科技英语阅读高级教程

KEJIYINGYU YUEDU GAOJI JIAOCHENG

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内 容 简 介

本教程紧密结合高等学校理工科专业设置和学科发展的特点，选取通信、电子、计算机和机械等四大领域的原版科技文章共48篇。本教程的结构编排旨在激起学生对科技文章的阅读兴趣以及对科技英语的学习兴趣，掌握科技英语的特点和使用，使学生获得较高的科技文章阅读理解能力，具有较强的针对性和实用性。

本教程可作为理工科专业本科生和研究生科技英语阅读教材，也可作为广大科技人员的英语阅读材料。

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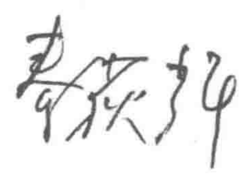
序

专业英语阅读课是大学英语学习中不可或缺的重要一环，是对学生英语基础知识掌握程度的检验，是对基础英语教学内容的巩固、扩展与深化，也是培养与提升学生的阅读水平、写作技能必不可少的一种实践。在基础学习阶段有些语言内容是不可能提及的，只有通过大量阅读才能真正了解与掌握，同时通过大量阅读还能扩大词汇量、提升知识面，真正达到学以致用的目的。

《教育部大学英语课程教学要求》中对专业阅读的指导意见为:“专业英语为必修课”,“专业英语是大学英语教学的一个重要组成部分，是促进学生完成从学习过渡到实际应用的有效途径”。

本教程正是为上述目的而设计的，编者均是长期工作在科技英语教学第一线、具有丰富教学经验、业务能力强、深受学生欢迎的教师，课文内容选材新颖、涉及的科技内容面广且极具趣味性，相信读者通过学习本教程可以获得英语知识和科技信息的双丰收。



2017 年 1 月

前 言

随着国际交流的不断深入，英语也日趋成为中国学者对外交流时最广泛使用的语言，用英语撰写学术论文的要求越来越迫切，科技论文写作能力已经成为国际学术交流必备的英语应用能力之一。然而，我国高校中相当数量的学习者用英语撰写学术论文的能力较为薄弱，难以清楚地表达思想或者错误百出，无法写出有水平的英文科技论文，因此在国外科技杂志的投稿论文常常被退回，要求修改或重写，评阅人意见往往集中在语言表达方面。语言表达成为英语科技论文写作的最大难点，为了解决这一问题，英语教学界研究者对此已有共识：第二语言的习得必须要有大量的目的语输入。也就是说，必须在语言输出上下工夫，由"输入"来刺激学习者，从而产生理想的"输出"。

科技英语书面语表达能力的提升需要经过长时间的专业训练和有效的积累。为培养和提高学习者英语科技论文的语言表达能力，编者认为，应采用以读促写的策略，鼓励学习者通过大量阅读来积累有效的英语表达方式，再通过摹写、改写等训练方式来提高英语科技论文写作能力。

本教程紧密结合理工类高校专业设置和学科发展特点，选取通信、电子、计算机和机械四大领域的原版科技文章共48篇，适用于各专业本科生和研究生，针对性强。本教程的结构编排旨在激起学生对科技文章的阅读兴趣以及对科技英语的学习兴趣，掌握科技英语的特点和使用，使学生获得较高的科技文章阅读理解能力。本教程所选阅读内容均是英语本族语的权威技术人员所写的科技文章，涉及相关专业最新的发展动态或科技成果，使得学生在学习科技英语的同时能够了解到科学技术发展的前沿。

此外，本教程所提供的阅读材料涵盖通信类、电子类、计算机类和机械类等四大模块(Module)，每个模块有三个单元(Unit)，每个单元包含四篇阅读材料，围绕同一主题展开，内容丰富，有层次感。具体来看，每单元中，精读篇章(Intensive Reading)A针对精读，编者提供清晰详尽的分类注释，突出讲解科技英语特有的表达方式，并设置适量练习，形式包括阅读理解、英汉互译和简短回答，让学习者在阅读中得到及时的帮助并在阅读后对知识点予以强化，时效性高；精读篇章B适用于精读，提供分类注释，不设置练习；补充阅读(Supplementary Reading)A、B两篇附加阅读材料则不予以注释或设置练习，供学习者泛读使用，增加阅读量。这些篇章由难到易，分别适合精读、泛读和自学，可满足各类学习者不同层次的要求，具有很强的实用性。

