

R. KELLY RAINER

INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

WILEY

**TESTBANK FOR Introduction to Artificial
Intelligence and Machine Learning, 1st Edition
Rainer**

Notes

- 1- The file is chapter after chapter.
- 2- We have shown you few pages sample.
- 3- The file contains all Appendix and Excel sheet if it exists.
- 4- We have all what you need, we make update at every time. There are many new editions waiting you.
- 5- If you think you purchased the wrong file You can contact us at every time, we can replace it with true one.

Our email:

storetestbanks@gmail.com

Introduction to Artificial Intelligence and Machine Learning, 1e (Rainer)
Chapter 1 Artificial Intelligence and Machine Learning and You

1.1 The Modern Business Environment

1) A disruptive technology typically has superior performance when it first enters the market.

Answer: FALSE

2) The Long Tail concept suggests that niche products can collectively generate more revenue than bestsellers.

Answer: TRUE

3) Established companies often fail to adopt disruptive technologies because they focus too much on their existing customers.

Answer: TRUE

4) Circuit-switched networks are more efficient than IP networks in terms of resource utilization.

Answer: FALSE

5) Netflix's initial business model was based on streaming video services.

Answer: FALSE

6) Modern organizations must compete in a 24/7/365 environment.

Answer: TRUE

7) Blockbuster failed primarily because it never attempted to offer online services.

Answer: FALSE

8) IP networks break data into packets and route them individually over the network.

Answer: TRUE

9) LinkedIn identified artificial intelligence as the #1 in-demand technical skill for 2024.

Answer: TRUE

10) The Long Tail strategy is equally effective for both online and brick-and-mortar retailers.

Answer: FALSE

11) Which characteristic is NOT typically associated with disruptive technologies?

A) Initially serves a niche market

B) Considered inferior at first

C) Immediate widespread adoption

D) Improves over time

Answer: D

12) According to the text, modern organizations operate in which environment?

- A) Local markets only
- B) Regional competition only
- C) Global, interconnected, and data-intensive
- D) Traditional business hours only

Answer: C

13) What was a key difference between Cisco Systems and Nortel Networks?

- A) Cisco focused on IP networking while Nortel focused on circuit-switched networking.
- B) Nortel was newer than Cisco.
- C) Cisco only served international markets.
- D) Nortel only served small businesses.

Answer: A

14) Why did Blockbuster struggle with the Long Tail concept?

- A) They had too many stores.
- B) Physical space limitations in stores restricted inventory.
- C) They had too few customers.
- D) Their prices were too high.

Answer: B

15) Netflix initially disrupted Blockbuster by:

- A) Offering streaming services
- B) Having lower prices
- C) Providing DVD-by-mail service
- D) Opening more stores

Answer: C

16) What is a key characteristic of modern data-driven decision making?

- A) Relying solely on past experience
- B) Making decisions based on intuition
- C) Using objective evidence from data analysis
- D) Avoiding technology use

Answer: C

17) Circuit-switched networks:

- A) Break data into packets
- B) Establish dedicated communication paths
- C) Are more efficient than IP networks
- D) Were invented after IP networks

Answer: B

18) The Long Tail strategy is most effective for:

- A) Small brick-and-mortar stores
- B) Online retailers
- C) Local markets only
- D) Single-product companies

Answer: B

19) Why do established companies often miss disruptive technologies?

- A) They are too small to implement them.
- B) They focus too much on existing customers and products.
- C) They lack resources.
- D) They don't have access to new technologies.

Answer: B

20) IP networks are more efficient than circuit-switched networks because:

- A) They're older technology
- B) They use resources only as needed
- C) They require more bandwidth
- D) They're more expensive

Answer: B

21) What was Blockbuster's primary business model?

