



## Subject Specific Skills

## Revisiting AI project cycle and Ethical Frameworks for AI

Answer the following

1. How is the application of computer vision in agricultural monitoring?

Computer vision is used in agriculture for tasks like monitoring crops, detecting pests and estimating yields. Drones equipped with cameras capture aerial images of farmland, which are analysed to evaluate crop health, detect pests and optimise farming practices.

2. What do you mean by bioethics?

Bioethics is an ethical framework that addresses complex moral and ethical dilemmas in healthcare, medicine, and biological sciences. It integrates principles from multiple disciplines including medicine, law, philosophy and sociology to guide ethical decision-making. The primary goal of bioethics is to ensure that decisions in healthcare are made fairly, respect individual rights, and protect human dignity.



Answer the following in brief:

1. What is the need of ethical frameworks for AI?

The need of the ethical framework is given below:

Fairness and bias:

AI should treat everyone equally. Ethical frameworks help reduce bias in AI, ensuring it doesn't favour one group over another. This ensures all individuals are given equal opportunities and treatment.

Privacy and data protection:

AI uses a lot of personal data, so guidelines are needed to protect people's privacy and ensure data is used responsibly. Clear rules help prevent misuse and ensure data security.

Environmental impact:

AI Systems can use a lot of personal data. Ethical frameworks encourage creating AI that uses less energy and is better for the environment.

Accountability:

People are impacted by the decisions made





by AI. There need to be methods for comprehending and contesting these choices. This guarantees that AI is responsible for its deeds.

## Transparency and explainability

AI decision making should be understandable to the general public, particularly in critical domains like healthcare and finance. In addition to building trust, this improves the identification of mistakes.

## 2. Describe the principles of Bioethics

The principles of bioethics are as follows

### Respect of Autonomy:

Autonomy emphasises respecting an individual's right to make decisions about their own body and life. It values informed consent, personal choice, and self determination.

For example, a patient has the right to accept or refuse a medical procedure after understanding its risks and benefits.

### Beneficence (Maximum Benefits)

It includes promoting the well being



and welfare of an individual or a society. In other words, it involves acting in ways that promote the well being and best interests of others. Beneficence requires healthcare professionals to act in the best interest of the patient, promoting well being and taking positive actions to prevent harm.

Non-maleficence (Do not Harm)

This Principle focuses on avoiding actions that could harm others whether intentional or unintentional to an individual or a community.

Justice

This principle ensures fairness in distributing healthcare resources, treatments and opportunities. It emphasises 'equality' and avoiding discrimination in medical decision-making.



Communication Skills - II

I. Answer the following.

1. What is communication?

→ The word 'communication' is derived from the Latin word *communicare*, meaning 'to share'.

→ The term communication is the act of conveying meanings from one entity or group to another through the use of mutually understood signs, symbols and semiotic rules.

2. What are the elements of communication cycle?

→ Communication cycle is a process of sending and receiving of messages using verbal or non verbal methods of communication.

→ The main elements of communication cycle are Sender, Message Encoding, Communication channel, Receiver, Decoding, Response/Feedback.

3. What is Non-verbal communication?

Non-verbal communication is defined



as communication through physical and physiological cues without using spoken or written words.

The information is transmitted using body language, touch, facial expressions, symbols, signals etc.

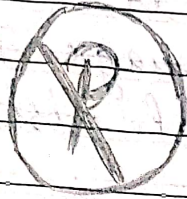
Non verbal communication can be further classified into Facial expressions, Body language and Gestures, Eye contact, Body posture, Appearance, personal space and proximity, paralanguage, and Haptics.

2. What do you mean by visual communication? Explain with few examples.

→ visual communication is the transmission and interpretation of information by using visual resources like photographs, videos, art, drawings, sketches, charts and graphs.

→ Visuals enhance the process of communication during written or verbal communication for better understanding and a meaningful interpretation of the information.





- No parking



- Railway crossing



- Wifi

4. What are the 7c's of Effective Communication?

**Clear** - The message intended to be delivered through communication should be clear and in understandable format.

**Concise** - The message must be conveyed by using only limited words.

**Concrete** - The content of the message should use only necessary words with complete facts and figures to avoid misinterpretation of the message by the receiver.



Correct - The message should be designed using the right level of language. There should be no spelling or grammatical mistakes for effective communication.

Coherent - The words used should be relevant to the message intended to be sent. It should relate to the main topic of the message and the content should flow logically.

Complete - The message should include all necessary information and should be complete in all respects for effective communication.

Courteous - The content of the message should be respectful, friendly, and honest.

