

Artificial Intelligence

人工智能



内容提要



计算机英语教学PPT



■ Definition

Artificial intelligence is the field of computer science that seeks to build autonomous machines—machines that can carry out complex tasks without human intervention. **人工**
智能是计算机科学的一个领域，它寻求构建自主机器——无需人为干预就能完成复杂任务的机器。

■ Intelligent Agents 智能主体

An agent is a “device” that responds to stimuli from its environment. 主体是一种对其环境刺激作出反应的“设备”。

➤ 大多数主体都有从其环境接收数据的传感器（sensors）和能够影响其环境的执行器（actuators）。主体要具有智能行为，其执行器的动作必须是对接收自传感器的数据的合理反应：

- ✓ 反射作用（reflex action）：最简单的反应
- ✓ 需要决策的反应：基于环境知识，调整动作
- ✓ 目标导向的行为要求的反应：制定动作计划或从选项中作选择
- ✓ 改进的反应：学习能力
 - 扩展过程性知识（procedural knowledge）
 - 储存陈述性知识（declarative knowledge）

■ Research Methodologies 研究方法

- engineering track (工程路线) : 开发展现智能行为的系统, 采取面向性能的 (performance-oriented) 方法, 生产达到某些性能目标的产品
- theoretical track (理论路线) : 开发对动物、尤其是人类智能的计算理解, 采取面向模拟的 (simulation-oriented) 方法, 增进对智能的理解

■ The Turing Test 图灵测试

- Alan Turing (艾伦·图灵) 在1950年提出
- 不再被视为具有意义的衡量智能的方法, 原因之一是可以比较容易地生成一种怪异的智能表象
- 著名的例子: DOCTOR 程序, Joseph Weizenbaum (约瑟夫·魏岑鲍姆) 于20世纪60年代中期开发

语言点聚焦



计算机英语教学PPT



- Artificial intelligence is the field of computer science that seeks to build autonomous machines—machines that can carry out complex tasks without human intervention. 人工智能是计算机科学的一个领域，它寻求构建自主机器——无需人为干预就能完成复杂任务的机器。

autonomous: a. (独立) 自主的; 自治的

- an autonomous region 自治区
- A typical WSN consists of spatially distributed autonomous sensors to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion, or pollutants. (12C/II) 典型的无线传感器网络由空间分布的自主传感器组成，这些传感器合作监测物理或环境条件，如气温、声音、震动、压力、运动或污染物。

intervention: n. 干涉, 干预

- Ensuring that antivirus software is performing correctly may require periodic intervention from users. (10B/IV) 确保防病毒软件正确运行，可能需要用户定期干预。

- The field of artificial intelligence is quite large and merges with other subjects such as psychology, neurology, mathematics, linguistics, and electrical and mechanical engineering. 人工智能领域相当大, 结合了心理学、神经学、数学、语言学以及机电工程学等其他学科。

merge: v. 合并; 结合

- Object-oriented analysis and design attempt to merge the data and process concerns into singular constructs called objects. (4B/IV) 面向对象分析与设计试图将与数据和处理过程有关的事务融合到称为对象的单一结构中。
- The data and process columns are essentially merged into a single object column. (4B/IV) 数据和处理过程列基本上合并成一个对象列。

- Indeed, much of the research in artificial intelligence can be categorized in terms of an agent's behavior. 事实上, 人工智能的许多研究都可按主体的行为来分类。

- An agent is a “device” that responds to stimuli from its environment. 主体是一种对其环境刺激作出反应的“设备”。 stimuli 系名词 stimulus (刺激, 刺激物) 的复数形式。
- It is natural to envision an agent as an individual machine such as a robot 把一个主体想象为一个单独的机器 (如机器人) 是很自然的。
envision: v. 想象; 设想
 - The Internet cloud is envisioned as a massive cluster of servers. (9A/V) 因特网云被设想为一个大规模的服务器集群。
 - Most people do stop at this point, not envisioning that there is anything beyond. 大多数人在这一点上就停住了, 没再想在此之外还有其他什么。
- Most agents have sensors by which they receive data from their environments and actuators by which they can affect their environments. 大多数主体都有从其环境接收数据的传感器和能够影响其环境的执行器。

