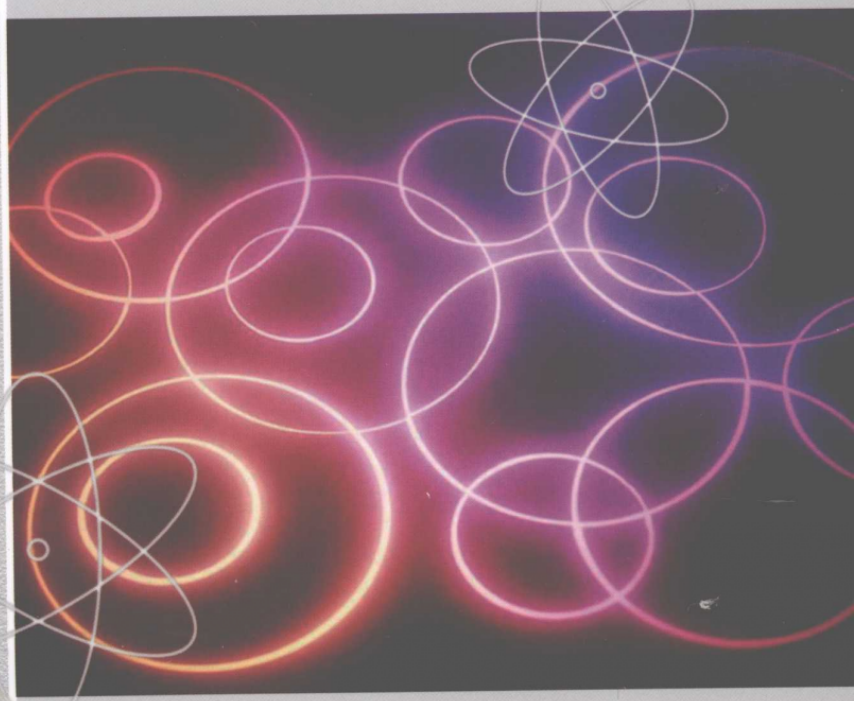
高等学校英语应用能力拓展教材

English

科技英语教程

English of Science and Technology

主编 田文杰



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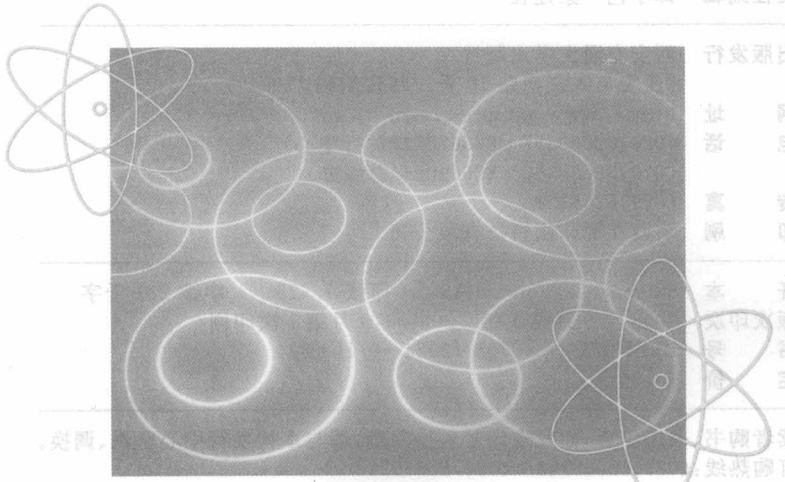

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前言

《科技英语教程》是大学英语基础阶段教学的后续课程，是大学英语教学的一个重要组成部分，体现了教育部有关“大学英语教学四年不断线”的基本精神。本教程是大学英语基础教学向真正的专业英语教学过渡的教材，其目的在于巩固并熟练应用在基础阶段所学的英语语言知识和阅读技能，拓宽语言知识面，扩大词汇量，同时认知和掌握科技英语的语言特点以及科技英语翻译中一些常见的技巧，使语言技能和科学知识共同提高，为今后阅读专业文献、获取科技信息打下良好的基础。

本教程的课文全部选自国内外的专业期刊、原版科技书籍和网站，材料涉及电子、通讯、网络、计算机、自动化、信息、和航天等领域，选材广泛，信息量大，内容新颖，具有强烈时代气息，体现了现代科技发展的成果和科技英语的特点，融知识性和实用性于一体。