本教程由李长安、周正履、任利华、孙玲玲、弥晓华共同编写。部分文章来源于国内外学术及科技网站，在此对原文作者一并致谢。本教程撰写及出版工作得到西安电子科技大学教务处2013年度校级教材立项资助。

鉴于编者水平有限，本教程难免存在疏漏之处，敬请科技英语领域专家、学者，从事科技英语教学的教师，学生及广大科技工作者提出宝贵意见。

编　者
2017年1月
于西安电子科技大学科技英语研究中心

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Module One Communications Technology

Unit One

Intensive Reading Text A

Think GPS is Cool? IPS will Blow Your Mind

For all of their awesome applications—from portable navigation devices, to self-driving cars, to cruise missile targeting—the American Global Positioning System and its Russian cohort GLONASS have two fundamental flaws: They don't work indoors, and they only really operate in two ***dimensions***.

Now, these limitations are fair enough; we are talking about an extremely weak signal that has traveled 20,200 km 12,600 mi), after all. Passing through ***concrete*** and other solid obstacles is hard enough for a strong, short-range cellular signal—you can't seriously expect a 50-watt signal traveling 12,000 miles to do the same. Detecting a GPS signal on Earth is comparable to[1] detecting the light from a 25-watt bulb from 10,000 miles.

The situation is a little more complex when it comes to[2] detecting a change in ***altitude***; GPS and GLONASS can measure altitude, but generally the data is inaccurate and too low-resolution (on the order of 10 - 25 meters) for everyday use. Even with these limitations, though, space-based satellite navigation systems have changed almost every aspect of society, from hardware hacking to farming to cartography to finding a girlfriend.

What if[3] we had a navigation system that worked indoors, though? What if we had an Indoor Positioning System (IPS)? Believe it or not, we're very nearly already there.

Last year, Google Maps for Android began introducing floor plans of shopping malls, airports, and other large commercial areas. Nokia, too, is working on an indoor positioning system, but using actual 3D models, rather than 2D floor plans. Just last week, Broadcom released a new chip (BCM4752) that supports indoor positioning systems, and which will soon find its way into smartphones.

Unlike GPS and GLONASS, there isn't a standard way of building an indoor positioning system. Google's approach tracks you via Wi-Fi—it knows where the Wi-Fi hotspots are in a given building, and through signal strength ***triangulation*** it can roughly work out[4] where you are. Nokia's solution is similar, but it uses Bluetooth instead of Wi-Fi, making it higher[5] ***resolution*** (but it would require the installation of lots of Bluetooth "beacons"). Other methods being ***mooted*** involve ***infrared***, and even ***acoustic*** analysis. None of these approaches[6] are accurate or reliable enough on their own, though—in spaces that are packed with different materials, and roving groups of attenuating meatbags, these signals are simply too noisy.

The Broadcom chip supports IPS through Wi-Fi, Bluetooth, and even NFC. More importantly, though, the chip also ties in with other sensors, such as a phone's ***gyroscope***, ***magnetometer***, ***accelerometer***, and ***altimeter***. Acting like a glorified ***pedometer***, this Broadcom chip could almost track your movements without wireless network triangulation. It simply has to take note of your entry point (via GPS), and then count your steps (accelerometer), direction (gyroscope), and altitude (altimeter).

In short, indoor positioning systems are coming—first to built-up and heavily-touristed areas (in the next year or two), and then, as smartphone saturation reaches 100%, everywhere else.

What does it mean to be able to track your movements, in real time, at any location in the world, inside, outside, and underground?

Before we begin, it's important to point out that—just like GPS—IPS doesn't necessarily betray your location to third parties. IPS can be entirely local to[7] your smartphone (or other portable navigation device). IPS, like GPS, can establish a location fix completely passively. The whole doomsday scenario of Rockefellers and global megacorps tracking your every move is unlikely to come to fruition without plenty of warning (and ample time to stage a rebellion).

Starting out in the shallow end, IPS would enable a whole new range of "real life analytics" apps. If you love how that Nike+ GPS app tracks your running speed and distance, an IPS version would blow your mind. IPS could track exactly how many steps you take and how many stairs you climb—and calculate, quite precisely, how many calories you burnt in the process. IPS could keep a perfect record of how many minutes you spend in the gym (and on which machines). IPS could tell you how many hours you spend in bed, commuting, in the office, and on the toilet.

