

Part A/Unit-II

Self-Management Skills-I

Self-management:

Which is also referred to as 'self control' or 'self-regulation', is the ability to regulate one's emotions, thoughts, and behaviour effectively in different situations. This includes motivating oneself, and setting and working towards personal and academic goals.

Self-management can also help in:

- Developing good habits
- Overcoming bad habits
- Reaching your goals
- Overcoming challenges and difficulties

Being able to manage yourself helps you to avoid stress and provides opportunities to get involved in fun activities.

Self-management skills include the following:

Self-awareness: Knowing yourself as an individual – your values, likes, dislikes, strengths and weaknesses

Self-control: Ability to control your behaviour, discipline, etc

Self-confidence: Believing in yourself that you can do any task that is given to you and not scared of taking risks

Problem solving: Understanding a problem and finding a solution using step-by-step method

Self-motivation: Doing tasks on your own without any external motivation

Personal hygiene and grooming: Keeping oneself clean, healthy and smart

Positive thinking: Expressing certainty or affirmation even in tough situations

Team work: Working together with people to accomplish shared goals.

Time management: Achieving tasks on time and according the plan

Goal Setting: Planning concrete goals to be accomplished within a set timeframe

Self-confidence:

Self-confidence is a sense of trusting own's abilities and self.

Building self-confidence

The three steps to building self-confidence are as follows:



Figure 2.17: Building Confidence

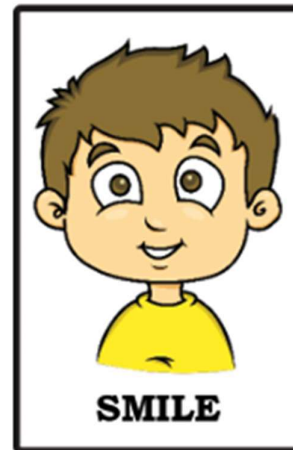
Self-confidence building tips - getting rid of the negative thoughts, thinking positively, staying happy with small things, staying clean, hygienic and smart, chatting with positive people, etc.

Positive thinking

It requires a person to look at the good in things, observe, understand and patiently work towards improving them rather than worrying and/or looking for the bad in things. Positive thinking leads to good results for you like

- overcoming challenges,
- Making you do well or making you an energetic individual,
- Helping you get better at work,
- Making you and people around you happy.

By using SMILE method you can keep your thinking positive:



Start your day in a positive way



Manage time to relax



Imagine the best in any situation



Learn to take feedback in a positive way



Express gratitude

UNIT-3

ICT Skills-I

Introduction to ICT

ICT (Information and Communication Technology) involves tools like computers, the Internet, radio, TV, and telephony to store, manage, and share information.

Importance: Essential for communication, business, education, and daily life.

Applications of ICT

- **At Workplace:** Used in banking, education, retail, healthcare, etc., for tasks like online transactions, data management, and communication.
- **At Home:** Used for entertainment (TV, social media), communication (phones, emails), and online activities (shopping, learning).

ICT Tools: Smart phones and Tablets ,

Smart phones : Advanced mobile phones with computer-like functions (browsing, emails, games, etc.). Operating Systems: Android, iOS, Windows Mobile. Features: Touch screen, apps, cameras, Wi-Fi, Bluetooth.

Tablets : Larger than smart phones, used for reading, browsing, and multimedia.

- Differences from Smart phones:
 - Bigger screen.
 - Longer battery life.
 - Higher storage capacity.

Common Apps

- Default apps: Phone, Calendar, Camera, Mail, Maps, Browser.
- Downloadable apps: Social media (Facebook), utilities (WhatsApp), games, etc.

Parts of a Computer and Peripherals

1. Input Devices: Keyboard, mouse, microphone, scanner.

2. Output Devices: Monitor, printer, speakers.

3. CPU (Central Processing Unit):

Control Unit: Manages operations.

ALU (Arithmetic Logic Unit): Performs calculations.

Memory Unit: Primary memory contains ROM and RAM.

RAM (Random Access Memory)	ROM (Read Only Memory) :
Stores data temporarily	Stores data permanently
Information is lost when computer is switched off	Information cannot be changed easily

Keypoints points to be known about computer:

Storage Devices: USB drives, hard disks, CDs, DVDs.

Memory Units: Bit (smallest unit), Byte (8 bits), KB, MB, GB, TB.

8 bits = 1 byte

1024 bytes = 1 KB

1024 KB = 1 MB

1024 MB = 1 GB

1024 GB = 1 TB

Motherboard: Motherboard, also referred to as a system board, is the main circuit board inside a computer. It connects input, processing and output devices.

Ports and Connections :

- USB: Connects peripherals (mouse, keyboard).
- HDMI/VGA: Connects monitors.
- Audio Ports: For headphones/microphones.
- Ethernet: For wired Internet.
- Power Port: Connects to electricity.

Hardware vs. Software :

- **Hardware:** Physical parts (keyboard, monitor).
- **Software:** Programs (OS, apps). Examples: Windows, Ubuntu, Android.

Starting and Shutting Down

Starting: Power on → BIOS test → OS loads → Login.

Logout/Shutdown: Close all programs before turning off.

Using Keyboard and Mouse

- Keyboard Functions: Function keys (F1-F12), Control keys (Ctrl, Alt), Navigation keys (Arrow keys).
- Mouse Actions: Click, double-click, drag-and-drop, hover.

Files and Folders

- Files: Store data (e.g., .txt, .docx, .jpg).
- Folders: Organize files.

File Operations :

Creating/Saving Files

1. Open a text editor (Notepad in Windows, Text Editor in Ubuntu).
2. Type content → Save with a filename (e.g., Neha.txt).

Keyboard Shortcuts:

- | | | |
|----------------------|--------------|---------------|
| • CTRL+z: undo | CTRL+x: cut | CTRL+v: paste |
| • CTRL+y: redo | CTRL+c: copy | CTRL+p: print |
| • CTRL+a: select all | CTRL+s: save | |

Internet Basics :

Uses of Internet :

- Search information, entertainment (movies, music), communication (email, social media), online shopping, banking, and learning. Connecting to Internet
- **Requirements:** Device (computer/phone), modem, ISP.
- **Connection Types:** Wired (Ethernet cable). Wireless (Wi-Fi).

Internet Browsers Examples: Chrome, Firefox, Internet Explorer.

- **Searching:** Type keywords in the search bar.

Email: Electronic mail or e-mail is a quick way of sending messages to people using the Internet. Electronic mail is a message sent over the Internet from one person to another.

Creating an Account: Gmail, Yahoo, Outlook.

Writing an Email:

To: Recipient's address.

Subject: Brief topic.

Attachments: Files (photos, documents).

Managing Emails:

Reply/Forward: Respond or share emails.

Folders: Inbox, Sent, Trash.

UNIT-4

Entrepreneurial Skills-I

What is Entrepreneurship?

Entrepreneurship involves identifying gaps in the market and innovating to fill them with new products or services.

Entrepreneur vs. Self-employed:

- An entrepreneur introduces new ideas (e.g., a vendor selling healthy snacks innovatively).
- A self-employed person (e.g., a shopkeeper) may not innovate.

Role of Entrepreneurship Entrepreneurs drive:

- Economic Development: Money circulates as businesses grow.
- Social Development: Job creation improves livelihoods.
- Standard of Living: Access to better products/services (e.g., antibacterial soap reducing illnesses).
- Resource Optimization: Efficient use of natural/resources.
- Competitive Pricing: Innovation lowers costs (e.g., cheaper mobile phones).

Qualities of a Successful Entrepreneur :

Key qualities:

Patience: Persistence despite delays (e.g., Sushma took 2 years to succeed).

Positivity: Staying optimistic during failures.

Hard Work & Grit: Continuous effort (e.g., Sushma improved toy designs).

Confidence: Decisiveness and self-belief.

Creativity: Innovative solutions (e.g., Prem's 108 dosa varieties).

Openness to Experimentation: Trial-and-error learning.

Entrepreneurship vs. Wage Employment

Entrepreneurship vs. Wage Employment

Entrepreneurship	Wage Employment
Owns business, takes risks	Works for a salary
Solves community problems	Follows employer's instructions
Keeps profits	Earns fixed wages
Flexible/innovative	Structured role

Example: A street food vendor (entrepreneur) vs. a restaurant cook (employee).

