

Student Learning Outcomes

By the end of this chapter, you will be able to:

- Explain how AI can be applied to specific applications in areas like NLP, Robotics, Speech Recognition.
- Conduct a technology recognition experiment where students interact with products based on NLP, Robotics, Speech Recognition.
- Discuss the benefits and limitations of NLP, Robotics, Speech Recognition, and others.
- Show that there are instances where use of AI causes social injustices.
- Develop critical thinking skills to assess situations where AI has led to social injustices and identify potential areas of improvement.
- Effectively communicate the social implications of AI, particularly regarding injustices and ethical responsibilities, both in writing and verbally.
- Exhibit an awareness of ethical considerations in AI development and usage, as well as the potential consequences of overlooking these considerations.
- Analyze case studies or scenarios where AI has caused social injustices, and discuss the underlying factors contributing to these issues.

Subjective Type Questions

Long Questions prepared in the light of new Examination Techniques
(Knowledge, Understanding, Application, Analytical & Conceptual)

Introduction

Q. How AI, NLP and speech technology help us?

Ans: Artificial Intelligence:

Computer Science is not just about using computers, it is about solving problems, creating smart tools, and making life easier. One of the most important areas of modern computer science is Artificial Intelligence (AI).

Natural Language Processing (NLP):

Natural Language Processing (NLP) helps computers understand human language. Chatbots, text analysis tools, and automatic translation apps are all part of NLP.

Speech technology:

Speech technology powers voice assistants like Alexa and Google Assistant. Recommendation systems suggest audios, videos, or products based on what users like. Autonomous vehicles, such as self-driving cars, use AI to move safely without drivers. Robotics is used in factories, hospitals, and even space missions. AI must be used fairly and safely.

Safety and responsibility:

It is important to study ethics, so that AI does not cause harm or injustice to people not harm people or create social injustices. Some systems may show bias or make unfair decisions if they are not designed carefully. That's why students and future developers must learn about data privacy, accountability, and ethical rules for creating AI tools. This chapter will also teach how to think critically about AI, recognize both its benefits and risks, and understand how AI affects jobs, education, health, and society.

7.1

Artificial Intelligence (AI)

Q.1. What is Artificial intelligence (AI)? Describe the impact of AI on jobs and work?

Ans:

Artificial Intelligence (AI) is a modern field of computer science that teaches machines how to "think" and "act" like humans. It helps computers solve problems, learn from data, and make smart decisions without being told what to do step by step.

Real life applications:

AI is used in many areas such as:

- Mobile apps
- Online shopping
- Health care
- Transportation etc.

For example:

When you use a voice assistant like Google assistant or a chatbot on a website, you are using AI. It helps doctors find diseases, drivers use maps, and students find answers online.

Impact of AI on Jobs and Work:

AI is changing the way people work in many fields. In factories, robots and machines now do jobs that were once done by human experts. These machines can work faster, longer, and with fewer mistakes. At the same time, AI is also creating new kinds of jobs. People are needed to design, test, and manage AI systems. Jobs like data scientist, AI developer, and machine learning engineer are growing fast.

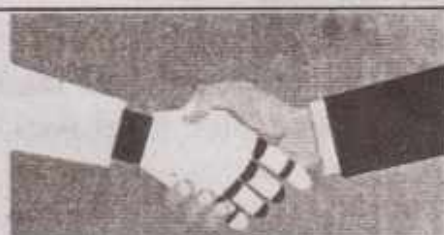


Figure 7.1: Ai helping people

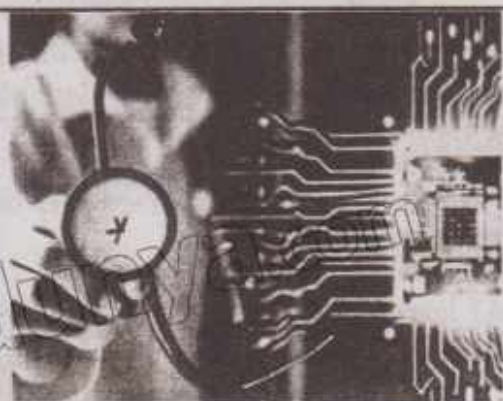


Figure 7.2: AI helps doctors in the diagnosis of diseases

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AI can now write stories, solve math problems, and even create art, just like a human!