The true power of IPS, though, would come from linking your real life analytics to other streams of data, such as social graphs and payment systems. IPS could track where and when you are most likely to use Facebook or Twitter, and tell you which locations are conducive to happy (or sad) status updates. IPS could be used to create beautiful heatmaps of where you spend money; you could even play it back in real time and watch your avatar as it bounces around a Google Map, first to Starbucks, then to the train ticket machine, then to the office vending machine, and so on.

Then, imagine if shops and other commercial locations broadcast their current special offers (which could simply be an internet RSS feed that your phone periodically downloads). If IPS detects that you are near a store with a special offer, your phone could alert[8] you. Likewise, your phone could tell you if you're about to go into Starbucks, but a nearby coffee house is cheaper. Again, this could be done passively[9], without giving away your location (though I wouldn't be surprised if some special offers are only available to people who opt[10] into being tracked).

IPS could replace (usually criminally expensive) audio guides in museums—just hold your smartphone up to your ear. Edging towards Big Brother territory, IPS could give parents the ability to track their kids—it could even automatically initiate a phone call, if your kid happens to wander into a store that you don't approve of (or an R-rated movie). IPS, it goes without saying[11], would massively simplify indoor ***augmented*** reality, too.

Perhaps most excitingly, IPS could ***herald*** the creation of real life social networks. By tying into Facebook, IPS could tell you, right this moment, if there's someone nearby who also wants to play squash or watch an art house film. You could be walking down the street and your phone could alert you that[12], just one block over, there's someone who shares your passion for early DC comics, or some other esoteric topic. We touched on this in another post recently, but IPS could also tell you exactly how many men (or women) are at a given nightclub—or, less contentiously, the nearest venue with a high concentration of geeks.

These real life social networks would require you to share a lot of data with those around you, but think about it: This could finally be an application of mobile computing that turns your attention outwards to those around you, instead of eternally gazing downwards at your smartphone screen.

Vocabulary

dimension n. 维度；尺寸
concrete n. 混凝土 adj. 具体的，有形的
altitude n. 高度，高地
triangulation n. 三角测量
resolution n. 分辨率
moot vt. 提出……供讨论
infrared n. 红外线
acoustic adj. 声学的，听觉的
gyroscope n. 陀螺仪，回转仪
magnetometer n. 磁强计
accelerometer n. 加速计
altimeter n. 测高仪，高度计
pedometer n. 步程计，计步器
augment vt. 增加，增大
herald vt. 预示……的到来

Notes

1. be comparable to：可相提并论，比得上。
2. when it comes to...：就……而论，说到……。
3. What if...：如果……会怎么样？相当于"what would happen if...?"或者"what would be the result if..."。
4. work out：算出，找到答案，解决。

5. making it higher resolution："make"后面的代词是其宾语，其后的名词(或形容词)是宾语补足语，补充说明宾语的性质、状态等，如"make him our manager"(让他做我们的经理)。
6. None of these approaches：完全否定形式。"no"、"neither"、"none"等用于表达完全否定概念。
7. be entirely local to...：限于……，仅对于……。
8. alert：警告，使意识到。alert sb. to...：警告某人……。
9. this could be done passively：这个操作是被动型的。
10. opt：选择。常见搭配为"opt for..."、"opt to do..."。
11. it goes without saying：毫无疑问。经常放在句首或者句中，用来强调语气。
12. You could be walking down the street and your phone could alert you that...：虚拟语气，表示一种假设。

Exercises

I. Translate the following sentences into Chinese.

1. Passing through concrete and other solid obstacles is hard enough for a strong, short-range cellular signal—you can't seriously expect a 50-watt signal traveling 12,000 miles to do the same.
2. Google's approach tracks you via Wi-Fi—it knows where the Wi-Fi hotspots are in a given building, and through signal strength triangulation it can roughly work out where you are.
3. In short, indoor positioning systems are coming—first to built-up and heavily-touristed areas (in the next year or two), and then, as smartphone saturation reaches 100%, everywhere else.
4. The true power of IPS, though, would come from linking your real life analytics to other streams of data, such as social graphs and payment systems.
5. If IPS detects that you are near a store with a special offer, your phone could alert you.

