



人工智能热

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全文导读

ChatGPT 也许是又一项通用技术，即将给各行各业带来革新，而在历史上这并不是新鲜事。回顾历史，科技创新和经济发展之间并非总是同步，而是有着更为复杂的精妙关系。而根据历史经验，新兴技术虽然不会导致大规模失业，但仍会给个别行业带来巨大冲击。

重难点讲义&全文翻译

The AI boom: lessons from history

AI 热潮：以史为鉴

How powerful new technologies transform economies

强大的新兴技术如何影响经济



boom 重点难词 n. an increase in how popular or successful something is, or in how often it happens
流行，风靡· the boom in youth soccer in the U.S.
美国的青年足球热

lesson 熟词僻义 n. something that provides

experience or information that you can learn from and use 经验，教训· There were important lessons to be learned from these discoveries. 从这些发现中可以获取重要的教训。

Para.1

It can take a little imagination to see how some innovations might change an economy. Not so with the latest AI tools. It is easy—from a writer's perspective, uncomfortably so—to think of contexts in which something like ChatGPT, a clever chatbot which has taken the web by storm since its release in November, could either dramatically boost a human worker's productivity or replace them outright. The GPT in its name **stands for** "generative pre-trained transformer", which is a particular kind of language model. It might well stand for general-purpose technology: an earth-shaking sort of innovation which stands to boost productivity across a wide-range of industries and occupations, in the manner of steam engines, electricity and computing. The economic revolutions **powered** by those earlier GPTs can give us some idea how powerful AI might transform economies in the years ahead (翻译训练) .

ChatGPT 背景知识 ChatGPT 是由 OpenAI 开发的一个人工智能聊天机器人程序，于 2022 年 11 月推出。该程序使用基于 GPT-3.5 架构的大型语言模型并通过强化学习进行训练。

chatbot 重点难词 /'tʃætbɒt/ n. a computer program designed to send messages back to a human user, as if it is having a conversation 聊天机器人

take somewhere by storm 固定搭配 to be very successful in a particular place 在某地大获成功·The new show took London by storm. 这部新剧在伦敦大获成功。

outright 重点难词 /aʊt'reɪt/ adv. clearly and completely 完全地，彻底地·They rejected the deal outright. 他们断然拒绝了这笔交易。

划线句 难句分析 It【形式主语，真正的主语是句子中的 to think of contexts...】 is easy【系动词和表语】 —from a writer's perspective, uncomfortably so【插入语，so 指代的是句子中 to think of contexts 这个行为让人不适】 —to think of

contexts in which 【in which 引导定语从句，说明是怎样的 contexts】 something like ChatGPT, 【in which 定语从句的主语】 a clever chatbot which has taken the web by storm since its release in November 【ChatGPT 的同位语，介绍其功能、影响和发布时间】 , could either dramatically boost a human worker's productivity or replace them outright, 注意其中的主干结构是：something like ChatGPT...could either...or】 .

stand for 固定搭配 if a letter or symbol stands for something, it represents a word or idea, especially as a short form [字母或符号] 代表，表示·What does ATM stand for? ATM 是什么意思？

generative pre-trained transformer 背景知识 生成式预训练变换模型（简称 GPT），是一种可利用互联网数据进行训练的文本生成深度学习模型，在问答、文本摘要、机器翻译、分类、代码生成和对话式 AI 领域都有相当出色的表现。

might well 固定搭配 used to say that there is a good reason for a reaction, question, or feeling 有

充分理由, 足以·a system of which we in Britain might well be envious 足以让我们英国人羡慕的一种制度

general-purpose 重点难词 adj. suitable for most situations or jobs, or having a wide range of uses 通用的, 多用途的·a general-purpose computer 一台通用计算机

earth-shaking 重点难词 adj. surprising or shocking and very important 惊天动地的, 震惊世界的·an earth-shaking event 惊天动地的事件

stand to do something 固定搭配 to be likely to do or have something 很可能会做某事, 可能有某物 What do firms think they stand to gain by merging? 公司认为通过合并会得到什么好处?