Q.2. Why Data is important in AI? Describe automated data collection? Also describe types of data?

Ans:

Data is the most important part of AI. AI learns from data, just like a student learns by reading books. If the data is large and correct, the AI system becomes smarter and gives better results. AI systems depend on data to learn and improve. When they receive a large amount of information from different sources, they can find patterns and learn how to make better choices.

Automatic Data Collection:

Automatic data collection means gathering information without needing a person to enter it by hand. Many devices and applications can collect data on their own. With automatic collection, AI can adjust and respond to user needs quickly. It also saves time, reduces errors, and allows systems to work without needing human input all the time.

Example:

Mobile phones collect location, usage, and search history automatically. Online websites also collect user clicks, views, and preferences.

Types of Data:

Quantity data type:

Quantity refers to how much data is available". When an AI system receives a large number of examples, it becomes more familiar with different situations.

Example:

If a machine sees many different images or texts, it becomes better at understanding new ones.

Quality data type:

Quality means how useful and correct the data is. If the data has mistaken, missing values, or confusing labels, the AI may learn the wrong things. Therefore, both the amount and the accuracy of data play a big role in building strong AI systems.

DO YOU KNOW

An AI trained with poor-quality data can give wrong answers or make unfair decisions.

DO YOU KNOW

AI learns better with both types of data: big (quantity) and accurate (quality).

Q.3. Describe the advantage of AI in real life applications? Also Define NLP?

Ans: Advantage of AI:

AI is now used in many areas of daily life. It helps businesses, schools, hospitals, and even homes become smarter and more efficient. These are real uses of AI that make work easier and faster.

Natural Language Processing:

Natural Language Processing (NLP) is a part of AI that helps computers understand human language. It allows machines to read text, listen to speech, and give answers in a way people can understand.

Example:

When someone types a question in a search bar or talks to a voice assistant, NLP helps the AI system understand and reply correctly.

Real World Application of NLP:

In customer service, it helps answer common questions without human help.



Figure 7.3: Talking Chatbot helps people

TIDBIT

Chatbots on websites can answer your questions 24/7, all thanks to NLP.

Q.4. Describe the use of Robotics in everyday life? Also explain speech technology and voice control?

Ans: Importance of Robots:

Robotics is an important part of AI that involves machines designed to do tasks like humans. These machines are called robots. They can perform tasks like lifting heavy items, helping in surgeries, or cleaning floors intelligently. Robots can help old or disabled people with simple daily tasks. Because robots do not get tired and can work with great accuracy.

Speech Technology and Voice Control:

Speech technology is a type of AI that allows computers to listen and understand spoken words. It helps machines turn voice into text and respond with answers.

Voice assistants:

Like those used in phones or smart devices are examples of this technology.

Customer Service Centers:

In customer service, it helps answer calls and guide users without a human operator.

Smart Home systems:

In smart homes, people can control lights or devices just by speaking.

Healthcare:

In healthcare, it can help doctors record notes without typing.

Note: Speech technology makes it easier and faster for people to use machines with just their voice.

DO YOU KNOW

Robots are now used in some restaurants to serve food and clean tables.

TIDBIT

Smartphones can now unlock using your voice, no need to touch anything.

DO YOU KNOW

Some cars now respond to voice commands to turn on music, make calls, or give directions.

Q.5. Define and explain recommendation systems with examples?

Ans: Importance of recommendation system:

Recommendation systems are a part of AI that give users suggestions based on their likes and past actions. These systems study what a person has viewed, searched, or selected before, and then show similar options.

Example:

Online shopping:

On an online shopping website, if someone looks at school bags, the AI may suggest other types of bags or related items.

Videos:

In education, a website can suggest helpful videos or articles based on a student's learning history.

User Experience:

Recommendation systems improve the user experience by making content more personal and useful.