II. Translate the following sentences into English.

1. 这相当于在 50 米外搜索 Wi-Fi 信号。
2. 说到未来的智能汽车，传感器、电子芯片以及计算机的应用是少不了的。
3. 想想看，如果所有的高速公路都安装了人工智能系统，会怎么样呢？
4. 所有的设备均不能满足顾客的需求。
5. 徒步时，如果你步入了没有移动电话信号的地方，安装了 GPS 的智能手机会提醒你。

III. Answer the following questions according to the text.

1. Can you list the shortcomings of GPS and GLONASS?
2. In terms of technology, what is the difference between GPS and IPS?
3. Without wireless network triangulation, how does the Broadcom chip track you?
4. In what way is "real life analytics" apps of IPS more attractive than Nike+ GPS?
5. According to the passage, what is the true power of IPS?

Intensive Reading Text B

Keep an Eye on Children, or Other Valuables

I still remember the baby monitor my parents had—my friends and I used as a ***primitive walkie-talkie***[1].

It was very basic: One boxy unit went in the baby's room near the ***crib***. It had a microphone so if the baby made a sound you'd hear it on the other unit, at the end of a long wire. You could even send your voice back up the wire to ***lull*** the little one back to sleep.

Needless to say, our games were limited by that wire. Technology has improved quite a bit since my childhood, of course, a point made ridiculously clear by the newly released Dropcam Pro[2].

Dropcam Pro is a $200 wireless ***webcam*** with two-way audio and night-vision capabilities. It's an upgrade over the previous model, simply named Dropcam. The size-imaging sensor in the new unit is twice as big, which means the camera captures much more light and can deliver a better picture with more ***zoom*** capability.

Plus, it has a 130-degree field of view, bigger than the previous 107 degrees. What does this mean? In my case, it means that after standing the camera on a shelf in my children's room it can see a lot of the floor, a bit of the ceiling, the window, the door and their beds from about six feet away. All in up to 1080p, HD video detail, even at night.

The camera unit itself is a ***sturdy***, plain, hockey-puck-shaped device, and it clips into a similarly sturdy and plain metal stand. The stand can be placed on a flat surface, and you can turn it left and right and ***tilt*** the camera up and down. This stand can also be clipped into a plastic ***mount*** that can be screwed to a wall or ceiling for a more permanent installation.

The main limitation: you need to be within about 10 feet of a power ***socket***, because that's the length of the cable that comes with it.

Over the years, my wife and I have tried a number of baby monitors, but they've either been unreliable or tricky to set up and maintain. This seems to be the situation the team at Dropcam has tried to avoid. Installing, then setting Dropcam up and using it via a web-based control from a computer or an app on an iOS or Android device couldn't be simpler[3].

Although I've introduced Dropcam Pro as a baby monitor, you can imagine it's capable of much more. The wide-screen camera, night vision and movement or sound alerts make it handy as a home or small business security monitor. But you're hardly going to be watching around the clock.

That's where Dropcam's secure, cloud-recording service comes in handy. It ***encrypts*** the video feed in the camera and constantly records it on the company's servers. Then it streams it back to your home using security like your bank's website.

To view the feed at any point over the previous few days, you click on the corresponding point on the ***timeline*** in the Dropcam app. A graphic above this timeline shows you when the camera detected movement or noise alerts. Clicking here brings up a camera feed at that moment, so you can see what caused the alert.

To keep the recording, you click on the "make clip" button, which changes the interface to allow you to select a few seconds or minutes of video from the timeline. This clip is saved to the company's servers as a file you can share via Twitter or YouTube. You can also email it to yourself or download it.

Cost is a big downside to all this functionality. While you can always watch your Dropcam Pro feed free, the secure recording system is costly. On monthly billings, it costs $9.95 to record a seven-day video ***loop***, or $29.95 for 30-day loops. On annual billings, the prices are $99 a year or $299 for seven-day or 30-day video loops.

That can add up over time, particularly if you have more than one camera (though you can get half-price discounts for extra cameras).

Now for my quibbles: There is no way to change where the camera is pointing in real time. That could limit your options if you want to use it as a security device. There's also a perceptible lag in the video feed, which means your baby may have been crying[4] for five or six seconds before you hear the sound through your phone or PC.

It takes another couple of seconds for your voice to be sent back. The audio quality of the Pro is said to be much better than the original Dropcam, but I found that it was hard to hear really quiet noises over the feed.

If you're planning to use one of these systems as a security monitor, placing it where it can get an excellent wireless signal[5] is going to be a priority.