- Examples of sensors include microphones, cameras, range sensors, and air or soil sampling devices. Examples of actuators include wheels, legs, wings, grippers, and speech synthesizers. 传感器的示例包括麦克风、照相机、距离传感器以及空气或土壤采样设备。执行器的示例包括轮子、腿、翅膀、夹子以及语音合成器。
- The simplest response is a reflex action, which is merely a predetermined response to the input data. 最简单的反应是反射作用，这只是对输入数据的预定反应。
- we might empower an agent with knowledge of its environment and require that the agent adjust its actions accordingly. 我们可能会使主体具有环境知识，要求主体相应地调整其动作。
empower: v. 授权给；使能够
 - The college is empowered to grant degrees. (9A/V) 这所学院有权授予学位。
 - What I'm trying to do is to empower people, to give them ways to help them get well. 我想要做的是授人以渔，给予他们能助其过上好日子的方法。

- Another level of response is required if we want the agent to seek a goal such as winning a game of chess or maneuvering through a crowded passageway. 如果我们想要主体寻求一个目标，如赢一盘国际象棋或者机动通过一条拥挤的通道，那么就需要另一个级别的反应。
maneuver (v. 调动，机动，移动) 系美国英语拼写方式，英国英语的为 manoeuvre。
- Learning procedural knowledge usually involves a trial-and-error process 学习过程性知识通常涉及一个试错过程。
- Following this approach, agents have been developed that, over time, improve their abilities in competitive games such as checkers and chess. 遵循这种方法，开发了相应的主体，这些主体可随着时间的推移提高其在西洋跳棋和国际象棋等竞技游戏中的能力。 句中的 that 从句系 agents 的定语从句，因比较长，放在了谓语后面，以保持句子结构平衡，避免头重脚轻。

- Learning declarative knowledge usually takes the form of expanding or altering the “facts” in an agent’s store of knowledge. 学习陈述性知识采取的形式通常是扩充或更改主体知识库中的“事实”。
- That is, an agent must be able to extract information from the data produced by its sensors, or in other words, an agent must be able to perceive. 也就是说，主体必须能够从其传感器产生的数据里提取信息，或者换句话说，主体必须能够感知。

extract: v. 提取，抽取，析取

- automated tools for extracting useful information from the big data (6C/I) 从大数据中提取有用信息的自动化工具
- to extract actionable knowledge from large databases (6C/IV) 从大型数据库中提取可利用的知识

- ❑ Signals obtained from a gyroscope are easily encoded in forms compatible with calculations for determining responses. 从陀螺仪获得的信号很容易以与确定反应的计算兼容的形式进行编码。
- ❑ Likewise, agents must be able to formulate their responses in terms compatible with their actuators. 同样，主体必须能够以与其执行器兼容的词语确切表述其反应。
- ❑ develop new response patterns through a learning process whose goal is to maximize the agent's abilities 通过一个学习过程开发新的反应模式，该学习过程的目标是最大限度地提高主体的能力。
maximize: v. 使增加到最大限度
 - A window object has methods such as minimizing, maximizing, resizing, and so forth. (4B/IV) 窗口对象具有最小化、最大化、调整尺寸等方法。
 - A blended attack uses multiple methods of infection or transmission, to maximize the speed of contagion and the severity of the attack (10C/IX) 混合攻击使用多种感染或传输方法，最大限度地提高感染速度和攻击严重性。

