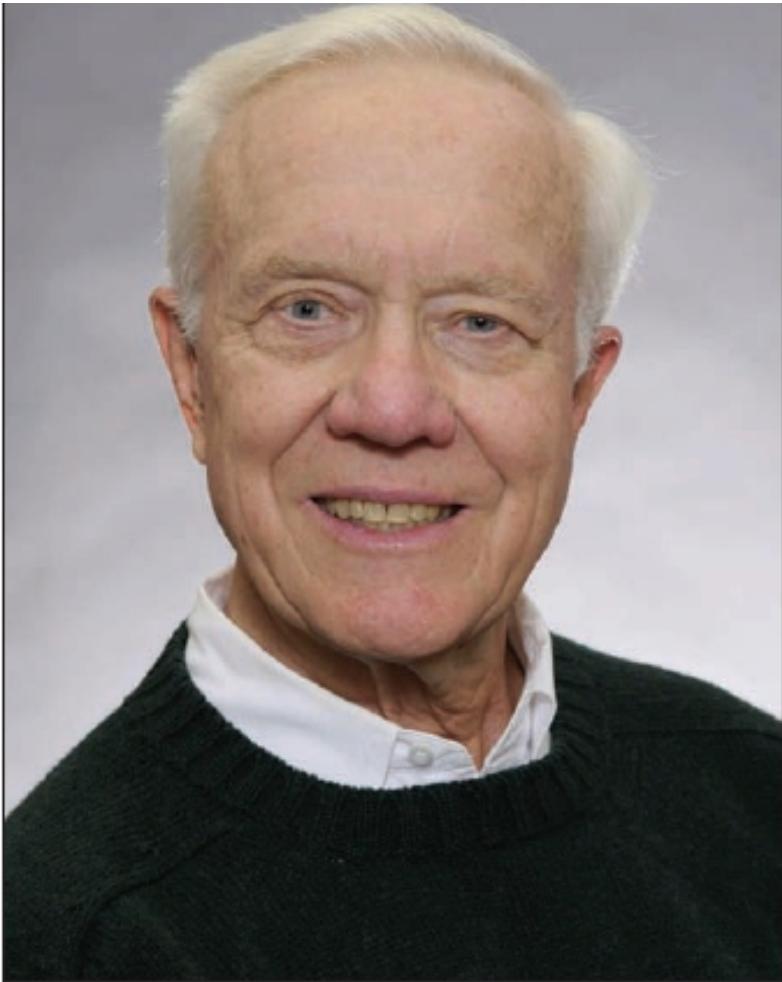


HALL OF FAME

Probability, Causality, and Intelligence

Judea Pearl

Judea Pearl is a computer scientist and philosopher, best known for introducing the probabilistic approach to AI and developing Bayesian networks as a tool of inference. He is also credited with developing a computational theory of causal and counterfactual reasoning applicable in several sciences. Pearl has a BS in electrical engineering from the Technion, Israel, an MS in physics from Rutgers University, and a PhD in electrical engineering from the Polytechnic Institute of Brooklyn. After graduation, he worked at RCA Research Laboratories on superconductive phenomena and on advanced memory systems at Electronic Memories. In 1970, he joined the University of California, Los Angeles, where he is currently a professor of computer science and statistics and the director of the Cognitive Systems Laboratory. Pearl was one of the first to mathematize causal modeling in the empirical sciences. His work is also intended as a high-level cognitive model and has contributed to knowledge representation, the philosophy of science, nonstandard logics, and machine learning. He received the ACM Allen Newell Award, IJCAI Award for Research Excellence in Artificial Intelligence, LSE Lakatos Prize in Philosophy of Science, Benjamin Franklin Medal in Computers and Cognitive Science, and David Rumelhart Prize in Cognitive Science. Pearl is a fellow of IEEE and a member of the National Academy of Engineering. He is also president of the Daniel Pearl Foundation (named after his son) and writes frequently on the Middle East peace process.



HALL OF FAME

Nils J. Nilsson

Nils J. Nilsson is the Kumagai Professor of Engineering (Emeritus) in the Department of Computer Science at Stanford University. He received a PhD in electrical engineering from Stanford University. Nilsson spent 23 years at the Artificial Intelligence Center of SRI International working on statistical and neural-network approaches to pattern recognition, coinventing the A* heuristic search algorithm and the Strips automatic planning system, directing work on the integrated mobile robot Shakey, and collaborating in the development of the Prospector expert system. He returned to Stanford in 1985 as the chairman of the Department of Computer Science, a position he held until August 1990. He has served on the editorial boards of the *Artificial Intelligence* journal and the *Journal of Artificial Intelligence Research* and was an area editor for the *Journal of the ACM*. He is a past-president of the American Association for Artificial Intelligence (AAAI) and a cofounder of Morgan Kaufmann Publishers. He received the IJCAI Research Excellence Award and IEEE Neural-Network Pioneer Award. He is also a foreign member of the Royal Swedish Academy of Engineering Sciences and a fellow of the AAAI and the American Association for the Advancement of Science.

Problem Solving and Planning



Geoffrey E. Hinton: an Engineering Fellow at Google where I manage Brain Team **Toronto**, which is a new part of the [Google Brain Team](#). We do basic research on ways to improve neural network learning techniques. I am also an Emeritus Professor at the University of Toronto. in 2016 23:05

Concepts or Terminologies:

-Some common questions

- Intelligence?
 - Intelligence Quotient -IQ
 - Emotion Quotient -EQ
- **Artificial intelligence?**
- Embodied Intelligence?
 - embodiment
- **Intelligent System?**
- Approaches or Methodologies?
 - the Classical Approach *vs* the Embodied approach?
 - Induction, Deduction, Abduction? –***One or All?***
- What are the prerequisites for a Theory of Intelligence?
- What are the Agent Design Principles?