Types of Business Activities :

- **Product Business:** Tangible goods (e.g., sports shop).
- **Service Business:** Intangible offerings (e.g., cricket coaching).
- **Hybrid Business:** Mix of both (e.g., restaurant selling food and catering services).

Product vs. Service Businesses

Product Business	Service Business
Tangible (e.g., earrings)	Intangible (e.g., delivery service)
Can be stored	Perishable (e.g., haircut)
Mass-produced	Customized per customer

Examples:

Product: Sana's handmade jewelry.

Service: Pragya's bike delivery.

Hybrid: Harish's tiffin service (food + delivery).

Entrepreneurship Development Process

Steps to Start a Business:

1. **Idea Generation:** Identify a need/passion (e.g., Prem's dosa stall near a station).
2. **Resource Mobilization:** Arrange funds/materials.
3. **Market Research:** Understand customer preferences.
4. **Improvement:** Adapt based on feedback (e.g., Prem added Chinese-flavored dosas).

UNIT 5: Green Skill-I

LEARNING OUTCOMES

- Understand and apply knowledge related to sustainable development, including reducing resource consumption, recycling, and managing renewable resources
- Equipping individuals with the knowledge, abilities, and attitudes necessary for a sustainable and resource-efficient society.
- Demonstrate the knowledge of green skills, green economy and green jobs.

Green skills encompass the knowledge, abilities, and attitudes necessary to live, work, and act in ways that reduce the environmental impact of human activity .i. e the skills required to build a sustainable and resource-efficient society.

The industrial development and intensive agriculture that provides the goods for our increasingly consumer-oriented society uses up large amounts of natural resources, such as water, minerals, petroleum products, wood, etc.

Natural resources

Natural resources come in many forms. It may be a solid, liquid or gas. It may also be organic or inorganic. It may also be metallic or non-metallic.

- (i) Land Resources: Human beings thus, use land as a resource for production as well as residence and recreation. It is a finite resource which is subject to agricultural and non-agricultural uses
- (ii) Forest Resources: A forest is a natural, self-sustaining community characterized by vertical structure created by presence of trees. Wood is used for making furniture, tool-handles, railway sleepers, matches, ploughs, bridges, boats, etc. and as a source of energy for cooking purpose and for keeping warm. Tannins, gums, drugs, spices, insecticides, waxes, honey, horns, musk ,ivory, ides, etc. are all provided by the flora and fauna of forests.
- (iii) Water resources include rivers, lakes, oceans, and underground aquifers, etc. Water is a vital resource in agriculture, industrial, household and recreational and environmental activities.
- (iv) Mineral resources are non-renewable and included metals (e.g., iron, copper, and aluminium),and non-metals (e.g., salt, gypsum, clay, and, phosphates).element, such as gold, silver, diamond (carbon),and sulphur.
- (v) Food Resources: Resources that are used as food, or provide food for organisms are called food resources. Plants serve as food resources for herbivores and omnivores.

- (vi) **Energy Resources:** An energy resource is something that can produce heat and power .

Natural resources fall under the following main categories:

(a) **Inexhaustible Resources:** The resources which cannot be exhausted by human consumption are called inexhaustible resources. These include energy sources like solar radiation, wind power, water power and tidal power, etc.

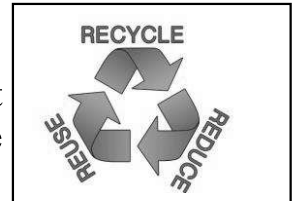
(b) **Exhaustible Resources:** There are some resources, which are available in limited quantities and are going to be exhausted as a result of continuous use. For example, the stock of coal in the earth is limited and one day there will be no more coal available for our use, if we keep on using it excessively.

(c) **Renewable Resources:** Renewable resources are those that are constantly available (like water) or can be reasonably replaced or recovered, like vegetative lands.

(d) **Non-renewable Resources:** Non-renewable resources are those that cannot easily be replaced once they are destroyed. For example, fossil fuels. Minerals are also non-renewable because even though they form naturally in a process called the rock cycle, it can take thousands of years, making it non-renewable.

Reduce, Reuse, Recycle

There are three Rs which you can apply for saving the environment – Reduce, Reuse and Recycle. It is a concept of the modern waste management



Reduce: Do not use what you do not need.

Reuse: Reuse the materials for other purposes, such as making pillow covers or rags out of used shirts or ladies suits.

Recycling: Recycling is reusing some components of the waste that may have some economic value. Recycling has readily visible benefits, such as conservation of resources, reduction in energy used during manufacture and reducing pollution levels. Some materials, such as aluminum and steel can be recycled many times.

Natural disasters

Natural disasters include floods, earthquakes, landslides, storms, etc. Our actions in exploiting natural resources for building structures, such as large dams and buildings, sometimes aggravates the impact of natural calamities and disasters.

Saving the environment: What can you do?

To save our environment, we need to educate people. Education is important, as it gives people the knowledge and skills that they need to perform. Educating people

about the environment, through the environment and for the environment will enlighten them in utilizing their knowledge and skills for saving the environment as responsible citizens.

(i) Learning about the environment: Learning about the environment focuses mainly on acquisition of knowledge and understanding of our surroundings and related issues.

(ii) Learning through the environment: The processes of learning while being engaged with environment inside and outside the classroom. It focuses on learning process, such as observation, hands-on experience, learning-by-doing, problem-solving through an exposure to the environment and learning. The direct contact with the environment provides the relevant context for acquiring knowledge, skills, aesthetic appreciation and practical experience to learning. Environment damage can be minimized by developing the skills and knowledge required for efficient resource utilization, green processes and technologies and integrating these into our businesses and daily activities.

(iii) Learning for the environment: Learning for the environment aims at the development of an informed response and responsibility towards the environment.

Conserving natural resources

Soil conservation

Soil conservation means checking soil erosion and improving soil fertility by adopting various methods.

Soil conservation can be useful for the following:

1. Maintenance of soil fertility: The fertility can be maintained by adding manure regularly as well as by rotation of crop.
2. Reforestation: Planting of trees and vegetation reduces soil erosion.
3. Terracing: Dividing a slope into several flat fields to control rapid run of water. It is practiced mostly in hilly areas.

Water conservation

Conservation and management of water are essential for the survival of mankind, plants and animals. This can be achieved by adopting the following methods:

1. Growing vegetation in the catchment areas, which will hold water in the soil and allow it to percolate into deeper layers and contribute to formation of ground water.
2. Constructing dams and reservoirs to regulate supply of water to the fields, as well as to enable generation of hydroelectricity.
3. Sewage should be treated and only the clear water should be released into the rivers.
4. Industrial wastes (effluents) should be treated to prevent chemical and thermal pollution of fresh water.
5. Judicious use of water in our day-to-day life.
6. Rainwater harvesting should be done by storing rainwater and recharging

groundwater.

Energy conservation

We use a lot of non-renewable energy resource for our needs. Since resources are limited, we need to conserve them as much as possible.

- Use tube lights and energy efficient bulbs that save energy rather than bulbs.
- Keep the bulbs and tubes clean.
- Remove dust on the tubes and bulbs to improve lighting levels by 10 to 20%.
- Use pressure cooker to save energy required for cooking.
- Keep vessels covered with a lid during cooking. It is useful in cooking the food faster and saving energy.
- Electric items like air conditioners geysers, heaters and dryers use a lot of electrical power. Use them when necessary
- Cool hot food before putting in the refrigerator.
- Use methods of cooking that use less energy, like use a pressure cooker or solar cooker to cook food.
- Travelling in a bus or travelling in a group in a carpool is better than going alone in a car.

Food conservation

Food conservation and storage have been practiced to feed mankind in times of shortage. Food is stored in warehouses on large scale and in refrigerators at home. Food is also preserved through various methods to prevent the spoilage due to harmful bacteria and other microorganisms.

Forest conservation

Forest conservation means the retention of existing forest or the creation of new forest at the levels prescribed by the State or local authority. Participation of the community living in and around the forest is important for the success of the forest conservation programme.

Sustainable development and green economy

Sustainability is the development that satisfies the needs of the present without compromising the capacity of future generations, guaranteeing the balance between economic growth, care for the environment and social well-being.

Sustainable development includes the following:

- reducing excessive use of resources and enhancing resource conservation.
- recycling and reuse of waste materials.
- scientific management of renewable resources, especially bio-resources.
- Planting more trees.
- Green grassy patches to be interspersed between concrete buildings.

- using more environment friendly material or biodegradable material.
- use of technologies, which are environmental friendly and based on efficient use of resources.