in the manner of 固定搭配 in the style that is typical of a particular person or thing 体现某人/某物所特有的风格·a painting in the manner of the

early Impressionists 一幅早期印象派风格的画

steam engine 专业词汇 an engine that uses the expansion or rapid condensation of steam to generate power 蒸汽机

power 熟词僻义 v. to supply power to a vehicle or machine 给〔车辆或机器〕提供动力, 以动力驱动·It's powered by a Ferrari V12 engine. 它由法拉利 V12 发动机驱动。

划线句 难句分析 It might well stand for 【主语和谓语, it 指代上文的 GPT】 general-purpose technology 【宾语】: an earth-shaking sort of innovation which stands to boost productivity across a wide-range of industries and occupations, in the manner of steam engines, electricity and computing 【冒号后面为同位语成分, 具体展开说明 general-purpose technology 的意涵; 其中 which 引导定语从句, 修饰 innovation】.

某些创新会如何变革经济难以预见, 但最新的人工智能工具却一反常态。自 11 月发布以来, ChatGPT 便在网上掀起了一阵热潮。从写作者的角度, 不难想到的是 (尽管不太舒服), 如此聪明的聊天机器人要么会极大地提高人类的生产力, 要么会直接取代他们。ChatGPT 中的 GPT 指的是“生成式预训练变换模型(generative pre-trained transformer)”, 这是一种特殊的语言模型。 (翻译作业)

Para.2

In a paper published in 1995, Timothy Bresnahan of Stanford University and Manuel Trajtenberg of Tel Aviv University **set out** what they saw as the characteristics of a general-purpose technology. It must be used in many industries, have an **inherent** potential for continued improvement and **give rise to** “innovational **complementarities**”—**that is, induce knock-on** innovation in the industries which use it. AI is being adopted widely, seems to get better by the day and is being **deployed** in ever more **R&D** contexts. So when does the economic revolution begin?

set out **固定搭配** to explain ideas, facts, or opinions in a clearly organized way, in writing or in a speech

〔清楚而系统地用书面或口头方式〕陈述, 阐明·He set out the reasons for his decision in his report. 在报告中他陈述了作出这个决定的理由。

inherent **重点难词** /ɪn'hɪərənt/ adj. a quality that is inherent in something is a natural part of it and cannot be separated from it 内在的, 固有的·I'm afraid the problems you mention are inherent in the system. 你提及的这些问题恐怕本来就存在于这个体制中。

give rise to **固定搭配** to be the reason why something happens, especially something bad or unpleasant 引起〔导致〕某事〔尤指坏事〕·The president's absence has given rise to speculation about his health. 总统的缺席引发了对他健康状况的猜测。

complementary **重点难词** /ˌkɒmplə'mentəri/ adj. t complementary things go well together, although they are usually different 互为补充的, 互补的·The computer and the human mind have different but complementary abilities. 电脑与人类各不相同, 却又互为补充。**complementarity** n. a relationship or situation in which two or more different things enhance or emphasize each other's qualities or form a balanced whole 互为补充; 相辅相成

that is (to say) **固定搭配** used to give more exact

information about something or to correct a statement 亦即, 那就是说, 换句话说·Languages are taught by the direct method, that is to say, without using the student's own language. 语言教学使用直接教学法, 也就是说, 不用学生的母语。

induce **重点难词** /ɪn'dju:s/ v. to cause something to happen 导致·Pills for seasickness often induce drowsiness. 晕船药经常会令人昏昏欲睡。

knock-on **重点难词** /'nɒkɒn/ adj. to start a process in which everything that happens causes something else to happen (对某物)引起连锁反应·These price rises will have a knock-on effect on the economy. 这些价格的上涨将给经济带来连锁反应。

deploy **重点难词** v. bring into effective action; utilize 有效使用(或发挥); 利用 they are not always able to deploy this skill. 他们并不总能施展这一技巧。

