ENGLISH for SCIENCE AND TECHNOLOGY

Integrated Course

科技英语综合教程

主　编　朱　倩　朱　莎

副主编　叶玉萍　葛　兰

编　者　李　立　洪　婷　蒋春丽

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内 容 简 介

本教材定位为应用型本科院校非英语专业学生使用的教材，作为大学英语拓展类课程教材，目的在于使学生直接了解专业前沿知识和技术发展现状，培养学生以英语为工具获取相关专业所需信息的能力，提高学生阅读相关专业科技专刊和科技文选的能力，为高年级阶段阅读专业的英语文献打下良好的基础。

本书参考答案请在ftp://ftp.tup.tsinghua.edu.cn上下载。

Foreword 前　言

随着教育部提出的"高等学校教学质量和教学改革工程"理念进一步贯彻深入，高校将积极推进外语教学改革和教材建设，复合型人才的培养目标日益得到专家、学者和广大师生的认同。

本教材定位为应用型本科院校非英语专业学生使用的教材，作为大学英语拓展类课程教材，目的在于使学生直接了解专业前沿知识和技术发展现状，培养学生以英语为工具获取相关专业所需信息的能力，提高学生阅读相关专业科技专刊和科技文选的能力，为高年级阶段阅读专业的英语文献打下良好的基础。

本教材的特色在于贯彻和实施"以内容为依托"的教学理念，能力培养目标明确，选用具有趣味性、时代性、真实性以及与专业设置相符合的科技文章。练习设计丰富多彩，听、说、读、写、译等语言技能的训练围绕教学内容展开，体现了对语言综合技能的培养。针对各主题自身的特点，不同单元的教学内容采用由浅入深、促进理解的原则安排。

本教材共有八个单元，每单元围绕同一主题精选三篇话题相近、风格不同的文章。主题涵盖了科技领域的方方面面，包括人工智能、生态环境、虚拟现实、网络交流、机械制造与新能源、太空探索、无人技术、医学突破等。每单元均提供了一堂有效而成功的英语课所必备的教与学环节。课文前的 Lead-in 为学生提供了团队合作、思考与口语表达等学习体验的机会。词汇予以英文注释，培养英文思维习惯与能力。本教材针对同一主题精选的三篇文章分别设置不同的精读和泛读练习。Text A 和 Text B 以精读为主，设置基于内容的阅读理解、词汇练习和翻译练习，注重使学生掌握科技英语阅读、翻译技巧，扩充专业英语词汇量，培

养学生阅读科技英语文章的能力。Text C 为泛读文章，配合阅读判断题，注重提升学生阅读科技英语文章的速度和理解力。

本教材涵盖的科普内容广泛，教师可以根据所在学校的课程设置和学生的实际特点与实际需求有的放矢地选择和提炼教学内容，建议 32–48 学时的课堂教学安排。

本教材从资料收集、初稿编撰、课堂试用到完成编写历时一年多，由南京理工大学紫金学院人文学院外语系科技英语课程教学团队合作完成。第 1 单元由团队共同执笔；第 2 单元由朱莎执笔；第 3 单元由朱倩执笔；第 4 单元由葛兰执笔；第 5 单元由李立执笔；第 6 单元由蒋春丽执笔；第 7 单元由洪婷执笔；第 8 单元由叶玉萍执笔。其中，朱倩、朱莎负责统稿。同时，本教材还得到了人文学院刘智芳院长和戚佳鸣主任的指导。在此我们对所有关心、支持和参与本教材编写工作的人士表示衷心的感谢。

由于编者水平有限，在编写过程中专业知识方面的疏漏之处在所难免，敬请专家和读者及时告知，给予指正。

编者

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1

Artificial Intelligence

Lead-in

Over the coming decades, Artificial Intelligence (AI) will profoundly impact the way we live, work, and play. The question whether we regard them as conscious or unwitting, revere them as a new form of life or dismiss them as mere clever appliances, is by no means easy to answer. In this unit, Text A looks at this question in a comprehensive way, discussing both the threats and benefits of AI technology. Text B takes a more positive attitude towards the issue, welcoming the exponential growth of AI technology in hoping of guiding AI to address the poverty problems in the world. Text C expresses worries about the threat of AI employed in weapons, in the words of the title *The Weapon of Doomsday: AI*.