- A) Online streaming
- B) DVD-by-mail
- C) Physical stores with movie rentals
- D) Movie production

Answer: C

22) According to Clayton Christensen, disruptive technologies initially:

- A) Serve large markets
- B) Have superior performance
- C) Serve small, niche markets
- D) Replace existing technologies immediately

Answer: C

23) Modern organizations must leverage:

- A) Only traditional decision-making methods
- B) Data-driven decision making in real-time
- C) Annual planning cycles
- D) Quarterly reviews only

Answer: B

24) The failure of Nortel Networks demonstrates:

- A) The importance of adapting to technological change
- B) The advantage of being a larger company
- C) The benefit of avoiding new technologies
- D) The superiority of circuit-switched networks

Answer: A

25) Which statement best describes modern business competition?

- A) It is limited to business hours.
- B) It is primarily local.
- C) It is global and constant (24/7/365).
- D) It is less intense than in the past.

Answer: C

26) Why is the modern business environment considered intensely competitive and data intensive?

Answer: The modern business environment is intensely competitive because organizations now operate in a global market, forcing them to compete not only with local firms but also with international companies. This competition spans diverse geographic regions, each with its own cultural and regulatory considerations, making it crucial for companies to adapt quickly and effectively. Additionally, the environment is data intensive, as the volume of data generated and accessible today allows businesses to make informed, real-time decisions. Advances in technology enable companies to capture, store, and analyze vast amounts of data, ensuring that strategic decisions are based on objective, up-to-date information rather than on outdated assumptions. Together, these factors make the modern business landscape dynamic, challenging, and reliant on continuous data-driven insights for success.

27) What is disruptive technology, and how does it impact established companies?

Answer: Disruptive technology is an innovation that fundamentally alters the way businesses, customers, and entire industries operate. Initially, these technologies may appear to serve only niche markets with lower performance compared to existing options. However, they often bring unique advantages, such as cost-effectiveness, convenience, or user-friendliness, which attract a subset of customers. Over time, these technologies improve, and as their benefits become more apparent, they begin to replace or transform established markets, sometimes rendering existing products or services obsolete. Established companies often struggle to adopt disruptive technologies because they focus on maintaining their current offerings, viewing new technologies as inferior or irrelevant. This hesitance can lead them to miss opportunities to enter new markets or keep pace with technological advancements, as seen in the cases of Nortel with Cisco and Blockbuster with Netflix.

28) How did Cisco's focus on IP networking contribute to its success over Nortel?

Answer: Cisco's emphasis on IP (Internet Protocol) networking was a major factor in its success over Nortel. While Nortel relied on traditional circuit-switched networking, which required dedicated communication paths, Cisco focused on packet-switched networks that use IP. IP networking allows data to be broken into packets and sent over shared paths, making it more efficient and less costly than circuit-switched networking. This technology became increasingly valuable as the Internet grew, creating a demand for efficient, scalable networking solutions that could handle higher volumes and longer distances. Cisco's foresight in focusing on IP networking allowed it to adapt to the changing landscape, while Nortel, tied to its circuit-switched model, struggled to keep up. This difference in technological focus ultimately contributed to Cisco's rise and Nortel's decline, culminating in Nortel's bankruptcy in 2009.

29) Why was Netflix's business model disruptive to Blockbuster's?

Answer: Netflix's business model disrupted Blockbuster's by leveraging a more convenient, affordable, and technology-driven approach to movie rentals. Unlike Blockbuster's traditional brick-and-mortar setup, where customers had to physically visit stores to rent and return videos, Netflix offered a DVD-by-mail service that allowed customers to rent movies online, avoiding the inconvenience of in-person rentals. Additionally, Netflix adopted a subscription model, which eliminated late fees and offered a more budget-friendly alternative to Blockbuster's pay-per-rental approach. Over time, Netflix further innovated by introducing personalized recommendations and streaming services, further appealing to customers' desire for convenience and choice. Although Blockbuster attempted to adapt, it struggled to keep up with Netflix's digital-first model, which had already garnered a large, loyal customer base. This shift ultimately led to Blockbuster's bankruptcy, with Netflix emerging as a leader in the video streaming industry.