- However, by isolating various types of rational behavior and pursuing them independently, researchers gain a toehold that can later be combined with progress in other areas to produce more intelligent agents. 通过分离出各种合理行为类型并单独地研究它们，研究人员可以获得一个立足点，这个立足点可以在以后与其他领域里取得的进步相结合，从而产生智能程度更高的主体。
- This dichotomy is clarified by considering the manner in which the two tracks are pursued. 通过考虑这两条路线的探索方式，可以阐明这种二分法。
- Linguists are interested in learning how humans process language and thus tend toward more theoretical pursuits. 语言学家的兴趣是了解人类如何处理语言，因而倾向于理论性探求。
pursue: v. 追求；追赶 → pursuit: n. 追求；追赶
 - the right of all people to the pursuit of liberty and happiness 所有人追求自由和幸福的权利
 - I'm always amazed at the things people do in pursuit of love. 我总是对人们追求爱情的所作所为感到惊奇。

- but often apply “shortcuts” that happen to work in the restricted environment of the particular system 但经常采取在特定系统的受限环境中恰好起作用的“捷径”。

- Should it carry the connotation of plagiarism? 它有剽窃的涵义吗?

connotation: n. 内涵意义, 隐含意义

- “Politician” has different connotations from “statesman”. “politician” (政客) 和 “statesman” (政治家) 具有不同的内涵意义。
- The word “professional” has connotations of skill and excellence. “professional” 这个词 隐含着技艺和优秀的意思。

- Thus the shell could perform its task just by matching its inputs to predetermined audio patterns. 因此, 外壳只要将其输入与预定的音频模式匹配即可完成其任务。

- The performance of such a system may be satisfactory to an engineer, but the way it is obtained would not be aesthetically pleasing to a theoretician. 这种系统的性能可能会令工程师满意, 但获得它的方式对于理论家来说却无审美上的愉悦。 实际上是说, 对于理论家
总有理论上的缺憾。

- Today the significance of the Turing test has faded although it remains an important part of the artificial intelligence folklore. 今天，图灵测试的意义已逐渐消失，但它仍是人工智能领域传说的一个重要部分。 folklore: n. 民间传说；民俗（学）。这里的言外之意是，Turing test 已没有什么现实价值，但谈到人工智能，特别是人工智能的历史发展时，人们还是常常提到 Turing test。斯人已隐退，江湖仍留名。
- Turing's proposal was to allow a human, whom we call the interrogator, to communicate with a test subject by means of a typewriter system without being told whether the test subject was a human or a machine. 图灵的提议是，让一个我们称为讯问者的人通过打字机系统与一个测试对象进行通信，但不告诉讯问者测试对象是人还是机器。
- Turing predicted that by the year 2000 machines would have a 30 percent chance of passing a five-minute Turing test—a conjecture that turned out to be surprisingly accurate. 图灵预测，到2000年，机器会有30%的机会通过一个5分钟的图灵测试——结果证明这测惊人地准确。 conjecture: n. 推测，猜想。



- an eerie appearance of intelligence can be produced with relative ease 可以比较容易地生成一种怪异的智能表象。
- This interactive program was designed to project the image of a Rogarian analyst conducting a psychological interview 这个交互程序旨在呈现一个进行心理访谈的罗杰斯式分析师的形象。 Rogarian analyst: 罗杰斯式分析师。来源于卡尔·罗杰斯 (1902-1987) , 美国心理学家, 首创以患者为中心的心理疗法。
- Internally, all that DOCTOR did was restructure the statements made by the patient according to some well-defined rules and direct them back to the patient. 在内部, DOCTOR 所做的一切就是根据一些明确定义的规则重新构造病人说出的语句, 然后回复给病人。
- To Weizenbaum's dismay, however, several psychologists proposed using the program for actual psychotherapy. 然而, 令魏岑鲍姆沮丧的是, 有几个心理学家建议将该程序用于实际的心理治疗。 与 to sb's dismay 类似的结构有 to sb's surprise/annoyance/delight (使/令...吃惊 / 恼火 / 高兴的是) 等等, 其中的介词 to 表示某人对某事或某情形的反应或感觉。