R&D **重点难词** n. abbreviation for research and development: the part of a business that tries to find ways to improve existing products, and to develop new ones 研究与开发 (research and development 的缩写)·If we want to get ahead of our competitors, we ought to invest more in R and D. 如果我们想领先于竞争对手, 就应该在研发上增加投入。

在一篇发表于1995年的论文里, 斯坦福大学的蒂莫西·布雷斯纳罕 (Timothy Bresnahan) 和特拉维夫大学的曼努埃尔·特拉伊滕贝格 (Manuel Trajtenberg) 提出了他们认为通用技术应包含的特征: 该技术必须适用于诸多行业, 且具有持续迭代的潜力, 并衍生出“创新互补效应”, 即在使用它的行业中引起一系列连锁创新。而眼下的人工智能, 不仅应用广泛, 似乎一天比一天聪明, 而且还在越来越多的研发环境中得到使用。那么, 我们要问的是: 经济变革何时到来?

Para.3

The first lesson from history is that even the most powerful new tech takes time to change an economy. James Watt patented his steam engine in 1769, but steam power did not **overtake** water as a source of industrial **horsepower** until the 1830s in Britain and 1860s in America. In Britain the contribution of steam to productivity growth **peaked** post-1850, nearly a century after Watt's **patent**, according to Nicholas Crafts of the University of Sussex. In the case of **electrification**, the key technical advances had all been accomplished before 1880, but American productivity growth actually slowed from 1888 to 1907. Nearly three decades after the first **silicon integrated circuits** Robert Solow, a Nobel-prizewinning economist, was still **observing** that the computer age could be seen everywhere but in the productivity statistics. It was not until the mid-1990s that a computer-powered productivity boom eventually emerged in America.

overtake 重点难词 /ˌəʊvə'teɪk/ v. to develop or increase more quickly than someone or something else and become more successful, more important, or more advanced than them [发展或增长]超越, 超过·Television soon overtook the cinema as the most popular form of entertainment. 电视很快就超过了电影, 成为最大众化的娱乐方式。

horsepower 重点难词 /'hɔːspauə/ n. a unit for measuring the power of an engine, or the power of an engine measured like this 马力 [功率单位或以此单位计算的引擎功率] · the superior horsepower of a Volkswagen 大众汽车的强劲动力

peak 重点难词 /pi:k/ v. to reach the highest point or level 达到顶峰, 达到最高水平·Sales peaked in August, then fell sharply. 销售额8月份达到最高点, 然后急速下降。

patent 重点难词 n. a government authority or

licence to an individual or organization conferring a right or title for a set period, especially the sole right to make, use, or sell some invention. letters patent 专利 (权) ; 专利证 he took out a patent for an improved steam hammer. 他取得了一项改良汽锤的专利权。

electrification 重点难词 /ɪlektʃɪfɪ'keɪʃən/ n. the process of making a machine or system operate using electricity when it did not before 电气化·the electrification of the railways 铁路的电气化

circuit 重点难词 /'sɜːkɪt/ n. the complete circle that an electric current travels 电路, 线路·an electrical circuit 电路 → **silicon integrated circuit** 硅集成电路

observe 熟词僻义 v. make a remark or comment 评论, 说 A stockbroker once observed that dealers live and work in hell. 一位股票经纪人曾评论说经纪人简直是在地狱里生活和工作