Safety:

these systems must be used carefully to protect privacy and avoid showing the same types of content again and again.

TIDBIT

When YouTube shows you "videos you may like," that's AI learning your interests.

Q.6. Define and explain autonomous vehicles with its advantages and challenges?

Ans:

Autonomous vehicles, also called self-driving vehicles, are vehicles that can move on the road without a human driver. These vehicles use AI to understand their surroundings and make decisions on their own.

Advantages of self-driven cars:

Equipment's:

They are equipped with smart sensors, cameras, Global Positioning System (GPS), and radars to detect traffic lights, road signs, other vehicles, and people pedestrian.

Speed Safety:

With the help of these tools and AI, the car can safely speed up, slow down, turn, and stop when needed.

Reduce Accidents:

They can reduce the number of road accidents caused by human mistakes such as distraction or tiredness.

Disable persons:

They can also help people who are unable to drive, such as the elderly or disabled.

Challenges:

Job Loss:

There are also concerns about job loss for drivers and the need for strong traffic laws for AI systems.

Responsibility:

People also worry about who is responsible if a self-driving car causes an accident. That's why engineers, governments, and companies are working together to improve safety and create fair rules for these smart vehicles.



Figure 7.4: Self-driving car

7.4 Benefits and Challenges of AI Applications

Q.7. Describe the benefits and challenges facing AI in today's era?

Ans: Benefits of AI:

Easy to Use:

AI applications are helping people complete tasks faster and more easily.

Businesses:

In offices, AI systems manage files, answer questions. In education, AI can guide students with smart learning apps that adjust to their level. This saves time and helps people focus on more important decisions.

Decision making:

At the same time, AI supports businesses in planning, predicting sales, and giving better service.

Efficiency:

These smart tools are improving lives by reducing human errors and increasing efficiency in many fields like agriculture, banking, and transport etc.

Limitations and Challenges of AI Applications:

Bias:

AI systems are not always correct and sometimes give wrong results if the low quality or biased.

Language issues:

A chatbot, for example, might misunderstand a question if the language is unclear.

Sensitive Fields:

Fields like law or health, small AI mistakes can cause big problems. That is why careful testing is needed.

Unemployment:

Another challenge is that AI can replace human workers in many jobs e.g., customer services, data entry and clerical works which may lead to job loss. Also, many AI systems cannot make fair decisions if they are not designed carefully.

DO YOU KNOW

AI systems can make mistakes if they are trained on incomplete or biased data.

7.5

Ethics, Fairness and Social Impact of AI

Q.8. Define Ethics in AI and explain bias in AI and algorithms?

Ans:

Ethics in AI means using AI in a way that is fair, honest, and safe for everyone. Since AI can make decisions, it is important to make sure those decisions do not hurt people or treat anyone unfairly.

Example:

If an AI system gives better service to one group of people and ignores others, it is not fair. AI should be developed with care, keeping in mind fairness, safety, and respect for human rights.

Bias in AI and Algorithms:

Bias in AI happens when the system gives unfair results because of the data it was trained on. If the data only represents one group of people, the AI may not understand or treat other groups fairly.

Example:

A face recognition tool may not work well for all skin colors if it was trained mostly on images of only one type. This shows that data should include different people, languages, and situations. Removing bias is a big step toward making AI more fair and helpful for all.

TIDBIT

AI can be unfair if not designed properly that's why developers must think about what's right and wrong.

Q.9. What is fairness and transparency in AI?

Ans: Fairness:

Fairness in AI means that the system should treat all users equally, no matter their race, gender, age, or background.

Importance of Fairness:

This is important in systems that make decisions about input Human Rights school admissions, job interviews, or legal cases. To ensure fairness, AI must be trained on data that includes all related types of people and situations.

Transparency:

Transparency means that people should understand how an AI system works and why it made a certain decision.

Example:

If an AI rejects a loan application or selects a student, users have the right to know what rules or steps the system followed.

Purpose:

Transparency helps avoid mistakes and gives confidence that the system is working honestly.