30) What makes artificial intelligence (AI) a prominent competitive advantage and disruptive technology today?

Answer: Artificial intelligence (AI) is recognized as a leading competitive advantage and disruptive technology because it fundamentally transforms how businesses operate and interact with their customers. AI enables organizations to analyze massive amounts of data quickly, facilitating real-time decision-making, personalization, and automation at an unprecedented scale. This technology enhances efficiency, accuracy, and speed, providing companies with tools to innovate and respond rapidly to market changes. In addition to operational benefits, AI is increasingly in demand as a skill, as noted by LinkedIn's identification of AI and machine learning as the top technical skills for 2024. AI's potential applications span nearly every industry, from healthcare to finance to logistics, making a foundational understanding of AI essential not only for technical professionals but for anyone in business today. Its impact extends beyond enhancing business processes; it disrupts entire industries, setting new standards for competitiveness and customer expectations.

31) Why is a basic understanding of AI and ML essential for students, even if they are not technical professionals?

Answer: A basic understanding of artificial intelligence (AI) and machine learning (ML) is crucial for all students, not just technical professionals, because these technologies are deeply embedded in today's business landscape across numerous disciplines. AI and ML applications span industries, including marketing, finance, supply chain, healthcare, and more. As future business leaders and decision-makers, students will need to understand the strategic value and ethical implications of these technologies to make informed decisions that harness AI and ML for competitive advantage. This foundational knowledge enables students to recognize opportunities for automation, improve data-driven decision-making, and understand the ways AI and ML can reshape processes, allowing them to be AI-literate and "informed users" in their respective fields.

32) How does a global environment influence business competition?

Answer: Operating in a global environment intensifies business competition because companies are no longer limited to local markets—they must compete with firms worldwide. This global reach requires businesses to manage diverse customer preferences, navigate cultural norms, and comply with varying regulatory requirements. To succeed, companies must be agile, adopting strategies that allow them to innovate quickly and serve various customer needs across multiple regions. Additionally, the global nature of business increases the pace of technological change, as companies continuously adopt innovations to maintain an edge over international competitors. In this environment, firms that effectively manage these complexities and adapt quickly to new markets and regulatory conditions are best positioned for success.

33) What role did the Long Tail strategy play in Netflix's success over Blockbuster?

Answer: The Long Tail strategy significantly contributed to Netflix's success over Blockbuster by allowing the company to offer a vast selection of movies and shows that went beyond mainstream titles. Unlike Blockbuster's brick-and-mortar stores, which were limited by physical shelf space and could only carry popular titles, Netflix's online platform allowed it to provide access to niche films and lesser-known content that appealed to a wider range of customer interests. This strategy helped Netflix attract a broader customer base, tapping into demand for diverse and unique content that traditional stores could not stock. The Long Tail not only increased customer satisfaction by catering to varied tastes but also enabled Netflix to maximize revenue from less popular content, creating a competitive edge over Blockbuster's traditional model.

34) Why do established companies often fail to adopt disruptive technologies?

Answer: Established companies frequently fail to adopt disruptive technologies because they are focused on maintaining their existing products and customer base. Disruptive technologies usually start by targeting niche markets with initially lower performance than mainstream alternatives, leading established firms to overlook their potential. These companies often prioritize incremental improvements to their current offerings, believing that their core customers prefer the familiar, proven solutions. Additionally, they may view new technologies as risky or inferior, causing them to dismiss early-stage innovations that eventually evolve and capture broader markets. By the time these disruptive technologies mature and gain traction, established companies are often too slow to adapt, missing opportunities to enter new markets or update their business models.

35) What is the significance of LinkedIn identifying AI and ML as the top technical skills for 2024?

