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# 科技英语

## English for Science and Technology

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Nucleus

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# 内 容 提 要

本书为新核心大学英语系列教材之一。以科技为主题,内容涉及船舶海洋、医学、军事科技、考古和服装纺织等领域,共分 10 个单元,每单元两篇课文,并设相应练习。本书是大学英语基础阶段教学的后续课程,通过本课程的学习,可为学生阅读专业文献、获取科技信息打下良好的基础。

# 前　　言

　　科技英语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。《科技英语》从不同的侧面反映了当今科技发展的现状和趋势,同时展现了科技英语自身的语言特点。其目的在于使学生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,认知和掌握科技英语的语言特点,为今后阅读专业文献、获取科技信息打下良好的基础。

　　本教材由从事大学英语教学和科技英语教学一线的教师精心设计编写。教材的课文选自原版科技书籍及相关网站,内容涉及船舶海洋、医学、军事科技、考古和服装纺织等领域。选材广泛,融知识性和实用性于一体,体现了现代科技发展的成果和科技英语的特点。

　　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。第二部分是 Main Reading,包括课文正文、生词、注解和练习。练习形式多样:包括阅读理解、简答、选词填空等。练习题中专业术语的英译汉、汉译英主要考核本课应掌握的主要专业词汇及专业术语。第三部分是 Related Reading,包括课文正文、术语、生词及练习。第四部分是 Further Reading,此部分为学生提供相关网

站,学生可在学习本单元专业知识的基础上,开阔视野,是学生直接了解世界范围内相关专业前沿知识和技术发展的必要途径。

本教材在编写过程中,得到复旦大学蔡基刚教授的全程指导,同时上海交通大学出版社编辑也给予了无私的帮助。在此我们对所有关心、支持本教材编写工作的人士表示衷心的感谢。本书编写中参考和引用了有关文章及文字资料,文中未能一一注明,在此笔者对原始文献的作者们表示衷心感谢。

由于编写时间较为仓促,加之水平有限,如有遗漏或不妥之处,敬请同行专家及广大读者提出宝贵意见。

编 者

# Contents

# Unit 1

# Smart Home, Creative Life

Task: Surfing and Reporting
1. What is a smart home?
2. How can people benefit from a smart home?

## Main Reading

## An Intelligent Sweet Home for Assisting the Elderly and the Handicapped

① In the society, each constituent would live his/her life with the blessed feeling of equality. In particular, it would be a society where the aged and elderly and even the disabled would live well independently and comfortably along with the ordinary normal people. Various types of high-tech equipment and systems may provide a good alternative for independent living of such people.

② The intelligent house for physically **impaired** people integrates devices for movement assistance of the resident and devices for continuously monitoring of his/her health status. Such solution will have strong positive emotional impact on the patients, improving their quality of life, giving them privacy and feeling that he/she lives in an ordinary

house, not in a hospital. The same approach will reduce significantly the medical care costs per person.

The importance of "smart houses" for the elderly and the disabled has been well understood. In several European countries, a number of demonstration smart houses for testing different strategies of the elderly and the disabled were developed, such as Smart House project (developed at Social Housing SPRU-University of Sussex, U. K. ), the Smart Home project (at Brandenburg Technical University, Cottbus, Germany), the Gloucester Smart House in U. K. (oriented to the specific needs of people with dementia), the SmartBo project, etc..

In contrast to existing automated homes that can be programmed to perform **preliminary** defined functions, a team of the Colorado University proposes the idea of the smart house where the home controller can essentially programs itself by observing the lifestyle and desires of the inhabitants and learning to anticipate their needs.

Fifteen demonstration and research houses, known as Welfare Techno Houses, have been recently built across Japan. A life-support **infrastructure** environment, called "Robotic Room" was developed at the Sato Laboratory at the Research Center for Advanced Science and Technology in the University of Tokyo in response to the needs of the rapidly aging society.

The research and development of intelligent human-friendly residential system is urgently in demand to **comply** with the needs of human beings to lead more convenient and safe lives and to deal with the increase in the number of the elderly and the handicapped. The following is focused on the development of three detailed research parts: intelligent bed robot, soft remocon, and network.

### Intelligent Bed Robot

An intelligent bed system is developed to assist the elderly and the

handicapped to live a convenient daily life since they usually spend much time in their beds. The **prototype** of the bed system consists of three parts—automatic bed, robotic arm and motion capture system.

The bed is designed in consideration of human body and can change its pose in various ways. The upper part can be folded from 0 to 90 degrees and the folded curve is similarly formed as the curve from **pelvis** to waist of human body by adopting 4-bar mechanism. The lower part is folded from $-70$ to 70 degrees for the user to keep a comfortable pose.

The robotic arm attached at the side of the bed can be utilized to serve transporting objects, pulling a quilt over, etc.. The arm also has the large work range including a table, a bookshelf and a massage-hanger around the bed. It can **manipulate** with pre-programmed path for service delivering a newspaper or a book because the position of these was assumed to be fixed.