Q.10. Explain privacy, security, surveillance and social equity in AI?**Ans: Privacy:**

Privacy means keeping personal information safe and not sharing it without permission. Many AI systems collect data from users, such as names, addresses, location, or search history. If this data is not protected, it can be stolen or misused.

Data security:

Data security means protecting information from hackers, viruses, or other attacks. AI systems must use strong security methods to keep user data safe.

Surveillance:

Surveillance is when systems or cameras watch people's actions. While it can help in safety, it must be used carefully. Watching people all the time without reason can harm freedom and privacy.

Social equity:

AI should be used in a way that helps all people equally, including the poor, disabled, and those living in remote areas. Sometimes, new technologies like AI are only available to rich or educated groups, while others are left behind. This creates a gap between people. To support fairness in society, AI tools should be designed so everyone can benefit, not just a few.

7.6**Responsibility of AI Designers****Q.11. Explain the responsibilities of designers when designing AI systems?****Ans:**

AI systems do not make rules by themselves; they follow instructions created by human designers. This means the people who build AI have a big responsibility to make sure their systems are fair, safe, and helpful for society. If an AI system makes a wrong decision or treats someone unfairly, the mistake often comes from the way it was designed. That is why AI designers must think carefully about how their tools will affect people in real life. Making AI that is helpful and trustworthy is not just a technical job it is a moral duty.

Following Ethics in AI:

Ethics in AI means doing what is right and fair when creating or using AI systems. AI designers must make sure their systems do not hurt people, spread false information or treat anyone unfairly. Ethics help designers make decisions that protect users and support justice. Following ethics also includes being honest about how the AI system

works. Users should know what data is being used and how decisions are made. Ethical design builds trust between people and technology.

DO YOU KNOW

AI is only as good as the people who build it, that's why designers must act responsibly.

Objective Type Questions

Additional MCQ's

Multiple Choice Questions prepared in the light of new Examination Techniques
(Knowledge, Understanding, Application, Analytical & Conceptual)

Introduction

1. NLP helps computer to:
(A) Safe Search through web (B) Understand human language
(C) Secure Private Data (D) Reduce Load
2. Which of the following is not the part of NLP?
(A) Chatbots (B) Text Analysis tools
(C) Translation apps (D) Web Browsers
3. Which of the following is a voice assistant?
(A) Web Browsers (B) All Gaming apps
(C) Google Assistant (D) All above
4. Which of the following is a property of autonomous vehicles?
(A) Full automated cars (B) Advance cars
(C) Fuel Efficient cars (D) Self driven cars
5. Which of the following use robotics?
(A) Industries (B) Hospitals (C) Space Missions (D) All above
6. Why Some system do not make correct decisions?
(A) Biased (B) Technical failure
(C) Both a & b (D) None of them

7.1

Artificial Intelligence (AI)

7. Which of the following is not the feature of AI?
(A) Think and act (B) Solve Problem step by step
(C) Learn from data (D) None of them
8. Which of the following is not the field of AI?
(A) Health care (B) Transportation
(C) Online shopping (D) Build a hardware
9. AI help doctors to:
(A) Find patients (B) Give instructions
(C) Find diseases (D) All above

10. **Why Robots are useful in industries?**
 (A) Robots are faster as compare to humans
 (B) Robots are cost less
 (C) Robots are accurate & consistent (D) All above
11. **Accuracy of Robots:**
 (A) 100% (B) Better than Human (C) 50% (D) 10%
12. **Which of the following is AI Job?**
 (A) Graphic designing (B) Design Database
 (C) Develop software (D) None of them