Artificial Intelligence: Friendly or Frightening?[1]

Tanya Lewis

It's a Saturday morning in June at the Royal Society in London. Computer scientists, public figures and reporters have gathered to witness or take part in a decades-old challenge. Some of the participants are flesh and blood; others are silicon and binary. Thirty human judges sit down at computer terminals, and begin chatting. The goal? To determine whether they're talking to a computer program or a real person.

The event, organized by the University of Reading, was a rendition of the so-called Turing test, developed 65 years ago by British mathematician and cryptographer Alan Turing as a way to assess whether a machine is capable of intelligent behavior indistinguishable from that of a human. The recently released film *The Imitation Game*, about Turing's efforts to crack the German Enigma code during World War II, is a reference to the scientist's own name for his test.

In the London competition, one computerized conversation program, or chatbot, with the personality of a 13-year-old Ukrainian boy named Eugene Goostman, rose above and beyond the other contestants. It fooled 33 percent of the judges into thinking it was a human being. At the time, contest organizers and the media hailed the performance as an historic achievement, saying the chatbot was the first machine to "pass" the Turing test.

When people think of artificial intelligence (AI)—the study of the design of intelligent systems and machines—talking computers like Eugene Goostman often come to mind. But most AI researchers are focused less on producing clever conversationalists and more on developing intelligent systems that make people's lives easier—from software that can recognize objects and animals, to digital assistants that cater to, and even anticipate their owners' needs and desires.

But several prominent thinkers, including the famed physicist Stephen Hawking and

billionaire entrepreneur Elon Musk, warn that the development of AI should be cause for concern.

Thinking machines

The notion of intelligent automata, as friend or foe, dates back to ancient times.

"The idea of intelligence existing in some form that's not human seems to have a deep hold in the human psyche," said Don Perlis, a computer scientist who studies artificial intelligence at the University of Maryland, College Park.

Reports of people worshipping mythological human likenesses and building humanoid automatons date back to the days of ancient Greece and Egypt, Perlis told Live Science. AI has also featured prominently in pop culture, from the sentient computer HAL 9000 in Stanley Kubrick's *2001: A Space Odyssey* to Arnold Schwarzenegger's robot character in *The Terminator* films.

Since the field of AI was officially founded in the mid-1950s, people have been predicting the rise of conscious machines, Perlis said. Inventor and futurist Ray Kurzweil, recently hired to be a director of engineering at Google, refers to a point in time known as "the singularity," when machine intelligence exceeds human intelligence. Based on the exponential growth of technology according to Moore's Law (which states that computing processing power doubles approximately every two years), Kurzweil has predicted the singularity will occur by 2045.

But cycles of hype and disappointment—the so-called "winters of AI"—have characterized the history of artificial intelligence, as grandiose predictions failed to come to fruition. The University of Reading Turing test is just the latest example: Many scientists dismissed the Eugene Goostman performance as a parlor trick; they said the chatbot had gamed the system by assuming the persona of a teenager who spoke English as a foreign language. (In fact, many researchers now believe that it's time to develop an updated Turing test.)

Nevertheless, a number of prominent science and technology experts have expressed worry that humanity is not doing enough to prepare for the rise of artificial general intelligence, if and when it does occur. Earlier this week, Hawking issued a dire warning about the threat of AI.

"The development of full artificial intelligence could spell the end of the human race," Hawking told the BBC, in response to a question about his new voice recognition system, which uses artificial intelligence to predict intended words. (Hawking has a form of the neurological disease amyotrophic lateral sclerosis, ALS or Lou Gehrig's disease, and

communicates using specialized speech software.)

And Hawking isn't alone. Musk told an audience at MIT that AI is humanity's "biggest existential threat." He also once tweeted, "We need to be super careful with AI. Potentially more dangerous than nukes."

In March, Musk, Facebook CEO Mark Zuckerberg and actor Ashton Kutcher jointly invested $40 million in the company Vicarious FPC, which aims to create a working artificial brain. At the time, Musk told CNBC that he'd like to "keep an eye on what's going on with artificial intelligence," adding, "I think there's potentially a dangerous outcome there."

