A. Short Answer type Question

Q1. List down the steps of AI project cycle.

Ans -

1. Problem Scoping
2. Data Acquisition
3. Data Exploration
4. Modelling
5. Evaluation
6. Deployment

Q3. The face lock feature in smartphones is an application of AI. Explain how this feature works and identify the AI domain it belongs to.

Ans - Face lock in smartphones come with a security system of using facial recognition to lock and unlock smartphones. It uses the front camera and computer vision algorithms to map and store facial features securely. Once it is stored, every time to unlock it matches the input face with the features already stored in it.

Face lock in smartphones belongs to Computer Vision(CV) domain of AI.

Q4. Explain the Evaluation stage of AI project cycle.

Ans - The **Evaluation stage** of the AI project cycle involves assessing how well the developed AI model performs in solving the intended problem. This step checks the accuracy, efficiency, fairness, and reliability of the model using test data that was not used during training. Key evaluation metrics include precision, recall, F1-score, and confusion matrix for classification tasks. In this stage, developers also identify biases, ethical issues, and errors to ensure the model behaves as expected in real-world situations. If the model performs poorly, it may require retraining or fine-tuning. Overall, the evaluation stage ensures the AI solution is trustworthy, responsible, and ready for deployment, aligning with user needs and ethical standards.

B. Long Answer type Question

1. Explain any three applications of Computer Vision.

Ans -

1. **Face lock:** Face lock in smartphones come with a security system of using facial recognition to lock and unlock smartphones. It uses the front camera and computer vision algorithms to map and store facial features securely. Once it is stored, every time to unlock it matches the input face with the features already stored in it.
2. **Self-driving cars:** Self-driving cars utilise CV to recognise objects such as lamp posts, pedestrian crossings, and stop signs. Image classification and object detection techniques enable self-driving cars to identify road boundaries, obstacles, and determine actions such as stopping or continuing to drive.
3. **Retail automation:** In retail store, smart checkout systems use computer vision to recognise products streamline the payment process by automating transactions.

2. List down the types of Ethical Frameworks.

Ans - **1. Sector-based ethical frameworks:** These frameworks focus on an ethical challenge specific to a field or industry. They are trained to focus on a particular sector such as technology, finance or healthcare. For instance, in technology, key considerations include data privacy and

the responsible development of AI. in healthcare. the emphasis is on making fair decisions that respect everyone's rights.

1.1 Bioethics: Bioethics is an interdisciplinary framework used in healthcare to solve tough ethical problems It combines ideas and principles from fields like medicine, law, and philosophy to help doctors, patients, and researchers make fair and respectful decisions.

2. Value-based ethical frameworks: These frameworks concentrate on essential ethical principles and values such as honesty, respect and fairness that influence decision-making. They are based on different moral beliefs and help us judge whether actions are right or wrong.
They are further categorised as -

2.1 Rights-based ethical frameworks: These frameworks are based on respecting and upholding individual's rights. These frameworks ensure that all policies and actions focus on basic human rights. In context to AI it means that AI systems should respect human rights and not discriminate any specific group.

2.2 Utility-based ethical frameworks: These frameworks evaluate actions focusing on maximising overall good, or minimising harm. These frameworks balance benefits and costs to achieve the maximum benefit to the maximum number of people. In context to AI, it may involve the potential benefits of AI applications in the betterment of human race against the risks like data privacy and biasness, involved in using AI

2.3 Virtue-based ethical frameworks: These frameworks emphasise on the importance of building a strong moral foundation and good character traits such as kindness, compassion and empathy involved in decision making. In context to AI, it would mean that the developers and users of AI should follow ethical virtues throughout the AI project cycle.

3. List down the major issues and concerns related to AI.

Ans - **a) Job loss:** Machines and robots powered by AI can replace human workers, which could lead to unemployment. For example, a hotel in Japan called Henn-na hotel started using robots for hospitality resulting in job loss of humans.

b) AI mistakes: AI systems can make errors that have serious consequences. For example, Uber's self-driving cars ran through red lights during a test, and Microsoft's chatbot Tay started posting offensive messages online shortly after its launch.

c) Environmental impact: Running AI systems requires a lot of electricity, which can harm the environment by increasing carbon emissions. This makes it important to consider how we can use AI in a more eco-friendly way.

4. Why the ethical framework is necessary for AI?

Ans - Ethical framework is necessary for AI because they offer a methodical approach for solving problem in a systematic manner that guarantees every relevant aspect and situations are considered. Framework also serves as a common language for collaboration and interaction, which makes it easier to share efficient procedures and encourages consistency in approaches for solving problems.

5. Differentiate between Data Acquisition and Data Exploration in AI Project Cycle.

Ans -

Aspect	Data Acquisition	Data Exploration
Definition	Collecting and gathering data from various sources.	Analyzing and understanding the data collected.
Purpose	To get relevant and sufficient data for the AI model.	To study data patterns, trends, and potential issues.
Activities Involved	Downloading datasets, web scraping, using sensors, etc.	Visualizing data, checking missing values, distributions, etc.

6. What is NLP? Explain any two real-life applications of NLP.

Ans - Natural Language Processing (NLP) is the domain of artificial intelligence focused on enabling machines to understand, analyse, and interact with humans through natural language.

Some of the real-time applications of NLP are:

Plagiarism Checker: It uses NLP to search through online repositories and identify any cases of published content that match your work line by line, warning you about them.

Chatbots: Chatbots are software applications that use NLP to communicate with users via text or speech. Smart assistants like Alexa and Siri understand the speech pattern of the instructions and execute them.

8. Mention the key characteristics of sector-based frameworks.

Ans - The **key characteristics of Sector-Based Ethical Frameworks** in AI are:

1. **Domain-Specific Guidelines -** Tailored to the needs and challenges of specific sectors like healthcare, agriculture, finance, education, etc.
2. **Focus on Safety and Well-being -** Emphasizes human safety, well-being, and ethical responsibilities in that particular field (e.g., patient care in healthcare, crop health in agriculture).
3. **Risk Management -** Helps identify and manage sector-specific risks, such as medical misdiagnosis or crop failure due to faulty AI predictions.