Class 8

Answer Key

Artificial Intelligence (Ver. 2.0)

1. Project to AI Project Cycle

Video Session (Page 16)

Do it yourself.

Ai Task (Page 18)

Do it yourself.

Ai Reboot (Page 19)

1. Economy, Society and Biosphere.
2. Feedback loops drive the system's overall behaviour.
3. SDG 14 Life Below Water.
4. Biosphere.

Ai Quiz

1. c
2. b
3. b
4. c
5. c
6. c

Exercise

A.
1. False
2. True
3. False
4. False
5. True
6. False

B.
1. Computer Vision
2. United Nations
3. Data Exploration
4. Arrows
5. 6
6. Project

C.
1. A project cycle is like a helpful road map that shows the journey every project takes from a bright idea to a successful finish.
2. Sustainability refers to the ability to maintain or support the world we live in, ensuring that our actions today do not deplete the resources we rely on for tomorrow.
3. No Poverty, Zero Hunger and Good Health and Well-being.
4. A system map is a diagram that shows the key elements of a system and the arrows of influence

between them. Nodes represent people, resources or events; arrows show the direction (and sometimes the polarity) of cause and effect.

5. Model training is used to prepare data to train a learning algorithm, enabling the system to recognise patterns and create a model to solve the problem.
6. To achieve **full sustainability**, we need to think about it from a **societal perspective**. This means that everyone – from individuals to communities, and even governments – must work together, using their resources responsibly, for a truly sustainable future.
7. Evaluation assess the trained model using new, unseen data to evaluate its performance. Check metrics such as accuracy, speed, and fairness, and watch out for unintended errors or bias.
8. Long-term thinking is necessary to ensure that development does not come at the cost of future generations' ability to thrive.

Ai Lab (Page 23)

Do it yourself.

Ai Ready .....1 (Page 26)

Do it yourself.

2. Stages of AI Project Cycle

Video Session (Page 29)

Do it yourself.

Ai Task (Page 31)

Do it yourself.

Ai Task (Page 32)

Do it yourself.

Ai Task (Page 38)

Do it yourself.

Ai Task (Page 43)

Do it yourself.

Ai Reboot (Page 44)

1. c. 2. d. 3. a. 4. b.

Ai Quiz

1. a. 2. b. 3. a. 4. b.
5. d. 6. b. 7. d. 8. b.

Video Session (Page 46)

Do it yourself.

Ai Task (Page 48)

Do it yourself.

Ai Task (Page 48)

Do it yourself.

Ai Task (Page 49)

Do it yourself.

Exercise

A. 1. False 2. True 3. True 4. False 5. True

B. 1. Primary 2. Audio 3. problem statement
4. modelling 5. Data Acquisition 6. patterns 7. textual
8. Who, What, Where, and Why

C. 1. Some commonly used data visualisation tools are:

- **Microsoft Power BI:** A powerful and free data visualisation tool by Microsoft that helps in analysing and presenting data effectively.
- **Google Data Studio:** Part of Google Marketing Platform, this tool allows you to create multiple custom views and reports from your data.
- **Plotly:** An open-source graphing library for creating high-quality interactive charts in Python, R, and JavaScript.
- **Zoho Analytics:** A cloud-based tool offering drag-and-drop interfaces to create detailed reports and dashboards.
- **Infogram:** An easy-to-use tool for creating infographics, reports, and interactive charts for online sharing.

2. The three types of AI techniques are as follows:

- **Supervised Learning:** In this technique, the data sets are labelled. For example, to determine whether an email is spam, a model is trained on a dataset of labelled emails (both spam and non-spam) to learn how to classify new and unseen emails.

- **Unsupervised Learning:** Unsupervised learning occurs when a computer identifies patterns in data independently to discover hidden relationships. For example, we provide computer images of cats and dogs without labelling them, and the computer identifies them by recognising features such as their ears, fur, etc.
- **Reinforcement Learning:** In this technique, the model learns from feedback provided in the form of rewards or penalties. For example, consider a game where a child needs to throw a ball into a basket. In this scenario, the child acts as the agent and learns that when the ball successfully goes into the basket, they earn a point. Conversely, a negative score is recorded if the ball misses the basket. Through this process, the child improves their performance and learns to earn points by successfully putting the ball in the basket.

