

Kendriya Vidyalaya Sangathan

Kendriya Vidyalaya Sangathan Regional Office, Ahmedabad



CLASS X

SUPPORT MATERIAL

ARTIFICIAL INTELLIGENCE (417)

Based on Latest CBSE Exam Pattern

Session 2022-2023

OUR PATRON



SMT SHRUTI BHARGAV
Deputy Commissioner, KVS RO Ahmedabad



SMT VINITA SHARMA
Assistant Commissioner, KVS RO Ahmedabad

SUBJECT CO-ORDINATION BY



Sh. Alok Kumar Tiwari

(Regional co-ordinator for AI, Ahmd Region)

Principal, KV No 3 ONGC , Surat

CONTENT TEAM

SH SATISH KUMAR MALI	PGT CS	KV NO 3, ONGC, SURAT
SH KASHIRAM BILHARIYA	PGT CS	KV NO 2, KRIBHCO,SURAT
SH MANGILAL KARVA	PGT CS	KV NO 1, ICCHHANATH SRT
SH ABHISHEK ARYA	PGT CS	KV AFS MAKARPURA
SH MANISH PARMAR	PGT CS	KV VV NAGAR
SH RAHUL AWASTHI	PGT CS	KV JUNAGARH

KENDRIYA VIDYALAYA SANGATHAN, AHMEDABAD REGION

SPLIT-UP OF SYLLABUS

SUB: ARTIFICIAL INTELLIGENCE (417)

CLASS – X (SESSION 2022-23)

Total Marks: 100 (Theory-50 + Practical-50)

	UNITS	NO. OF HOURS for Theory and Practical	MAX. MARKS for Theory and Practical
P A R T A	Employability Skills		
	Unit 1: Communication Skills-II*	10	-
	Unit 2: Self-Management Skills-II	10	3
	Unit 3: ICT Skills-II	10	3
	Unit 4: Entrepreneurial Skills-II	15	4
	Unit 5: Green Skills-II*	05	-
	Total	50	10
P A R T B	Subject Specific Skills		Marks
	Unit 1: Introduction to Artificial Intelligence (AI)		10
	Unit 2: AI Project Cycle		10
	Unit 3: Advance Python>(*To be assessed in Practicals only)		
	Unit 4: Data Science>(*To be assessed in Practicals only)		
	Unit 5: Computer Vision>(*To be assessed in Practicals only)		
	Unit 6: Natural Language Processing		10
	Unit 7: Evaluation		10
	Total		40
PAR T C	Practical Work:		
	<ul style="list-style-type: none"> ● Unit 3: Advance Python ● Unit 4: Data Science ● Unit 5: Computer Vision 		
	Practical Examination		35
	Viva Voce		
Total		35	
PART D	Project Work / Field Visit / Practical File / Student Portfolio		15
	Viva Voce		
	Total		15
GRAND TOTAL		200	100

Note: * marked units are to be assessed through Internal Assessment/ Student Activities.

They are not to be assessed in Theory Exam

MONTH- WISE DISTRIBUTION

Month	Portion to be covered	No of periods
April 2022	<p>Part A - Employability Skills:</p> <p>1.Communication Skills: Methods of communication, Verbal communication,</p> <p>2.Non-verbal communication, Communication Cycle</p> <p>3.Importance of feedback,</p> <p>4.Barriers of effective communication, Writing Skills – Part of Speech, Writing Skills - Sentences</p>	10
June 2022	<p>Part B – Subject Specific Skills</p> <p>Unit 1: Introduction to AI Foundational Concepts of AI</p> <p>1.What is intelligence?</p> <p>2.Decision Making</p> <p>3.What is Artificial Intelligence and what is not?</p> <p>4.Basics of AI: Let’s Get started</p> <p>5.Introduction to AI and related terminologies</p> <p>6.Introducing AI, ML, & DL</p> <p>7.Introduction to AI Domains (Data, CV & NLP)</p> <p>8.Applications of AI – A look at real life AI implementations</p> <p>AI ethics</p>	10
July 2022	<p>Unit 2 : AI Project Cycle Introduction:</p> <p>Introduction to AI Project Cycle</p> <p>1.Problem Scoping</p> <p>2.Understanding problem scoping and Sustainable Development Goal</p> <p>3.Data Acquisition Simplifying data acquisition Data Exploration</p> <p>4.Visualizing Data Modelling</p> <p>Introduction to modelling</p> <p>1.Introduction to Rule Based & Learning Based AI Approaches</p>	10

	<p>2.Introduction to Supervised Unsupervised & Reinforcement</p> <p>3.Learning Models</p> <p>4.Neural Networks</p> <p>5.Evaluation</p> <p>6.Evaluating the idea!</p>	
August 2022	<p>Part A - Employability Skills</p> <p>Unit 2: Self-management Skills</p> <p>1.Stress Management</p> <p>2.Self-awareness — Strength and Weakness Analysis</p> <p>3.Self-motivation</p> <p>4.Self-regulation — Goal Setting</p> <p>5.Self-regulation — Time Management</p> <p>Part B – Subject Specific Skills</p> <p>Unit 3 – Advance Python (To be assessed through practicals)</p> <p>1.Recap Jupyter Notebook</p> <p>2.Introduction to Python</p> <p>3.Python Basics</p> <p>Unit 4 Data Sciences (To be assessed through practicals)</p> <p>1.Introduction</p> <p>2.Introduction to Data Science</p> <p>3.Applications of Data Science</p> <p>4.Revisiting AI Project Cycle</p> <p>5.Concepts of Data Sciences</p> <p>6.Python data Sciences</p> <p>7.Statistics Learning & Data Visualization</p> <p>8.K-nearest neighbour model (Optional)</p>	10
September 2022	<p>Part A : Employability Skills</p> <p>Unit 3-Information and Communication Technology Skills</p> <p>1.Basic Computer Operations</p> <p>2.Performing Basic File Operations</p>	10

	<p>3.Computer Care and Maintenance</p> <p>4.Computer Security and Privacy</p> <p>Part B – Subject Specific Skills</p> <p>Unit 5 – Computer Vision (To be assessed in practicals)</p> <p>Introduction</p> <p>1.Introduction to Computer Vision</p> <p>2.Applications of CV</p> <p>3.Concepts of Computer Vision</p> <p>4.Understanding CV Concepts, Pixels, How do computers see images?</p> <p>5.Image features</p> <p>Open CV</p> <p>6.Introduction to Open CV</p> <p>7.Image Processing</p> <p>8.Convolution Operator (Optional)</p> <p>9.Understanding Convolution Operator</p> <p>10.Convolution Operator</p> <p>11.Convolution Neural Network</p> <p>12.Introduction CNN, Understanding CNN, Kernel, Layers Testing CNN</p>	
October 2022	<p>Part A - Employability Skills</p> <p>Unit 4- Entrepreneurial Skills</p> <p>1.Entrepreneurship and Society</p> <p>2.Qualities and Functions of an Entrepreneur</p> <p>3.Myths about Entrepreneurship</p> <p>4.Entrepreneurship as a Career Option</p>	15
November 2022	<p>Part B Subject Specific Skills</p> <p>Unit 6 Natural Language Processing Introduction</p> <p>1.Introduction to Natural Language Processing</p> <p>2.NLP Applications</p> <p>3.Revisiting AI project cycle</p>	10

	<p>4.Introduction to Chatbots</p> <p>5.Human Language VS Computer Language Concepts of Natural</p> <p>6.Language Processing</p> <p>7.Text Processing, Data Processing</p> <p>8.Bag of Words, TFIDF(Optional), NLTK</p>	
December 2022	<p>Part A : Employability Skills</p> <p>Unit 5 Green Skills</p> <p>1.Sustainable Development</p> <p>2.Our Role in Sustainable Development</p> <p>Part B: Subject Specific Skills</p> <p>Unit 7 Evaluation</p> <p>1.Introduction to model evaluation</p> <p>2.Confusion Matrix</p> <p>3.Understanding Accuracy, Precision, Recall & F1 Score</p> <p>Practice Evaluation</p>	05
January 2023 & February 2023	Thorough Revision for the Final Examinations(Theory and Practical)	10

Unit 2 Self-Management Skills

Self-management

Self-management is the ability to control and regulate our emotions, thoughts and behaviour as per the situation. Self-management is also known as self-control or self-regulation. It helps us in determined achieving pre- goals by regulating our actions, organising our time and taking responsibility for our decisions. Self-management can be defined as our ability to: manage our tasks and goals successfully. function amicably with others. control feelings, emotions and activities. tolerate unpleasant situations. deal with difference of opinion with others. learn new ideas sincerely. handle ourselves and work towards reaching goal.



Stress and Its Types

Stress is a feeling of emotional or physical tension. It is our body's reaction to a challenge or demand. It can come from any event or thought that makes us feel frustrated, angry, or nervous. Stress means different things to different people. To an executive, the challenge of meeting a deadline may be equally stressful as to a singer performing at a live concert. To a driver it can be the hassles of heavy traffic. To a student it can be the pressure of doing well in the exams.

Stress can be either positive (Good) or negative (Bad).

Positive Stress: Stress which results from exhilarating experiences, can be positive. A little stress is important to keep us going. It gives a zing to life and the edge that rejuvenates us. Just imagine you have received an unexpected promotion in office. Doesn't your heart start beating faster? Think of a student who was not expecting good marks in English but when the results were announced he got the highest marks in the class. He smiles with flushed face and perspiration dripping down his body. This is 'eustress' which is the stress of wining and achieving.

Negative Stress: Mostly stress strikes us in negative way. It stems from the fear of losing, falling, overworking or not being able to cope. In such a situation, we see stress as a destructive, debilitating force. It's true of negative stress because negative stress causes distress. Such stress affects us in a harmful manner.

Meaning and Importance of Stress Management

Stress management is all about taking charge of your lifestyle, thoughts, emotions, and the way you deal with problems. Stress management starts with identifying the sources of stress in your life. This is not as easy as it sounds.

The true sources of stress are not always obvious, and it is all too easy to overlook your own stress-inducing thoughts, feelings, and behaviour. Sure, you may know that you are constantly worried about work deadlines. But maybe it is your procrastination, rather than the actual job demands, that leads to deadline stress. To identify the true sources of stress, look closely at your habits, attitude, and excuses. Until you accept responsibility for the role you play in creating or maintaining it, your stress level will remain outside your control. Being well versed with stress coping mechanisms helps people lead and healthy and happier life. Adequately managed stress prevents medical and physical illnesses.

Stress management is vital because it leads to following benefits.

- Improves mood
- Boosts immune system
- Promotes longevity
- Leads to burst of physical strength, which is vital for goal achievement
- Complete mental and physical engagement for task accomplishment
- Increases efficiency and effectiveness
- Prevents psychological disorders and behavioural problems.

Sources of Stress

On the basis of its stimulus, these are the factors that are the sources of stress.

Mental Stress

It is often spoken of as emotional stress and involves powerful feelings and emotions. It hampers the power of our own mind in how we think, rationalize and make meaning of our stress, hassles and worries. It is about how our brain perceives the stress in our life. Very high expectations from our own selves can leave us with chronic anxiety and mental stress.

This source of stress revolves around critical incidents and significant events in our life. There are significant events that may occur in our life and give us stress. It may be positive stress like making a speech in school's annual

function or winning a sporting event. However, there are also significant events that involve negative stress. These may involve a serious accident, or failure, etc. Students may feel this stress, if they are unable to handle their assignment submission deadlines or their examinations grades drop. Such events give rise to high degree of mental stress and anxiety. They are often associated with continuing trauma after the event for an unnecessary longer period, often referred to as post traumatic stress disorder (PTSD).

Physical Stress

Physical stress refers to how our body reacts and responds to stressful situations. It is a common response to situations where do-or die situation arises. This kind of stress puts us on high alert with instinctive fight or flight response. During this type of stress, the adrenal glands of the body naturally respond with a surge of hormones like adrenalin and cortisol in the bloodstream which pumps burst of energy in the body helping us to deal with the stress. Physical stress is often generated by the fatigue and overwork that we build up over a period of time.

Social Stress

Social stress relates to the stress involved in interacting, socializing and communicating with other human beings. It revolves around our relationships with other people. Some of these social interactions and relationships can be very demanding and tension-filled experiences leading to stress. Discord among the members of the family, peer pressure for doing things against their will and maintaining balance between life and studies, may lead to stress at times. Inhibiting feelings like worries, frustrations, apprehensions within our inner self keep on building up inside our body and hinder our open outlook towards life. These may arise due to situations over which we have no control, hence they give us stress thus obstructing our performance

Financial Stress

Financial stress is caused when we face problems in finances. Mostly this type of stress is faced by adults who have to make the ends meet within their income. Youngsters may have aspirational financial stress. It may be a cause of worry for them to become financially independent soon so that they are not dependent on their parents for long. Sometimes financial stress is caused when they are not able to manage their spending within the means of their pocket money due to rising costs and peer pressure. Students living in hostels, away from home, face this stress more often than those who are living with their parents.