Answer: LinkedIn's designation of artificial intelligence (AI) and machine learning (ML) as the top technical skills for 2024 underscores the growing demand for professionals skilled in these areas across industries. This trend highlights the critical role AI and ML have in enhancing productivity, driving innovation, and maintaining a competitive edge in today's data-driven economy. By investing in AI and ML expertise, organizations can harness the power of automation, predictive analytics, and personalization to meet customer needs more effectively. LinkedIn's ranking reflects the shift toward a future where understanding and applying AI and ML are essential for technical roles and business professionals who will rely on these tools to inform strategic decisions.

1.2 A Brief History of Artificial Intelligence and Machine Learning

1) The Turing Test assesses a machine's ability to exhibit intelligent behavior indistinguishable from human behavior.

Answer: TRUE

2) Arthur Samuel's checkers program was an early example of supervised learning.

Answer: FALSE

3) The Dartmouth Conference participants accurately predicted the timeline for AI development.

Answer: FALSE

4) Expert systems and AI/ML systems both require some form of human expert involvement.

Answer: TRUE

5) Cloud computing requires users to maintain their own local servers.

Answer: FALSE

6) Graphics Processing Units (GPUs) are specialized for sequential processing.

Answer: FALSE

7) Large language models can only process text data.

Answer: FALSE

8) The 1990s saw the emergence of both big data and cloud computing.

Answer: TRUE

9) Expert systems can always better explain their recommendations than AI/ML systems.

Answer: TRUE

10) Generative AI is limited to creating text-based content.

Answer: FALSE

11) The Turing Test involves:

- A) A computer playing chess
- B) Image Recognition
- C) Mathematical calculations
- D) Natural language conversation

Answer: D

12) Which of these is NOT a characteristic of big data?

- A) Visibility
- B) Velocity
- C) Volume
- D) Variety

Answer: A

13) Arthur Samuel's checkers program demonstrated:

- A) Supervised learning
- B) Reinforcement learning
- C) Deep learning
- D) Expert systems

Answer: B

14) Expert systems primarily operate using:

- A) Neural networks
- B) Deep learning
- C) Random algorithms
- D) IF-THEN rules

Answer: D

15) Which technology is specialized for parallel processing?

- A) GPU
- B) Traditional CPU
- C) Floppy disk
- D) RAM

Answer: A

16) Which is NOT a type of generative AI output?

- A) Images
- B) Audio
- C) Hardware
- D) Video

Answer: C

17) Large language models learn from:

- A) Academic papers
- B) Websites
- C) Conversations
- D) All of the above

Answer: D

18) Cloud computing provides:

- A) Social media platforms
- B) Computing resources over the internet
- C) Graphic design tools
- D) All of the above

Answer: D

19) The primary challenge of expert systems is:

- A) Cost of hardware
- B) Lack of data
- C) Difficulty in transferring human expertise
- D) Internet connectivity

Answer: C

20) What is the Turing Test and what does it measure?

Answer: The Turing Test, introduced by Alan Turing in 1950, measures a machine's ability to demonstrate human-like intelligence. In the test, a human evaluator interacts in a natural language conversation with both a machine and another human without knowing which is which. If the evaluator cannot reliably distinguish the machine from the human based on their responses, the machine is said to have exhibited a form of intelligence. The Turing Test is significant because it shifts the focus from the question of whether a machine "thinks" to whether it can imitate human conversation convincingly enough to be indistinguishable from a person, establishing an early benchmark for artificial intelligence.

21) What was significant about Arthur Samuel's checkers program?

Answer: The program was one of the earliest self-learning systems capable of improving its performance through experience. It played thousands of checkers games against itself, learning from its mistakes and refining its strategies in a process called reinforcement learning. This method allowed the program to get better over time, without direct human intervention in each game. Samuel's work demonstrated that computers could learn autonomously, laying the groundwork for machine learning approaches that enable computers to adapt and improve through trial and error, a concept central to modern AI.

22) What is Natural Language Processing (NLP)?