The intelligent bed robot with a proposed **configuration** is very useful to assist daily life of the elderly and the handicapped, and is able to serve four kinds of fundamental tasks: pulling a book and put it back on the bookshelf, transporting a newspaper, massaging, and pulling a quilt over and putting it away.

### Soft Remocon

The remote controller seems to be a good choice for the normal people, but it cannot be helpful for the handicapped/elderly since it happens that they cannot move themselves to find the controller nor remember where it is. Recognizing an object pointed by a finger and a successive hand gesture for commanding machines is an alternative way in the sense of human-friendliness since it is how human does.

This soft remote control system has five **modules**: data acquisition module, preprocessing module, hand region segmentation module, pointing recognition module and appliance control module.

The starting module of the system is data acquisition module. Three cameras equipped with **pan/tilt** devices with 2 DOF (degree of freedom) are used to acquire images. After obtaining the images, the preprocessing module enhances the images and removes noise. In this module, skin color region including hand and face is detected.

The next is hand region segmentation module. It selects hand region from skin color region. Since the output of this module needs to be converted into a suitable form, which means representation of raw data, for computer processing, the feature extraction processing is also included in this module. The next is pointing recognition module that calculates the orientation angle and pointing direction. The last is appliance control module in which the according IR signal is sent for controlling home appliances.

Several specific devices are used in this system such as pan/tilt devices, vision board and remote control board. Vision board is used in data acquisition module, preprocessing module and hand region segmentation module, and remote control board is used in appliance control module.

Currently, on/off control is able to be done for those several home appliances including TV, VCR, automatic door, light and curtain.

*Network*

The intelligent sweet home consists of many assistive devices and sensors such as robotic arm, motion capture device, camera system and hand gesture recognition system. Since some devices are responded to the other devices, network connection is in demand to comply with sharing information with each other and TCP/IP-based network configuration is established with home network server.

The idea of intelligent sweet home is treated at present not as a science fiction but as an important goal of strong social and economical

significance. Its realization will give a solution to many existing problems of the welfare society and will make the lives of the handicapped/elderly much pleasant and easier.

## Notes

1. **human-friendly** 人性化的
2. **intelligent bed robot** 智能床机器人
3. **motion capture system** 动作捕捉系统
4. **4-bar mechanism** 4 杆调节机制
5. **remocon (remote controller)** 遥控器
6. **data acquisition module** 数据采集模块
7. **preprocessing module** 预处理模块
8. **hand region segmentation module** 手动区域分离模块
9. **pointing recognition module** 指向识别模块
10. **appliance control module** 家电控制模块
11. **pan/tilt device with 2 DOF** 二自由度云台装置（云台装置专门用于监控时调整摄像头的位置,可做上下左右调节）
12. **feature extraction** 特征提取
13. **IR signal** 红外信号
14. **TCP/IP-based network configuration** 基于 TCP/IP 协议的网络配置（TCP/IP 是 Transmission Control Protocol/Internet Protocol 的简写,中译名为传输控制协议/因特网互联协议,又名网络通讯协议,是 Internet 最基本的协议、Internet 国际互联网络的基础,由网络层的 IP 协议和传输层的 TCP 协议组成。TCP/IP 定义了电子设备如何连入因特网,以及数据如何在它们之间传输的标准。）

## Vocabulary

**impaired** /ɪmˈpeəd/ *adj.* 有（身体或智力）缺陷的;有……障碍的

**preliminary** /prɪˈlɪmɪnəri/ *adj.* 预备的;初步的

**infrastructure** /ˈɪnfrəstrʌktʃə/ *n.* 公共建设;基础建设

**comply** /kəmˈplaɪ/ *v.* (对要求、命令等)依从,顺从,遵从(＋with)

**prototype** /ˈprəʊtətaɪp/ *n*. 原型；标准；模范

**pelvis** /ˈpelvɪs/ *n*. 骨盆；肾盂

**manipulate** /məˈnɪpjʊleɪt/ *v*. (熟练地)操作，运用

**configuration** /kənˌfɪɡəˈreɪʃn/ *n*. 结构；表面配置

**module** /ˈmɒdjuːl/ *n*. 模数(建筑部件等的度量单位)；组件；单元

**pan** /pæn/ *v*. 摇镜头；摇摄

**tilt** /tɪlt/ *v*. 倾斜；翘起

**Task 1: Answer the following questions based on your comprehension.**

1. What's the text mainly about?

_____

2. What's the significance of the intelligent house for the elderly and disabled?

_____

3. What's the difference of the smart house proposed by a team of the Colorado University?

_____

4. What constitutes an intelligent bed system?

_____

5. How can intelligent bed robot assist the elderly/handicapped?

_____

6. Why is soft remocon developed?

_____

7. What is soft remocon used for now?

_____

8. Why is network needed for a smart house?

_____

**Task 2: Match the English and Chinese terms in the two columns.**

| | | | |
|---|---|---|---|
| 1. | pan/tilt device | A. | 软遥控 |
| 2. | human-friendly | B. | 配置 |
| 3. | feature extraction | C. | 原型 |
| 4. | configuration | D. | 人性化的 |
| 5. | infrastructure | E. | 家电控制 |
| 6. | pointing recognition | F. | 特征提取 |
| 7. | appliance control | G. | 指向识别 |
| 8. | prototype | H. | 动作捕捉装置 |
| 9. | motion capture device | I. | 基础建设 |
| 10. | soft remocon | J. | 云台装置 |