Coping with Stress

It may seem that there's nothing you can do about stress. The bills won't stop coming, there will never be more hours in the day, and your career and family responsibilities will always be demanding. But more control than you might think. In fact, the simple realization that you are in control of your life is foundation of stress management. Managing stress is all about taking charge of your thoughts, emotions, schedule, and the way you deal with problems. Here are some ways for reducing stress:

Identify the cause of stress by monitoring your state of mind write down the cause, your thoughts throughout the day. If you feel stressed, thoughts and your mood. Once you know what's bothering you, develop a plan for addressing it.

Build strong relationships because relationships can be a source of stress. The negative, hostile reactions can cause immediate changes in stress-sensitive hormones. But relationships can also serve as stress buffers.

Reach out to family members or close friends and let them know you are having a tough time. They may be able to offer support, useful ideas or just a fresh perspective as you begin to tackle whatever is causing your stress.

Walk away when you are angry. Before you react, take some time by counting to 10. Then reconsider. Walking or other physical activities can also help you work off steam.

Get help from professionals. If you continue to feel overwhelmed, consult a professional who can help you identify situations or behaviors that contribute to your chronic stress and then develop an action plan for changing them.

Stress Management Strategies

Let's learn about strategies that help us to manage stress.

Stress Management Strategy :

Avoid Unnecessary Stress: Not all stress can be avoided, and it is not healthy to avoid a situation that needs to be addressed. You may be surprised by the number of stressors in your life that you can eliminate. Learn how to say "no". Know your limits and stick to them. Taking on more than you can handle is a sure-fire recipe for stress.

Avoid people who stress you out: If someone consistently causes stress in your life and you cannot turn the relationship around, limit the amount of time you spend with that person.

Take control of your environment: If the evening walk makes you anxious, turn to the treadmill. If traffic's got you tense, drive on a longer but less-travelled route. If going to the market is an unpleasant chore, do your grocery shopping online.

Avoid hot-button topics: If you get upset over religion or politics, cross them off your conversation list.

Stress Management Techniques

Adopt a Healthy Lifestyle You can increase your resistance to stress by strengthening your physical health. helps in maintaining good physical health. Adopting a healthy lifestyle **Eat a Healthy Diet** Well-nourished bodies are better prepared to cope with stress, so start your day with healthy breakfast, and keep your energy up with balanced, nutritious meals throughout the day.

Get Enough Sleep

Adequate sleep fuels your mind as well as your body. Feeling tired will increase your stress because it may cause you to think irrationally.

Physical Exercise

A Common sign of getting stressed is that your muscles contract leading to headache, back pain, muscle null and high blood pressure. It is very important to exercise regularly. Physical activity plays a key role in reducing and preventing the effects of stress. Make time for at least 30 minutes of exercise, three times per week. Nothing beats aerobic exercise for releasing pent-up stress and tension.

Yoga

Yoga is another form of exercise. It has all sorts of exercises - physical exercise, breathing patterns and meditation. Yoga keeps the mind and body relaxed and healthy. Depending upon your physical fitness, choose the yogasanas and do them regularly for better physical and mental health.

Meditation

Meditation helps in enhancing our mind power. Regular meditation brings peace and calm to mind and composure to the body. By doing meditation every day, we can manage day-to-day stress besides meditation, relaxing the muscles by deep breathing, lying down with closed eyes is also a good idea to deal with stress.

Self-awareness

Our lives revolve around us and there is always something happening in life. We are what we believe we are. Self-awareness helps in knowing ourselves

better. Self-awareness is to have a clear perception of our personality. It is to be conscious of our strengths, weaknesses, thoughts, beliefs, motivation, and emotions. Self-awareness allows us to understand other people, how they perceive us, our attitude and our responses towards them.

Relative Scale

We might quickly assume that we are self-aware, but it is helpful to have a relative scale for awareness if we have ever been in a tricky situation, we may have experienced everything happening in slow motion and noticing details of our thought process and the event. This is a state of heightened awareness. With practice we can learn to engage these types of heightened states and see new opportunities for interpretations in our thoughts, emotions, and conversations.

Developing Self-awareness

Self-awareness is developed through practice in focusing our attention on the details of our personality and behaviour. It cannot be learned from reading a book. When we read a book we are focusing our attention, the conceptual ideas in the book. With our attention in a book we are practicing not paying attention to our own behaviour, emotions and personality.

Types of Self-Awareness

Self-awareness of Strengths

You should be aware of your own strengths. Discover them by paying attention to the work at hand and how well you are able to perform. This will give you an idea of your strengths and what kind of projects you should do.

Self-awareness of Weaknesses

As you already know, you cannot do everything. Discovering your weaknesses help you to look for support from others. It builds humility and makes you a humble person instead of being an egoist.

Self-awareness of Flaws

We all have flaws and we need to be aware of them. Do not hide them and suffer. Instead accept them and try to overcome them with the help of family and friends.

Self-awareness of Emotional Triggers

Everyone has some trigger points that make them aggressive or stressed. Knowing your emotional triggers. helps you develop a strategy to keep your calm in such situations. Keeping calm and composed in the worst scenarios help in your professional success.



Motivation

Motivation is a driving force that compels an action toward a desired goal. The motivation to go to the dining table is the hunger that elicits a desire to eat. Motivation is the purpose towards an action.

Motivation can be categorized in two types

Intrinsic Motivation

It is the motivation that is driven by an interest or enjoyment in the task itself, and exists within you rather than relying on external pressures. It is free from any desire for reward. Intrinsic motivation is a natural motivational tendency which arrives from the feeling of having things under control.

Extrinsic Motivation

Extrinsic motivation comes from outside of the individual. Common extrinsic motivations are rewards in the form of money for showing the desired behavior, and the threat of punishment following misbehaviour. Competition is also an extrinsic motivator because it encourages the performer to win and to beat others. A cheering crowd and the desire to win a trophy also act as extrinsic incentives.

Self-motivation

Self-motivation is a force that keeps pushing us to go on and achieve our goals. It is our internal drive to keep moving forward. It is a fundamental tool for

Eight Steps to Self-motivation

Start Simple: Keep motivators around your work area - things that give you that initial spark to get going. These motivators will be the triggers that remind you to get going.



Keep Good Company: Make more regular encounters with positive and motivated people. This could be as simple as a quick discussion with a friend who likes sharing ideas. Positive and motivated people are very different from the negative ones. They will help you grow and see opportunities during tough times.

Keep Learning: Read and try to take in everything you can. The more you learn, the more confident you become in starting projects.

See the Good in Bad: When encountering obstacles or challenging goals, you want to be in the habit of finding what works to get over them. So be positive and find good in everything.

Stop Thinking: Just do the work. If you find motivation for a particular project lacking, try getting started on something else. Something trivial even, then you'll develop the momentum to the more begin important stuff. When you're thinking and worrying about it too much, you're just wasting time

Know Yourself: Keep notes on when your motivation sucks and when you feel like a superstar. There will be a pattern that, once you are aware of, you can work around and develop.

Track Your Progress: Keep a tally or a progress bar for ongoing projects. When you see something growing you will always wish to nurture it.

Help Others: Helping others actually helps yourself. Share your ideas and help friends get motivated. Seeing others do well will motivate you to do the same. Write about your success and get feedback from the readers.

Self-regulation

Self-regulation can be defined as the ability to control one's behaviour, emotions, and thoughts in the pursuit of long-term goals. More specifically, emotional self-regulation refers to the ability to manage disruptive emotions and impulses.

Self-regulation is like an invisible magic. You cannot see it or smell it, but its effects are amazing. It can transform fat into slim, ignorant into expert, Door into rich, misery into happiness. It prepares you for that bumpy ride all the way to the shore. It makes you happier and gives you that sense of real achievement earned through sheer intensity of sustained focus. If you really want to succeed at a task then self-regulation is essential. It is easy to feel that success comes easily; that it is just a question of self-belief. But anyone who has achieved anything has done so because they have been able to control and direct their own inner lives and actions to the extent that has enabled them to become proficient at what they do.

Strategies for Self-regulation

If self-regulation is so important, why were most of us never taught strategies for using this skill? Most often we all expect to do this naturally. While this is true for the most part, all children and adults can benefit from learning these concrete strategies for self-regulation.

Mindfulness:

Mindfulness involves the cultivation of moment-to-moment awareness through deep breathing. This helps with self-regulation by allowing you to delay gratification and manage emotions. In a 2018 review of 27 research studies, mindfulness was shown to have an effect on attention, which in turn helped to regulate feelings and higher-order thinking.

Cognitive Reappraisal:

Cognitive reappraisal is a strategy that can be used to improve self-regulation abilities. This strategy involves changing your thought patterns. Cognitive reappraisal means thinking about a situation in an adaptive way, rather than one that is likely to increase negative emotions. For example, imagine a friend did not return your calls or texts for several days. Rather than thinking that this reflected something about yourself, such as "my friend hates me," you might instead think, "my friend must be really busy."

Acceptance and problem solving:

Another strategy for self-regulation is acceptance of a situation and then finding ways to tackle it. Till the time we accept a problem, we will not get down to find its solution. Once acceptance comes the solution to the problem is easy to find. For this self-regulation and open minded attitude are required. people who are adept at self-regulating tend to see the good in others, view challenges as opportunities, and can calm themselves when upset and cheer when feeling down.

Following are some of the skills you must master to succeed in life:

- **Self-awareness:** Ask for honest feedback. Gather insights on your personality and work-specific proficiencies. Think about your daily interactions and how you handled situations well or could have handled them differently.
- **Responsibility:** Taking responsibility for your tasks is very important. Taking ownership is the step towards self-development. For example, if you have been assigned a task by a teacher; ensure you take complete ownership. Even if you are unable to complete the task on time, you must report it and then correct it.
- **Time Management:** Prioritise the things you have to do. Remove waste and redundancy from work. Make a time table and follow it diligently.
- **Adaptability:** Stay current with best practices and read up on new information always. Prepare yourself for new changes, so that you can transition seamlessly.

Session 1: Stress Management

What is Stress?

Stress can be defined as our emotional, mental, physical and social reaction to any perceived demands or threats. These demands or threats are called stressors. Stressors are the reason for stress.

For example,

- you are too close to the exams but feel unprepared.
- you are experiencing a loss of someone close in the family.
- you are worried about what people would think of you if you don't dress well or cannot speak confidently.

Stress Management

Managing stress is about making a plan to be able to cope effectively with daily pressures. The ultimate goal is to strike a balance between life, work, relationships, relaxation, and fun. By doing this, you are able to deal with daily stress triggers and meet these challenges head-on.

Always keep in mind the ABC of stress management

A: Adversity or the stressful event

B: Beliefs or the way you respond to the event

C: Consequences or actions and outcomes of the event



Management Techniques

Here are a few simple stress management techniques.

- **Time management:** Proper time management is one of the most effective stress-relieving techniques.
- **Physical exercise and fresh air:** A healthy lifestyle is essential for students. Stress is generally lower in people who maintain a healthy routine. Doing yoga, meditation and deep breathing exercises help in proper blood circulation and relaxes the body. Even taking a walk or playing in the park will help you get a lot of fresh oxygen, which will help you become more active.

- **Healthy diet:** Having a healthy diet will also help you reduce stress. Eating a balanced diet, such as Dal, Roti, vegetables and fruits will give you the strength to do your daily work efficiently.

- **Positivity:** Focussing on negative aspects of life will add more stress. Instead, learn to look at the good things and stay positive. For example, instead of feeling upset over a scoring less in a test, try to maintain a positive attitude and look at ways to improve the next time.

- **Sleep:** We should get a good night's sleep for at least 7 hours so that your brain and body gets recharged to function better the next day.

- **Holidays with family and friends:** Going to a relative's place, such as your grandparents' house or a new place during your summer vacations can help you break from the normal routine and come back afresh.

Ability to Work Independently

If you can become a calm and relaxed person, you will have the ability to work independently, which means.

1. becoming self-aware, self-monitoring, and self-correcting.
2. knowing what you need to do.
3. taking the initiative rather than being told what to do.
4. recognising your mistakes and not blaming others.
5. having the ability and the will to learn continuously.

Emotional Intelligence

Emotional intelligence is the ability to identify and manage one's own emotions, as well as the emotions of others.

- **Emotional awareness** : the ability to identify and name one's own emotions.

- **Harnessing emotions** : the ability to harness and apply emotions to tasks like thinking and problem solving.

- **Managing emotions** : the ability to regulate one's own emotions when necessary and help others to do the same.

Some steps to manage emotional intelligence are as given below.

- **Understand your emotions:** Observe your behaviour and note the things you need to work on. You can then work on the things you need to improve.
- **Rationalise:** Do not take decisions abruptly; be rational in your thinking.
- **Practise:** Do meditation and yoga to keep yourself calm.

Session 2: Self-awareness – Strength and Weakness Analysis

Techniques for Identifying your Strengths and Weaknesses

Finding Strengths (or abilities)

- Think of anything that you are always successful at.
- Think about what others like in you.
- Take out time and think about what you do well.