历史上的第一个经验是，即使是最为强大的新兴技术对经济的变革也需要时间。詹姆斯·瓦特（James Watt）在 1769 年为他的蒸汽机申请了专利，但英国直到 19 世纪 30 年代，美国到 19 世纪 60 年代，蒸汽动力才取代水力成为工业的动力来源。根据苏塞克斯大学的尼古拉斯·克拉夫特（Nicholas Crafts）的说法，蒸汽对英国生产力增长的贡献在 1850 年后才达到顶峰，而这已然是瓦特申请专利的一百年后。就电气化而言，关键的技术进步在 1880 年之前就已经实现，但实际上，美国的生产力增长却在 1888 年到 1907 年之间有所减缓。此外，在第一块硅集成电路问世近三十年后，诺贝尔奖获得者经济学家罗伯特·索洛却发现：计算机革命虽然看似声势浩大，却在提高生产力方面鲜有作为。直到 20 世纪 90 年代中期，美国才最终出现了互联网驱动的生产力爆发。

Para.4

The **gap** between innovation and economic impact is **in part** because of **fine-tuning**. Early steam engines were **wildly** inefficient and consumed **prohibitively** expensive piles of coal. Similarly, the **stunning performance** of recent AI tools represents a big improvement over those which sparked a **boomlet** of AI enthusiasm roughly a decade ago. (Siri, Apple's virtual assistant, was released in 2011, for example.) Capital **constraints** can also slow **deployment**. Robert Allen of New York University Abu Dhabi argues that the **languid** rise in productivity growth in industrialising Britain reflected a lack of capital to build **plants** and machines, which was gradually overcome as capitalists reinvested their **fat profits**.

gap 重点难词 n. a period of time when nothing is happening, that exists between two other periods of time when something is happening 时间间隙，时间间隔·The gaps between his visits got longer and longer. 他探望的时间隔得越来越长了。

in part 固定搭配 to some degree, but not completely 在某种程度上；部分地·His reluctance to help could, in part, be explained by his poor eyesight. 他不愿意帮忙，在某种程度上可能是由于他视力不好。

fine-tune 重点难词 v. to make very small changes to something such as a machine, system, or plan, so that it works as well as possible 对〔机器、系

统、计划等〕进行微调，精密调节·Over the next few days, we fine-tuned the scheme and made some useful improvements. 接下来的几天，我们对计划进行微调，作了些有益的改进。**fine-tuning** n.

wildly 重点难词 /'waɪldli/ adv. extremely 非常，极其·The band is wildly popular in Cuba. 这支乐队在古巴深受欢迎。

prohibitively 重点难词 /prəʊ'hɪbɪtɪvli/ adv. a way that is too expensive or too much 贵得令人望而却步地，价格高得让人不敢问津地；过分地·Moving house would be prohibitively expensive. 搬家的费用可能会高得惊人。

stunning 重点难词 /'stʌnɪŋ/ adj. extremely impressive or attractive 极好的；极吸引人的

performance 重点难词 n. how well or badly you do sth; how well or badly sth works 表现；性能；业绩；工作情况 performance indicators (= things that show how well or badly sth is working) 性能指标

boomlet 重点难词 /'bu:mlet/ n. a short period of increased activity, interest, or growth in the economy or a part of the economy 小景气，略有繁荣·By itself, an economic boomlet says little about the long-term health of a country. 就其本身而言，小规模的经济繁荣对一个国家的长期发展状况几乎没有影响。

划线句 难句分析 Similarly, the stunning performance of recent AI tools 【主语，of 是名词短语作后置定语，限定是“.....的 performance”】 represents 【谓语】 a big improvement over those 【those 指代 AI tools, 这里说明现在的 AI tools 相对于以前有了巨大改进】 which sparked a boomlet of AI enthusiasm roughly a decade ago 【which 引导定语从句，说明十年前 AI tools 的情况】。