Sustainable Development Goals (SDGs)

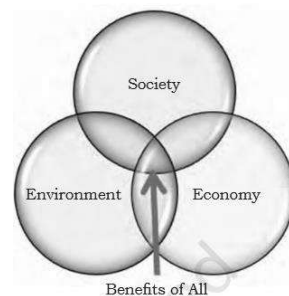
The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

The Sustainable Development Goals (SDGs) were launched at the United Nations Sustainable Development Summit in New York in September 2015, forming the 2030 Agenda for Sustainable Development. The 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) adopted by world leaders in 2015.

Green growth

The concept of green growth aims at achieving economic growth that is socially inclusive and environmentally sustainable. The Ministry of Environment, Forest, and Climate Change, Government of India recognized green growth in its vision, wherein ‘poverty eradication’ along with green growth is to be seen as the focal point for green economy.

To ensure sustainable development, any activity that is expected to bring about economic growth must also consider its environmental impacts so that it is more consistent with long term growth and development. This means vehicles on the road which leads to traffic congestion, waste of time for all the commuters, and a great load of particulate matter and carbon monoxide from the exhaust of vehicles should be slowly replaced with an efficient public transport system.



Green Economy

A ‘Green Economy’ is a system which helps in economic growth while at the same time, taking care of the environment.

The term ‘Green Economy’ was first coined in a 1989 report for the Government of the United Kingdom by a group of leading environmental economists, entitled Blueprint for a Green Economy. UNEP has defined the green economy as “one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.

Components of a Green Economy

- Renewable energy (Renewable energy from renewable resources like wind, water, sun, earth, biomass, etc)

- Green building (Green buildings are buildings that cause minimum damage to the environment during their construction)
- Sustainable transport - Sustainable means what is good for the economy as well as the future of the environment
- Water management - We need to avoid water pollution and not waste water
- Waste management - All wastes result in loss of resources and increase land, water and air pollution

Green Skills:

Values and attitudes required to live in, develop and support a sustainable and resource-efficient society.

Some of the areas in which green skills contribute to the sustainable development are as follows:

- using renewable energy (example, using solar power and wind energy)
- water and waste management
- rain water harvesting
- conserving energy
- reducing pollution

Green Consumer Day is celebrated on September 28 of each year. It is a day when people celebrate the earth and bring about awareness on how small actions can help earth to remain green and clean

Green jobs

A 'green job' is employment in any industry that contributes to preserving or restoring environmental quality in that sector and allowing for sustainable development. It includes jobs that help protect ecosystems and biodiversity and reduce energy, materials and water consumption through high efficiency strategies.

Green projects:

Many people and organisations are concerned and motivated about doing something to save the environment. They are implementing green projects in areas like waste management, energy conservation, green sanitation, bio fuel use, green buildings, etc.

Examples of green projects

- Solid Waste Management by 'Swachh Cooperative'
- Modern Chulha of 'Society of Development and Environment Protection'
- Bio-toilet by 'Green Solution Foundation'

UNIT-1

AI Reflection, Project Cycle and Ethics

1. What is artificial intelligence (AI)?

- A. When a machine mimics human intelligence it can solve real world problems, improves on its own from past experiences, it can predict and make decisions on its own.



2. How do you think Artificial Intelligence can help you as you go about your daily life?

Artificial intelligence (AI) can significantly enhance daily life in various ways

- **Digital Assistants:**
AI-powered virtual assistants like Siri, Google Assistant, and Alexa can manage schedules
- **Smart Home Automation:**
AI can control lighting, temperature, appliances, and security systems, creating a more efficient and comfortable living environment.
- **Personalized Recommendations:**
AI algorithms can suggest movies, books, music, and even restaurants based on individual preferences.
- **Healthcare Advancements:**
AI can assist in diagnosing diseases, developing personalized treatment plans, and monitoring patient health.
- **Smart Devices:**
Wearable devices with AI can track fitness levels, monitor vital signs, and even detect potential health issues.
- **Personalized Learning:**
AI can analyze student learning styles and provide customized educational content and support.
- **Educational Apps:**
AI can power educational apps that offer interactive learning experiences and adaptive assessments.
- **Navigation and Route Optimization:**
AI can provide real-time traffic updates and optimize routes for efficient travel.
- **Autonomous Vehicles:**
AI is playing a crucial role in the development of self-driving cars, promising to revolutionize transportation.
- **Smart Entertainment Devices:**
AI can power streaming services, gaming consoles, and other entertainment devices, providing personalized recommendations and experiences.
- **Interactive Storytelling:**
AI can be used to create interactive stories and games that engage users in unique ways.
- **Financial Services:**
AI can help with financial planning, investment management, and fraud detection.
- **Smart Shopping:**
AI can personalize shopping experiences, find deals, and even manage budgets.

3. What are the domains of AI?

Depending on the type of data, we can divide AI into 3 important domains:

Computer Vision (CV):

Computer Vision, is an AI domain works with videos and images enabling machines to interpret and understand visual information.

Example game: Quick draw

Natural Language Processing (NLP):

NLP is an AI domain focused on textual data enabling machines to comprehend, generate, and manipulate human language.

Example game: Semantris

Statistical Data or Data Science:

Statistical Data refers to statistical techniques to analyse, interpret and draw insights from numerical/tabular data.

Example game: Rock-Paper-Scissors

4. What are the various applications of AI?

Face Lock in Smartphones:

Smart phones nowadays come with the feature of face locks in which the smartphone's owner can set up his/her face as an unlocking mechanism for it.

The front camera detects and captures the face and saves its features during initiation.

Next time onwards, whenever the features match, the phone is unlocked.

Smart assistants:

Smart assistants like Apple's Siri and Amazon's Alexa recognize patterns in speech, then infer meaning and provide a useful response.

Fraud and Risk Detection:

Finance companies were fed with bad debts and losses every year. However, they had a lot of data which used to get collected during the initial paperwork while sanctioning loans. That can help them to identify the frauds.

Moreover, it also helped them to push their banking products based on customer's purchasing power.

Medical Imaging:

For the last decades, computer supported medical imaging application that has been a trustworthy help for physicians.

It doesn't only create and analyse images, but also becomes an assistant and helps doctors with their interpretation.

The application is used to read and convert 2D scan images into interactive 3D models that enable medical professionals to gain a detailed understanding of a patient's health condition.

5. QUIZ

1. Which one of the following is an application of AI?

- a. Remote controlled Drone
- b. Self-Driving Car**
- c. Self-Service Kiosk
- d. Self-Watering Plant System

2. This language is easy to learn and is one of the most popular languages for AI today:

- a. C++
- b. Python**
- c. Ruby
- d. Java

3. This field is enabling computers to identify and process images as humans do:

- a. Face Recognition**
- b. Model-view-controller
- c. Computer Vision
- d. Eye-in-Hand System

4. What does NLP stand for in AI?

- a. Neutral Learning Projection
- b. Neuro-Linguistic Programming
- c. Natural Language Processing**
- d. Neural Logic Presentation

5. Which of the following is not a domain of artificial intelligence?

- a. Data Management System**
- b. Computer Vision
- c. Natural Language Processing
- d. Data Science

UNIT-2: DATA LITERACY

LEARNING OUTCOMES

- To guide students in becoming data-literate individuals who can handle data responsibly and intelligently.
- Define data literacy and recognize its importance and to understand how data literacy enables informed decision-making and critical thinking.
- Apply the Data Literacy Process Framework to analyze and interpret data effectively and differentiate between data privacy and security.
- Identify potential risks associated with data breaches and unauthorized access.
- Learn measures to protect data privacy and enhance data security and determine the best methods to acquire data.
- Classify different types of data and enlist different methodologies to acquire it ,define and describe data interpretation, explain the different methods of data interpretation and recognize the types and importance of data interpretation.
- Apply acquired knowledge to select and employ appropriate data visualization methods