Finding Weaknesses

- Point out the areas where you struggle and the things you find difficult to do.
- Look at the feedback others usually give you.
- Be open to feedback and accept your weaknesses without feeling low about it. Take it as an area of improvement.

Difference between Interests and Abilities (Strengths)

Interests

1. Things that you like to do in your free time that make you happy. An acquired or natural capacity
2. Things you are curious about or would do even if no one asked you to do it.
3. Things you want to learn or would like to do in the future

Ability

1. An acquired or natural capacity
2. nable you to perform a particular job or task with considerable proficiency.

Session 3: Self-motivation

Self-motivation is simply the force within you that drives you to do things. Self-motivation is what pushes us to achieve our goals, feel happy and improve our quality of life. In other words, it is our ability to do the things that need to be done without someone or something influencing us.

Qualities of Self-motivated People

1. Know what they want from life
2. Are focussed
3. Know what is important
4. Are dedicated to fulfill their dreams

Building Self-motivation

- Find out your strengths
- Set and focus on your goals
- Develop a plan
- to achieve your goals
- Stay loyal to your goals

Session 4: Self-regulation – Goal Setting

Goals : They are a set of dreams with a deadline to get them, for example, saving pocket money to buy a favourite mobile phone by a particular date.

Goal setting : It is all about finding and listing your goals and then planning on how to achieve them.

How to Set Goals?

We can use SMART method to set goals. SMART stands for:

● **Specific** : A specific and clear goal answers six questions. Who is involved in the goal? What do I want to do? Where do I start? When do I start and finish? Which means do I use? Why am I doing this?

Not a specific goal: "I would learn to speak English."

Specific goal: "I would learn to speak English fluently by joining coaching classes after my school everyday, and in six months I will take part in the inter-school debate competition."

Measurable : A measurable goal answers the questions "How much?", "How many?" and "How do I know that I have achieved results?"

Not measurable goal: "I want to be rich."

Measurable goal: "I want to have 5 times more money than what I have today in my hand at the end of this year."

Achievable : Breaking down big goals into smaller parts will make the goal achievable. Bigger Goal: "I want to become a teacher in my school."

Realistic : A realistic goal would be something that we want to achieve and can work towards.

Example of unrealistic goal: "I will read my entire year's syllabus in one day and get good marks."

Realistic goal: "I spend 3 hours every day of the year after school to revise my subjects to get good marks in the exams."

● **Time bound** : A SMART goal should have a timeframe by when the goal needs to be achieved.

This encourages us to take actions to completely fulfill the goals.

Not a time bound goal: "I want to lose 10 kg someday."

Time bound goal: "I want to lose 10kg in the next 6 months."

Session 5: Self-regulation – Time Management

Time Management and Its Importance

Time management is the thinking skill that helps you to

- complete tasks on time.
- make a daily timetable.
- make a good guess at how long it will take you to do something.
- submit homework and assignments on time.
- not waste time during the day.

Four Steps for Effective Time Management Organise

1. Organise: We plan our day to- day activities.

2. Pritortis: We make a to-do list that has all our activities and we rank them in the order of importance.

3. Control: We have a control over our activities and time.

4. Track: We identify and note where we have spent our time.

Unit 3 Basic ICT Skills

Information and Communication Technology (ICT)

Topics to Study:

Lesson 1: Basic Computer Operations

Lesson 2: Performing Basic File Operations

Lesson 3: Computer Care and Maintenance

Lesson 4: Computer Security and Privacy

Lesson 1: Basic Computer Operations

Hardware and Software

A computer system consists of two main parts—

Hardware- The physical parts that we can see and touch are called hardware. It is the machinery of a computer. These are the keyboard, monitor, CPU, etc.

Software: The part which cannot be seen but it makes hardware to work. Example: Windows, MS office etc.

Operating System (OS). This is the software that starts working as soon as we switch on a computer. It displays the desktop on the monitor. Some of the most commonly used operating systems for laptops and desktop are Ubuntu, Microsoft Windows and Mac OS.

An operating system is a software that serves as an interface between the user and computer.

Basic Functions of Operating system are:

It manages all the devices of a computer.

It checks whether the device is functioning properly or not.

It controls software resources of the computer.

It manages the computer memory.

It keeps track of the amount of disk space used by a specific file.

It allows you to create, copy, move and delete files.

Types of Operating Systems :

1) Interactive (GUI-based) : A graphical user interface in which commands can be entered by clicking/double-clicking/right clicking a mouse. for example Windows

2) Single-user, single-task operating system : This type of operating system allows only one user to do a task on

the computer and one thing at a time.

3) Single-user, multi-task operating system : This type of operating system where a single user can operate on several programs at the same time. for example Windows, Apple MacOS.

4) Multi-user : A multi-user operating system enables multiple users to work on the same computer at different

times or simultaneously.

5) Real Time : A real time operating system is used to control machinery, scientific instruments like robots. A real-time operating system is a computing environment that reacts to input within a specific period of time. Windows CE and Lynx OS are examples of real-time operating systems.

6) Distributed : A distributed operating system combines different computers in the network into a single integrated computer and storage location. for example Windows, UNIX, and LINUX .

Some commonly used operating systems are:

DOS (Disk Operating System)

Windows : It is an operating system developed by Microsoft.

Linux : It is an operating system designed for personal computers. It is a free and open-source software.

Mobile operating Systems

Android

Symbian

Windows Phone

Ios

Components of Windows 7 / 8 / 10 Desktop :

- 1) Desktop : The first screen that appears on the monitor is called desktop.
- 2) Wallpaper : A picture for the desktop background is called wallpaper.
- 3) Icons : Small pictures on the desktop are called icons.
- 4) Taskbar : The long bar at the bottom of the desktop is called taskbar. The main components of Taskbar are : Start button, Active applications, Notification Area, Date/Time icon

Some of the commonly used icons are :

- 1) Computer : It displays all storage areas of the computer . Through the Computer icon, you can access all drives, files and folders on the computer.
- 2) Recycle Bin : Files and folders deleted by the user are stored in the Recycle Bin. From Recycle Bin, you can retrieve files or folders deleted by mistake.

- **Starting a Computer**

To start a computer, press the Power button on the CPU. This will start the operating system and display the desktop on the monitor.

Basic Functions performed when a computer starts a computer automatically runs a basic program called BIOS (Basic Input/Output System) as soon as it is switched on or the power button is pushed on. The BIOS first does a self-test. If the self-test shows that the system is fine, the BIOS will load the Operating System.

- **Login and Logout**

When you login to the computer with your login-ID and password (as shown in Figure 3.5), the computer knows that you are an authorised person and allows you to work on the applications in the computer.

- **Shutting Down a Computer**

You can shut down the windows computer clicking Start button at the bottom left corner and then click Shut Down. When you click Shut down, the Operating System will close all the applications and turn off the computer.

- **Using the Keyboard**

A keyboard is an input device used to type text, numbers and commands into the computer.

- **Function Keys**

Keys labeled from F1 to F12 are function keys. You use them to perform specific functions.

(a) Control keys: Keys, such as Control (CTRL), SHIFT, SPACEBAR, ALT, CAPS LOCK and TAB, are special control keys

(b) Enter key: The label on this key can be either ENTER or RETURN, depending on the brand of computer that you are using. You use the ENTER or the RETURN key to move the cursor to the beginning of a new line.

(c) Punctuation keys: Punctuation keys include keys for punctuation marks, such as colon (:), semicolon (;), question mark (?), single quotation marks (' '), and double quotation marks (" "). (d)

(d) Navigation keys: Keys, such as the arrow keys, HOME, END, PAGE UP, and PAGE DOWN are navigation keys.

(e) Command keys: Keys, such as INSERT (INS), DELETE (DEL), and BACKSPACE are command

keys. When the INSERT key is turned ON, it helps you overwrite characters to the right of the

cursor

(f) Windows key: Pressing this key opens the Start menu

- **Using a Mouse**

a small device that you can use to move, select and open items on your computer screen.

- **Roll Over or Hover**

Some actions can be done by simply rolling over or hovering over an item. When you bring the mouse over a file in File Explorer, it will show the details of that file

- **Point and Click**

As you move the mouse on your desk, a pointer moves correspondingly on your screen. When you click a particular file, it gets selected

- **Drag and Drop**

To move an item, you need to click it, and then holding the mouse button down, move the item to a new location. After you move the item to the new location, you release the mouse button. This is called drag and drop.

- **Double-click**

Double-clicking means to quickly click the left mouse button twice. When we double-click on a file, it will open the file.

Lesson 2: Performing Basic File Operations File :

Files and Folders

A folder is a location where a group of files can be stored

Everything you store on your computer is stored in the form of a file. File system is a way in which you give name to a file, store it and retrieve it. Files can be separately placed into groups, called folders/directories

All information stored in a computer is kept in files. Each file is given a file name and has a file name extension that identifies the file type. Example: .txt, .jpg, .mp3.

- **Creating a folder :** The steps to create a new folder are:

Double-click the Computer icon.

Select the drive in which you want to create a new folder.

Click New Folder on the toolbar.

Type a name for the folder & Press Enter key.

Or

Right-click anywhere in the blank area of the right column. A shortcut menu appears. Select New Folder from the shortcut menu. Type a name for the folder & Press Enter key.

- **Creating a file :** Steps to create new file are :

Right-click anywhere in the blank area .

In the Shortcut menu, click New and select the type of file you want to create.

Renaming folders and files : Steps to rename file or folder are :

Right-click the file or the folder.

From the shortcut menu, select Rename option.

Type the new name or edit the existing name and press the Enter key.

OR

Select the file/folder and press function key F2.

Type the new name or edit the existing name and press the Enter key.

Deleting files or folders : Steps to delete files or folder are :

Click the file or the folder.

Press the Delete key from the keyboard.

Or

Right-click and select Delete option from the Shortcut menu.

- **Copying Files and folders :** You can copy a file or a folder in any one of the following ways:

1) Shortcut menu: Steps are

- a. Right-click the file or the folder you want to copy.
- b. Select Copy option from the Shortcut menu.
- c. Select the drive or the folder where you want to make a copy of the selected file or folder.
- d. Right-click and select Paste option from the Shortcut menu

2) Drag and Drop method: To copy a file or a folder, hold down the Ctrl key while copying it to the new location.

3) Using Keyboard:

- a. Select the file or the folder.
- b. Press Ctrl + C to copy the file or the folder.
- c. Open the destination folder.
- d. Press Ctrl + V to paste the copied file.

- **Moving Files and folders :** You can move a file or a folder in any one of the following ways

1) Shortcut menu:

- a. Right-click the file or the folder you want to copy.
- b. Select Cut option from the Shortcut menu.
- c. Select the drive or the folder where you want to move the selected file or folder.
- d. Right-click and select Paste option from the Shortcut menu.

2) Drag and Drop method: To move a file or a folder, select the file and drag it to a new location.

3) Using Keyboard:

- a. Select the file or the folder.
- b. Press Ctrl + X to cut the file or the folder.
- c. Open the destination folder.

d. Press Ctrl + V to paste the copied file.

- **Permanently Deleting Files** : You can permanently delete the contents of the Recycle Bin in any one of the following ways:

1) Right-click the Recycle Bin icon and then

2) Click Empty Recycle Bin.

- **Restore Files/Folder from Recycle Bin**

To recover a file from the Recycle Bin, right-click the file, and then click Restore.

Or

Select the file and click Restore this item.

Computer systems require maintenance so that the system works efficiently. Poor maintenance may lead to system failure.

Regular care and maintenance may help you detect any issues at an early stage and keep it functioning well. Computer virus can cause damage to the working of the computer. If anti-virus is installed in the computer, and is updated and run periodically, then any loss of data can be prevented.

Both internal and external parts of the computer system should be taken care of.

- Keep the computer dust free.
- Do not eat or drink while working on the computer. .
- To keep the keyboard clean, make sure your hands are clean before using it.
- CDs and DVDs should be handled carefully so that they do not get damaged.
- Keep keyboard covered when not in use.

General precautions to be taken while cleaning the computer components are :

- Always Power Off the computer system before cleaning.
- Never spray cleaning fluid directly on the component of the computer.
- Do not allow the cleaning liquid to drip near the circuit board
- Regular maintenance of the computer system is very important. Some of the maintenance activities are:
- Run anti-virus periodically.
- A regular disk defragmentation should be done to remove all unnecessary information that slows down the computer
- Take regular backup of the data on your computer.
- System should be upgraded like increasing RAM, storage space.
- Temporary internet files should be deleted from time to time.

Basic Shortcuts

CTRL+z — undo

CTRL+y — redo

CTRL+a — select all

CTRL+x — cut
CTRL+c — copy
CTRL+v — paste
CTRL+p — print
CTRL+s — save.

Lesson 3: Computer Care and Maintenance

Importance of Care and Maintenance of Computers

Taking care of electronic devices, such as computer and mobiles helps them to work properly.