Answer: Natural Language Processing (NLP) is a branch of AI that focuses on enabling computers to understand, interpret, and generate human language in a way that is meaningful and useful. NLP combines elements of linguistics, computer science, and machine learning to allow computers to process and respond to spoken or written language. Key applications of NLP include speech recognition, language translation, and sentiment analysis, among others. By making it possible for machines to interact with humans in natural language, NLP has become essential for many AI-driven applications, from virtual assistants like Siri and Alexa to sophisticated language models that can analyze large volumes of text.

23) How do expert systems store knowledge?

Answer: Expert systems store knowledge typically in the form of IF-THEN rules, which capture specific logical relationships or decision criteria from a domain expert. These systems are designed to mimic human expertise within a narrowly defined area by applying stored rules to make decisions or offer recommendations. Complex expert systems can contain thousands of these rules, representing a structured approach to encoding specialized knowledge. The effectiveness of an expert system depends on the quality and depth of the rules, which serve as a substitute for human judgment in particular fields, such as medical diagnosis or financial analysis. However, the rigid structure of rule-based knowledge storage can limit the system's adaptability in highly variable or uncertain scenarios.

24) What are three characteristics of big data?

Answer: Big data is commonly defined by three main characteristics: volume, velocity, and variety. Volume refers to the massive amount of data generated every day from diverse sources such as social media, sensors, and business transactions. Velocity indicates the high speed at which data is created and processed, often in real-time, which requires efficient systems for timely analysis. Variety encompasses the different forms of data, including structured data (like databases), semi-structured data (like XML), and unstructured data (like text, images, and videos).

25) Explain how GPUs contribute to AI development.

Answer: Graphics Processing Units (GPUs) are specialized hardware designed for parallel processing, making them ideal for handling the complex computations required in AI, especially for training deep neural networks. Unlike CPUs, which execute tasks sequentially, GPUs can process thousands of calculations simultaneously, enabling the efficient handling of large datasets. This capability significantly reduces the time needed to train AI models, particularly in deep learning, where vast amounts of data and multiple layers of computation are involved. The parallel processing power of GPUs has helped to make AI training feasible for real-world applications.

26) What is cloud computing and why is it important for AI?

Answer: Cloud computing delivers essential computing resources – such as storage, servers, databases, and software – over the internet, allowing users to access them on demand rather than maintaining them on local servers. This is critical for AI, as training and deploying machine learning models require significant computational power and storage capacity. With cloud computing, AI developers and companies can rent the required resources as needed, avoiding the high costs of owning and maintaining hardware. Furthermore, cloud computing allows for easy scaling, so AI systems can handle larger datasets or more users without major infrastructure changes, making AI more accessible and cost-effective for organizations of all sizes.

27) How did internet growth in the 1990s contribute to AI development?

Answer: The rapid growth of the internet in the 1990s led to an explosion of data, as more users and websites generated vast amounts of information that became valuable for training AI models. This period saw a shift in data availability, with the internet serving as a massive, easily accessible source of diverse data for AI research and applications. Additionally, the internet facilitated global collaboration among researchers, allowing for the faster exchange of ideas and developments in AI. The availability of this large-scale data, combined with advancements in computational power, helped propel AI forward, making it possible to train more sophisticated algorithms capable of tackling real-world problems.

28) What are large language models (LLMs) and what can they do?

Answer: Large Language Models (LLMs) are AI models trained on extensive amounts of text data to understand and generate human language. By analyzing language patterns in vast datasets, LLMs can perform various tasks, including completing text, summarizing documents, answering questions, and translating languages. These models, such as OpenAI's GPT series, Google's BERT, and Microsoft's Turing NLG, are designed to understand context and nuance in language, allowing them to produce human-like responses in natural language. LLMs have become increasingly valuable in applications like customer service, content creation, and language translation, as they enable more efficient and accessible interactions with technology.

29) What ethical concerns emerged in the 2020s regarding AI?