7.2

Data and AI

13. **To handle larger data & summarize it we use?**
 (A) Database (B) MS Word (C) Google Assistant (D) MS Excel
14. **AI improvement depends upon:**
 (A) Windows updates (B) Software update
 (C) Data (D) Technology
15. **Why AI making unfair decisions?**
 (A) Wrong update of software (B) Use of unreliable source
 (C) Both a & b (D) None of the above
16. **Which is used to collect data automatically?**
 (A) MS Excel (B) Database (C) Google Assistant (D) IoT Devices
17. **Online websites collect user clicks which are called?**
 (A) Hyperlinks (B) Cookies (C) Files (D) Downloads
18. **Types of Data:**
 (A) 1 (B) 2 (C) 3 (D) 4
19. **When we required data in amount, it is called?**
 (A) Qualitative Data (B) Abstract Data
 (C) Decomposed Data (D) Quantitative Data
20. **Data usefulness refers to:**
 (A) Quality (B) Accuracy (C) Quantity (D) All above
21. **The correctness of data is called:**
 (A) Accuracy (B) Reliability (C) Quality (D) All above
22. **When the data becomes big it is called as:**
 (A) Quality (B) Quantity (C) Both A & B (D) None of them

7.3

Real-World Applications of AI

23. **Why AI is popular now a day?**
 (A) Easier to use (B) Difficult to handle (C) Costly (D) All above
24. **Can NLP answer questions in multiple languages?**
 (A) Yes (B) No (C) May be yes (D) No
25. **Chatbots are:**
 (A) Mobile apps (B) Computer app (C) Websites (D) All above

26. AI can help in:
 (A) Surgeries (B) Fighting heavy items
 (C) Help disable persons (D) All above
27. Which of the following is a voice assistant?
 (A) IoT sensors (B) IoT System (C) Alexa (D) Chatbot
28. In Smart homes, people control devices by:
 (A) Touch control (B) Gestures (C) Voice (D) Remote
29. Recommendation system give suggestion based on:
 (A) User history (B) Download files (C) Web browsing (D) All above
30. In which platform Recommendation system are used?
 (A) Online websites (B) YouTube
 (C) Netflix (D) All above
31. Recommendation are helpful:
 (A) To find more customers (B) Making system more secure
 (C) Both A & B (D) None of these
32. AI learn your interest which you?
 (A) Watch a video (B) Like a video
 (C) Both a, b (D) None of these
33. Which help autonomous cars to move safely on roads?
 (A) GPS (B) Software
 (C) Sensors (D) Traffic lights
34. Advantage of autonomous cars:
 (A) Cost Effective (B) Reduce accidents (C) Fewer efficient (D) All above

7.4 Benefits and challenges of AI Applications

35. In business, AI helps in:
 (A) Manage Security (B) Manage Files
 (C) Manage Employees (D) All above
36. By focus on most important decisions we save:
 (A) Time (B) Cost (C) Both (D) None
37. AI in today's world can reduce:
 (A) Human effort (B) Human error (C) Human policy (D) All above
38. A chatbot maybe misunderstood the command:
 (A) If language is not clear (B) Network is too slow
 (C) Software is not update (D) None of them

7.5 Ethics, fairness and social impact of AI

39. Fairness, ethics and safety of AI ensure?
 (A) Safety of Rights (B) Safety of human
 (C) Follows Law & regulation (D) All above
40. When system treat all users equally it is called?
 (A) Fairness (B) Ethics (C) Safety (D) None of them

Answers

- | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|
| 1. B | 2. D | 3. C | 4. D | 5. D | 6. A | 7. B |
| 8. D | 9. C | 10. D | 11. B | 12. A | 13. D | 14. C |
| 15. B | 16. C | 17. B | 18. B | 19. D | 20. A | 21. C |
| 22. B | 23. A | 24. A | 25. D | 26. D | 27. C | 28. C |
| 29. A | 30. D | 31. A | 32. B | 33. C | 34. B | 35. B |
| 36. C | 37. B | 38. A | 39. D | 40. A | | |

Additional Short Question's

Short Answer Questions prepared in the light of new Examination Techniques
(Knowledge, Understanding, Application, Analytical & Conceptual)

Introduction

1. **Define NLP.**

Ans: Natural Language Processing (NLP) helps computers understand human language. Chatbots, text analysis tools, and automatic translation apps are all part of NLP.

2. **Why Speech technology is important in AI?**

Ans: Speech technology powers voice assistants like Alexa and Google Assistant. Recommendation systems suggest audios, videos, or products based on what users like.

3. **Why it is important to use AI responsibly?**

Ans: It is important to study ethics, so that AI does not cause harm or injustice to people not harm people or create social injustices. Some systems may show bias or make unfair decisions if they are not designed carefully.

