

Ques. 1) What is data analysis?

- Write short notes on data analysis.
- Data analysis is the process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, drawing conclusions and support decision making.
- Purpose:
- understand structure & quality of dataset
 - Identify patterns, trends & relationships within data.
 - Detect anomalies or outliers that may impact.

- 2 Describe how to plan a data science project. List all steps
- A data science project plan is a structured roadmap that defines the sequence of steps to be followed when solving a problem using data. It ensures that efforts are organized, goal driven & measurable.
- To provide clarity on what the project aims to achieve.
- Break down a data science project into well defined phases.
- List of steps:
- 1] Define Problem
 - 2] Data collection
 - 3] Data cleaning
 - 4] EDA
 - 5] Feature engineering
 - 6] Model building
 - 7] Model Evaluation
 - 8] Deployment
 - 9] Monitoring & maintenance

- 3 Frame a ML problem statement: Predict whether a customer will churn based on purchase behavior.
- Scenario: An e-commerce company wants to reduce customer churn.
 - Business objective: Identify customer likely to stop using platform.
 - Input (x): Customer age, subscription length, last login, purchase history
 - Output (y): Churn ($y_{\text{Yes}} = 1$, $y_{\text{No}} = 0$)
 - ML task: Classification
 - Evaluation Metric: Recall (so fewer at-risk customers are missed)
 - Success criteria: Recall $> 80\%$.

what are Tensors?

- A Tensor is a mathematical object that generalizes scalars (0D), vectors (1D) & matrices (2D) to higher dimensions. In simple terms, a tensor is just a container for data in multiple dimensions, widely used in deep learning, numerical computing.

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5) Provide in depth explanation of tensor using numpy. Mention its applications.

→ import numpy as np

→ scalar = np.array(5)

vector = np.array([1, 2, 3])