**Task 3: Translate the following sentences into English.**

1. 随着机器人技术的迅猛发展,独居老人和残障人士的生活已经变得越来越轻松了。(along with)

   _____

2. 暴露于高浓度的一氧化碳之下会损害心脏和大脑的功能。(impair)

   _____

3. 为了遵守已承诺的安全规范,开发商们不得不安装高质量的锁、防盗窗以及安全门。(comply with)

   _____

4. 一项初步调查显示,我国城乡的收入差距正在缩小。(preliminary)

   _____

5. 一个聪明的政治家知道如何利用舆论。(manipulate)

   _____

**Task 4: Fill in the blanks with the words given in the bank.**

With the development of technology and society, the aged and the disabled are blessed with various types of high-tech equipment an systems to 1) _____ for an independent living. The intelligent house is a typical example, which 2) _____ devices for movement assistance of the resident and devices for monitoring his/her health 3) _____. The 4) _____ and development of such houses meets the needs of human beings to lead more convenient and safe lives and to deal with the increase in the number of the elderly and the 5) _____.

Three research parts are detailed, 6) _____, intelligent bed robot, soft remocon, and network. An intelligent bed system is developed to 7) _____ the elderly and the handicapped to live a convenient daily life since they usually spend much of their time in bed. With the automatic bed, robotic arm and motion capture system, the intelligent bed robot is able to serve many kinds of 8) _____ tasks including massaging and bringing things and putting them away. Soft remocon is very 9) _____ in that it can recognize an object pointed by a finger and a successive hand gesture for the on/off control of some home appliances. Since devices are responded to each other, network connection is in demand to comply with sharing information with each other and TCP/IP-based network 10) _____ has to be established.

| | | | |
|---|---|---|---|
| A. configuration | B. assist | C. insist | D. timely |
| E. provide | F. integrates | G. correction | H. research |
| I. handicapped | J. urgent | K. namely | L. fundamental |
| M. status | N. human-friendly | O. emerges | |

# Related Reading

# Smart Home—Digitally Engineered Domestic Life

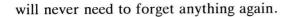As the need increases for information and media technology to

**deviate** from conventional desktop computing environments and **fuse** with daily household appliances, an interaction style that effectively **compliments** recent technology's innovations and applications is in great demand. The **ubiquitous** and pervasive computing systems that provide the user with adequate information at the desired moment must also provide a digital environment that is both natural and friendly. The continuing pursuit of discovering and exploring new possibilities and ideas, and the demonstration of prototypes for new design concepts, will be utilized in tomorrow's infrastructure to develop a wider vision and formation. The purpose of the Smart Home Project is to devise a set of home appliances with more intelligence and awareness of the users' contexts so that they can provide better home life experience to residents without **overpowering** them with complex technologies and **intuitive** user interfaces. The main aim is to improve people's home life with smart computer technologies whilst being as non-invasive as possible with regards to their home life. The following are some key ideas for appliances and devices that came out of the Smart Home Project. Some of these innovations are now on their "working-prototype implementation" phases, while others remain as on-screen, virtual prototypes.

### Smart Memories

The atmosphere transmission system has the capacity to record its own memories of living patterns and the residents' preferred lighting, sounds, images and smells. It can then access these memories in order to create the perfect and appropriate atmosphere in the smart house.

### Gate Reminder

Forgetting an important item at home that you need for your day is something that happens to the best of us. But now, this **innovative** Gate reminder will remind you what you need before you leave the house, so you

will never need to forget anything again.

## *GIA*

GIA is a new professional picture management device that controls every function in your photo album through interaction methods using simple hand gestures. Most people become lazy when it comes to putting their photographs in an album, and their pictures end up being lost and forgotten. GIA is easy to use in **conjunction** with a digital camera—even for people who are not confident at using computers—and with a simple hand gesture, you can access all your favorite memories.

## *Smart Wardrobe*

The smart wardrobe digitally looks up the weather forecast for the user so that they can comfortably and adequately coordinate what they wear with the outside environment before they leave the house. Once the user returns home, the clothes that they have worn can be easily deposited to go through the simple laundry function.

## *Smart Pillow*

Wouldn't it be great if, as an adult, you could still be read a bedtime story of your choice and have someone taking care of you and your needs when you went to bed each night? But what if you had a pillow that could look after your bedtime needs? Smart pillow can read any books of your choice to you at bedtime and can play your favorite music to drift off to sleep when you start to get sleepy. Once your body goes into deep sleep, it will automatically check the condition and quality of your sleep, gradually reducing the volume of the music accordingly and, eventually, turning it off completely. As well as being ready for you when you wake up in the morning, it also checks the user's basic body information (such as **respiration**, **pulse** and body temperature) and in the case of any emergency or illness it will immediately