7.1

Artificial Intelligence (AI)

4. **Explain the purpose of AI?**

Ans: Artificial Intelligence (AI) is a modern field of computer science that teaches machines how to "think" and "act" like humans. It helps computers solve problems, learn from data, and make smart decisions without being told what to do step by step.

5. **Name the real life applications of AI.**

Ans: AI is used in many areas such as:

- Mobile apps • Online shopping • Health care • Transportation etc.

6. **Why AI has impact on Job opportunities?**

Ans: AI is reduced the way people work in many fields. In factories, robots and machines now do jobs that were once done by human experts. These machines can work faster, longer, and with fewer mistakes.

7. **Is AI creating Job opportunities? Explain.**

Ans: At that time, AI is also creating new kinds of jobs. People are needed to design, test, and manage AI systems. Jobs like data scientist, AI developer, and machine learning engineer are growing fast.

8. Explain briefly the use of AI for large data sets.

Ans: Data is the most important part of AI. AI learns from data, just like a student learns by reading books. If the data is large and correct, the AI system becomes smarter and gives better results. AI systems depend on data to learn and improve.

9. Define automated data collection using AI.

Ans: Automatic data collection means gathering information without needing a person to enter it by hand. Many devices and applications can collect data on their own.

Example:

Mobile phones collect location, usage, and search history automatically. Online websites also collect user clicks, views, and preferences.

10. Differentiate between quantitative and Qualitative data.

Ans:

Quantitative Data	Qualitative Data
1. It refers to data that can be counted or measured in numerical form (quantity).	1. It refers to descriptive data that deals with characteristics or qualities (non-numerical).
2. It answers questions like "How much?" or "How many?" and can be used for statistical analysis.	2. It answers questions like "Why?" or "How?" and helps understand reasons and motivations.

11. Explain shortly the uses of AI.

Ans: AI is now used in many areas of daily life. It helps businesses, schools, hospitals, and even homes become smarter and more efficient. These are real uses of AI that make work easier and faster.

12. Name the real-world application of NLP.

Ans: In customer service, it helps answer common questions without human help. Chatbots on websites can answer your questions 24/7, all thanks to NLP.

13. Describe the importance of Robots.

Ans: Robotics is an important part of AI that involves machines designed to do tasks like humans. These machines are called robots. They can perform tasks like lifting heavy items, helping in surgeries, or cleaning floors intelligently.

14. Write two applications of speech technology in real life.

Ans: Smart Home systems:

In smart homes, people can control lights or devices just by speaking.

Healthcare:

In healthcare, it can help doctors record notes without typing.

15. Why recommendation system are useful?

Ans: Recommendation systems are a part of AI that give users suggestions based on their likes and past actions. These systems study what a person has viewed, searched, or selected before, and then show similar options.

16. Write any one example of recommendation system.

Ans: Videos:

In education, a website can suggest helpful videos or articles based on a student's learning history.

17. Describe any two advantages of self-driven cars.

Ans: Speed Safety:

With the help of these tools and AI, the car can safely speed up, slow down, turn, and stop when needed.

Reduce Accidents:

They can reduce the number of road accidents caused by human mistakes such as distraction or tiredness

18. What are the challenges facing by self-driven cars?

Ans: Job Loss:

There are also concerns about job loss for drivers and the need for strong traffic laws for AI systems.

Responsibility:

People also worry about who is responsible if a self-driving car causes an accident

7.4

Benefits and challenges of AI Applications

19. Write down any two benefits of AI.

Ans: Easy to Use:

AI applications are helping people complete tasks faster and more easily.

Businesses:

In offices, AI systems manage files, answer questions. In education, AI can guide students with smart learning apps that adjust to their level. This saves time and helps people focus on more important decisions.

20. Write down any two limitations of AI.

Ans: Bias:

AI systems are not always correct and sometimes give wrong results if the low quality or biased.

Language issues:

A chatbot, for example, might misunderstand a question if the language is unclear.