3. Problem scoping is the first and most important step in the AI project cycle. It involves identifying a real-world issue that can be addressed using AI. This step requires not only spotting a problem but also imagining how AI can help solve it.
4. The description of the stages of AI project cycle is as follows:
   - **Problem scoping:** This is the first step where the problem is identified and clearly defined using the 4Ws—Who, What, Where, and Why. It helps in understanding the issue and planning how AI can solve it.
   - **Data acquisition:** In this stage, relevant raw data (text, images, videos, etc.) is collected from sources like the Internet, books, or surveys to support the project.
   - **Data exploration:** The collected data is analysed and visualised using statistical tools to understand patterns, trends, and insights.
   - **Modelling:** Suitable algorithms are selected to build and test models that can solve the problem effectively. Different models are compared to choose the best fit.
   - **Evaluation:** The model is tested to check its performance. If it fails to meet the goals, data or the model may be adjusted. Once ready, the model proceeds to deployment.
   - **Deployment:** The final model is implemented in a real-world environment with ongoing monitoring and maintenance to ensure continued success.
5. Data Acquisition is the foundation of a successful AI project. In this stage, relevant data is identified, collected, and organised for further analysis and modelling. Since AI systems learn from data, the quality, quantity, and variety of data directly impact how accurately the AI system can perform.

   Without proper data acquisition, even the most advanced algorithms will produce poor results. Hence, this stage ensures the AI model has a reliable and representative dataset that reflects real-world conditions.
6. **Rule-based AI:** Rule-based approach is based on a set of rules and a set of facts already fed to the machine to generate the desired output. These models can operate with simple basic information and data. The relationship or patterns in the data is defined by the developer.

   Learning-Based AI: A learning-based approach is when a machine learns by itself from the data it receives, instead of following fixed rules made by a person. When the data is unlabelled or random, the machine looks for similarities and groups similar data together. This way, it can find hidden patterns or trends without anyone telling it exactly what to do. This approach is useful because sometimes it's hard to write clear rules for complicated or messy data. The machine's ability to discover patterns helps solve problems that rule-based systems cannot handle easily.

7. Evaluation is one of the most critical stages of an AI project. This phase is an important step where we check how well the AI model works to see if it meets the goals set at the start. If the model does not perform as expected, changes may be needed. Once the developer is happy that the model works well and fits the project's needs, the AI project moves to the next phase called deployment.
8. Data modeling refers to the process of developing decision-making algorithms that are trained on the dataset gathered during the data acquisition phase, following the problem defined in the problem-scoping phase. These algorithms learn to detect particular patterns within the data.

   Once the data has been visualised and patterns identified, the focus shifts to building the AI model by applying these algorithms. This can be achieved either by creating new models or by leveraging existing AI models.

   AI modelling involves creating algorithms called models that are designed to learn from data and make intelligent decisions or predictions. This process essentially means programming machines to simulate human thinking and problem-solving abilities. By developing these models, we enable AI systems to perform tasks that require reasoning, understanding, and adaptability.

(Page 52)

Do it yourself.


Ai Ready .....2 (Page 53)

Do it yourself.

Test Sheet–1

(Based on Chapters 1 & 2)

A. 1. b 2. b 3. c 4. c 5. b
6. d 7. a

B. 1. True 2. False 3. False 4. True 5. False
6. True 7. True 8. False

C. 1. Arrows 2. 6 3. Computer Vision 4. United Nations
5. Audio 6. modelling 7. Primary 8. textual

D. 1. A system map is a diagram that shows the key elements of a system and the arrows of influence between them. Nodes represent people, resources or events; arrows show the direction (and sometimes the polarity) of cause and effect.

2. Model training is used to prepare data to train a learning algorithm, enabling the system to recognise patterns and create a model to solve the problem.

3. To achieve full sustainability, we need to think about it from a societal perspective. This means that everyone – from individuals to communities, and even governments – must work together, using their resources responsibly, for a truly sustainable future.
4. Evaluation Assess the trained model using new, unseen data to evaluate its performance. Check metrics such as accuracy, speed, and fairness, and watch out for unintended errors or bias.
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3. AI Ethics

Video Session (Page 61)

Do it yourself.

AI Reboot (Page 64)

1. United Nations Educational, Scientific and Cultural Organization
2. Correctional Offender Management Profiling for Alternative Sanctions

AI Task (Page 67)

Do it yourself.

AI Quiz

1. c. 2. b. 3. c. 4. b. 5. c.

Exercise

A. 1. True 2. False 3. False 4. True 5. False

B. 1. Ethics 2. represent 3. Everyone 4. Sustainable
5. Group Attribution

C. 1. Ethics are the moral behaviour of humans in given circumstances in their social life. Ethics are important because they helps us to:
   - Be kind and honest.
   - Respect other's feelings and rights.
   - Make thoughtful choices, not just easy ones.
   - Take responsibility for what we say and do.

2. The purpose of AI ethics is:
   - To define ownership of AI systems.
   - To guide the moral behaviour of humans when designing, creating, and using AI systems.
   - To develop human-centred AI for the greater good of people.
   - To create an ethical compass that builds respect for the rule of law in the digital world.