Siri 背景知识 Siri 是一款内置在苹果 iOS 系统中的人工智能助理软件。此软件使用自然语言处理技术，用户可以使用自然的对话与手机进行交互，完成搜索资料、查询天气、设置手机日历、设置闹钟等许多服务。

constraint 重点难词 /kən'streɪnt/ n. something that limits your freedom to do what you want 限制，束缚，约束·Constraints on spending have

forced the company to rethink its plans. 由于开支受到限制，这家公司不得不重新考虑其计划。

deployment 重点难词 /di'plɔimənt/ n. the use of something or someone in an effective way 有效运用；发挥...的作用·the deployment of technologies to address this challenge 为应对这一挑战的高科技运用

languid 重点难词 /'læŋgwɪd/ adj. moving slowly and involving very little energy 无精打采的；懒洋洋的；慢吞吞的·Efforts in Canada and elsewhere have been arguably languid at best. 加拿大和其他地方的努力充其量只能说是乏味的。

plant 重点难词 n. a factory or building where an industrial process happens 工厂；车间·a huge chemical plant 一座大型化工厂

fat 熟词僻义 adj. containing or worth a large amount of money 巨额的·Of course the supermarkets' aim is to make fat profits. 当然，超市的目的是要获取丰厚的利润。

划线句 难句分析 Robert Allen of New York University Abu Dhabi 【主语，of 是名词短语作后置定语，说明身份】 argues 【谓语】 that 【that 引导宾语从句，说明研究内容】 the languid rise in productivity growth in industrialising Britain 【宾语从句内的主语，核心词是“the languid rise”，即缓慢的增长】 reflected a lack of capital to build plants and machines 【宾语从句内的谓语和宾语】， which was gradually overcome as capitalists reinvested their fat profits 【宾语从句内的定语从句，修饰 a lack of..., 指资本缺少的问题逐渐被克服】。

创新和经济影响之间的滞后性，部分是缘于前者还需要不断改进才能发挥作用。早期的蒸汽机效率极低，耗费的煤炭量令人望而却步。而与之类似，最近人工智能所展现出的惊人性能，实则代表了那些大约十年前引发过一波人工智能热潮工具（例如，苹果的虚拟助手 Siri 发布于 2011 年）的巨大改进。资本匮乏也会减缓创新所能发挥的作用。纽约大学阿布扎比分校的罗伯特·艾伦（Robert Allen）认为，处于工业化进程中的英国的生产力增长一度乏力，反映出的是建造工厂与机器的资本匮乏。但随着资本家将他们丰厚的利润进行再投资，这一问题被逐渐克服。

Para.5

Of course for many people, questions about the effects of AI on growth **take a back seat** to concerns about consequences for workers. Here, history's messages are mixed. There is good news: despite **epochal** technological and economic change, fears of mass technological unemployment have never before been **realised**. Tech can and does take a **toll** on individual occupations, however, in ways that can prove socially **disruptive**. Early in the Industrial Revolution, mechanisation dramatically increased demand for relatively unskilled workers, but crushed the earnings of craftsmen who had done much of the work before, which is why some chose to join machine-smashing Luddite movements. And in the 1980s and 1990s, automation of routine work on factory **floors** and in offices **displaced** many workers of modest **means**, while boosting employment for both high- and low-skilled workers.

take a back seat 固定搭配 to have less influence or importance （相对某人/某事）退居次要位置·Foreign policy will take a back seat to domestic problems for a while. 外交政策暂时要排在国内问题之后了。

epochal 重点难词 /'i:pəkəl/ adj. used to refer to times or events that are very important because they involve new developments and great change 新纪元的，划时代的，有重大意义的·An epochal shift in the global oil market is under way. 全球石油市场正在发生划时代的变化。

realise 熟词僻义 (also realize) v. if sb's fears are realized, the things that they are afraid will

happen do happen （所担心的事）发生，产生 His worst fears were realized when he saw that the door had been forced open. 他一看门被撬了，就知道最担心的事还是发生了。

toll 重点难词 n. a very bad effect that something has on something or someone over a long period of time 严重的不良影响·Years of smoking have taken their toll on his health. 多年的吸烟习惯已严重损害他的健康。

disruptive 重点难词 /dis'rʌptɪv/ adj. causing problems and preventing something from continuing in its usual way 引起混乱的，扰乱性的，捣乱的·Night work can be very disruptive to

home life. 夜间工作会给家庭生活带来很大的麻烦。

Luddite movements 背景知识 **卢德运动**，是英国工人以破坏机器为手段反对工厂主压迫和剥削的自发工人运动。首领称为卢德王，故名。相传，莱斯特郡一个名叫卢德的工人，为抗议工厂主的压迫，第一个捣毁织袜机。工业革命时期，机器生产逐渐排斥手工劳动使大批手工业者破产，工人失业，工资下跌。