7.5

Ethics, fairness and social impact of AI

21. Define ethics.

Ans: Ethics in AI means using AI in a way that is fair, honest, and safe for everyone.

Since AI can make decisions, it is important to make sure those decisions do not hurt people or treat anyone unfairly.

Example:

If an AI system gives better service to one group of people and ignores others, it is not fair. AI should be developed with care, keeping in mind fairness, safety, and respect for human rights.

22. Why is it important in today's world?

Ans: This is important in systems that make decisions about input Human Rights school admissions, job interviews, or legal cases. To ensure fairness, AI must be trained on data that includes all related types of people and situations.

23. Define Transparency in AI.

Ans: Transparency means that people should understand how an AI system works and why it made a certain decision.

Example:

If an AI rejects a loan application or selects a student, users have the right to know what rules or steps the system followed.

24. What is Social equity?

Ans: AI should be used in a way that helps all people equally, including the poor, disabled, and those living in remote areas. Sometimes, new technologies like AI are only available to rich or educated groups, while others are left behind. This creates a gap between people. To support fairness in society, AI tools should be designed so everyone can benefit, not just a few.

25. Explain shortly privacy.

Ans: Privacy means keeping personal information safe and not sharing it without permission. Many AI systems collect data from users, such as names, addresses, location, or search history. If this data is not protected, it can be stolen or misused.

Exercise Questions (Solved)

Multiple Choice Questions

1. What does AI stand for?
(a) Automatic Intelligence
(b) Artificial Intelligence
(c) Active Interface
(d) Applied Information
2. Which of the following is an example of Natural Language Processing (NLP)?
(a) Online calculator
(b) Voice typing
(c) File copying
(d) Image editing
3. What type of data helps AI make better decisions?
(a) Short and weak data
(b) Only images
(c) Large and good quality data
(d) Data without labels
4. Which tool uses AI to understand human voice?
(a) Video player
(b) Translator
(c) Speech recognition
(d) Mouse
5. What is the role of robots in factories?
(a) Watching videos
(b) Making websites
(c) Doing repeated or dangerous tasks
(d) Writing stories
6. What is a challenge of using AI?
(a) It works slowly
(b) It cannot be turned off
(c) It may replace human jobs
(d) It cannot store data
7. If data represents only a group of people it is called:
(a) Unbiased data
(b) Biased data
(c) Good data
(d) Reliable data

8. Why is fairness important in AI?
(a) So the system looks good (b) To avoid slow speed
(c) To give equal treatment to all users
(d) To use more memory
9. Which of these is NOT an AI tool?
(a) Chatbot (b) Face detection (c) Spell checker (d) Paper notebook

Answers

- | | | | | |
|--------|--------|--------|--------|--------|
| 1. (b) | 2. (b) | 3. (c) | 4. (c) | 5. (c) |
| 6. (c) | 7. (b) | 8. (c) | 9. (d) | |

Short Questions

1. What is Artificial Intelligence (AI)?

Ans: Artificial Intelligence (AI) is a modern field of computer science that teaches machines how to "think" and "act" like humans. It helps computers solve problems, learn from data, and make smart decisions without being told what to do step by step.

For example:

When you use a voice assistant like Google assistant or a chatbot on a website, you are using AI. It helps doctors find diseases, drivers use maps, and students find answers online.

2. How is AI used in daily life?

Ans: Real life applications:

AI is used in many areas such as:

- Mobile apps • Online shopping • Health care • Transportation etc.

3. Why does AI need large and good-quality data?

Ans: Data is the most important part of AI. AI learns from data, just like a student learns by reading books. If the data is large and correct, the AI system becomes smarter and gives better results. AI systems depend on data to learn and improve. When they receive a large amount of information from different sources, they can find patterns and learn how to make better choices

4. What is the role of Natural Language Processing (NLP)?

Ans: Natural Language Processing (NLP) helps computers understand human language. Chatbots, text analysis tools, and automatic translation apps are all part of NLP

5. Give one example of robotics in everyday life.

Ans: Robotics is an important part of AI that involves machines designed to do tasks like humans. These machines are called robots. They can perform tasks like lifting heavy items, helping in surgeries, or cleaning floors intelligently.