MAIN POINTS

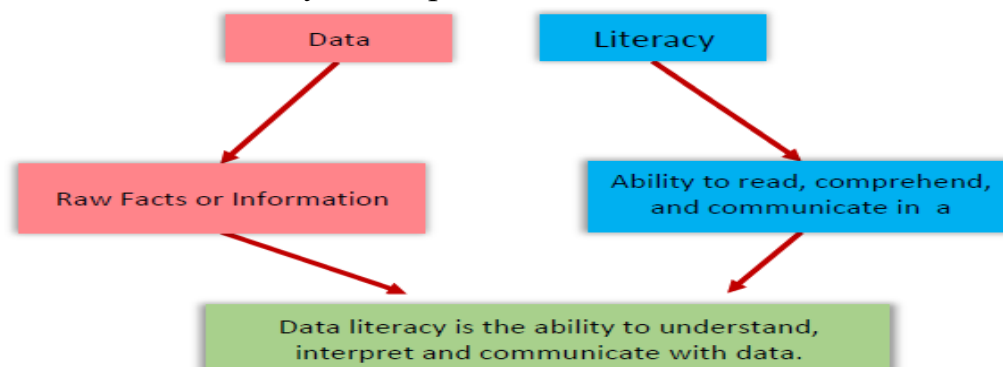
Basics of data literacy

Introduction to Data Literacy

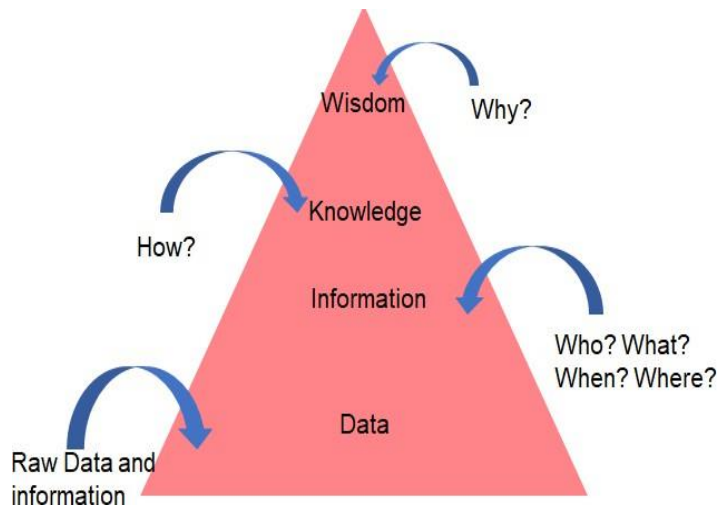
Data literacy means knowing how to understand, work with, and talk about data.

It's about being able to collect, analyze, and show data in ways that make sense.

Data literacy is essential because it enables individuals to make informed decisions, think critically, solve problems, and innovate.



Data Pyramid Data Pyramid is made of different stages of working with data.



Impact of data Literacy

Every data tells a story, but we must be careful before believing the story. Data literacy is essential because it enables individuals to make informed decisions, think critically, solve problems and innovate.

How to become Data Literate?

Data Literate is a person who can interact with data to understand the world around them.

Scenario: Buying a product online

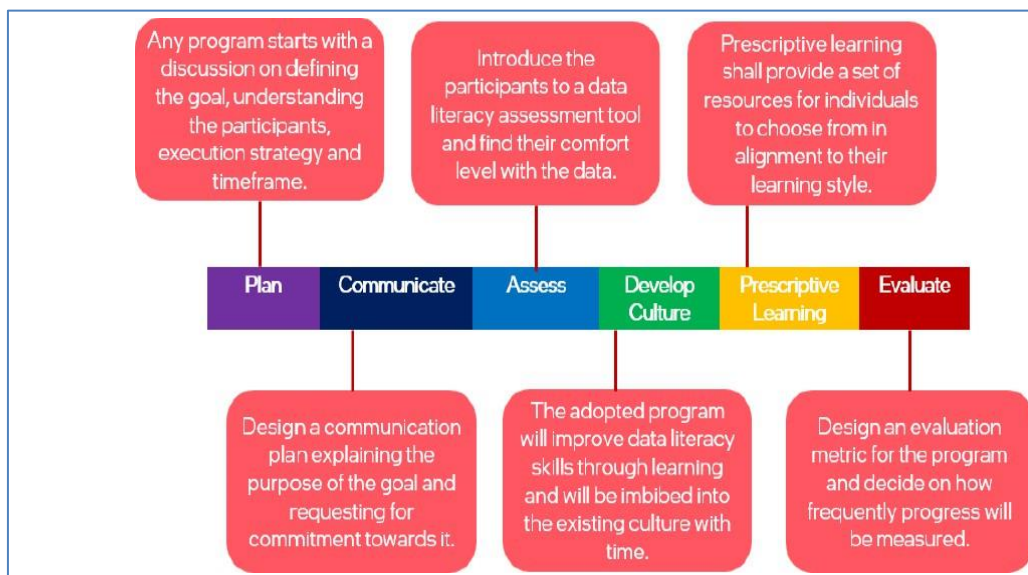
Data literacy helps people research about products while shopping over the internet.

A data literate person can –

- Filter the category as per the requirement – If the budget is low, select the price filter as low to high
- Check the user ratings of the products
- Check for specific requirements in the product

Data Literacy Process Framework

The data literacy framework provides guidance on using data efficiently and with all levels of awareness. Data literacy framework is an iterative process.



What are data security and privacy? How are they related to AI?

Data Privacy and Data Security are often used interchangeably but they are different from each other.

What is Data Privacy?

Data privacy or information privacy is concerned with the proper handling of sensitive data including personal data and other confidential data, such as certain financial data and intellectual property data, to meet regulatory requirements as well as protecting the confidentiality and immutability of the data.

Eg: Downloading an unverified mobile application, Accepting the Terms of Service without reading.

Why Data Privacy is important?

- A data breach at a government agency can put top secret information in the hands of an enemy state.
- A breach at a corporation can put proprietary data in the hands of a competitor.
- A breach at a hospital can put personal health information in the hands of those who might misuse it.

The following best practices can help you ensure data privacy:

Understanding what data, you have collected, how it is handled, and where it is

stored.

- Necessary data required for a project should only be collected.
- User consent while data collection must be of utmost importance

What is Data Security?

Data security is the practice of protecting digital information from unauthorized access, corruption, or theft throughout its entire lifecycle.

Why is it important?

Due to the rising amount of data in the cloud there is an increased risk of cyber threats. The most appropriate step for such an amount of traffic being generated is how we control and protect the transfer of sensitive or personal information at every known place.

The most possible reasons why data security is more important now are:

- Cyber-attacks affect all the people
- The fast-technological changes will boom cyber attacks

Best Practices for Cyber Security

Cyber security involves protecting computers, servers, mobile devices, electronic systems, networks, and data from harmful attacks.



Do's

- Use strong, unique passwords with a mix of characters for each account.
- Activate Two-Factor Authentication (2FA) for added security.
- Download software from trusted sources and scan files before opening.
- Prioritize websites with "https://" for secure logins.
- Keep your browser, OS and antivirus updated regularly.
- Adjust social media privacy settings for limited visibility to close contacts.
- Always lock your screen when away.
- Connect only with trusted individuals online.
- Use secure Wi-Fi networks.
- Report online bullying to a trusted adult immediately.



Don't's

- Avoid sharing personal info like real name or phone number.
- Don't send pictures to strangers or post them on social media.
- Don't open emails or attachments from unknown sources.

- Ignore suspicious requests for personal info like bank account details.
- Keep passwords and security questions private.
- Don't copy copyrighted software without permission.
- Avoid cyberbullying or using offensive language online.

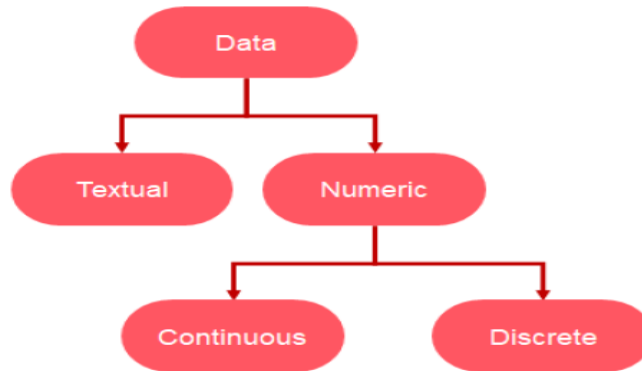
Acquiring Data, Processing, and Interpreting Data

- Data is the raw fact and figure.

Types of data

Artificial Intelligence is crucial, with data serving as its foundation. We come across different types of information every day.