But despite the fears of high-profile technology leaders, the rise of conscious machines—known as "strong AI" or "general artificial intelligence"—is likely a long way off, many researchers argue.

"I don't see any reason to think that as machines become more intelligent … which is not going to happen tomorrow—they would want to destroy us or do harm," said Charlie Ortiz, head of AI at the Burlington, Massachusetts-based software company Nuance Communications. "Lots of work needs to be done before computers are anywhere near that level," he said.

Machines with benefits

Artificial intelligence is a broad and active area of research, but it's no longer the sole province of academics; increasingly, companies are incorporating AI into their products. And there's one name that keeps cropping up in the field: Google. From smartphone assistants to driverless cars, the Bay Area-based tech giant is gearing up to be a major player in the future of artificial intelligence.

Google has been a pioneer in the use of machine learning—computer systems that can learn from data, as opposed to blindly following instructions. In particular, the company uses a set of machine-learning algorithms, collectively referred to as "deep learning," that allow a computer to do things such as recognize patterns from massive amounts of data.

For example, in June 2012, Google created a neural network of 16,000 computers that trained itself to recognize a cat by looking at millions of cat images from YouTube videos, *The New York Times* reported. (After all, what could be more uniquely human than watching cat videos?)

The project, called Google Brain, was led by Andrew Ng, an artificial intelligence researcher at Stanford University who is now the chief scientist for the Chinese search engine Baidu, which is sometimes referred to as "China's Google."

Today, deep learning is a part of many products at Google and at Baidu, including

speech recognition, Web search and advertising, Ng told Live Science in an email.

Current computers can already complete many tasks typically performed by humans. But possessing humanlike intelligence remains a long way off, Ng said. "I think we're still very far from the singularity. This isn't a subject that most AI researchers are working toward."

Gary Marcus, a cognitive psychologist at NYU who has written extensively about AI, agreed. "I don't think we're anywhere near human intelligence [for machines]," Marcus told Live Science. In terms of simulating human thinking, "we are still in the piecemeal era."

Instead, companies like Google focus on making technology more helpful and intuitive. And nowhere is this more evident than in the smartphone market.

Undoubtedly, AI could have many benefits, such as helping to aid the eradication of war, disease and poverty, the scientists wrote. Creating intelligent machines would be one of the biggest achievements in human history, they wrote, but it "might also be the last." Considering that the singularity may be the best or worst thing to happen to humanity, not enough research is being devoted to understanding its impacts, they said.

As the scientists wrote, "Whereas the short-term impact of AI depends on who controls it, the long-term impact depends on whether it can be controlled at all."

New Words

1. **silicon** *n.* a chemical substance that exists as a solid or as a powder and is used to make glass, bricks, and parts for computer 硅（一种化学元素，符号为 Si）

2. **binary** *n.* a system of counting, used in computers, in which only the numbers 0 and 1 are used （计算机运算系统）二进制

3. **terminal** *n.* a piece of computer equipment consisting of at least a keyboard and a screen, that you use for putting in or taking out information from a large computer （计算机的）终端；终端设备

4. **rendition** *n.* (usually singular) someone's performance of a play, piece of music, etc.（剧本、诗歌或音乐作品的）演出，表演，演绎

5. **cryptographer** *n.* decoder skilled in the analysis of codes and cryptograms 译解密码者；密码学家

6. **indistinguishable** *a.* not capable of being distinguished or differentiated 难以区别的

7. **crack** *v.* to find the answer to a problem or manage to understand something that is difficult to understand 解决（难题）；理解（费解之事）

8. **hail** *v.* to describe someone or something as being very good 把……称赞为，把……誉为

9. **automata** *n.* a plural of automaton 自动装置；机器人（automaton 的复数）

10. **foe** *n.* an enemy 敌人，仇敌

11. **psyche** *n.* someone's mind, or their deepest feelings, which control their attitudes and behavior 心灵；灵魂，精神

12. **mythological** *a.* of or relating to mythology or myths dealt with in mythology; lacking factual basis or historical validity 神话的；神话学的；虚构的