- **Basic Tips for Taking Care of Devices**

- Keyboard: You can clean a keyboard with a soft brush
- Screen: You can wipe the screen with a soft cloth to remove any finger marks.
- Handle devices carefully: Handle and move your laptop carefully and avoid dropping or banging it against a hard surface.
- Keep the computer cool: If a computer, laptop or mobile device gets overheated, the internal parts can be damaged. The CPU has an internal fan to keep it cool. We should make sure the fan is functioning.
- Do not overcharge your battery: Sometimes we keep a device plugged in for charging even after it is fully charged. This reduces the battery life. Always unplug the device once it is charged 100%.
- Always plug in devices carefully: Any device being connected to a laptop or computer such as a USB drive or headphones, should be done gently. It should not be forced into the port.
- Do not run too many programs at a time: When too many programs are running at the same time, the computer can become slow and even crash.

- **Prepare a Maintenance Schedule**

(a) Daily Maintenance

- i. Clean up your e-mail inbox
- ii. Download e-mail attachments and save in proper folders

(b) Weekly Maintenance

- i. Clean your keyboard
- ii. Clean your monitor
- iii. Dust CPU and printer
- iv. Backup your data to an external drive

(c) Monthly Maintenance

- i. Transfer photographs to computer and delete from drive
- ii. Organise photos into folders or albums
- iii. Clean up 'Download' folder
- iv. Uninstall unused programs and apps
- v. Run disk-cleaner software
- vi. Run full system virus scan

(d) Yearly/Annual Maintenance

- (i) Clean up contacts list on social media accounts
- (ii) Clean up e-mail contact list
- (iii) Update your operating system
- (iv) Check for expiry of anti-virus software
and renew

- **Backup Your Data**

Backing up data means to save the information present on your computer on another device, such as CD/DVD drives Data can recovered from here in case the computer stops working completely. Computers can crash, humans can make mistakes and natural disasters, such as floods can happen

- **Scanning and Cleaning Viruses**

Sometimes computer viruses can enter a computer from such attacks we can install anti-virus software. This will prevent any viruses from entering and will also clean any viruses that may enter our system before they affect the data.

Increasing Computer Performance If we have been using a computer for a long time we

have a lot of unnecessary files and data, such as temporary files and images. When they use too much hard-disk space, the performance of the computer goes down. It is important that we keep cleaning by removing any extra files.

- **Removing SPAM from your Computer**

Sometimes we get emails from companies who are advertising a product or trying to attract you to their website. Such mails are called SPAM. We should never respond to SPAM and delete it on a regular basis.

Lesson 4: Computer Security and Privacy

A computer virus is a software program that attaches itself to other programs and alters their behavior. VIRUS is an acronym for Vital Information Resource Under Seize. A virus may get attached to e-mail messages and spread from one computer to another.

To prevent our computer from virus, we should install anti-virus software, run it periodically and keep it updated. examples of antivirus software are McAfee Virus Scan, Norton AntiVirus, Microsoft Security essentials, and Quick Heal..

- **A computer can get infected with virus in any of the following ways:**
- Infected files
- Infected pen drives
- Infected CD-ROMs/DVD-ROMs
- Through infected file attachment of e-mails

A computer virus cannot do the following:

- It cannot infect files on CD or DVD, if they are closed for writing.
- It cannot infect computer hardware like, keyboard, mouse, etc.
- **Common signs of a virus attack are:**
- Computer runs very slow
- There is change in the file size
- Computer often stops responding
- There is an increase in number of files (unusual)
- Unusual error message appears on the screen
- Computer restarts on its own
- Install and use anti-virus software.
- **Threats to Computer**

Threats are the ways in which personal information can be leaked from a computer without our knowledge.

(a) Theft: Theft means stealing of information or hardware. These may be of three types:

- Physical: Where a person may steal your desktop computer or laptop.
- Identity: Where a hacker steals your personal information and assumes your identity. Using this false identity, the hacker can gain access to your account information or perform illegal activity.
- Software Piracy: This is stealing of software and includes using or distributing unlicensed and unauthorised copies of a computer program or software.

(b) Virus: Viruses are computer programs that can damage the data and software programs or steal the information stored on a computer. Major types of viruses are Worms and Trojan Horse.

Worms: These are viruses that replicate themselves and spread to all files once they attack a computer. This makes it very difficult to remove them.

Trojan Horse: A Trojan Horse disguises itself i.e., it appears to be a useful software program but once it reaches a computer it starts behaving like a virus and destroying data.

- Online Predator: Online predators are people who trap you into inappropriate relationships.

They may be older people posing to be your age, bullying you into doing illegal activities

online and sometimes face to face.

- Internet Scams: Sometimes you may receive very attractive offers saying you have won huge money in a lottery and that you can claim the prize by depositing a certain amount of money. When you deposit the money using credit card or online banking, you not only lose the deposit money but your card/account information may be misused later.

- **Protecting your Data**

(a) Use passwords to login to your computer: Use passwords that are difficult to guess. Passwords are difficult to hack if they are a mix of small (For example 'a b c d') and capital letters (For example, 'H J E R'), numbers (For example '8 7 6 5') and special characters

(For example, '% ^ # \$'). This would prevent unauthorised people from using your computer.

(b) Install Anti-virus and Firewall: Anti-viruses and Firewall monitor the data coming in and out of a computer and prevent and viruses from entering. Anti-viruses can also detect and clean viruses that may have entered a computer.

(c) Encrypt Data: This is usually done by banks and companies in which important customer information is stored. They can encrypt their entire hard disk using the encrypting feature in Windows (Bitlocker). This would force users to use a decryption password (or key) before starting the computer thus preventing unauthorised usage.

(d) Secure sites: Give details of your credit card or bank account only on secure sites. See in the address bar of the browser. If the site address starts with https://and a lock symbol, then it is safe to give your credit card and bank details.

The following points should be kept in mind to prevent virus infection:

- Keep anti-virus software updated.
- Scan all the files that you download from the Internet
- Do not open e-mails of an unknown person/sender
- Don't allow any untrustworthy person to use your system.
- **Removing Temporary Files :**

Temporary files are created when you are running computer programs. Microsoft Windows and Windows programs often create a .TMP file as a temporary file. Temporary files are also created by web browsers to store your web browser history. These temp files take up a large amount of disk space so should be removed to clear space.

The steps to remove temporary files are:

- Double-click Computer icon on the desktop.
- The Computer Window opens.
- Right-click Local Disk C: and select Properties option from the Shortcut menu
- The Properties window opens. Click Disk Cleanup.
- The Disk Cleanup for C: window appears
- Click the Check box next to Temporary Files, Temporary Internet files, etc. that you want to delete.
- Click OK.
- A confirmation message will appear
- Click Delete Files.
- Windows will delete all the temporary files on the computer.
- Removing files of Temporary Folder : The steps to remove files of temporary folder are:
 - Press Windows button + R on the keyboard.
 - The Run dialog box appears.
 - Type %temp%
 - The Temp folder opens. Click Ctrl + A to select all the files in the folder. Press Delete key.
 - A message box appears. Click Yes to confirm.
 - All the files in the Temp folder will be deleted.

Firewall :

Computer firewall could be a programmable device or a software or a network security system that monitors and controls incoming and outgoing network traffic based on user-defined security rules.

Cookies :

Cookies are small files which are stored on a user's computer when you visit a website on the internet. These files typically contain information about your visit to the webpage or record your login information. This may not always be bad.

For example, if you are exploring an online shopping website, most of the online retailers use cookies to keep track of the items in a user's shopping cart, otherwise, your shopping cart would be reset to zero every time you click on a new link on the website.

Unit 4 Entrepreneurial Skills

Topics to Study:

Lesson 1: Entrepreneurship and society.

Lesson 2: Qualities and functions of an entrepreneur.

Lesson 3: Role and importance of an entrepreneur.

Lesson 4: The myth about entrepreneurship.

Lesson 5: Entrepreneurship as a career option.

Lesson 1: Entrepreneurship and society.

Entrepreneurs run their businesses in a market. The market has people who buy products and services and people who sell them also. When people are buying and selling from each other, it is helpful for everyone because everyone involved makes money. This is how entrepreneurs help in growing the area and society they live in.

what do entrepreneurs do when they run their business?

Fulfil Customer Needs

Demand means a product or service that people want. Entrepreneurs find out what people want. Then, they use their creativity to come up with a business idea that will meet that demand.

Use Local Materials

Entrepreneurs use the material and people available around them, to make products at low cost.

Help Society

Entrepreneurs have a positive relationship with society. They make profits through activities that benefit society. Some entrepreneurs work towards saving

the environment, some give money to build schools and hospitals. This way, the people and area around them becomes better.

Create Jobs

With the growth of a business, entrepreneurs look for more people to help them. They buy more material, and from more people. They also hire more people to work for

them. In this way, more people have jobs. Sharing of Wealth Wealth means having enough money to live a comfortable life. As entrepreneurs grow their business, the people

Lower Price of Products

As more entrepreneurs sell the same product, the price of the product goes down. For example, when more mobile phones were getting sold in India, the cost of the phone became lesser.

Bharti, the Jewellery Queen (A Story)

Bharti is a young woman from Bihar. Many girls in her area like to wear earrings. She buys jute from a farmer and makes earrings from that. Her business is called Manavi Natural Handicrafts. She sees that most women in her village do not work. So, she hires two women to help her. As her orders increase, she buys more jute. She hires three more women to work for her. The farmer, and the women working for her now earn more money.

Lesson 2: Qualities and functions of an entrepreneur.

Qualities of an Entrepreneur :

- **Hard work:** Without working hard, no entrepreneur can be successful. On an average, successful entrepreneurs are found to be working anywhere between 60 to 90 hours per week
- **Optimism:** Positivity and belief in what they do is what takes entrepreneurs far in their journey.
- **Independence:** Entrepreneurs are confident and like the independence to drive a business on their own.
- **Energetic:** Energy is always high in successful entrepreneurs which makes them extremely proactive.
- **Self-confident :** Entrepreneurs are confident to take decision.

Functions of an Entrepreneur :

- **Organisation Building and Management** : An entrepreneur builds the organization by taking various steps such as hiring employees, organizing the factors of production, sourcing finance etc.
 - **Risk taking**: Risk taking is about taking responsibility and planning for a loss or mishap that may occur in the future due to unforeseen contingencies.
 - **Innovation**: Entrepreneurs innovate by introducing new concepts, products, services, designs, ideas etc
 - **Detailed Investigation**: An entrepreneur conducts research, investigates and evaluates an idea considering various factors and estimates the total demand for a new product or service.
 - **Financing**: Raising capital for a business is one of the core functions that entrepreneurs perform themselves at all the stages of business.
 - **Planning**: An entrepreneur documents a business idea in the form of a business plan, to detail each element of the business such as product or service description, operations, marketing, finance etc.
 - **Leadership**: Leadership is more of a skill than a function for an entrepreneur. As a leader, an entrepreneur guides, directs, and influences the work of others to attain specific goals.
-
- **Communication** : An entrepreneur has to communicate every single day, in the form of writing, responding, drafting emails, verbal instruction, discussion etc.

Lesson 3: Role and importance of an entrepreneur.

Role of Entrepreneurs:

- **Innovator's Role** : Entrepreneurs innovate by bringing unique and new products and services into the market.
- **Agent's role** : Entrepreneurs act as 'Agents of Change' as they identify opportunities, solve problems, offer effective solutions, establish enterprises, set up industries and bring positive change for the economy.
- **Coordinating role**: An entrepreneur coordinates many things such as factors of production, delegated tasks, smooth functioning across different business departments etc
- **Employment Generation role**: Entrepreneurship solves the problem of unemployment, which is a major problem in economic development.

Importance of Entrepreneurs :

- **Free market evolution**: In a free market, entrepreneurs bring change in technology, trends and markets. For example, with increase in digital services, entrepreneurs have created companies that offer many home delivery services such as groceries, restaurant food, clothes, accessories etc.

- **New values:** Sometimes, entrepreneurs choose ethics over profit and offer a more ethical product to the world and are transparent about it.
- **New markets:** Entrepreneurs can often 'redefine the rules' of an established industry. They do this by creating new markets for existing products and slightly innovating in small ways to suit the needs of a new target market.

Lesson 4: Myths about Entrepreneurship

Misconceptions

- The misconception is that every business idea needs to be unique or special.
- The misconception we have is that a person needs a lot of money to start a business.
- A misconception we have is that only a person having a big business is an entrepreneur.
- A misconception we have is that entrepreneurs are born, not made.

Lesson 5: Entrepreneurship as a Career Option

A career is a line of work that a person takes for life. There are two ways a person can earn a living.

- **self-employment**
- **wage employment**

A person who becomes an entrepreneur goes through a career process. This process is as follows:

ENTER

When an entrepreneur is starting, they are just entering the market to do business. For example, Sanjana is starting a small grocery store in a locality.

SURVIVE

There are many entrepreneurs in the market. The entrepreneur has to remain in a competitive market.

For example, there are many other grocery stores in the area. Yet, Sanjana's store survives

the competition and does well. She also expands the store to two more floors.

GROW

Once the business is stable, an entrepreneur thinks about expanding his or her business.