Some common types of data include:



Textual Data (Qualitative Data)	Numeric Data (Quantitative Data)
• It is made up of words and phrases • It is used for Natural Language Processing (NLP) • Search queries on the internet are an example of textual data • Example: “Which is a good park nearby?”	• It is made up of numbers • It is used for Statistical Data • Any measurements, readings, or values would count as numeric data • Example: Cricket Score, Restaurant Bill

Numeric Data is further classified as:

- **Continuous data** is numeric data that is continuous. E.g., height, weight, temperature, voltage

- **Discrete data** is numeric data that contains only whole numbers and cannot be fractional.

E.g. the number of students in the class – it can only be a whole number, not in decimals, A soccer team scored 0, 1, 2, or 3 goals in their last few matches. Goals are counted in whole numbers — not fractions.

Types of Data used in three domains of AI

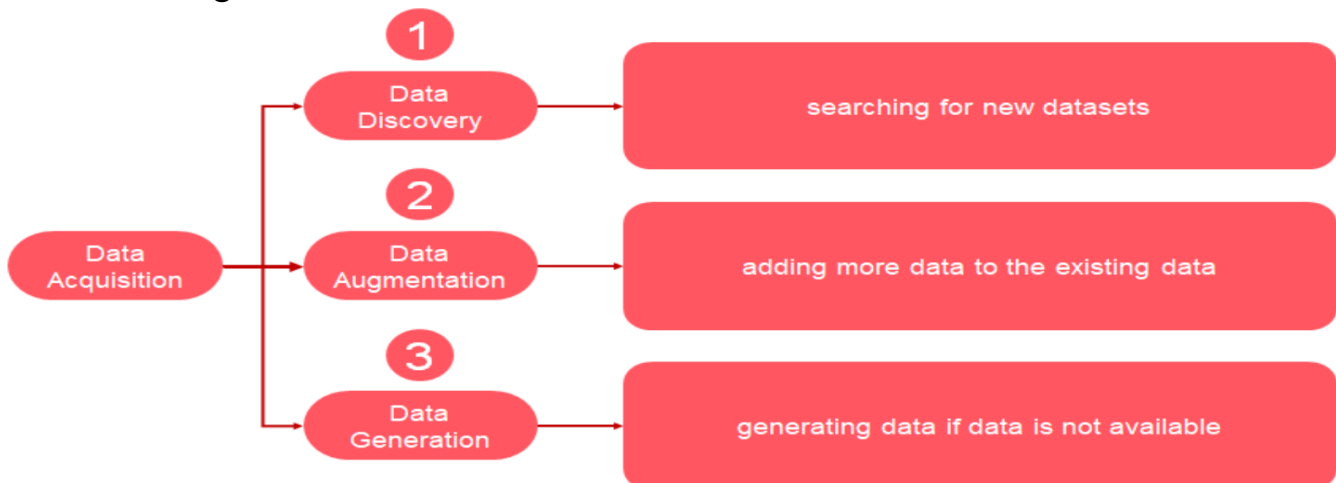
- Visual data -Eg: images,videos [Computer Vision(CV)]
- Textual data -Eg : Documents,pdf files etc [Natural Language Processing(NLP)]
- Numeric data – Eg : Tables,Excel sheets etc [Statistical Data (SD)]

Data Acquisition/Acquiring Data

Data Acquisition, also known as acquiring data, refers to the procedure of gathering data. This involves searching for datasets suitable for training AI models.

Steps Involved in Data Acquisition:

- 1) **Data Discovery:** Data discovery refers to searching new data sets.
- 2) **Data Augmentation:** Data augmentation means increasing the amount of data by adding copies of existing data with small changes.
- 3) **Data Generation:** Data generation refers to generating or recording data using sensors.



Sources of Data

Various Sources for Acquiring Data:

- **Primary Data Sources** — The data generated from the experiment is an example of primary data. Some of the sources for primary data include surveys, interviews, experiments etc.

- **Secondary Data Sources**—Secondary data collection obtains information from external sources, rather than generating it personally. Some sources for secondary data collection include: Kaggle, Google, .gov datasets etc.

Best Practices for Acquiring Data

Good Data	Bad Data
• Information is well structured	• Information is scattered
• It is accurate	• Contains a lot of incorrect values
• It is consistent.	• Contains missing and duplicate values
• It is clearly presented.	• It is poorly presented
• Contains information which is relevant to our requirement.	• Contains information which is not relevant to our requirement.

Ethical concerns in data acquisition

While gathering data and choosing datasets, certain ethical issues can be addressed before they occur:

Bias	Take steps to understand and avoid any preferences or partiality in data
Consent	Take necessary permissions before collecting or using an individual's data
Transparency	Explain how you intend to use the collected data and do not hide intentions
Anonymity	Protect the identity of the person who is the source of data
Accountability	Take responsibility for your actions in case of misuse of data

Features of data and Data Preprocessing

Usability of Data

There are three primary factors determining the usability of data:

1.**Structure-** Defines how data is stored.

For example data stored in spreadsheet will have good structure where as the same data stored in text document will have poor structure.

2.**Cleanliness-** Clean data is free from duplicates, missing values, outliers, and other anomalies that may affect its reliability and usefulness for analysis.

3.**Accuracy-** Accuracy indicates how well the data matches real-world values, ensuring reliability. Accurate data closely reflects actual values without errors, enhancing the quality and trustworthiness of the dataset.

Features of Data

Data features are the characteristics or properties of the data. They describe each piece of information in a dataset.

For example,

- In a table of student records, features could include things like the student's name, age, or grade.
- In a photo dataset, features might be the colors present in each image. These features help us understand and analyze the data.

In AI models, we need two types of features: independent and dependent

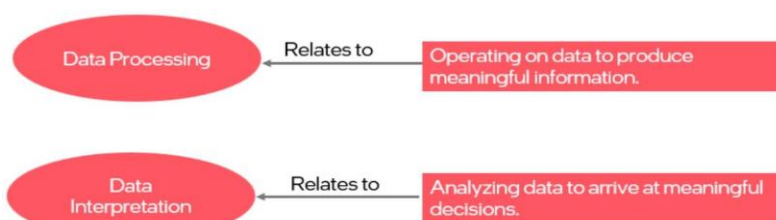
Independent features are the input to the model—they're the information we provide to make predictions.

Dependent features, on the other hand, are the outputs or results of the model—they're what we're trying to predict.

In research, researchers often manipulate and measure independent and dependent variables to test cause-and- effect relationships.

Data Processing and Data Interpretation

Data processing and interpretation have become very important in today's world.



Data Processing

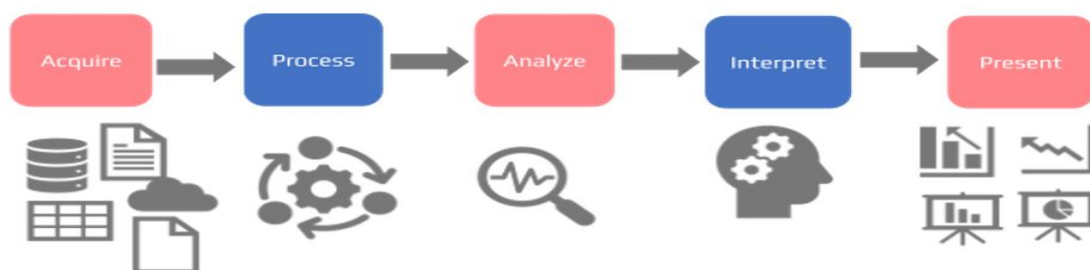
- Data processing helps computers understand raw data.
- Use of computers to perform different operations on data is included under data processing.

Data Interpretation

- It is the process of making sense out of data that has been processed.
- The interpretation of data helps us answer critical questions using data.

Understanding some keywords related to Data

- **Acquire Data**- Acquiring data is to collect data from various data sources.
- **Data Processing**- After raw data is collected, data is processed to derive meaningful information from it.
- **Data Analysis** – Data analysis is to examine each component of the data in order to draw conclusions.
- **Data Interpretation** – It is to be able to explain what these findings/conclusions mean in a given context.
- **Data Presentation**- In this step, you select, organize, and group ideas and evidence in a logical way.



Types of Data Interpretation

How to interpret Data?

Based on the two types of data, there are two ways to interpret data-

- Qualitative Data Interpretation

- Quantitative Data Interpretation

Qualitative Data Interpretation

Data Collection Methods – Qualitative Data Interpretation

Record keeping: This method uses existing reliable documents and other similar sources of information as the data source. It is similar to going to a library.

Observation: In this method, the participant – their behavior and emotions – are observed carefully

Case Studies: In this method, data is collected from case studies.

Focus groups: In this method, data is collected from a group discussion on relevant topic.