13. **humanoid** *a.* having a human shape and human qualities 具人的形状和特性的，类人的

14. **sentient** *a.* able to experience things through your senses 有感知力的，有知觉力的

15. **singularity** *n.* an extremely small point in space that contains an extremely large amount of material and which does not obey the usual laws of nature, for example a black hole or the point at the beginning of the universe technical 奇点（宇宙中含有大量物质的极小的点，不遵循自然规律，如黑洞或宇宙开端时的点）

16. **hype** *n.* attempts to make people think something is good or important by talking about it a lot on television, the radio, etc. (传媒的）大肆宣传，炒作（含贬义）

17. **grandiose** *a.* impressive because of unnecessary largeness or grandeur; used to show disapproval 浮夸的，不切实际的

18. **fruition** *n.* the successful result of a plan, a process or an activity （计划、项目等的）实现，完成

19. **parlor trick** 小把戏（非正式）

20. **persona** *n.* the way you behave when you are with other people or in a particular situation, which gives people a particular idea about your character （伪装的）外表，形象

21. **dire** *a.* extremely serious or terrible 极其严重的，极可怕的

22. **neurological** *a.* related to the nervous system 神经系统的，神经病学的

23. **nuke** *n.* a nuclear weapon 核武器

24. **high-profile** *a.* attracting a lot of public attention, usually deliberately （刻意地）引人注目的，高调的

25. **incorporate** *v.* to include something as part of a group, system, plan, etc. 把（某事物）并入；包含

26. **crop up** 突然发生或出现

27. **gear up** 为……做好准备

28. **algorithm** *n.* a set of instructions that are followed in a fixed order and used for solving a mathematical problem, making a computer program, etc. technical 演算法，

计算程序

29. **neural** *a.* relating to a nerve or the nervous system 神经的；神经系统的

30. **cognitive** *a.* related to the process of knowing, understanding, and learning something 认知的，认知过程的

31. **simulate** *v.* to make or produce something that is not real but has the appearance or feeling of being real 模拟，模仿

32. **piecemeal** *a.* done in a disorganized or fragmentary way; made or done in separate stages rather than being planned and done as a whole 零碎的，缺乏通盘计划的

33. **intuitive** *a.* spontaneously derived from or prompted by a natural tendency 直觉的

34. **eradication** *n.* the complete destruction of every trace of something 消灭，扑灭；根除

Notes

1. **Turing test** is a proposed test of a computer's ability to think, requiring that the covert substitution of the computer for one of the participants in a keyboard and screen dialogue should be undetectable by the remaining human participant. 图灵实验

2. **Eugene Goostman** is a chatterbot. Developed in Saint Petersburg in 2001 by a group of three programmers, Goostman is portrayed as a 13-year-old Ukrainian boy— characteristics that are intended to induce forgiveness in those with whom it interacts for its grammatical errors and lack of general knowledge. 尤金·古斯特曼（机器人聊天程序）

3. ***2001: A Space Odyssey*** is a science-fiction narrative, produced in 1968 as both a novel, written by Arthur C. Clarke, and a film, directed by Stanley Kubrick. It is a part of Clarke's Space Odyssey series. Both the novel and the film are partially based on Clarke's short story *The Sentinel*, written in 1948 as an entry in a BBC short story competition, and *Encounter in the Dawn*, published in 1953 in the magazine *Amazing Stories*. 科幻小说《2001 太空漫游》

4. ***The Terminator*** is a 1984 American science-fiction action film directed by James Cameron. It stars Arnold Schwarzenegger as the Terminator. 科幻电影《终结者》

5. **Exponential growth** occurs when the growth rate of the value of a mathematical function is proportional to the function's current value. Exponential decay occurs in the same way when the growth rate is negative. （经济）指数增长

6. **Moore's law** is the observation that the number of transistors in a dense integrated circuit doubles approximately every two years. The observation is named after Gordon Moore, the co-founder of Fairchild Semiconductor and Intel, whose 1965 paper

described a doubling every year in the number of components per integrated circuit, and projected this rate of growth would continue for at least another decade. 摩尔定律

7. **ALS** Amyotrophic lateral sclerosis, a form of motor neuron disease; also known as Lou Gehrig's disease. 肌萎缩性脊髓侧索硬化症