5. Mention the barriers to effective communication.

Physical Barrier

Linguistic Barrier

Interpersonal Barrier

Organisational Barrier

Cultural Barrier

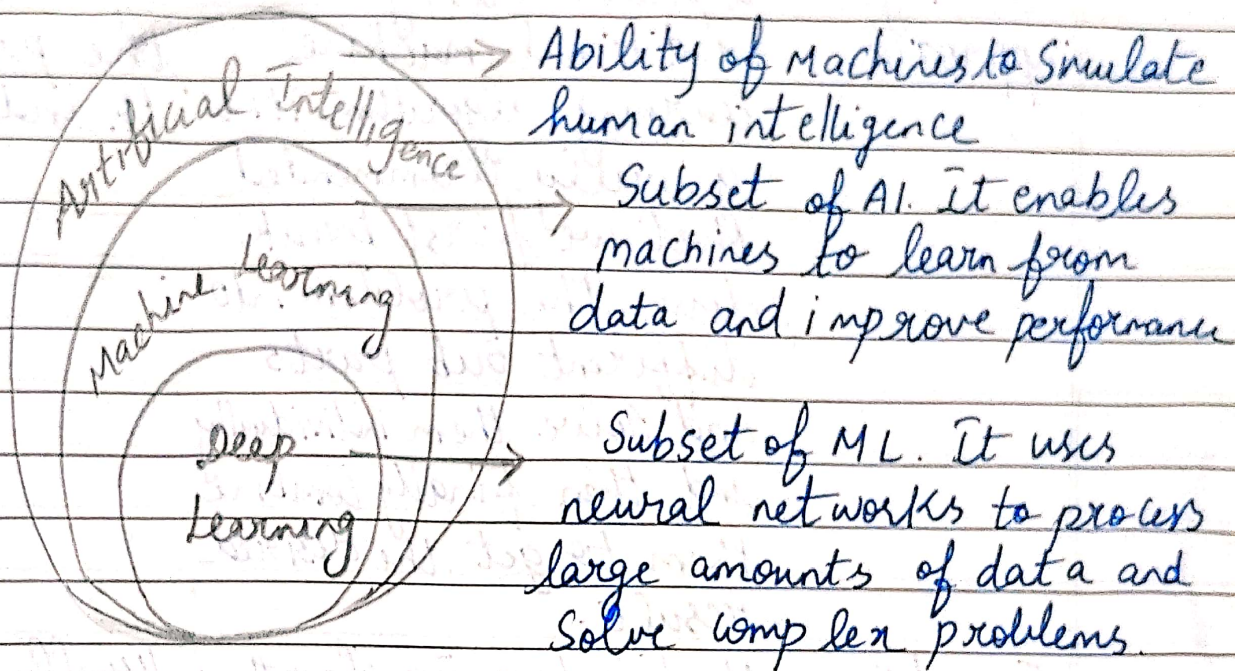


## Subject Specific Skills

## Advanced concepts of Modeling in AI

I. Answer the following in brief:

1. Differentiate between DL, ML and AI. Draw a labelled venn diagram between DL, ML, DL



Parameters	ML	DL
Data Dependency	ML algorithm can easily work with smaller data set.	when the size of the data is small, a Deep Learning algorithm does not perform well as a deep learning algorithm needs large amounts of data to understand perfectly.





Hardware dependency	ML algorithms can work on low end machines as well.	Deep Learning algorithms are heavily dependent on high-end machine.
Problem Solving approach	when we are solving a problem using a traditional machine learning algorithm it is generally recommended that we first break down the problem into different sub parts and solve them individually and then finally combine them to get the desired result.	Deep Learning algorithm solves the problem end to end.
Execution Time	Machine Learning algorithms take much less time to train.	Usually Deep Learning algorithms take a long time to train.

What are Labels?

→ Data refers to the raw information or collection of facts that a machine learning model uses to learn patterns make predictions or derive insights. For example, a table containing information about cars is an example of data. Each row represents related information about a type of a car.



Car type	color	price
Sedan	Silver	12 Lac
MUV	Black	17 Lac
SUV	Red	30 Lac

3. what do you mean by a Training Dataset?

→ A collection of data provided to a machine learning model to help it analyse and learn patterns is called training data.

→ It is like how a teacher explains any concept to students through examples and illustrations helping them understand and solve similar problems.

→ Similarly, a set of labelled data (features and their corresponding labels) is used to train the AI Model, teaching it how to make accurate predictions or decisions.

4. what do you mean by a Testing Dataset?

→ The testing dataset is a collection of



data provided to a machine learning model to evaluate how well it has learned to make predictions.

→ It is like how a teacher gives a test to students after teaching a concept to assess their understanding and identify any gaps

→ Similarly a set of labelled data that the model has not seen before is used to test its performance, ensuring it can make accurate predictions or decisions on new, unseen data.