Longitudinal Studies: This data collection method is performed on the same data source repeatedly over an extended period.

One-to-One Interviews: In this method, data is collected using a one-to-one interview.

5 Steps to Qualitative Data Analysis

1. Collect Data
2. Organize
3. Set a code to the Data Collected
4. Analyze your data
5. Reporting

Quantitative Data Interpretation

- Quantitative data interpretation is made on numerical data
- It helps us answer questions like “when,” “how many,” and “how often”
- For example – How many numbers of likes on the Instagram post?

Data Collection Methods -Quantitative Data Interpretation

- Interviews: Quantitative interviews play a key role in collecting information.
- Polls: A poll is a type of survey that asks simple questions to respondents. Polls are usually limited to one question.
- Observations: Quantitative data can be collected through observations in a particular time period
- Longitudinal Studies: A type of study conducted over a long time
- Survey: Surveys can be conducted for a large number of people to collect quantitative data.

4 Steps to Quantitative Data Analysis

1. Relate measurement scales with variables
2. Connect descriptive statistics with data
3. Decide a measurement scale
4. Represent data in an appropriate format

Difference between Qualitative and Quantitative Data

Qualitative Data Interpretation	Quantitative Data Interpretation
Categorical	Numerical
Provides insights into feelings and emotions	Provides insights into quantity
Answers how and why	Answers when, how many or how often
Methods- Interviews, Focus Groups	Methods – Assessment , Tests, Polls, Surveys
Example question – Why do students like attending online classes?	Example question – How many students like attending online classes?

Types of Data Interpretation (DI)

There are **three ways** in which data can be presented:

- Textual
- Tabular
- Graphical

Textual Data Interpretation

- The data is mentioned in the text form, usually in a paragraph.
- Used when the data is not large and can be easily comprehended by reading.
- Textual presentation is not suitable for large data.

Eg: "A company conducted a survey to find out employee satisfaction levels. Out of 500 employees:300 said they were satisfied with their job.120 said they were neutral.80 said they were dissatisfied.

Interpretation- 60% (300 out of 500) of employees are satisfied.

24% are neutral.

16% are dissatisfied.

Tabular Data Interpretation

- Data is represented systematically in the form of rows and columns.

- Title of the Table (Sales Growth (2020 to 2022)) contains the description of the table content.
- Column Headings(Year; Product A Sales (in units); Product B Sales (in units)); contains the description of information contained in columns.

Eg: Sales Growth (2020 to 2022)

Year	Product A Sales (in units)	Product B Sales (in units)
2020	1,200	1,000
2021	1,500	1,300
2022	1,800	1,700

Interpretation - Sales Growth (2020 to 2022):

- Product A: Increased from 1,200 to 1,800 units → **50% growth.**
- Product B: Increased from 1,000 to 1,700 units → **70% growth.**

Graphical Data Interpretation

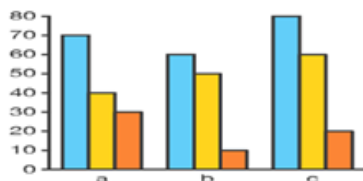
Graphical data interpretation is a skill that involves using visual representations of data to make informed decisions and derive insights.

Eg:

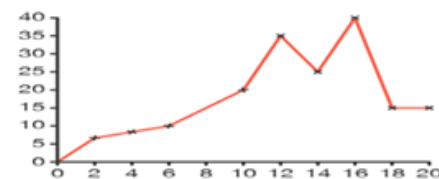
pie chart



bar chart



line graph



pictogram

category	frequency
A	■ ■ ■ ■
B	■ ■ ■ ■
C	■
D	■ ■ ■ ■ ■

Importance of Data Interpretation

- **Informed Decision Making** – A decision is only as good as the knowledge is based on. Eg: Since the average height of students is known, school can custom design the furniture according to the requirement of the class.

- **Reduced Cost** – Identifying needs can lead to reduction in cost. Eg: Based on the review or survey from customer, production of the items with low review/interest can be drop/modify.
- **Identifying Needs** – We can identify needs of people by Data Interpretation. Eg: Pizza is a popular choice among age group 8-10

Project Interactive Data Dashboard & Presentation

Data can be collected and can be visualized using visual data analytics platform like tableau or MS Excel or Datawrapper using which graphs or chart can be prepared on the basis of collected data which aids in decision making like which is the highest yield grain in India among wheat, rice, jowar, barley etc.

Instructions

- Download Tableau public with the help of an adult using this link -
- <https://public.tableau.com/en-us/s/download>
- Install the package via the install wizard.

MULTIPLE CHOICE QUESTIONS

Q1. What does data literacy primarily involve?

- Learning how to use a computer
- Knowing how to understand, work with, and talk about data
- Creating databases
- Collecting data for surveys

Q2. Which of the following is NOT a component of the Data Pyramid?

- Data
- Information
- Knowledge
- Imagination

Q3. Why is data literacy important?

- It helps in collecting data more efficiently
- It enables individuals to make informed decisions and solve problems
- It helps in creating complex algorithms
- It allows individuals to work without the need for technology

Q4. What does the Data Literacy Process Framework help with?

- Making decisions faster

5. QUIZ

1. Which one of the following is an application of AI?

- a. Remote controlled Drone
- b. Self-Driving Car**
- c. Self-Service Kiosk
- d. Self-Watering Plant System

2. This language is easy to learn and is one of the most popular languages for AI today:

- a. C++
- b. Python**
- c. Ruby
- d. Java

3. This field is enabling computers to identify and process images as humans do:

- a. Face Recognition**
- b. Model-view-controller
- c. Computer Vision
- d. Eye-in-Hand System

4. What does NLP stand for in AI?

- a. Neutral Learning Projection
- b. Neuro-Linguistic Programming
- c. Natural Language Processing**
- d. Neural Logic Presentation

5. Which of the following is not a domain of artificial intelligence?

- a. Data Management System**
- b. Computer Vision
- c. Natural Language Processing
- d. Data Science

Unit 3

Math for AI (Statistics & Probability)

3.0 How are Math and AI related?

Math is the study of patterns

- To solve the puzzles, you identify an order/arrangement in the list of numbers or the images.
- This arrangement is called a pattern. ▪ These patterns exist all around us.
- We have patterns in numbers, images, and language.

AI is a way to recognize patterns

- AI can learn to recognize patterns, like human beings.
- AI can see patterns in different types of data - numbers, images, and speech and text.
- These patterns help AI to solve puzzles – like identifying dogs and muffins, or predicting

hurricanes!

- AI needs Math to study and recognize patterns in order to take decisions

“Just like we can recognize patterns in numbers, words, pictures, etc., AI can also recognize similar patterns.”

3.1 Essential Mathematics for AI

Just like us, AI can also solve 4 type of problems using Math. AI uses Math for:

Statistics (Exploring data): Example – What is the middle value of the data? Which is the most common value in the data?

Calculus (training and improving AI model): Example – which line is more slanted? Which figure covers more area?

Linear Algebra (finding out unknown or missing values): Example – How many plants are there in total? How many cars are there in a city?

Probability (predicting different events): Example – what will be the possible results of a coin toss? Will it rain tomorrow?

3.2 Statistics

” Statistics is used for collecting, exploring, and analyzing the data. It also helps in drawing conclusions from data.”

- Data is collected from various sources. ▪ Data is explored and cleaned to be used.
- Analysis of data is done to understand it better.
- Conclusions and decisions can be made from the data.

Applications of Statistics:

- Predict the **performance of sports teams**
- It can be used to find out specific things such as:

The reading level of students , The opinions of voters, The average weight of a city's resident.

Disaster Management

- Authorities use statistics to alert the citizens residing in places that might be affected by a natural disaster in near future.

Sports

- The Tokyo 2020 Olympics were postponed due to the developing global situation in light of the Covid-19 pandemic.
- Statistics revealed that COVID cases sharply increased in Japan during the planned period of Olympics.

3.3 Probability

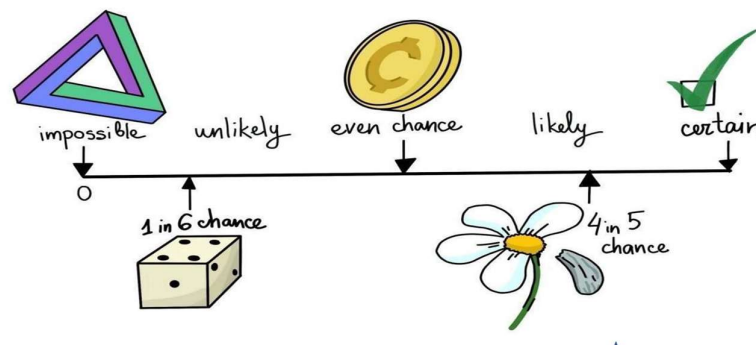
The purpose of the probability is to understand the possibility of occurrence of an event.