For example, after five years, Sanjana has opened a chain of four more grocery stores in the same city. In the next two years, she plans to expand to two other cities.

Entrepreneurs are independent-minded, innovative business people who have skill sets, which

make them self-starters. An Entrepreneur can be an artist, educator, professional, homemaker,

restaurateur, businessman, service sector worker or an inventor. The Entrepreneurship are

career option is as follows:

- Entrepreneurs create products, services, companies and even industries.
- New Entrepreneurial venture creation includes launching a company, buying a business,
- taking a franchise, starting a new venture in a family business.
- Join existing Entrepreneurial ventures as a working/investing partner.
- Enter-partnership with startups, small business, educational ventures, research,
- development sector, corporate Entrepreneur or strategic Entrepreneurial unit etc.
- Work with traditional companies as support/service provider.
- In a new start-ups they draw up a business plan and decide a career path, source funds for the project from both private and government lenders, decide location suitable for the business and lease space, form a team of workers/partners and formerly launch a company.

Qualities/Characteristics of a Good Entrepreneur

The major qualities/characteristics of a good entrepreneur are linked below.

- **Leadership** An entrepreneur must possess the characteristics of leadership and must lead a team for achievement of goals. leader is able to clearly articulate their ideas and has a clear vision. An entrepreneurial leader realises the importance of initiative and reactivity and they go out of their way to provide a support to the team.
- **Risk Taking** An entrepreneur with rational planning and firm decisions bear the risks. They have differentiated approach towards risks. Good entrepreneurs are always ready to invest their time and money but they always have a back up for every risk they take.
- **Innovativeness** With the changing needs and requirements of customers production should meet requirements with the help of innovative ideas. An entrepreneurial venture does not have to restrict itself to just one innovation or even one type of innovation. Success can be built on combination of

innovation. For example, a new product delivered in a new way with a new message.

- **Goal-oriented** Goal-oriented entrepreneurs achieve the maximum results from their efforts in business due to the fact they work towards clear and measurable targets.
- **Decision-maker** An entrepreneur has to take many decisions to put his business idea into reality. He chooses the best suitable and profitable alternative.
- **Highly Optimistic** A successful entrepreneur is always optimistic and the present problems does not matter to them. He is always hopeful that the situation will become favourable for business in future.
- **Motivator** An entrepreneur has to create a spirit of team work and motivate them. So that he gets full cooperation from the employees.
- **Self-confident** An entrepreneur should have confidence to achieve his goals otherwise he won't be able to convince his team to achieve his goals.
- **Action-oriented** An entrepreneur should have an action oriented vision and ideology to plan things well.
- **Dynamic Agent** An entrepreneur creates new needs and new means to satisfy them. He has the ability to visualise new ventures and new plans.
- **High Achiever** An entrepreneur is a high achiever as they have a strong urge to achieve. The most important characteristic is his achievement motivation.
- **Trust in Self** An entrepreneur believes in their own decisions and actions as he has trust in his perseverance and creations. He does not believe in luck

Functions of an Entrepreneur

The various functions of an entrepreneur may be classified and described as under

- **Innovation** It includes introducing new products, opening new markets, new sources of raw material and new organisation structure.
- **Risk Taking** An entrepreneur has to take risk by choosing one among various alternatives.
- **Decision-making** It includes stabilising organisation's aims and objectives and changing them according to changing conditions, taking decisions on effective techniques, utilisation of financial resources etc. So, decision-making is an important function of an entrepreneur
- **Organisation and Management** An entrepreneur organises and manages various economic and human factors through planning, coordination, control, supervision and direction
- **Size and Scale of Business Unit** An entrepreneur has to decide about the size of business unit as he wants to establish one production unit or more dependent upon the demand of the product. Similarly, he has to decide about the scale of production. i.e. small scale, middle scale or large scale.
- **Appointment of Managerial and Other Work Force** It is the entrepreneur who appoints the management staff as well as other work force as per the requirement and needs of the enterprise.
- **Factors of Production** The factors of production i.e. land, labour, capital etc., should be in appropriate proportion and to maximise output of these factors is the responsibility of the entrepreneur.
- **Control and Direction** He must exercise control over all departments and direct them on a timely basis.

- **Finding Suitable Market** A proper research must be done to find a suitable market for selling the products. Other functions like advertisement and publicity, appointment of selling agents, providing incentives to various selling intermediaries to promote sales should be **Given priority**. * New Inventions and Innovations New inventions and innovations must be encouraged and introduced in production, sales, marketing, advertisement etc.
- **Establishing Relations with Government** An entrepreneur must establish good relations with government and its functionaries. His functions are to obtain licences, payment of taxes, selling the product to government, provision for export-import etc.
- **Establishing Contacts with Competitors** An entrepreneur must form contacts with the competitors to analyse the market. He must be in a position to make opportunities out of the given situation.

Role and Significance/Importance of Entrepreneur

An entrepreneur is the builder of economic growth. He promotes the prosperity of a country by his initiative and skill for innovation and dynamic leadership. He creates wealth, opens up employment opportunities and fosters the other segments of economic system.

The role and significance of an entrepreneur are given under the following headings

- **Organiser of Society's Productive Resources** An entrepreneur is the organiser of society's productive resources. He is the person who assembles the unused natural, physical and human resources of the society, combines them properly, establishes effective coordination between them and makes the economic activities dynamic.
- **Helpful in Capital Formation** An entrepreneur is helpful in capital formation as we know that increase in the rate of capital formation is quite essential for the economic development of any country. Those nations which are not able to increase the rate of capital formation or does it nominally remain backward from industrial development's point of view.
- **Increase in Employment Opportunities** An entrepreneur creates maximum employment opportunities in the society by way of establishing new industries, developing and expanding the existing industries and by undertaking innovative activities.
- **Development of New Production Techniques** An entrepreneur does not feel contented only with the existing techniques of production. Hence, he carries out various experiments for saving time, labour and capital in the production, as also to improve the variety and quality of the product and service.
- **Visionary Leader** An entrepreneur has a good vision towards the achievement of his goals. He is able to recognise profitable opportunities and conceptualise strategies.
- **Contribution of the Execution of Government Policies** An entrepreneur provide an important contribution in implementing government policies and achieving the national goals. An entrepreneurs cooperate with the government for implementations of development plans of the country.

- **Higher Productivity** Entrepreneur have the ability to produce more goods and services with less inputs. They play an important role in raising productivity.
- **Initiator** An entrepreneur is the one who initiates the process of creating an enterprise by coming up with the idea for the business and planning out how to turn that idea into reality.
- **Backbone of Capitalist System** Capitalist economy is one in which there is a freedom to save and invest to compete and operate any business. An entrepreneur plays a vital and prominent role in the enterprise because he controls market by assuming the role of a competitor and a leader.
- **Ingredient of Modern Production System** An entrepreneur has become the balancing wheel of modern global economy. They seek the unique product, change the technical frontiers and reshape public desires. Today, entrepreneurs act as an ingredient of modern production system as they create wealth and employment.

Myths of Entrepreneurship

Entrepreneurship is a set of activities performed by the entrepreneur. It is the process of identifying opportunities in the market place. It is the attempt to create value. Many entrepreneurs believe a set of myths about entrepreneurship and the most common are as follows.

- **Starting a Business is Easy** In reality, it is a very difficult and challenging process to start a successful business. The rate of failure of new ventures is very high but small entrepreneurship are comparatively easier to start.
- **Lot of Money to Finance New Business** Successful entrepreneurs design their business with little cash also.
- **Startups cannot be Financed** Under the schemes like MUDRA, entrepreneurs can raise loans from banks.
- **Talent is more Important than Industry** This is not true as the nature of industry an entrepreneur chooses greatly effects the success and growth of the business.
- **Most Startups are Successful** Mostly in the developing countries startups fail as they could not manage to earn high profits.

Advantages of Entrepreneurship

The main advantages of adopting entrepreneurship as a career are discussed below

- **Independence** An entrepreneur is himself a boss or owner and he can take all the decisions independently.
- **Exciting** Entrepreneurship can be very exciting with many entrepreneurs considering their ventures highly enjoyable. Everyday will be filled with new opportunities to challenge your determination, skills and abilities.
- **Wealth Creation** The principal focus of entrepreneurship is wealth creation and improved livelihood by means of making available goods and services. Entrepreneurial venture generates new wealth, new and improved products, services or technology form entrepreneurs, enable new markets to be developed and new wealth to be created.

- **Flexibility** As an entrepreneur you can schedule your work hours around other commitments, including quality time you would spend with your family. – Status Success in entrepreneurship brings a considerable fame and prestige within the society.
- **Ambition Fulfilment** Through entrepreneurship one can fulfil his ambitions into original products or services.

Disadvantages of Entrepreneurship

Some of the disadvantages of entrepreneurship as a career are discussed below

- **Huge Amount of Time** You have to dedicate a huge amount of time to your own business. Entrepreneurship is not easy and for it to be successful, you have to take a level of time commitment.
- **Risk** An entrepreneurship involves high risk of loss. If the business fails then it will wipe away all the personal savings.
- **Hard Work** An entrepreneur has to work very hard to make the new business very successful.
- **Uncertain Income** There is no regular or fixed income available to an entrepreneur. So, there is uncertain kind of income received by an entrepreneur.
- **Incompetent Staff** A new entrepreneur may not be able to hire qualified and experienced staff so there are chances of incompetency by the staff due to lack of experience and knowledge.

Part 2 Subject Specific Skills

Unit 1 : INTRODUCTION TO AI: BASICS OF AI

Data science

Data sciences is a domain of AI related to data systems and processes, in which the system collects numerous data, maintains data sets and derives meaning/sense out of them. The information extracted through data science can be used to make a decision about it.

OR

Data science is the field of study that combines domain expertise, programming skills, and knowledge of mathematics and statistics to extract meaningful insights from data.

OR

Data Sciences, it is a concept to unify statistics, data analysis, machine learning and their related methods in order to understand and analyses actual phenomena with data.

For example: a company that has petabytes of user data may use data science to develop effective ways to store, manage, and analyze the data.

Computer Vision

Computer Vision, abbreviated as CV, is a domain of AI that depicts the capability of a machine to get and analyze visual information and afterwards predict some decisions about it. The entire process involves image acquiring, screening, analyzing, identifying and extracting information.

OR

Computer vision is an interdisciplinary field that deals with how computers can be made to gain high-level understanding from digital images or videos.

OR

The Computer Vision domain of Artificial Intelligence, enables machines to see through images or visual data, process and analyze them on the basis of algorithms and methods in order to analyze actual phenomena with images.

For Example: - Self-Driving cars/ Automatic Cars, Face Lock in Smartphones

Natural Language Processing

Natural Language Processing, abbreviated as NLP, is a branch of artificial

intelligence that deals with the interaction between machine/computers and humans using the natural language. *Natural language* refers to language that is spoken and written by people, and natural language processing (NLP) attempts to extract information from the spoken and written word using algorithms.

OR

Natural Language Processing, or NLP, is the sub-field of AI that is focused on enabling machine/computers to understand and process human languages. AI is a subfield of Linguistics, Computer Science, Information Engineering, and Artificial Intelligence concerned with the interactions between computers and human (natural) languages, in particular how to program computers to process and analyze large amounts of natural language data.

OR

In NLP, we teach machines how to understand and communicate in human language. Natural language refers to speech analysis in both audible speeches, as well as text of a language. NLP systems capture meaning from an input of words (sentences, paragraphs, pages, etc.)

For Example: Email filters, Smart assistants: - Apple's Siri and Amazon's Alexa

1. Where do we collect data from?

Data can be collected from various sources like –

- Surveys
- Sensors
- Observations
- Web scrapping (Internet)
- Interviews
- Documents and records.
- Oral histories

2. Why do we need to collect data?

Data to a machine is similar to food for human being to function. The world of Artificial Intelligence revolves around Data. Every company whether small or big is collecting data from as many sources as possible. Data is called the New Gold today. It is through data collection that a business or management has the quality information they need to make informed decisions from further analysis, study, and research. Data collection allows them to stay on top of trends, provide answers to problems, and analyze new insights to great effect.

3. What is data mining? Explain with example.

Data mining is the process of analyzing large data sets and extracting the

useful information from it. Data mining is used by companies to turn raw data into useful information. It is an interdisciplinary subfield of computer science and statistics with an overall goal to extract information

OR

Data mining is an automatic or semi-automatic technical process that analyses large amounts of scattered information to make sense of it and turn it into knowledge. It looks for anomalies, patterns or correlations among millions of records to predict results, as indicated by the SAS institute, a world leader in business analytics.

Example:

Price Comparison websites- They collect data about a product from different sites and then analyze trends out of it and show up the most appropriate results.

Data mining is also known as Knowledge Discovery in Data (KDD) To be moved to chapter no. 3

4. What do you understand by Data Privacy?

The world of Artificial Intelligence revolves around Data. Proper and ethical handling of own data or user data is called data privacy. It is all about the rights of individuals with respect to their personal information.