Finally, there's an experimental, motion-recognition system in the system's Web interface. In theory, you could use this to teach your camera to ignore the movement of a door that's used often but to send an alert if a window is opened[6]. I found the interface to control this opaque, and even with a good deal of ***tinkering*** I couldn't master it.

But Dropcam Pro is a great camera that can work as a child monitor or as a security system. Its setup is remarkably simple and its interface is excellent, but it is not without quirks. And if you want to use it as a surveillance system, the cost of ***snooping*** is going to get ***steep***.

Vocabulary

primitive adj. 原始的，初期的

walkie-talkie n. 步话机，对讲机

crib n. 婴儿床

lull vt. 使平静；哄……入睡

webcam n. 网络摄像头

zoom n. 变焦

sturdy adj. 坚固的，结实的

tilt　v. 倾斜
mount　vt. 安装
socket　n. 插座
encrypt　vt. 加密
timeline　n. 时间轴，时间线
loop　n. 循环
tinker　vt. 调整，修补
snoop　vt. 窥视，探听
steep　adj. 急剧升降的；陡峭的

Notes

1. I still remember the baby monitor my parents had—my friends and I used as a primitive walkie-talkie："my friends and I used as a primitive walkie-talkie"，该句相当于前面句子中"the baby monitor"的定语从句"which my friends and I used as a primitive walkie-talkie"。
2. a point made ridiculously clear by the newly released Dropcam Pro："a point"作为前面句子的同位语。
3. couldn't be simpler：极为简单，不能再简单了。
4. may have been crying：这是虚拟语气，表示一种假设。
5. placing it where it can get an excellent wireless signal：该句作为整个句子"If you're planming to... is going to be a priority."的主语。"is"是该句的谓语动词。
6. In theory，you could use this to teach your camera to ignore the movement of a door that's used often but to send an alert if a window is opened：该句结构为"you could use... to teach... to ignore... but to send..."。"ignore"和"send"并列。

Supplementary Reading Text A

Wireless ATM

The wideband local access technologies can be divided into WLAN and WPAN divisions. WLAN can be further divided into connectionless, represented by the IEEE 802, and Connection-based networks that in early 1990s were ***perceived*** to turn into the so-called end-to-end ATM solutions. This perception initiated a couple of activities related to the LANs. The first activity was the LAN ***emulation*** (LANE) using ATM that intended to ***integrate*** legacy LAN applications in an ATM setting. The second activity was wireless ATM (WATM) that intended to design a wideband local access that integrated with the ATM ***backbone*** to provide an end-to-end ATM solution. Both these activities lost the heat of their publicity by the turn of the last century, after the success of the Internet and IP-based networks to provide a cheaper solution for the backbone connections. ATM never made it to the desktop in any case.

The WATM research activities addressed the important issue of how to implement QoS in a mobile environment. The QoS support has two features, the first providing ***multirate*** services on demand with guaranteed bandwidth, delay, and so on, and the second providing ***implementation*** of a variable user-charging mechanism according to their usage of the resources. Currently data-oriented Internet services are provided at a flat rate **to** the fixed users, but the voice-oriented services are charged according to the usage of the network. The vision of the service providers for the future of the wideband local access is to provide wireless Internet access services that carry different charging mechanisms where, for example, no charge will be associated for home or office connections, but there is a ***tariff*** for public usage of the AP owned by the service provider. These public APs could be broadband WLAN APs or a GPRS BS. Therefore, the argument is that we need different charging mechanism because we are providing different QoS to the user. To ***incorporate*** this charging mechanism into the wideband local access, service providers are keen on supporting multi-QoS operation under wideband local access. As a result, the successful EU cellular industry has supported HIPERLAN-2 to provide the transmission rate of the WLAN but incorporate a connection-based charge mechanism that is useful for variable QoS support and in particular the tariff mechanism for that support.

Wireless ATM was first introduced in 1992, and it meant to provide for an integrated broadband application programming interface (API) to the ATM network for a variety of mobile terminals. In 1996, a WATM working group was formed under the ATM forum that drew around a hundred participants in their first meeting in Helsinki. Fig. 1. 1 illustrates the vision of the end-to-end ATM network that was used by the ATM forum. In the mid-1990s, a number of experimental projects at NEC Laboratories, Nokia, AT&T, Olivetti (now