Probability is a way to tell us how likely something is to happen. For example – When a coin is tossed, there are two possible results or outcomes: heads (H) or tails (T)

The probability equation defines the likelihood of the happening of an event. It is the ratio of favourable outcomes to the total favourable outcomes. The probability formula can be expressed as,
Probability of an Event = Number of Favourable Outcomes / Total Number of Possible Outcomes

Probability can be expressed in the following ways:

- **Certain events:** An event will happen without a doubt
- **Likely events:** The probability of one event is higher than the probability of another event
- **Unlikely events:** One event is less likely to happen than another event
- **Impossible events:** There's no chance of an event happening
- **Equal Probability events:** Chances of each event happening is same



Probability - Applications :

Sports : Probability can be used in estimating batting average in Cricket.

Weather Forecasting : One of the most common real-life examples of using probability is weather forecasting.

Traffic Estimation : Regular people often use probability when they decide to drive to Some place.

Unit 4

Generative Artificial Intelligence

1. Supervised Learning and Discriminative Modeling:

Supervised Learning :

The classification of data elements into categories or labels was initially taught to the machine learning models by humans.

Unsupervised Learning:

In unsupervised or self-supervised learning, the machine learning model takes unlabeled datasets and figures out patterns and inherent structures within them — without human intervention.

2. What is Generative AI?

- Generative artificial intelligence (AI) refers to the **algorithms that generate new data that resembles human-generated content, such as audio, code, images, text, simulations, and videos.**
- This technology is trained with existing data and content, creating the potential for applications such as natural language processing, computer vision, the metaverse, and speech synthesis.

3. Generative AI vs Conventional AI

In contrast to other forms of AI, Generative AI is specially made to produce new and unique content rather than merely processing or categorizing already-existing data.

Here are some significant variations:

Parameter	Generative AI	Conventional AI
Goal	Generative AI creates new content	Generative AI creates new content, whereas conventional AI analyzes, processes, and classifies data
Training	Generative AI models use vast libraries of samples to train neural networks and other complicated structures to produce new content based on those patterns.	Conventional AI employs fewer complex algorithms and training methods.
Output	Generative AI output is fresh, innovative, and often unexpected.	Conventional AI produces more predictable output based on existing data.
Applications	Generative AI benefits art, music, literature, gaming, and design.	Conventional AI is used in banking, healthcare, image recognition, and language processing.

4. Types of Generative AI

Generative AI comes in a variety of forms, each with unique advantages and uses. Some of the most typical varieties are listed below:

GANs (Generative Adversarial Networks)

- GANs are neural networks that collaborate to produce fresh data
- Made up of two neural networks: Generator Network & Discriminator Network
- The generator network produces the data, while the discriminator network analyses the data and provides feedback.
- Until the generator can generate data that is identical to real data, the two networks collaborate in a feedback loop.
- Examples-creating portraits of non-existing people, convert images from day to night, generate images based on textual description, generate realistic video etc.

VAEs (Variational Auto encoders)

- Another class of generative models is VAEs. In order to produce fresh data, VAEs learn the distribution of the data and then sample from it.
- Examples- Generation of new images similar to given training set, image reconstruction, generating drafts for writer, generating new sounds and music composition etc.

RNNs (Recurrent Neural Networks)

- RNNs are a special class of neural networks that excel at handling sequential data, like music or text.
- They function by ingesting past inputs and applying that knowledge to anticipate future inputs.
- Example- Generating novel text in the style of a specific author or genre, predicting next character or word in a sequence etc.

Auto encoder

- These are Neural networks that have been trained to learn a compressed representation of data
- They function by compressing data first, then decompressing that compressed data to restore it to its original form.
- Auto encoders can be applied to denoising or picture compression applications.
- Examples- artistic image creation, drug discovery. They generate highly realistic samples.

5. Examples of Generative AI

Generative AI has many applications, from art and music to language and natural language processing. Here are some examples of how generative AI is being used in various fields:

Art: Generative AI is being used to create unique works of art.

For example, The Next Rembrandt project used data analysis and 3D printing to create a new painting in the style of Rembrandt

Music: Generative AI is being used to create new music, either by composing original pieces or by remixing existing ones. ▪ For example, AIVA is an AI composer that can create original pieces of music in various genres.

Language: Generative AI is being used to generate new language, such as chatbots that can hold conversations with users or natural language generation systems that can produce written content.

6. Benefits of using Generative AI:

Generative AI offers a range of benefits, including increased creativity, efficiency, personalization, exploration, accessibility, and scalability. By leveraging these benefits, businesses and organizations can improve their content creation processes and provide better experiences for their users.

Creativity: Generative AI can assist creatives in pushing the boundaries in making creative processes more efficient and personalized. This can be particularly valuable in fields such as art, design, and music.

Efficiency: Generative AI can automate content creation processes, which can save time and reduce costs compared to traditional manual processes.

Personalization: Generative AI can be used to create personalized content for individual users based on their preferences and behaviors, such as customized product recommendations or personalized news articles

Exploration: Generative AI can be used to explore new design spaces or optimize complex systems, such as designing new drugs or improving industrial processes.

Accessibility: Generative AI can democratize access to content creation tools, making it easier for people with limited resources or technical expertise to produce high-quality content.

Scalability: Generative AI can be used to generate large volumes of content quickly and efficiently, making it a scalable solution for businesses and organizations that need to produce large amounts of content.

7. Limitations of Using Generative AI

Data Bias: If generative AI is trained on biased or incomplete data, the output may be similarly biased or flawed. This can lead to inaccurate or problematic results in certain applications, such as in facial recognition or natural language processing.

Uncertainty: Generative AI can produce unexpected and often unpredictable results, which can be both a benefit and a drawback.

Computational Demands: Generative AI requires significant computational resources to train and generate its output, which can be expensive and time-consuming.

8. Generative AI tools

There are many generative AI tools available today that enable users to create and experiment with generative models. Here are some popular tools:

Artbreeder: Artbreeder is a web-based tool that enables users to generate new images by combining different GAN models. Users can select and combine different GAN models to create new and unique images. Go to artbreeder.com

Runway ML: Runway ML is a platform for creating, training, and deploying generative models. It provides a user-friendly interface for building and training various types of generative models, including GANs, VAEs, and image classifiers.

Video	 Muse AI	 Visla AI	 Topaz AI
Text	 ChatGPT	 Notion AI	 Compose
Images	 Midjourney	 Magic Studio	 Pebblely
Design	 Viesus	 Piggy AI	 Galileo

Coding	 Bugasura	 CodeGPT	 Replit Ghostwriter
Audio	 FineShare	 Boomy AI	 Playlist AI
Productivity	 Briefly AI	 Socra AI	 Lexi AI

9. Ethical considerations of using Generative AI

While Generative AI offers many benefits, there are also several ethical considerations that should be considered when using this technology.

Ownership: There are questions about who owns the content generated by generative AI. This is particularly relevant in creative fields such as music, literature, or art, where generative AI can create original works that blur the lines between human and machine authorship.

Human Agency: Generative AI raises questions about human agency and control. As technology becomes more sophisticated, it may become increasingly difficult to distinguish between content generated by humans and machines, which could lead to a loss of human autonomy and agency.

Bias: Generative AI can replicate and amplify existing biases present in the data used to train the model. This can lead to harmful or discriminatory outcomes, especially if the generated content is used in high-stakes applications such as hiring, loan approvals, or criminal justice.

Misinformation: Generative AI can be used to create fake news or deep fakes, which can be used to spread misinformation and manipulate public opinion. This can have serious consequences for democracy and trust in institutions.

Privacy: Generative AI can potentially be used to generate sensitive personal information, such as credit card numbers, social security numbers, or medical records. This could be used for malicious purposes.

10. The Potential Negative Impact on Society :

Generative AI can be used to create fake news or deep fakes that can spread misinformation and manipulate public opinion.

Lead to job displacement for humans who previously performed these tasks.

Generative AI has the potential to generate sensitive personal information, such as social security numbers or medical records, which could be used for malicious purposes.