Data privacy or information privacy is a branch of data security concerned with the proper handling of data – consent, notice, and regulatory obligations. More specifically, practical data privacy concerns often revolve around: Whether or how data is shared with third parties

5. Is data which is collected by various applications ethical in nature? Justify your

Yes, most of the times, the data collected by various applications is ethical in nature as the users agree to it by clicking on allow when the application asks for various permissions. They ask for our data for various facilities like - to show us personalized recommendations and advertisements and to make their app more accurate and efficient.

OR

No, the data collected by various applications is not always ethical in nature. Sometimes, we just share our data to non – trusted third party applications without reading what happens to our data. This may lead to unethical use of our data. If one does not want to share his/her data with anyone, he/she can opt for alternative applications which are of similar usage and

keep the data private. For example, an alternative to WhatsApp is the Telegram app which does not collect any data from us.

Note: This is an open-ended question, so both the answers yes/no will be considered right with correct justification.

Machine Learning

Machine Learning is a subset of Artificial Intelligence which enables machines to improve at tasks with experience (data). The intention of Machine Learning is to enable machines to learn by themselves using the provided data and make accurate Predictions/ Decisions.

OR

Machine learning focuses on the development of computer programs that can access data and use it to learn for themselves.

OR

Machine learning is a data analytics technique that teaches computers to do what comes naturally to humans and animals: learn from experience.

Deep Learning

Deep Learning is the most advanced form of Artificial Intelligence. In Deep Learning, the machine is trained with huge amounts of data which helps it in training itself around the data. Such machines are intelligent enough to develop algorithms for themselves.

OR

Deep learning is an artificial intelligence (AI) function that imitates the workings of the human brain in processing data and creating patterns for use in decision making.

OR

Deep learning is a subset of machine learning where artificial neural networks, algorithms inspired by the human brain, learn from large amounts of data.

Intelligence

Intelligence refers to the ability to think, perceive information and apply knowledge within the behavioural environment. Intelligence can be defined as :

- Ability to interact with the real-world – To perceive, understand and act
- Reasoning and Planning – Modelling the external world, given input
- Learning and Adaption – Continuous learning and adapting graph

List out the types of intelligence.

The different types of intelligence are as follows:

1. Mathematical Logical Reasoning
2. Linguistic Intelligence
3. Spatial Visual Intelligence
4. Kinaesthetic Intelligence
5. Musical Intelligence
6. Intrapersonal Intelligence
7. Existential Intelligence
8. Naturalist Intelligence
9. Interpersonal intelligence

Artificial Intelligence

When a machine possesses the ability to mimic human traits or copy human behaviours or make decisions, predict the future, learn and improve on its own. In other words, machines are intelligent artificially by collecting data, understanding it, analysing it, learning from it and improving it.

Some popular AI apps and tools.

The following are some powerful AI apps and tools.

1. **Google:** Google uses AI for responding to our queries through keywords. Gmail spam filter is also using AI technology. Google maps help through navigation in travelling.
2. **Virtual Assistants:** Apple Siri, Amazon Alexa, Google Assistant, and MS Cortana are some examples of Virtual Assistants. These assistants are used to accept the command in terms of voice and provide assistance.
3. **Gaming:** AI is used to enhance the gaming experience for gamers. Along with this AI can help in enhancing graphics, come up with new difficulty levels, encourage gamers etc.
4. **Recommendations:** As you have seen some recommendations on amazon, Netflix, Amazon, Spotify, YouTube etc. These are all recommendations based on your interests and engagements likes, dislikes and comments. Some recommendations are based on preferences on social media like Facebook and Instagram. Sometimes AI also sends some notifications about online shopping details, and auto-create playlists according to requests.
5. **Chatbots:** Chatbots are generally available on many websites. Chatbots are software applications integrated with AI technology used for online chat support. Sophia was the first humanoid bot.
6. **Health Apps:** Health apps are also created and integrated with AI which helps users to monitor physical and mental health aspects.
7. **Others:** Moreover, there are some other AI applications like face locks in smartphones, language translators, weather forecasts, and many more.

Three domains of AI

- Data Science/ Big Data

- Computer Vision
- Natural Language Processing (NLP)

AI bias

AI bias is the underlying prejudice in data that's used to create AI algorithms, which can ultimately result in discrimination and other social consequences.

AI Bias can creep into algorithms in several ways. AI systems learn to make decisions based on training data, which can include biased human decisions or reflect historical or social inequities, even if sensitive variables such as gender, race, or sexual orientation are removed. Amazon stopped using a hiring algorithm after finding it favored applicants based on words like "executed" or "captured" that were more commonly found on men's resumes, for example. Another source of bias is flawed data sampling, in which groups are over- or underrepresented in the training data.

For Example

- Majorly, all the virtual assistants have a female voice. It is only now that some companies have understood this bias and have started giving options for male voices but since the virtual assistants came into practice, female voices are always preferred for them over any other voice. Can you think of some reasons for this?
- If you search on Google for salons, the first few searches are mostly for female salons. This is based on the assumption that if a person is searching for a salon, in all probability it would be a female. Do you think this is a bias? If yes, then is it a Negative bias or Positive one?

Data Privacy

Data privacy, sometimes also referred to as information privacy, is an area of data protection that concerns the proper handling of sensitive data including, notably, personal data but also 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. It focuses on how to collect, process, share, archive, and delete the data in accordance with the law.

Privacy, in the broadest sense, is the right of individuals, groups, or organizations to control who can access, observe, or use something they own, such as their bodies, property, ideas, data, or information.

Control is established through physical, social, or informational boundaries that help prevent unwanted access, observation, or use. For example:

- A physical boundary, such as a locked front door, helps prevent others from entering a building without explicit permission in the form of a key

to unlock the door or a person inside opening the door.

- A social boundary, such as a members-only club, only allows members to access and use club resources.
- An informational boundary, such as a non-disclosure agreement, restricts what information can be disclosed to others.

Privacy of information is extremely important in this digital age where everything is interconnected and can be accessed and used easily. The possibilities of our private information being extremely vulnerable are very real, which is why we require data privacy.

Artificial Intelligence (AI)

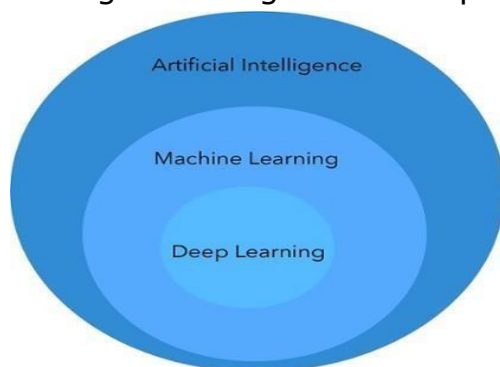
AI is incorporating human intelligence to machines. Whenever a machine completes tasks based on a set of rules that solve problems (algorithms), such an “intelligent” behavior is what is called artificial intelligence.

Machine Learning (ML)

ML is a subset of AI that uses statistical learning algorithms to build smart systems. The ML systems can automatically learn and improve without explicitly being programmed.

Deep Learning (DL)

In Deep Learning, the machine is trained with huge amounts of data which helps it in training itself around the data. Such machines are intelligent enough to develop algorithms for themselves.



How they differ?

- Deep Learning is the most advanced form of Artificial Intelligence out of these three. Then comes Machine Learning which is intermediately intelligent and Artificial intelligence covers all the concepts and algorithms which, in some way or the other mimic human intelligence.
- Therefore, AI is the umbrella term which covers ML and DL.

About AI replace laborious jobs

AI should replace laborious jobs.

- AI can replace laborious jobs like lifting of heavy items, working in mines etc.
- AI can indeed automate most repetitive and physical tasks.
- In future, AI would be a good option in the field of architecture and construction.

OR

No, AI should not replace laborious jobs completely as if it replaces laborious jobs completely, then there will be no source of income for the daily wage workers due to unemployment. So, industry owners can use some machines but more of man power. Hence the production will not get affected as humans are smarter than machines since they were the ones who invented AI.

Note: As this is an open-ended question so both the answers (yes/No) are correct but it must be with correct justification.

Is there an alternative for major unemployment?

- AI taking over laborious jobs won't create unemployment. It is just a groundless fear. The standard view of technical change is that some jobs are displaced by the substitution of machines for labour, but that the fear of total displacement is misplaced because new jobs are created, largely due to the technology-fuelled increase in productivity. Humans have always shifted away from work suitable for machines and to other jobs.
- The basic fact is that technology eliminates jobs, not work. If this level of AI revolution will happen, lots of job opportunities will be created. For example: 20-30 years ago, being an accountant was a lucrative job, but AI took over this job but this created a lot of opportunities, it raised the demand of a software engineer, data scientist, etc.
- It will open doors to skillful jobs rather than doing laborious tasks.
- Thus, we will be able to cope with the level of major unemployment, if AI took over laborious jobs.

UNIT 2 : AI PROJECT CYCLE INTRODUCTION:

1. Introduction to AI Project Cycle
2. Problem Scoping
3. Understanding problem scoping and Sustainable Development Goal
4. Data Acquisition Simplifying data acquisition Data Exploration
5. Visualizing Data Modeling

Introduction to modeling

1. Introduction to Rule Based, Learning Based AI Approaches

2. Introduction to Supervised Unsupervised, Reinforcement
3. Learning Models
4. Neural Networks
5. Evaluation
6. Evaluating the idea!

What is Project Life Cycle :

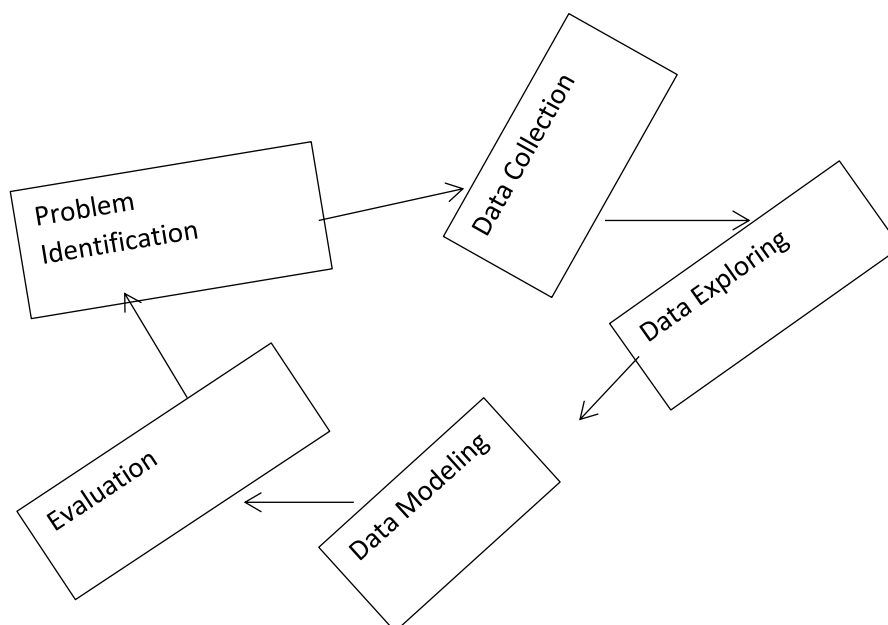
Project Cycle is a step-by-step process to solve problems using proven scientific methods and drawing conclusions about them.

AI Life Cycle :

The AI life cycle involves various stages or phases i.e. from data collection, data analysis, algorithm selection (Selecting Suitable Method) to model building, testing, deployment, management, monitoring and feedback loops/cycle for continuous improvement.

Creating an AI model from scratch needs a huge amount of effort and investment for collecting datasets, labeling data, choosing algorithms, defining network architecture, etc. Apart from this choice of language (programming language), frameworks and libraries along with client preferences, etc.

Steps or Components of AI Project Cycle AI project cycle?



Components of the AI project life cycle are the steps that contribute to completing the Project. The Components of AI Project Cycle are:

- a) **Problem Scoping / Problem Identification** – Understanding the Problem.
- b) **Data Acquisition / Data Collection**– Collecting accurate and reliable data.
- c) **Data Exploration** – Arranging the data uniformly.
- d) **Data Modeling** – Creating Models from the data.
- e) **Data Evaluation** – Evaluating the project.

a) **Problem Scoping** : Problem Scoping refers to understanding a problem, finding out various factors which affect the problem, define the goal or aim of the project. It Has 4 W's, Who, What Where and Why?

1. **Who** – “Who” part helps us in comprehending and categorizing who all are affected directly and indirectly with the problem and who are called the Stake Holders

2. **What** – “What” part helps us in understanding and identifying the nature of the problem and under this block, you also gather evidence to prove that the problem you have selected **exists**.

3. **Where** – “Where” does the problem arise, situation, and location.

4. **Why** – “Why” is the given problem worth solving.

b) Data Acquisition

Data Acquisition is the process of collecting accurate and reliable data to work with. Data Can be in the format of the text, video, images, audio, and so on and it can be collected from various sources like interest, journals, newspapers, Surveys, API (Application Program Interfaces), Sensors, Cameras, Observations etc.

c) Data Exploration

Data Exploration is the process of arranging the gathered data uniformly for a better understanding. i.e. data can be arranged in the form of a table, plotting a chart, or making a database.