8. **CNBC** Consumer News and Business Channel is an American pay television business news channel that is owned by NBCUniversal News Group, a division of NBCUniversal, with both being ultimately owned by Comcast. Headquartered in Englewood Cliffs, New Jersey, the network primarily carries business day coverage of US and international financial markets; following the end of the business day and on non-trading days, CNBC primarily carries financial and business-themed documentaries and reality shows. 美国全国广播公司财经频道

9. **NYU** New York University is a private research university in the United States. 纽约大学

Exercises

I. Checking Your Comprehension

Directions: *Choose the best answer to each of the following questions and complete the sentence with the information given in the passage.*

1. Why have computer scientists, public figures and reporters gathered on Saturday morning in London?

    A. To attend a new-product launch event.

    B. To join in a years-old Turing test.

    C. To issue a cooperation agreement.

    D. To apply the new product into the commercial business.

2. Turing test is a way to _____.

    A. measure human being's intelligence

    B. crack the German Enigma code during World War II

    C. assess whether a machine can work without human's control

    D. evaluate whether a machine can show the indistinguishable intelligent behavior

3. In the London competition, what's the percentage of the judges being fooled into thinking the chatbot was a human being?

    A. 37%.　　　　B. 45%.　　　　C. 33%.　　　　D. 20%.

4. The word "hail" in Para.3 most probably means _____.

    A. complain　　B. acclaim　　　C. fear　　　D. criticize

5. Most AI researchers are focused on the following fields except _____.

   A. producing clever conversationalists

   B. developing systems that make people's lives easier

   C. digital assistant that can cater to their owners' needs

   D. software that can recognize objects and animals

6. What's Stephen Hawking and Elon Musk's attitude towards the development of AI?

   A. Indifferent.   B. Optimistic.   C. Ironic.   D. Concerned.

7. According to the passage, which of the following is NOT true?

   A. Many scientists argue that Eugene Goostman performance was a parlor trick.

   B. Both Hawking and Musk warned that the development of artificial intelligence is a dangerous threat.

   C. Many researchers believe that human beings will soon be confronted with the threat of the "strong AI."

   D. Artificial intelligence is increasingly being incorporated into many companies' products.

8. The scientists wrote that artificial intelligence "might also be the last" achievement in human history because _____.

   A. smartphone market would become a more helpful and intuitive technology

   B. enough research would be devoted to understanding impacts of singularity

   C. they feared that human beings would lose control over the long-term impact of AI

   D. scientists had achieved a lot in terms of simulating human thinking

9. The notion "singularity" pointed out by Ray Kurzweil refers to a time _____
   _____.

10. A set of machine-learning algorithms or "deep learning" adopted by Google company
    can _____.

II. Building Your Vocabulary

Section A

Directions: Select the best word and fill in the blanks with the appropriate form.

simulate	cognitive	intuitive	singularity
grandiose	eradication	terminal	high-profile
crack	indistinguishable	hail	incorporate
mythological	fruition	foe	psyche
rendition	dire	silicon	province

1. As children grow older, their _____ processes become sharper.

2. The scientist developed one model to _____ a full year of the globe's climate.

3. We answer this question instinctively and quite quickly because we have some _____ sense of the whole experience.

4. Teenage Matt Brown is being _____ a hero for saving a child from drowning.

5. The party vowed to _____ environmental considerations into all its policies.

6. The other narrative techniques Faulkner used to construct his stories include symbolism and _____ and biblical allusions.

7. His extravagant plan has never brought to _____.

8. Tony has now been thrust into the limelight, with a _____ job.

9. Replica weapons are _____ from the real thing.

10. It took them nearly two months to _____ the code.

11. But he soon discovers that his old _____ may be leading him into a trap.

12. "It probably shows up a deeply immature part of my _____," he confesses.

13. A chip is a piece of _____ about the size of a postage stamp.

14. Mother and I are especially fond of the Tchaikovsky Concerto, and your _____ of it was simply superb.

15. Carl sits at a computer _____ 40 hours a week.

Section B

Directions: Write down the words each abbreviation stands for.

eg. CEO—Chief Executive Officer

1. IC _____

2. IP _____

3. UN _____

4. EU _____

5. VR _____

6. USB _____

7. CAD _____

8. UFO _____

9. CPU _____

10. WHO _____

11. GDP _____

12. ISO _____

13. B2B _____