6. What is the purpose of speech recognition technology?

Ans: Speech technology powers voice assistants like Alexa and Google Assistant. Recommendation systems suggest audios, videos, or products based on what users like. Autonomous vehicles, such as self-driving cars, use AI to move safely without drivers.

7. How do recommendation systems work?

Ans: Recommendation systems are a part of AI that give users suggestions based on their

likes and past actions. These systems study what a person has viewed, searched, or selected before, and then show similar options.

Example:

Online shopping:

On an online shopping website, if someone looks at school bags, the AI may suggest other types of bags or related items.

8. What is meant by bias in AI systems?

Ans: Bias in AI and Algorithms:

Bias in AI happens when the system gives unfair results because of the data it was trained on. If the data only represents one group of people, the AI may not understand or treat other groups fairly.

Example:

A face recognition tool may not work well for all skin colors if it was trained mostly on images of only one type. This shows that data should include different people, languages, and situations. Removing bias is a big step toward making AI more fair and helpful for all.

9. Why should AI systems be transparent and fair?

Ans: Fairness in AI means that the system should treat all users equally, no matter their race, gender, age, or background.

Importance of Fairness:

This is important in systems that make decisions about input Human Rights school admissions, job interviews, or legal cases. To ensure fairness, AI must be trained on data that includes all related types of people and situations.

Long Questions

1. What is the importance of data in AI? Explain why good and large data is needed.

Ans. For Answer See Q No. 2.

2. Write in detail about any three real-world applications of AI (such as NLP, robotics, or speech technology).

Ans: For Answer See Q No. 3,4.

Ans: 1. Natural Language Processing:

Natural Language Processing (NLP) is a part of AI that helps computers understand human language. It allows machines to read text, listen to speech, and give answers in a way people can understand.

Example: When someone types a question in a search bar or talks to a voice assistant, NLP helps the AI system understand and reply correctly.

Real World Application of NLP:

In customer service, it helps answer common questions without human help.

2. Robots:

Robotics is an important part of AI that involves machines designed to do tasks like humans. These machines are called robots. They can perform tasks like lifting heavy items, helping in surgeries, or cleaning floors intelligently. Robots can help old or disabled people with simple daily tasks. Because robots do not get tired and can work with great accuracy.

3. Speech Technology and Voice Control:

Speech technology is a type of AI that allows computers to listen and understand spoken words. It helps machines turn voice into text and respond with answers.

Voice assistants:

Like those used in phones or smart devices are examples of this technology.

Customer Service Centers:

In customer service, it helps answer calls and guide users without a human operator.

Smart Home systems:

In smart homes, people can control lights or devices just by speaking.

3. Explain the ethical issues in AI. Why are fairness, privacy, and transparency important?

Ans: Ethics in AI means using AI in a way that is fair, honest, and safe for everyone. Since AI can make decisions, it is important to make sure those decisions do not hurt people or treat anyone unfairly.

Example:

If an AI system gives better service to one group of people and ignores others, it is not fair. AI should be developed with care, keeping in mind fairness, safety, and respect for human rights.

Bias in AI and Algorithms:

Bias in AI happens when the system gives unfair results because of the data it was trained on. If the data only represents one group of people, the AI may not understand or treat other groups fairly.

Example:

A face recognition tool may not work well for all skin colors if it was trained mostly on images of only one type. This shows that data should include different people, languages, and situations. Removing bias is a big step toward making AI more fair and helpful for all.

Importance of Fairness:

This is important in systems that make decisions about input Human Rights school admissions, job interviews, or legal cases. To ensure fairness, AI must be trained on data that includes all related types of people and situations.

Importance of Transparency:

Transparency helps avoid mistakes and gives confidence that the system is working honestly.

Example:

If an AI rejects a loan application or selects a student, users have the right to know what rules or steps the system followed.

Importance of Privacy:

Privacy means keeping personal information safe and not sharing it without permission. Many AI systems collect data from users, such as names, addresses, location, or search history. If this data is not protected, it can be stolen or misused.