Tools for Data Exploration : Google Charts , Tableau, Fusion Charts, High Charts etc

d) Modelling

Modelling is the process in which **different models** based on the **visualized data** can be **created** and even **checked** for the advantages and disadvantages of the model. To Make a machine learning model there are 2 ways/Approaches **Learning-Based Approach** and a **Rule-Based Approach**.

Learning Based Approach: It May be Supervised Learning, Unsupervised Learning , Reinforcement Learning

Supervised learning is where a computer algorithm is trained on input data that has been labeled for a particular output. **For example** a shape with three sides is labeled as a triangle, **Classification** and **Regression** models are also type of **supervised Learning**

Unsupervised Learning In terms of machine learning, unsupervised learning is in which a system learns through data sets created on its own. In this, the training is not labeled.

Learning on its own is termed **Unsupervised learning**. Basically, in unsupervised learning where the data is un-tagged or un-named, the machine creates a learning algorithm using its structural data-sets present in its input.

Example: Suppose a boy sees someone performing tricks by a ball, so he also learnt the tricks by himself. This is what we call unsupervised learning.

Reinforcement Learning

Learning through **feedback or trial and error method** is called Reinforcement Learning. In this type of learning, The system works on Reward or Penalty policy. In this an agent performs an action positive or negative, in the environment which is taken as input from the system, then the system changes the state in the environment and the agent is provided with a reward or penalty. The system also builds a **policy**, that what action should be taken under a specific condition.

Example: A very good example of these is **Vending machines**. Suppose you **put a coin (action)** in a **Juice Vending machine(environment)**, now the system detects the amount of **coin given** (state) you get the drink corresponding to the amount(reward) or if the coin is damaged or there is any another problem, then you get nothing (penalty). Here the machine is building a policy that which drink should be provided under what condition and how to handle an error in the environment.

Rule Based Approach

Datasets :is a collection of related sets of information that is composed of separate elements but can be manipulated by a computer as a unit.

- Rule Based Approach Refers to the AI modelling where the relationship or patterns in data are defined by the developer.
- That means the machine works on the rules and information given by the developer and performs the task accordingly.

For example: Suppose you have a dataset containing 100 images of apples and bananas each. Now you created a machine using Computer-Vision and trained

it with the labeled images of apples and bananas. If you test your machine with an image of an apple it will give you the output by comparing the images in its datasets. This is known as the **Rule-Based Approach**.

In the **Rule-based Approach** we will deal with 2 divisions of the dataset:

1. **Training Data** – A subset required to **train** the model
2. **Testing Data** – A subset required while **testing** the trained the model

e) **Evaluation**

Evaluation is the method of understanding the reliability of an API Evaluation and is based on the outputs which are received by feeding the data into the model and comparing the output with the actual answers.

SUSTAINABLE DEVELOPMENT GOALS (SDG) CLASS 10

Brief History of SDGs

In 1992 there was earth summit in a Brazil city of Rio De Janeiro. After the 20 years of this earth summit, again there was a earth summit named **Rio + 20**. In this summit the foundational steps were taken towards sustainable development.

The Sustainable Development Goals (SDG) were adopted by all United Nations (UN) members in 2015 to ensure peace and prosperity all over the world by the year 2030.

Why SDG ?

Sustainable means to use something for a long time. To use natural resources and energy in such a way that it remains conserve for the future generations, is called Sustainable Development.

For example: Natural resource like coal takes a long time to get refresh. have to be completed in 2015 but it failed due to certain reasons. SDG is also known as **Global Goals** as it have to be achieved by all UN Members.

Goal 1: No Poverty

Goal 2: Zero Hunger

Goal 3: Good Health and Well-being

Goal 4: Quality Education

Goal 5: Gender Equality

Goal 6: Clean Water and Sanitation

Goal 7: Affordable and Clean Energy

Goal 8: Decent Work and Economic Growth

Goal 9: Industry, Innovation and Infrastructure

- Goal 10: Reduce Inequality
- Goal 11: Sustainable Cities and Communities
- Goal 12: Responsible Consumption and Production
- Goal 13: Climate Action
- Goal 14: Life Below Water
- Goal 15: Life on Land
- Goal 16: Peace and Justice Strong Institutions
- Goal 17: Partnership To Achieve Goal

AI, ML, DL

Machine Learning (ML) It is a subset of Artificial Intelligence that enables machines to improve at tasks with experience (data). The intention of Machine Learning is to enable machines to learn by themselves using the provided data and make accurate algorithms for Predictions/ Decisions.

Now let's understand Machine Learning in a simple way. In literal **Machine Learning** is "Machine" + "Learning".

How Humans Learn ?

To understand the human learning process, let us illustrate it through a simple sequence of activities involved.

Machine Learning Process (ML)
 computer learns in a similar way. However, it needs a lot of information, to ensure that it recognizes things accurately. Machines need to be trained to make decisions and to act based on goals

ARTIFICIAL INTELLIGENCE VS MACHINE LEARNING

But even though both AI and ML are based on statistics and mathematics, they are not the same thing.

Artificial Intelligence	Machine learning
It is the study of how to train computers so that computers can do things which at present humans can do better.	Machine Learning is the learning in which a machine can learn on its own without being explicitly programmed.
Perform tasks that require human intelligence.	Helps machines to learn certain things on their own.
The aim is to increase the chance of success and not accuracy.	The aim is to increase accuracy, but it does not care about success.

Artificial Intelligence	Machine learning
It works as a computer program that does smart work.	it is a simple concept machine that takes data and learns from data.
AI is decision making	ML allows systems to learn new things from data.
AI leads to intelligence or wisdom.	ML leads to knowledge.

What is Deep Learning?

Deep learning is a type of machine learning and artificial intelligence (AI) that imitates the way humans gain certain types of knowledge. Deep learning is an important element of **data science**, which includes statistics and predictive modeling.

Deep learning utilizes both structured and unstructured data for training. **Practical examples** of deep learning are Virtual assistants, vision for driverless cars, money laundering, face recognition and many more.

Deep learning is an AI function that mimics the workings of the human brain in processing data for use in detecting objects, recognizing speech, translating languages, and making decisions.

How Deep Learning works :

Deep learning is based on ML but it can work with unstructured data and learns on its own through reading the data, so it requires large amount of datasets called **Big Data** which is drawn from sources like social media, internet search engines, e-commerce plat-forms, etc.

Machine Learning vs Deep Learning

MACHINE LEARNING	DEEP LEARNING
Machine Learning is a superset of Deep Learning	Deep Learning is a subset of Machine Learning
The data represented in Machine Learning is quite different as compared to Deep Learning as it uses structured data.	The data representation is used in Deep Learning is quite different as it uses neural networks(ANN).
Machine learning consists of thousands of data points.	Big Data: Millions of data points.

Machine Learning is highly used to stay in the competition and learn new things.

Deep Learning solves complex machine learning issues.

NEURAL NETWORKS

What is Neural Network ?

A Neural Network is essentially a system of organizing machine learning algorithms to perform certain tasks. It is a fast and efficient way to solve problems for which the dataset is very large, such as in images.

Neural Networks are collection of Neurons containing specific algorithm which are networked together to solve a particular set of problems irrespective of data size. The key advantage of **Neural Networks**, are that they are able to extract data features automatically without needing the input of the programmer.

Why Neural networks ?

To understand clearly, lets dive to its earlier stage!

If Else Era : In earlier times people tried to solve big data related problems using if else statements, for better understanding let's go through a example.

Example: Suppose we want to build a AI enabled chat app which will talk to people just like any other human. for that we will write if statements (**programming concept**) checking if he/she says "hello" we will reply "hi" but the problem in this is that we need to write 100 or 1000 lines of if else logic which is very inefficient and a bad practice in programming world. So we take apply concept of our brain to a machine cause we don't have to think "**if he says hello i will say hi**" it's not a command, the reply changes based on situation.

Neural Networks are base of an AI model. As input data increases the accuracy of Ai increases

FEATURES OF NEURAL NETWORKS:

- Neural Network systems are modeled on the human brain and nervous system.
- They are able to automatically extract features without input from the programmer.
- Every neural network node is essentially a machine learning algorithm.
- It is useful when solving problems for which the data set is very large.

Unit 6 AI – Natural Language Processing

Natural Language Processing

Natural Language Processing (NLP) refers to AI method of communicating with an intelligent systems using a natural language such as English.

Processing of Natural Language is required when you want an intelligent system like robot to perform as per your instructions, when you want to hear decision from a dialogue based clinical expert system, etc.

The field of NLP involves making computers to perform useful tasks with the natural languages humans use. The input and output of an NLP system can be –

- Speech
- Written Text

Application of Natural Language Processing :

- Automatic Text Summarization
- Sentiment and Emotion Analysis
- Text Classification
- Virtual Assistants
-

NLA and AI Project Life Cycle :

- Problem Scoping
- Data Acquisition
- Data Exploration
- Modeling
- Evaluation
- Chatbots

Data Processing for NLP :

- Text Normalization
- Sentence Segmentation
- Tokenization
- Removing Stopwords, Special Characters and Numbers

Converting Text to a Common Case :

- Stemming
- Lemmatization
- NLP Algorithms

BAG of Words :

- Text normalization
- Create Dictionary
- Create Document Vectors
- Create Document Vectors for all the Documents

TF – IDF : Term Frequency and Inverse Document Frequency :

TF-IDF is an information retrieval techniques that weights a term's frequency (TF) and its inverse document frequency (IDF). Each word of term in the document has its respective TF and IDF score. The product of the TF and IDF scores of a term is called the TF-IDF weight of that term.

This means that higher the TF-IDF score or weight, the more relevant the term. The TF-IDF algorithm is used to weigh a word in any document and assign the importance to that keyword based on the number of times it appears in the document.

For a term t in a document d , the weight $W_{t,d}$ of term t in document d is given by:

$$W_{t,d} = T_{Ft,d} \log (N/D_{Ft})$$

where,

$T_{Ft,d}$ is the number of occurrences of t in document d

D_{Ft} is the number of documents containing the term t

N is the total number of documents in the corpus

Getting Started with NLTK :

Python has a library called NLTK (Natural Language Toolkit) for building programs for text analysis.

- Installing NLTK

pip install nltk

If we are using Anacondas, then a Conda package for NLTK can be built by using the following command :

conda install -c anaconda nltk

- Downloading NLTK's Data

import nltk

nltk.download ()

- Other Packages

Some other Python packages like **gensim** and **pattern** are important for text analyses as well as building NLP applications in python.

gensim : It is a semantic modelling library which can be used for many NLP applications. We can install it by the following command :

pattern : It can be used to make gensim package work properly.

Tokenization : It can be used to divide the input text into sentences.

Keyword Extraction :

Keyword extraction is a text analysis technique that extracts the most used and important words from a text. It helps summarize the content of texts and recognize the main topics discussed.

Components of NLP :

There are two components of NLP as given –

Natural Language Understanding (NLU)

Understanding involves the following tasks –

- Mapping the given input in natural language into useful representations.
- Analyzing different aspects of the language.

Natural Language Generation (NLG)

It is the process of producing meaningful phrases and sentences in the form of natural language from some internal representation.

It involves –

- **Text planning** – It includes retrieving the relevant content from knowledge base.
- **Sentence planning** – It includes choosing required words, forming meaningful phrases, setting tone of the sentence.
- **Text Realization** – It is mapping sentence plan into sentence structure.

The NLU is harder than NLG.

Difficulties in NLU

NL has an extremely rich form and structure.

It is very ambiguous. There can be different levels of ambiguity –

- **Lexical ambiguity** – It is at very primitive level such as word-level.
- For example, treating the word “board” as noun or verb?
- **Syntax Level ambiguity** – A sentence can be parsed in different ways.
- For example, “He lifted the beetle with red cap.” – Did he use cap to lift the beetle or he lifted a beetle that had red cap?
- **Referential ambiguity** – Referring to something using pronouns. For example, Rima went to Gauri. She said, “I am tired.” – Exactly who is tired?
- One input can mean different meanings.
- Many inputs can mean the same thing.

NLP Terminology

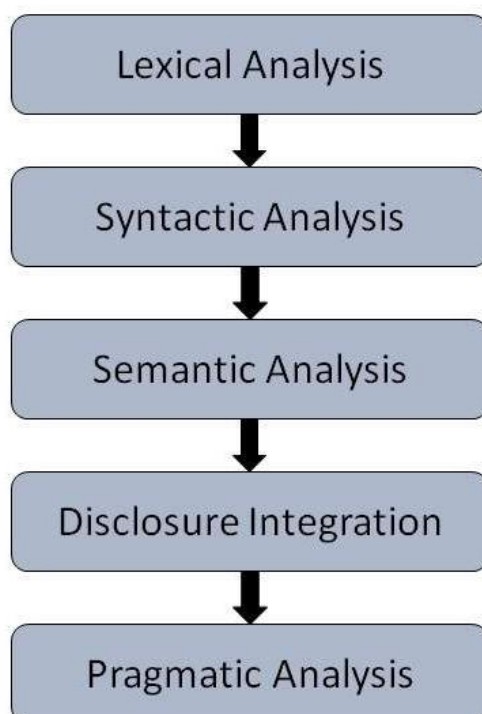
- **Phonology** – It is study of organizing sound systematically.
- **Morphology** – It is a study of construction of words from primitive meaningful units.
- **Morpheme** – It is primitive unit of meaning in a language.