3. Data bias happens when the data used to train an AI system doesn't represent everyone fairly. This could be because certain groups are missing or underrepresented.

4. Societal bias affects AI when AI systems reflect stereotypes or prejudices that exist in society and culture. For example, if an AI system is trained on biased societal data, it might exhibit biases such as showing women when searching for "nurse" or men when searching for "doctor", reinforcing traditional gender role.

5. AI can be made environmentally sustainable by considering its impact on the planet and society. Key ways to make AI environmentally sustainable are:
   - AI should support the creation of systems that use resources efficiently.
   - AI should reduce energy consumption.
   - AI should minimize environmental harm.

Ai Lab (Page 69)

Do it yourself.

Ai Ready .....3 (Page 70)

Do it yourself.

4. AI at a Glance

Ai Reboot (Page 73)

i. Google Maps

ii. Amazon Alexa

Ai Task (Page 81)

Do it yourself.

Ai Quiz

1. c. 2. c. 3. b. 4. c. 5. c.

Exercise

A. 1. True 2. False 3. True 4. True 5. False

B. 1. Voice Assistants 2. Data, Patterns 3. Security Surveillance
4. Automation 5. Chatbots

C. 1. Artificial intelligence, or AI, is about teaching machines to do some of these human-like tasks. It allows computers and robots to learn from data, recognise patterns, and make decisions without someone having to guide them through every step.

For example, take an email app that can identify spam and automatically move those messages to a separate folder.

Human intelligence is the incredible ability of our brain to think, understand, learn from what we experience, solve problems, and make decisions based on what we know or observe. For example, when you figure out how to fix a broken toy or choose the best way to prepare for a test, you're using your intelligence.

2. Computer Vision helps computers "see" and understand what is in pictures or videos, almost like how our eyes and brain work together. Self-driving cars have cameras all around them that help detect the road, other vehicles, traffic lights, and pedestrians, enabling them to drive safely without a human driver.
3. NLP lets computers understand human language—both the words we say and the ones we write. It allows machines to talk, read, and answer questions just like people do.
4. Sustainability in AI refers to the development of AI technologies that contribute to environmental Sustainability in AI is all about building smart technologies that help us take better care of our planet and improve the quality of life for everyone.
5. The stages of the AI Project Cycle include:

   Stage 1: Problem Scoping

   Define precisely what the AI should accomplish and why it is important. Establish success criteria and identify any constraints such as time, budget, or ethical considerations like fairness.

   Stage 2: Data Collection

   Collect a large amount of relevant, high-quality data for the system to learn from—this can include images, sounds, text, numbers, sensor data, and more.

   Stage 3: Data Exploration

   Examine, clean, and organise the data. Remove errors, add useful labels, and look for patterns or missing information. Decide which features (key pieces of information) will be most valuable for the model.

Ai Lab (Page 84)

Do it yourself.

Ai Ready .....4 (Page 85)

Do it yourself.

5. Preparing & Presenting Your AI-Project

Ai Task (Page 87)

Do it yourself.

Video Session (Page 94)

Do it yourself.

Ai Quiz

1. c. 2. b. 3. b.

Exercise

A. 1. True 2. True

B. 1. Computer Vision 2. AI ethics

C. 1. AI project cycle involves steps like problem identification, data collection, data analysis, modelling, evaluation, and deployment to create effective AI systems. Additionally, you are aware of AI ethics, which emphasises fairness, privacy, and responsible use to ensure AI benefits everyone without causing harm.

2. The AI-powered traffic management system analyses real-time traffic camera feeds, sensor data, and historical traffic patterns to detect congestion, accidents, and unusual road conditions. It aims to optimise traffic flow, reduce delays, and suggest alternative routes or signal timings.

3. Artificial Intelligence (AI) is a field of computer science that enables machines to think and learn like humans. AI is used to perform tasks such as recognising speech, making decisions, and solving problems without being explicitly programmed for every step.

(Page 98)

Do it yourself.

(Page 99)

Do it yourself.

Test Sheet–2

(Based on Chapters 1 & 2)

A. 1. b 2. c 3. b 4. b 5. c
6. c 7. b 8. c

B. 1. False 2. False 3. True 4. True 5. False
6. True 7. True 8. True

C. 1. Sustainable 2. Group Attribution 3. Ethics
4. Security Surveillance 5. Automation 6. Chatbots
7. Computer Vision 8. AI ethics

D. 1. Data bias happens when the data used to train an AI system doesn't represent everyone fairly. This could be because certain groups are missing or underrepresented.

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