Concepts or Terminologies:

- Intelligence?
 - **Cognition**
 - Consciousness
 - Awareness
 - Perception
 - Recognition
 - **Learning**
 - Inference
 - Reasoning
 - language
 -

Concepts or Terminologies:

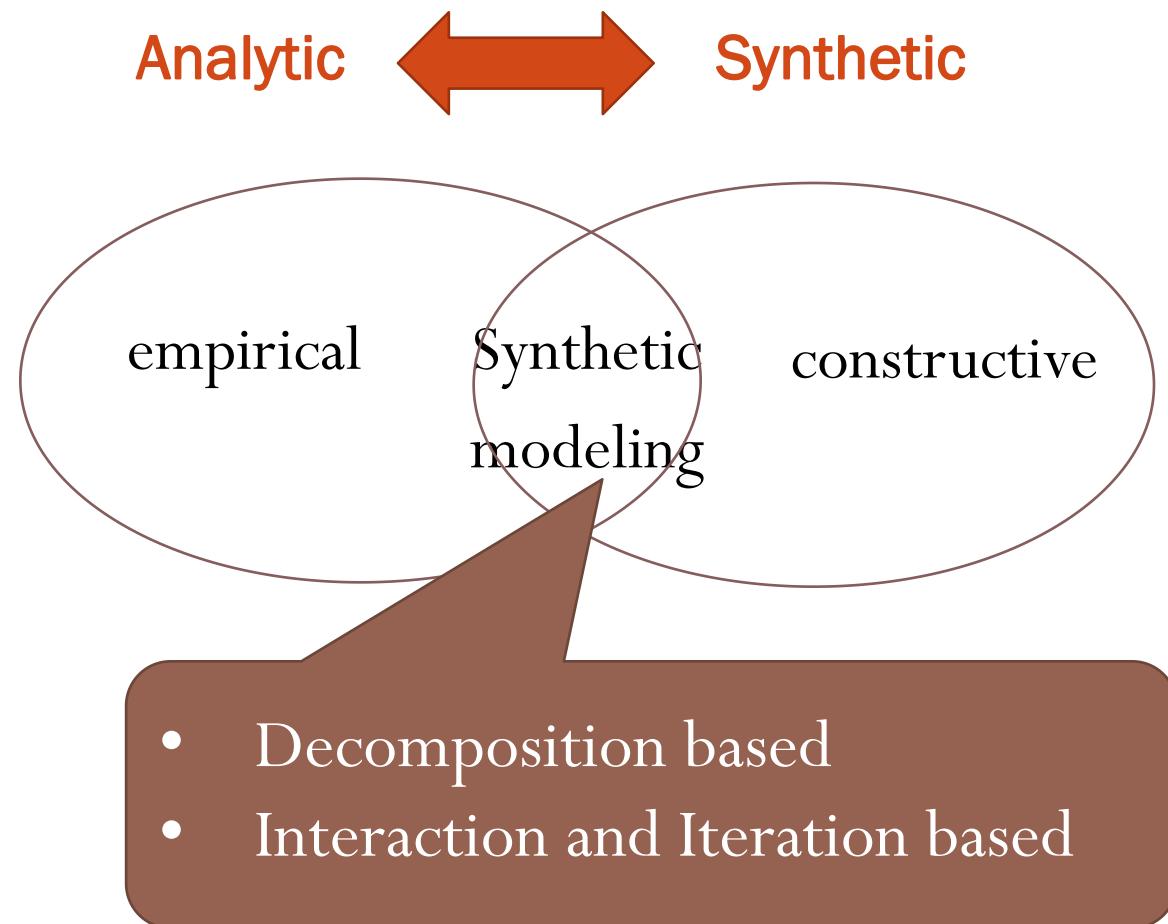
-Some common questions

- Intelligence?
- **Artificial intelligence?**
- Embodied Intelligence?
 - **Embodiment**
 - By embodiment, we mean that intelligence always requires a body
 - more precisely, we ascribe intelligence only to agents that are *embodied*, i.e., real physical systems whose behavior can be observed as they *interact* with the environment.
 - Software agents, and computer programs in general, are *disembodied*
 - **Intelligent System?**
 - Classical IS
 - Embodied IS
 - NGAI IS

How to make a decision for AI?*

- DEDUCTIVE, INDUCTIVE, AND ABDUCTIVE REASONING
- **Reasoning**
 - is the process of using existing ***knowledge*** to draw conclusions, make predictions, or construct explanations.
- **Deductive reasoning**
 - From general to specific, conclusion guaranteed
- **Inductive reasoning**
 - From specific to general, conclusion merely likely
- **Abductive reasoning**
 - typically begins with an incomplete set of observations and proceeds to the likeliest possible explanation for the set, incomplete decision-making

How to study Intelligence?



Summary

- Reading materials: Chap 1, Chap 2, additional materials
- Website for Global lecture <http://shanghailectures.org>
- Website for Local lecture <http://axxt.nwpu.edu.cn/>
 - 2012 人工智能上海授课 ShanghAIlectures
 - 2013 人工智能上海授课 ShanghAIlectures
 - 2014 人工智能上海授课 ShanghAIlectures
 - 2015 人工智能上海授课 ShanghAIlectures
 - 2016~2020
- Recording of 2014 Rolf's talk on TED
- QQ group for our course: IS-2021-Li

Assignment

- Reading materials:
 - Chap 1, Chap 2, additional materials
 - Review based on recording of GL1, Rolf's Talk on TED 2017
- Exercise
 - To be provided in QQ's group
- Presentation
 - We will have a 15 min Students' Corner for student presentations starting from the second lecture
 - volunteers for presenting “Chinese Room” thought experiment