- **Syntax** – It refers to arranging words to make a sentence. It also involves determining the structural role of words in the sentence and in phrases.
- **Semantics** – It is concerned with the meaning of words and how to combine words into meaningful phrases and sentences.
- **Pragmatics** – It deals with using and understanding sentences in different situations and how the interpretation of the sentence is affected.
- **Discourse** – It deals with how the immediately preceding sentence can affect the interpretation of the next sentence.
- **World Knowledge** – It includes the general knowledge about the world.

Steps in NLP

There are general five steps –

- **Lexical Analysis** – It involves identifying and analyzing the structure of words. Lexicon of a language means the collection of words and phrases in a language. Lexical analysis is dividing the whole chunk of txt into paragraphs, sentences, and words.
- **Syntactic Analysis (Parsing)** – It involves analysis of words in the sentence for grammar and arranging words in a manner that shows the relationship among the words. The sentence such as “The school goes to boy” is rejected by English syntactic analyzer.



- **Semantic Analysis** – It draws the exact meaning or the dictionary meaning from the text. The text is checked for meaningfulness. It is done by mapping syntactic structures and objects in the task domain. The semantic analyzer disregards sentence such as “hot ice-cream”.

-
- **Discourse Integration** – The meaning of any sentence depends upon the meaning of the sentence just before it. In addition, it also brings about the meaning of immediately succeeding sentence.
- **Pragmatic Analysis** – During this, what was said is re-interpreted on what it actually meant. It involves deriving those aspects of language which require real world knowledge.

Question Banks – MCQs :

1. What is NLTK tool in Python ?
 (a) Natural Linguistics Tool (b) Natural Language Toolkit
 (c) Neutral Language Kit (d) Neutral Language Toolkit
2. TF-IDF in NLP is defined as :
 (a) Term Frequency and Definite Frequency
 (b) Term Frequency and Indefinite Frequency
 (c) Term Frequency and Inverse Document Frequency
 (d) Term Frequency and Integrated Document Frequency
3. What do we call the process of dividing a string into component words ?
 (a) Regression (b) Word Tokenization
 (c) Classification (d) Clustering
4. What is the stem of the word "Making" ?
 (a) Mak (b) Make (c) Making (d) Maker
5. What is the Lemma of the word "Making" ?
 (a) Mak (b) Make (c) Making (d) Maker
6. Which of these is not a stop word ?
 (a) This (b) Things (c) Is (d) Do
7. The higher the value, the more important the word in the document – this is true of which model ?
 (a) Bag of Words (b) TF-IDF (c) YOLO (d) SSD
8. Which of these is not an NLP library ?
 (a) NLTK (b) NLP Kit (c) Open NLP (d) NLP Suite
9. What is a chatbot called which uses simple FAQs without any intelligence ?
 (a) Smart Chatbot (b) Script Chatbot
 (c) AI Chatbot (d) ML Chatbot
10. What is the process of extracting emotions within a text data using NLP called?
 (a) Sentiment Analysis (b) Emotional Data Science

Subjective Type Questions :

1. Explain the key steps of NLP – based text analysis.
2. Compare Bag of words and TF-IDF and share your finding.
3. What are some of the applications of chatbots in health care ?
4. Explain the difference between Stemming and Lemmatization.
5. What is the difference between how humans interpret communication and how NLP interprets ?

Unit 7 AI – Evaluation**What is evaluation?**

Evaluation is the process of understanding the reliability of any AI model, based on outputs by feeding test dataset into the model and comparing with actual answers. There can be different Evaluation techniques, depending of the type and purpose of the model.

The various terms which are very important to the evaluation process.

Model Evaluation Terminologies

There are various new terminologies which come into the picture when we work on evaluating our model. Let's explore them with an example of the Forest fire scenario.

Consider developing an AI-based prediction model and deploying it in a forest that is prone to forest fires. The model's current goal is to make predictions about whether or not a forest fire has started. We need to consider the two circumstances of prediction and reality. The reality is the actual situation in the forest at the time of the prediction, while the prediction is the machine's output.



Prediction: Yes

Reality: Yes

True Positive

Here, we can see in the picture that a forest fire has broken out in the forest. The model predicts a Yes which means there is a forest fire. The Prediction matches with the Reality. Hence, this condition is termed as True Positive.



Prediction: No

Reality: No

True Negative

Here there is no fire in the forest hence the reality is No. In this case, the machine too has predicted it correctly as a No. Therefore, this condition is termed as True Negative.



Prediction: Yes

Reality: No

False Positive

Here the reality is that there is no forest fire. But the machine has incorrectly predicted that there is a forest fire. This case is termed as False Positive.



Prediction: No

Reality: Yes

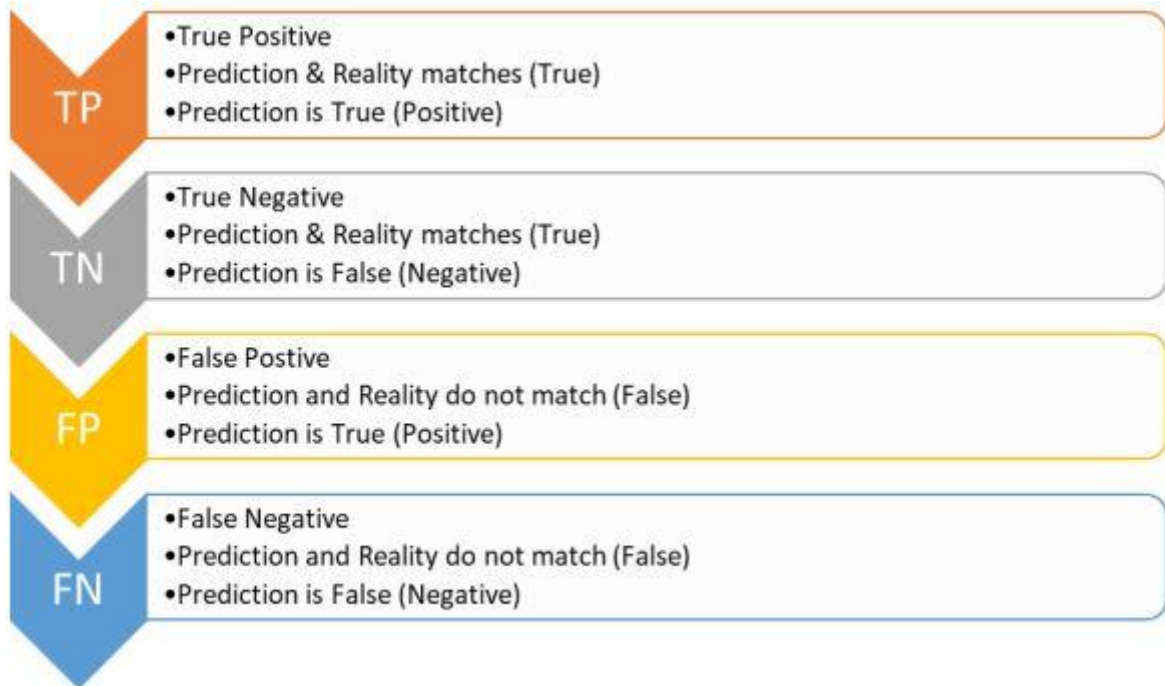
False Negative

Here, a forest fire has broken out in the forest because of which the Reality is Yes but the machine has incorrectly predicted it as a No which means the machine predicts that there is no

Forest Fire.
Therefore, this case becomes False Negative.

Confusion matrix

The result of comparison between the prediction and reality can be recorded in what we call the confusion matrix. The confusion matrix allows us to understand the prediction results. Note that it is not an evaluation metric but a record which can help in evaluation. Let us once again take a look at the four conditions that we went through in the Forest Fire example:



Prediction and Reality can be easily mapped together with the help of this confusion matrix.

The Confusion Matrix		Reality	
		Yes	No
Prediction	Yes	True Positive (TP)	False Positive (FP)
	No	False Negative (FN)	True Negative (TN)

Evaluation Methods

Accuracy, precision, and recall are the three primary measures used to assess the success of a classification algorithm.

Accuracy

Accuracy allows you to count the total number of accurate predictions made by a model. The accuracy calculation is as follows: How many of the model predictions were accurate will be determined by accuracy. True Positives and True Negatives are what accuracy considers.

$$\text{Accuracy} = \frac{\text{Correct prediction}}{\text{Total cases}} * 100\%$$
$$\text{Accuracy} = \frac{(TP + TN)}{(TP + TN + FP + FN)} * 100\%$$

Here, total observations cover all the possible cases of prediction that can be True Positive (TP), True Negative (TN), False Positive (FP) and False Negative (FN).

Precision

Precision is defined as the percentage of true positive cases versus all the cases where the prediction is true. That is, it takes into account the True Positives and False Positives.

$$\text{Precision} = \frac{\text{True Positive}}{\text{All Predicted Positives}} * 100\%$$
$$\text{Precision} = \frac{TP}{TP + FP} * 100\%$$

Recall

It can be described as the percentage of positively detected cases that are positive. The scenarios where a fire actually existed in reality but was either correctly or incorrectly recognised by the machine are heavily considered. That is, it takes into account both False Negatives (there was a forest fire but the model didn't predict it) and True Positives (there was a forest fire in reality and the model anticipated a forest fire).

$$\text{Recall} = \frac{\text{True Positive}}{\text{True Positive} + \text{False Negative}}$$

$$\text{Recall} = \frac{TP}{TP + FN}$$

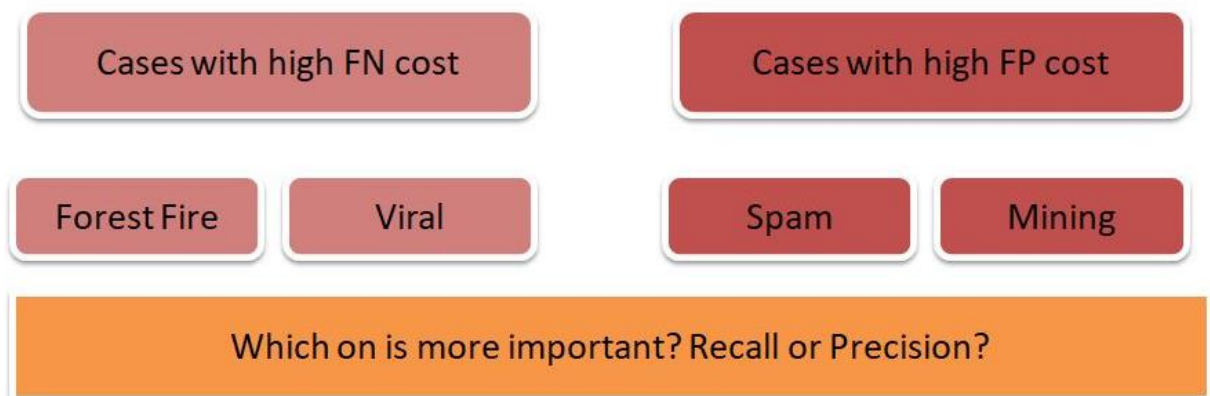
Which Metric is Important?

Depending on the situation the model has been deployed in, choosing between Precision and Recall is necessary. A False Negative can cost us a lot of money and put us in danger in a situation like a forest fire. Imagine there is no need for a warning, even in the case of a forest fire. The entire forest might catch fire.

Viral Outbreak is another situation in which a False Negative might be harmful. Consider a scenario in which a fatal virus has begun to spread but is not being detected by the model used to forecast viral outbreaks. The virus may infect numerous people and spread widely.

Consider a model that can determine whether a mail is spam or not. People would not read the letter if the model consistently predicted that it was spam, which could lead to the eventual loss of crucial information.

The cost of a False Positive condition in this case (predicting that a message is spam when it is not) would be high.



F1 Score

F1 score can be defined as the measure of balance between precision and recall.

$$\text{F1 Score} = 2 * \frac{\text{Precision} * \text{Recall}}{\text{Precision} + \text{Recall}}$$

Take a look at the formula and think of when can we get a perfect F1 score? An ideal situation would be when we have a value of 1 (that is 100%) for both Precision and Recall. In that case, the F1 score would also be an ideal 1 (100%). It

is known as the perfect value for F1 Score. As the values of both Precision and Recall ranges from 0 to 1, the F1 score also ranges from 0 to 1.

Let us explore the variations we can have in the F1 Score:

Precision	Recall	F1 Score
Low	Low	Low
Low	High	Low
High	Low	Low
High	High	High