- The Rogerian thesis is that the patient, not the analyst, should lead the discussion during the therapeutic session and thus, they argued, a computer could possibly conduct a discussion as well as a therapist could. 罗杰斯的论点是，在治疗时段，应该是病人来引导讨论，而不是分析师；因此，他们认为计算机或许能够像治疗师那样开展讨论。

session: n. (从事某项活动的) 集会，一段时间；【计算机】会话，时域

- a training session 一堂训练课； a question-and-answer session 问答环节
- The course is made up of 12 two-hour sessions. 这门课总共上12次，每次两小时。

- DOCTOR projected the image of comprehension so strongly that many who “communicated” with it became subservient to the machine’s question-and-answer dialogue. DOCTOR呈现的理解形象特别强烈，许多与它“交流”的人都愿意顺从机器的问答式对话。

subservient: a. 屈从的；恭顺的；顺从的

- Your own needs must be subservient to those of the group. 你个人的需求必须服从集体的。

- The result was that ethical, as well as technical, issues were raised, and Weizenbaum became an advocate for maintaining human dignity in a world of advancing technology. 结果是，不仅技术问题而且伦理问题被提了出来，而魏岑鲍姆成为了一个提倡在不断进步的技术世界中维护人类尊严的人。
- carry on “intelligent” dialogs with a human victim in order to trick the human into dropping his or her malware guard 与受害人进行“智能”对话，以诱骗其放弃对恶意软件的警惕。
- Although these programs select moves merely by applying brute-force techniques, humans competing against the computer often experience the sensation that the machine possesses creativity and even a personality. 尽管这些程序只是通过应用蛮力技术来选择棋子的走法，但是与计算机竞赛的人类却经常产生一种感觉，该机器具有创造力，甚至具有个性。 brute force: 暴力，蛮力。在计算机领域，指 BF 算法，暴力算法，蛮力法。that 引导的从句为同位语从句，其本位语是 sensation。

- Similar sensations occur in robotics where machines have been built with physical attributes that project intelligent characteristics. 在机器人领域中也产生了类似的感觉，具有某些物理属性的机器已经制造出来，这些物理属性呈现出智能特征。 **robotics**: n. 机器人学；机器人技术。
- Examples include toy robot dogs that project adorable personalities merely by tilting their heads or lifting their ears in response to a sound. 例子包括玩具机器狗，它们听到声音会侧头或竖耳，仅仅靠这些动作就呈现出可爱的个性。

知识扩展



计算机英语翻译

七、定语从句的翻译

有人讲英语的限定性定语从句要译成汉语的前置定语，非限定性定语从句可作他译。实际上，汉译时是限定性的还是非限定性的不是十分重要，关键在于译文要符合汉语习惯。汉语的定语要前置，太长就会显得啰嗦而且句子结构会失衡。因此，英语中的定语从句如果太长，不管是限定性的还是非限定性的，都不宜译成汉语的定语，而要运用其他方法来处理。

(一) 译成前置定语

定语从句、特别是限定性定语从句如果不长，一般可译成前置定语。

□ 例句1

Memory chips are hardware that stores information and instructions. 存储芯片是存储信息和指令的硬件。

□ 例句2

Windows operating environments evolved into today's comprehensive operating systems, which do not require the DOS kernel. Windows 操作环境演变成了今天不再需要 DOS 内核的综合操作系统。

(二) 译成并列句

定语从句如果比较长、译成前置定语显得啰嗦，或者虽然不长但译成前置定语不合逻辑或汉语习惯，可拆译成汉语的并列句。

□ 例句1

The client issues a command to the server, which gets processed at the server and the results are sent back to the client machine. 客户机向服务器发出命令，该命令在服务器上得到处理，而处理的结果再返回给客户机。

这个句子本身就是由 and 连接的两个并列分句，定语从句是第一个分句的宾语 command 的定语。译文将定语从句译成了与两个分句并列的第三个分句。

□ 例句2

The resulting video files, compressed for transmission over a satellite phone, are sent to newsroom technicians, who decompress and then broadcast them—all in a matter of seconds. 由此产生的视频文件经压缩后通过卫星电话传送给新闻编辑室的技师，新闻编辑室的技师解压缩后即可播出这些视频文件——这一切不过是数秒钟的事。