11. Responsible Use of Generative AI

Ensuring that the training data used are diverse and representative.

The outputs are scrutinized for bias and misinformation.

Prioritizing user privacy and consent,

Having clear guidelines around ownership and attribution of generative content.

Engaging in public discussions around the social and ethical implications of this technology to ensure that it is developed and used in ways that are beneficial to society.

In short, responsible use of Generative AI is essential for ensuring that this technology is developed and used in ways that benefit society! By emphasizing ethics, creating trust, limiting negative repercussions, defining legislation, and encouraging innovation, we may maximize Generative AI's potential to improve society!

Unit 5

Introduction to Python

1. Introduction to Python Language :

- Python is a high-level, interpreted programming language known for its simplicity and readability.
- Its easy syntax makes it beginner-friendly and allows developers to write clean and concise code.
- Python is portable and versatile, running on multiple platforms without requiring major changes.
- It is widely used in various fields such as web development, artificial intelligence, automation, data science, and more.

2. Applications of Python Language

Python Programming & Applications



- Web Development
- AI & Machine Learning
- Data Analysis
- Automation (scripts)
- Game Development

3. Python Basics

Variables-Variables are symbolic names that refer to objects or values stored in your computer's memory, and they're essential building blocks for any

Python program:

Eg: x=5

```
name="ZIET"
```

Here x and name are variables.

Points to note:

- You don't need to declare the type of a variable in Python. It is automatically decided based on the value you assign.
- You can change the value of a variable any time.
- Variable names should be meaningful and follow rules

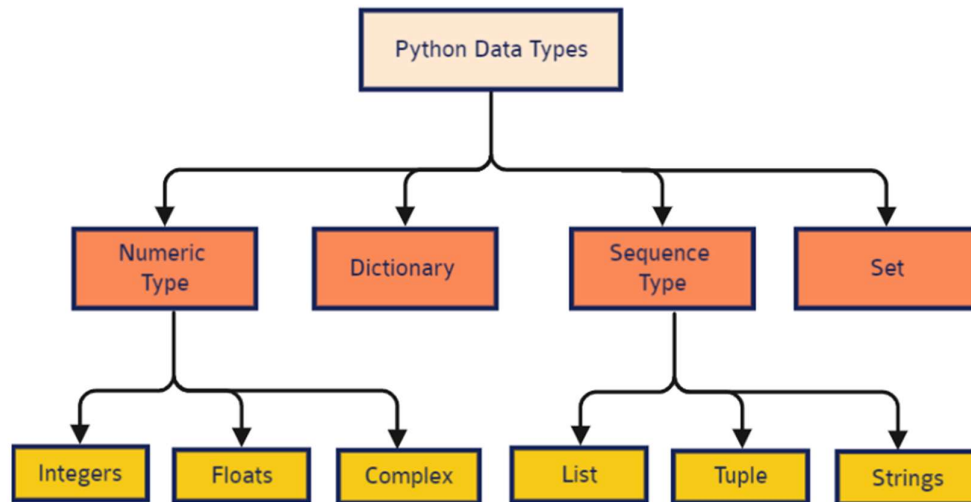
4. Rules for Naming Variables:

- Must start with a letter or underscore (_)

- Can include letters, digits, and underscores (e.g., AI_9)
- Cannot be a Python keyword (like if, for, else)
- Python is case-sensitive (Name and name are different)

5. Data Types-

Every value in Python has a data type. Since everything is an object in Python programming, data types are actually classes and variables are instance (object) of these classes.



• Integer (int):

Used to store whole numbers (without decimal). Eg:145,4.78,-98

• Float (float):

Used to store decimal numbers or numbers with a fractional part. Eg:3.14, -0.5, 100.0.

• String (str):

Used to store text or characters. Anything written inside quotes (single or double) is a string, like "rain" or '2025'.

Note: type() – This function is used to check the datatype of a given value or object.

Input/Output Operation	Function	Purpose	Example
Input	input()	Used to take data from the user.	name=input("Enter your name")
Output	print()	Used to show messages or results.	print(name)

Note:

- input () function always takes input as a string (even if you type a number).
- You can convert it to other types (like int or float) using type casting functions, if needed.

6. Operators

- **Arithmetic Operators:**

These operators are used to perform basic mathematical operations.

Operator	Meaning	Expression	Result
+	Addition	5+7	12
-	Subtraction	52-9	43
*	Multiplication	4*3	12
/	Division	10/2	5.0
%	Remainder	20%3	2
//	Integer Division	13//3	4
**	Raised to power	2**3	9

- **Comparison Operators:**

Comparison operators are used to compare two values. They return either True or False.

Operator	Meaning	Expression	Result
>	Greater Than	20 > 10	True
		15 > 25	False
<	Less Than	20 < 45	True
		20 < 10	False
==	Equal To	5 == 5	True
		5 == 6	False
!=	Not Equal to	67 != 45	True
		35 != 35	False
>=	Greater than or Equal to	45 >= 45	True
		23 >= 34	False
<=	Less than or equal to	13 <= 24	True
		13 <= 12	False

- **Logical Operators:**

Operator	Meaning	Expression	Result
And	And operator	True and True	True
		True and False	False
Or	Or operator	True or False	True
		False or False	False
Not	Not Operator	not False	True
		not True	False

Program-1

Aim: Write a program to print “hello world”

Code:

```
print("Hello, World!")
```

Output:

Hello, World!

Program-2

Aim: Write a program to find sum of two numbers by taking input values from the user

```
# Program to find the sum of two numbers
num1 = float(input("Enter first number: "))
num2 = float(input("Enter second number: "))
add = num1 + num2
print("The sum of the two numbers is:", add)
```

Output:

```
Enter first number: 234
Enter second number: 789.67
The sum of the two numbers is: 1023.67
```

Program-3

Aim: Write a program to calculate total and percentage of the students result

```
# Program to calculate total and percentage of a student's result
sub1 = float(input("Enter marks of Subject 1: "))
sub2 = float(input("Enter marks of Subject 2: "))
sub3 = float(input("Enter marks of Subject 3: "))
sub4 = float(input("Enter marks of Subject 4: "))
sub5 = float(input("Enter marks of Subject 5: "))
total = sub1 + sub2 + sub3 + sub4 + sub5
percentage = (total / 500) * 100
print("|----- RESULT -----")
print("Total Marks =", total)
print("Percentage =", percentage, "%")
```

Output:

```
Enter marks of Subject 1: 89
Enter marks of Subject 2: 98
Enter marks of Subject 3: 87.5
Enter marks of Subject 4: 56
Enter marks of Subject 5: 61
----- RESULT -----
Total Marks = 391.5
Percentage = 78.3 %
```

Program-4

Aim: Write a program to make use of all the arithmetic operators

#WProgram to make use of all the arithmetic operators

```
a=int(input("Enter first value:"))
b=int(input("Enter second value:"))
add=a+b
print("The sum of two numbers is:",add)
sub=a-b
print("The difference between two numbers is:",sub)
prod=a*b
print("The product of two numbers is:",prod)
div=a/b
print("The division of two numbers is:",div)
fldiv=a//b
print("The floor division of two numbers is:",fldiv)
mod=a%b
print("The reminder of two numbers is:",mod)
pwr=a**b
print("a power b is: ",pwr)
```

Output:

```
Enter first value:25
Enter second value:6
The sum of two numbers is: 31
The difference between two numbers is: 19
The product of two numbers is: 150
The division of two numbers is: 4.166666666666667
The floor division of two numbers is: 4
The reminder of two numbers is: 1
a power b is: 244140625
```

Program-5

Aim: Write a program to perform concatenation and replication on 2 strings.

```
# Program to perform concatenation and replication on 2 strings
str1 = input("Enter first string: ")
str2 = input("Enter second string: ")
concat = str1 + str2
rep1 = str1 * 3    # replicating first string 3 times
rep2 = str2 * 2    # replicating second string 2 times
print("\n----- RESULTS -----")
print("Concatenation:", concat_result)
print("Replication of first string (3 times):", rep1)
print("Replication of second string (2 times):", rep2)
```

Output:

```
Enter first string: Artificial
Enter second string: Intelligence
```

```
----- RESULTS -----
```

```
Concatenation: ArtificialIntelligence
```

```
Replication of first string (3 times): ArtificialArtificialArtificial
```

```
Replication of second string (2 times): IntelligenceIntelligence
```