Answer: In the 2020s, ethical concerns about AI became more prominent, focusing on issues of fairness, accountability, transparency, and societal impact. As AI systems are increasingly integrated into daily life, questions have arisen regarding biases in algorithms, the potential for unequal treatment of individuals, and the consequences of AI decisions on employment and privacy. Moreover, the lack of transparency in how some AI models make decisions has raised accountability concerns, especially when AI systems are used in sensitive areas like healthcare, finance, and criminal justice. These ethical issues have prompted researchers, policymakers, and organizations to advocate for responsible AI practices and ensure that AI benefits society fairly.

1.3 Definitions

1) AI is defined based on how humans think rather than how they perform tasks.

Answer: FALSE

2) The Turing Test is used to determine if a computer exhibits intelligent behavior.

Answer: TRUE

3) In customer service, AI systems can fully interpret and respond to complex human emotions.

Answer: FALSE

4) Natural intelligence is perishable, while artificial intelligence is permanent in terms of knowledge preservation.

Answer: TRUE

5) Weak AI can perform a wide range of tasks, just like human intelligence.

Answer: FALSE

6) Machine learning is a subset of artificial intelligence.

Answer: TRUE

7) Strong AI currently exists and is widely used in various applications.

Answer: FALSE

8) Artificial intelligence can be easily duplicated and disseminated across platforms.

Answer: TRUE

9) Human intelligence is limited to focused and stable domains, while AI excels in using a wide range of experiences.

Answer: FALSE

10) Machine learning algorithms do not require data to improve their performance.

Answer: FALSE

11) Super AI would theoretically surpass human intelligence in all cognitive tasks.

Answer: TRUE

12) AI is better than humans at recognizing patterns and relationships in every context.

Answer: FALSE

13) Symbolic AI relies on machine learning to improve its performance.

Answer: FALSE

14) Natural intelligence can use sensory experiences directly, whereas AI must interpret data to use sensory information.

Answer: TRUE

15) ML and AI are often used interchangeably in discussions but have distinct meanings.

Answer: TRUE

16) What does the Turing Test assess?

A) If a computer can perform complex calculations

B) If a human can communicate with a computer

C) If a computer can exhibit behavior indistinguishable from a human

D) If a computer can generate emotions

Answer: C

17) Which of the following is a capability associated with intelligence?

A) Memory storage

B) Following specific rules

C) Learning from experience

D) Data entry

Answer: C

18) Which type of AI system would theoretically exceed human intelligence in all areas?

A) Weak AI

B) Strong AI

C) Machine Learning

D) Super AI

Answer: D

19) Weak AI is also known as:

A) Artificial General Intelligence

B) Narrow AI

C) Symbolic AI

D) Super AI

Answer: B

20) Which of the following is an example of weak AI?

A) A robot that can feel emotions

B) A self-improving machine with free will

C) An AI system that can perform any task a human can

D) A voice assistant like Siri

Answer: D

21) Which aspect of AI in customer service ensures that the knowledge base is always consistent?

- A) Creativity
- B) Preservation of knowledge
- C) Sensory experiences
- D) Recognizing patterns

Answer: B

22) Machine learning focuses on:

- A) Algorithms that improve from data
- B) Fixed programming for specific tasks
- C) Storing large amounts of data
- D) High-level symbolic reasoning

Answer: A

23) Which of the following capabilities is challenging for AI compared to natural intelligence?

- A) Consistent knowledge dissemination
- B) Creativity
- C) Documentation of interactions
- D) Duplication of processes

Answer: B

24) Symbolic AI typically uses:

- A) Machine learning models
- B) Statistical patterns
- C) Predefined rules and logic
- D) Deep learning neural networks

Answer: C

25) The term "artificial general intelligence" is synonymous with:

- A) Super AI
- B) Weak AI
- C) Narrow AI
- D) Strong AI

Answer: D

26) An example of AI that does not use machine learning would be:

- A) An expert system with predefined rules
- B) A recommendation system
- C) A neural network for image recognition
- D) A predictive maintenance system

Answer: A