本书由多年从事大学英语教学和科技英语教学一线的教师精心设计和编写。全书分为十个单元，每一单元由四部分组成。第一部分是导入，引出本单元的主题，并简要介绍两篇课文的主要内容；第二部分是Text A(精读课文)：包括课文正文、专业名词和术语、生词和短语、专业知识或语言点注解和练习；第三部分是Text B(泛读课文)：包括课文正文、生词和短语及练习；第四部分是科技英语翻译技巧：1~5单元是英译汉，6~10单元是汉译英，通过实例分析，介绍了科技英语翻译中的基本方法。

全书选材语言规范，篇幅适中，语言难度略高于大学英语四级阅读。每个单元A篇文章为精读材料，难度稍大，B篇文章

为泛读材料，相对容易。从第一单元到第十单元，文章的难度逐步加深，由浅入深，循序渐进，有利教学，也便于读者学习和理解。每一单元主题突出，栏目设置新颖。书的附录部分附有练习参考答案和课文的参考译文，有助于读者进行自学。

本书简明实用，既可供文科和理工科院校高年级本科生科技英语教学的使用，也可供科技工作者、理工类专业人员或具有中级英语水平以上的英语爱好者学习使用。

编　者

2008年8月

Contents

1 Artificial Intelligence

Lead-in

Artificial intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable. In this unit, the two passages present a general picture of AI research. Text A briefly introduces the definition of AI, some kinds of architectures of AI system, essential capabilities to AI programs

and so on. Text B explains a particular area of AI research— natural language processing including its definition and a legendary Turing's Test.

Text A

An Introduction to Artificial Intelligence

Samuel Hsiung

Computers can do many wonderful things. They can perform calculations millions or billions of times faster than human beings. Yet, is this all that computers can do? Just crunch numbers? Certainly present digital computers are capable of much more. ① In the past, computer scientists have created a great many programs that could perform tasks that people wouldn't have otherwise believed a computer could do. This is not limited to only playing chess, or proving theorems, but also programs that can hold a regular conversation with humans, understand stories and perform many other human-like tasks. Yet, there have also been very many legitimate questions whether or not the intelligence that these programs exhibit can be comparable to human intelligence. The problem lies with architecture, the way our programs are structured. Alan Turing, one of the fathers of AI, once created a theorem that stipulated that all computers can compute anything that is computable. If creating a human being via a digital computer was ever possible, we must first answer some philosophical questions

concerning whether emotion or consciousness is computable.

There were some scientists that questioned the capability of digital computers. Citing that the architecture of digital computers would be a terrible approach to emulating human intelligence, they strove to create artificial neurons. This was based on the architecture of our own biological brains. The idea of course, failed for the mean time, since very little was known about the subject. The digital computer proved to be the only sufficient medium to carry out artificial intelligence (AI).

There then came another question. People doubted whether or not symbolic AI programs, which encompassed just about every program in the 1950s, could exhibit true intelligence. Some examples of Symbolic AI programs are chess-playing programs, expert systems such as theorem provers, ELIZA, STUDENT etc. Just like any task-centered programs AI program is a symbolic AI program. These programs operate by manipulating symbols. The critics claimed that the architecture of these programs were not sufficient enough for intelligence. In essence, they have no "common sense" and can rarely perform tasks other than the tasks that were assigned to them. One of the early natural language programs could translate Russian to English, and vice versa. When it converted the English phrase "The spirit is willing but the flesh is weak" to Russian, then back to English, it came up with "The vodka is good but the meat is rotten". Of course, the machine translation technology that we have today has certainly improved, but many "common sense" mistakes like this are common. You may actually want to try this with the SYSTRAN translator. These critics of Symbolic AI systems were the connectionists. They in turn created the neural network architecture. Neural networks are able to draw links between meanings and thus exhibit some form of "common sense" in some situations. More generally they are based

on the architecture of neurons, synapses and dendrites in brains. As much as these systems have been hyped, they have not nearly been able to replace symbolic AI systems. On the other hand, they have been very useful for things such as image recognition.