划线句 难句分析 Early in the Industrial Revolution 【时间状语,工业革命早期】, mechanisation 【主语】 dramatically increased demand 【谓语和宾语,极大增加了需求】 for relatively unskilled workers 【介词短语, 说明需求的内容】, but crushed the earnings of craftsmen who had done much of the work before 【who 引导定语从句说明, 修饰说明

craftsman 的情况】 , which is why some chose to join machine-smashing Luddite movements 【定语从句, which 修饰的是 “mechanization... crushed the earnings of craftsmen who had done much of the work before” 这件事】。

floor 熟词僻义 n. a large area in a building where a lot of people do their jobs 【工作场所的】场地·He wasn't keen on the idea of working on the shop floor. 他对去工厂车间干活不感兴趣。

displace 重点难词 /dis'pleis/ v. to remove sb from a job or position 撤职; 免职; 使失业 displaced workers 被辞退的工人

means 熟词僻义 n. the money or income that you have 钱; 收入·Try to live within your means. 过日子要尽可能量入为出。

当然，对许多人而言，相比于人工智能会如何影响经济增长，它是否会取代工人更为重要。在这方面，历史经验较为局限。好消息在于：尽管技术和经济发生了划时代的变革，但对技术导致的大规模失业的忧虑却从未成真。然而，技术可以，而且的确对个别职业造成过具有社会性破坏力的冲击。在工业革命早期，机械化虽然极大地增加了对初级工人的需求，但却剥夺了此前从事大部分同类工作的工匠的收入。这也是为何一些人当时选择加入捣毁机器的卢德运动。而在20世纪80年代和90年代，工厂车间和办公室日常工作的自动化虽然让许多收入中等的工人失业，但却同时提高了高技能和低技能工人的就业率。

全文思维导图作业

请大家阅读全文后，绘制思维导图。

方法提示：思维导图旨在督促大家从整体框架上把握文章逻辑，如果读完文章对文章所讲内容一头雾水，思维导图无从下手，说明还没有读懂，继续重复通读几遍文章，读懂文章之后再去做思维导图。

翻译作业

翻译作业：请将以下句子翻译成中文，要求理解准确、表达流畅

It might well stand for general-purpose technology: an earth-shaking sort of innovation which stands to boost productivity across a wide-range of industries and occupations, in the manner of steam engines, electricity and computing. The economic revolutions powered by those earlier GPTs can give us some idea how powerful AI might transform economies in the years ahead (para.1)

写作练习

文章第 3 段提到：James Watt patented his steam engine in 1769, but steam power did not **overtake** water as a source of industrial horsepower...

句子中 **overtake**，表示 to develop or increase more quickly than someone or something else and become more successful, more important, or more advanced than them [发展或增长] 超越，超过；如 Hingis has now overtaken her in the world tennis rankings. 现在辛吉斯的世界网球排名已经超过了她。

同义表达有：

1 surpass: v. to be even better or greater than someone or something else 超过；胜过 The number of multiple births has surpassed 100,000 for the first time. 多胎产首次突破了 10 万例。

2 outstrip: v. to do something better than someone else or be more successful 比...做得好，胜过 We outstripped all our competitors in sales last year. 去年我们的销售额超过了所有竞争对手。

牛刀小试:

请使用以上表达, 将句子翻译成英文

1. 在工业产量方面德国迅速超过了英国。

2. 许多人认为, 市场已经超过了州政府, 成为塑造美国高等教育的主导性外部力量。