译文将定语从句译作主句的并列句，并重复先行词，使其起到某种连接作用。

(三) 译成状语

有些定语从句实际上具有状语的作用，翻译时可根据具体情况译成表示原因、目的、结果、条件、让步、时间等的状语。

□ 例句1

However, its speed is more than adequate for most interactive applications, where the CPU is often idle, waiting for input or for data from other sources. 然而，其速度完全能够满足大多数交互式应用程序的需要。在这些应用程序的情况下，中央处理器经常空闲，等待着输入或来自其他来源的数据。

这句话的定语从句实际上起到原因状语的作用，对主句的判断进行解释说明。据此，我们也可以将定语从句译成原因状语从句：

然而，其速度完全能够满足大多数交互式应用程序的需要，因为在这些应用程序的情况下，中央处理器经常空闲，等待着输入或来自其他来源的数据。

□ 例句2

The proliferation of such systems is causing headaches for large organizations who find them costly to maintain and risky to evolve. 这种系统的激增使大型机构感到头痛，（因为）它们发现这些系统维护起来费用高，而改进起来又有风险。

可以说，这个句子中的定语从句起到了解释说明为何感到头痛的作用，因此，也可译成原因状语从句。

□ 例句3

Electronic computers, which have many advantages, can not carry out creative work and replace man.

电子计算机虽然有许多优点，但不能进行创造性工作，也代替不了人。

定语从句译成了让步状语。

(四) 用汉语“外位成分”的方式处理

□ 例句1

Data duplication is minimized as much as possible, which is an efficient storage strategy that eliminates data inconsistencies. 数据重复应尽可能减少, 这是消除数据不一致的有效存储策略。

□ 例句2

Examples include toy robot dogs that project adorable personalities merely by tilting their heads or lifting their ears in response to a sound. 例子包括玩具机器狗, 它们听到声音会侧头或竖耳, 仅仅靠这些动作就呈现出可爱的个性。

(五) 含定语从句的 there be 句型的译法

带有“there be + 主语 + 定语从句”结构的复合句，汉译时可将 there be 主句与定语从句融合在一起，译成“有 + 名词 + 做什么”。

□ 例句

In large development projects, there are often specialists known as test engineers who are responsible for testing the system as a whole—that is, for testing to make sure all the programs work together. 在大型开发项目中，常有称为测试工程师的专家负责测试整个系统，即负责确保所有程序能一起工作的测试。

(六) 定语从句翻译中的变通

翻译需要变通，不知变通或不敢变通，就会造成硬译死译，译文就会不自然、不通顺。定语从句的翻译也是这个道理。除了上面谈到的常见变通之外，我们在翻译的过程中还可视具体情况进行各种变通。

□ 例句1

The individual who authors an e-mail message does not own all rights related to it. 电子邮件的作者并不是所有与电子邮件相关的权利都拥有。

这个句子按照字面直译是：写电子邮件的个人并不是所有与电子邮件相关的权利都拥有。

译文经过变通，显然要比直译流畅，比直译意思清楚。特别是原句中的定语从句，在翻译过程中进行了很大的变通：定语从句的动宾结构变成了偏正结构，动词变名词，宾语变定语；定语从句在自身变通之后用作了句子主语，而原主句的主语 individual 则被省略。

□ 例句2

The name after the colon and double slash (encarta.msn.com) indicates the hostname, which is the name of a specific computer system connected to the Internet. 冒号和双斜线后面的名称 (encarta.msn.com) 表示主机名, 亦即连接到因特网上的具体计算机系统的名称。

定语从句译成同位语。

□ 例句3

E-commerce seems simple from the perspective of a shopper who connects to an online store, browses the electronic catalog, selects merchandise, and then pays for it. 从一个购物者的角度看, 电子商务似乎很简单: 连接到一个在线商店, 浏览电子商品目录, 选择商品, 然后付款。

在译文中, 定语从句与其先行词完全脱离, 改译成对“电子商务似乎很简单”的具体说明。