Adaptability and learning has since been almost essential to many AI programs. ②This follows the goal that one day our machines will function completely free of their masters, able to learn and adapt freely from the environment that they live in. Humans and animals can adapt to their environments, so why not machines? For example, Sam Hsiung's program, IQATS is a program that asks questions and provides answers given an article or essay (for test-making purposes), it can learn to ask new questions and make new answers by memorizing the pattern of other questions and answers that could be asked (but is not already in its knowledge base). We cannot expect, for example, for a program to innately understand that a falling glass of water will break; neither can we expect to teach a program every single detail in this universe. The only plausible solution is for our machines to learn.

Whatever the approach, we are sure that although our programs may not exhibit exactly human-like intelligence, they are nevertheless intelligent. By simply looking at what our computers can accomplish today, there is no question in this fact. If our machines are getting smarter and smarter, will there once be a day that they'll take over the earth? Marvin Minsky, a greatly respected scientist believes so. According to Minsky, one day, our ③nanotechnology may even make us immortal. We'll be able to store our human brain's composition inside of artificial brains. Many other scientists share this view. Will there once be a day where our robots will become so evolved that our earth will be inhabited by nothing but robots. Or is it just a science fiction fantasy ?

From http:// www.generation5.com

Special Terms

symbolic AI:符号化人工智能
natural language programs :自然语言处理系统(机器翻译系统)
SYSTRAN:现在流行于网络的一个在线翻译系统
Neural network:神经网络系统
IQATS:Intelligent Question and Answer Test Summarizer 智能问答测试系统
nanotechnology 纳米技术

New Words and Expressions

crunch *v*.嘎扎嘎扎地咬嚼，压碎，*n*.咬碎，咬碎声，扎扎地踏
digital *adj*.数字的，数位的，手指的 *n*.数字，数字式
perform *vt*.履行，执行，表演，演出
theorem *n*.【数】定理，法则
legitimate *adj*.合法的，合理的，正统的
architecture *n*.建筑，建筑学
stipulate *v*.规定，保证
philosophical *adj*.哲学的
consciousness *n*.意识，知觉，自觉，觉悟
emulate *n*.仿效
strive *v*.努力，力争，斗争
biological *adj*.生物学的
medium *n*.媒体，方法，媒介 *adj*.中间的，中等的，
encompass *v*.包围，环绕，包含或包括
symbolic *adj*.象征的，符号的
neuron *n*.神经细胞，神经元
synapse *n*. 神经键 *vi*.形成突触
hype *n*.皮下注射，骗局，大肆宣传，大做广告，瘾君子
adaptability *n*.适应性
function *n*.官能，功能，作用，职责，典礼，【数】函数 *vi*.(器官等)活动，运行，行使职责
innately *adv*.天赋地，天生就有地
plausible *adj*.似是而非的

Notes

① In the past, computer scientists have created a great many programs that could perform tasks that people wouldn't have otherwise believed a computer could do

副词 otherwise 意思是“否则;要不然”,但是当它用在含有虚拟语气的句子中时往往可以代替一个被省略的条件从句。例如:

A surveyor's inspection of the building revealed faults that might otherwise have been overlooked. (= if there had not been an inspection.) 检查员检查大楼找出了一些毛病,要不然的话,这些毛病可能被忽略了。因此本句可翻译为:在过去的这段时间里,电脑科学家们发明了许许多多的电脑程序,使得电脑可以完成一些难以置信的任务(如果不是亲眼看到,人们不会相信电脑能够做到)

② This follows the goal that one day our machines will function completely free of their masters, able to learn and adapt freely from the environment that they live in.

代词“this”指带上句话,即人工智能程序应该具有应变能力和学习能力。因此本句可以翻译为:这一点符合我们的目标,即将来有一天我们的电脑能够摆脱主人,独立地工作,能够自己学习并自如地应对所处的环境。

③ nanotechnology: 纳米技术:它是指加工尺度达到纳米级的制造技术,其基本思想是在纳米尺寸范围内认识和改造自然,直接操纵单个原子、分子或原子团、分子团,精确地排布原子结构。纳米技术所研究的领域是人类过去很少涉及的非宏观、非微观的中间领域,开辟了人类认识世界的新层次。纳米及纳米技术已不仅仅是一个空间尺度概念,而且代表了一种新兴的产业。由纳米技术制造出纳米材料和纳米级的装置,具有广阔的应用前景。而且,采用纳米技术制成的纳米材料在物质特性方面会发生变化,从而具备普通材料所没有的优异性能。

Exercises

1. Comprehension questions

1. What is AI according to the text?
2. What is the author's attitude towards AI?
3. What are the two kinds of architectures of AI system? And which is the more popular one?
4. What does “to have no common sense” mean in this text?
5. What are the essential two capabilities to AI programs?
6. After reading the text, what's your opinion about the future of our life concerning the development of AI?

2. *Word-building*

Blending（拼缀法）：Blending is the formation of new words by combining parts of two words or a word plus a part of another word. Word formed in this way are called blends. For examples, motel (motor ＋hotel) 汽车旅馆，psywar (psychological＋ warfare) 心理战，humint (human＋ intelligence) 间谍情报

Write the blend of each group of words and give their Chinese equivalents.

1. communication satellite
2. parachute troops
3. breath analyze
4. lunar telecast
5. television diagnosis
6. communication intelligence
7. alphabetic numeric
8. teleprinter exchange

3. *Translation*

1. Computer scientists have created a great many programs that could perform tasks that people wouldn't have otherwise believed a computer could do.
2. If creating a human being via a digital computer was ever possible, we must first answer some philosophical questions concerning whether emotion or consciousness is computable.
3. Neural networks are able to draw links between meanings and thus exhibit some form of "common sense" in some situations.
4. We cannot expect, for example, for a program to innately understand that a falling glass of water will break; neither can we expect to teach a program every single detail in this universe.
5. Will there once be a day where our robots will become so evolved that our earth will be inhabited by nothing but robots. Or is it just a science fiction fantasy?

Text B

An Introduction to Natural Language Processing

Samuel Hsiung

A natural language is a language used in human culture such as Chinese, English or Bulgarian. They can be either spoken or written. So, what is Natural Language Processing?

What is Natural Language Processing?

NLP (Natural Language Processing) is a field in AI involving anything that processes natural language. Extensive research in NLP over the past decade has brought us one of the most useful applications of AI: machine translation. If we could one day created a program that could translate (for example) English text to Japanese and vice versa without need of polishing by a professional translator then bridges of communication could be significantly widened. Our current translation programs have not yet reached this level, but they may do so very soon. In particular, NLP research also deals with speech recognition. Currently, programs that convert spoken speech into text have been widely used and are fairly dependable. Another field of study in NLP are *story understanders*, as well as *chatterboxes*. During the 1960s Joseph Weizenbaum created ELIZA. ELIZA created a storm of public interest in AI, as it helped thousands overcome their personal problems. ELIZA was a psychiatrist, particularly one that posed analytical questions for every answer the user gave it. Though sometimes they may have seemed ambiguous, people actually felt ELIZA could take care of their needs just as well as any other therapist. The following is a transcript of ELIZA chatting with another program PARRY:

Parry: I don't understand your motives.
Eliza: Why don't you understand my motives?
Parry: Shouldn't I be?
Eliza: What did you say just now?
Parry: That's just the way it is.
Eliza: Suppose that's just the way it were not.
Parry: So?
Eliza: I am not sure I understand you fully.
Parry: You harp on the same questions too much.
Eliza: What does this similarity suggest to you?
Parry: I don't get you.
Eliza: Do you wish that you did get I?
Parry: It's about time you showed some interest in my feelings.
Eliza: Oh? I showed some interest in your feelings?

When people had started calling ELIZA intelligent, Joseph Weizenbaum went into an uproar. Technically, ELIZA was actually unable to understand people's personal problems to the depth of any other human being. ELIZA could only manipulate syntax (grammar), and check for some key words. Certainly, if someone had no knowledge of ELIZA being a program, one could easily conclude that it behaved like a human conversing, although it never really necessary understood everything to the detail that humans do.

Many researchers realized this limitation, and as a result conceptual dependency (CD) theory was created. CR systems such as SAM (Script Applier Mechanism) are story understanders. When SAM is given a story, and later asked questions about it, it will answer many of those questions accurately. (Thus showing that it "understands") It can even infer. It accomplishes this through use of scripts. The scripts designate a sequence of actions that are to be performed in chronological fashion for a certain situation. A