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Question Bank

2 marks

1. **What is what if Analysis?**

Ans – what -if analysis in excel is a tool which helps us to create different models ,scenarios , data table.

2. **List different types of What if Analysis.**

Ans- three types of what if analysis are :-

1. **Scenario manager.**
2. **Goal seek in excel.**
3. **Data table in excel.**

3. **Do we always need a formulae cell to do what-if analysis?**
4. **What is the advantage of sorting?**

Ans-

1. Produces ordered arrangement of spreadsheet.
2. Facilitates efficient decision making process.
3. Results in effective analysis and investigation of data.
4. Aids the process of searching, organizing and formatting data.

5. **What is the advantage of regression analysis?**

Ans-

1. **regression analysis is most applied technique of statistical analysis and modeling .**
2. **it is highly variable in economic and business research.**

6. **What is sorting?**

Sorting in Excel is **arranging data according to our requirements**. It can be done alphabetically or numerically.

7. **What is the filter?**

Filters **can be used to narrow down the data in your worksheet and hide parts of it from view**.

8. **What is machine learning?**

the use and development of computer systems that are able to learn and adapt without following explicit instructions, by using algorithms and statistical models to analyse and draw inferences from patterns in data.

Or

According to Arthur Samuel, Machine Learning algorithms enable the computers to learn from data, and even improve themselves, without being explicitly programmed.

9. **Define statistics**

- Statistics is a collection of tools that you can use to get answers to important questions about data. Statistics is generally considered a prerequisite to the field of applied machine learning.

10. Where is unsupervised learning used?

- Clustering, in which the computer finds similar data points within a data set and groups them accordingly (creating "clusters").
- Density estimation, in which the computer discovers insights by looking at how a data set is distributed.
- Anomaly detection, in which the computer identifies data points within a data set that are significantly different from the rest of the data.
- Principal component analysis (PCA), in which the computer analyses a data set and summarises it so that it can be used to make accurate predictions.

5 **marks**

1. Explain correlation with the help of an example.

- **Correlation refers to a process for establishing the relationships exist between two variables.**
- **Methods of correlation summarize the relationship between two variables in a single number called the correlation coefficient. The correlation coefficient is usually represented using the symbol r, and it ranges from -1 to +1.**
- **A correlation coefficient quite close to 0, but either positive or negative, implies little or no relationship between the two variables.**
- **A correlation coefficient close to plus 1 means a positive relationship between the two variables, with increases in one of the variables being associated with increases in the other variable.**
- **A correlation coefficient close to -1 indicates a negative relationship between two variables, with an increase in one of the variables being associated with a decrease in the other variable.**

Example:-

spending more time on a treadmill burns more calories. Negative correlation: A negative correlation between two variables means that the variables move in opposite directions.

2. **Explain regression analysis.**
   Regression analysis is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables. It can be utilized to assess the strength of the relationship between variables and for modeling the future relationship between them.
3. **Discuss the role of data filter.**

Data filtering is the process of choosing a smaller part of your data set and using that subset for viewing or analysis. Filtering is generally (but not always) temporary – the complete data set is kept, but only part of it is used for the calculation.
Filtering may be used to:

- Look at results for a particular period of time.
- Calculate results for particular groups of interest.
- Exclude erroneous or "bad" observations from an analysis.
- Train and validate statistical models.

Filtering requires you to specify a rule or logic to iden

4. **What is the difference between filter and sorting?**

Sorting: To arrange your data in a particular order. E.g. Arranging a list on the alphabetical order, arranging your data on in increasing or decreasing order of numeric values.

Filtering: To filter out some data based on a condition. E.g. You may like to see list of students who have scored more than 80 percent from a list of all the students. In filtering some data rows gets hidden and some are visible which satisfies a condition.

5. **Name 5 programming languages most commonly used for AI.**
   Python , lisp , java , c++ . R

6. **Discuss descriptive statistics.**
   Descriptive statistics are brief descriptive coefficients that summarize a given data set, which can be either a representation of the entire

population or a sample of a population. Descriptive statistics are broken down into measures of central tendency and measures of variability (spread).

7. **Discuss inferential statistics.**
   Inferential statistics deals with **the process of inferring information about a population based on a sample from that population**. Because the sample size is typically significantly smaller than the size of the population, such inferred information is subject to a measure of uncertainty.

8. **What are Pivot Tables? How it helps in data interpretation and processing.**

A Pivot Table is one of the basic data analysis tools. Pivot Tables can quickly answer many important business questions.

One of the reasons we build Pivot Tables is to pass information. We would like to support our story with data that is easy to understand, easy to see.

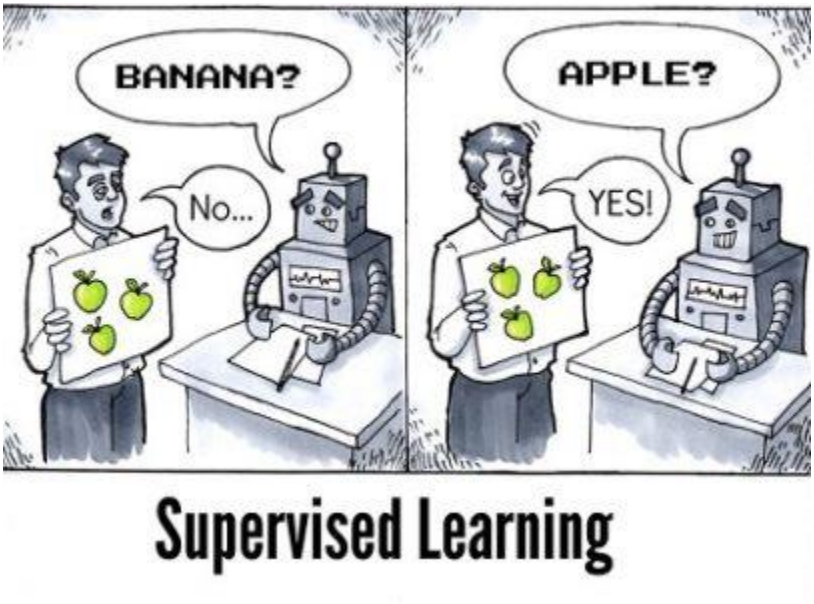
Although Pivot Tables are only tables and thus missing real visuals, they can still be considered as a mean of Visual Storytelling.

Pivot tables are a technique in data processing. They arrange and rearrange **(or "pivot") statistics in order to draw attention to useful information**. This leads to finding figures and facts quickly making them integral to data analysis. This ultimately leads to helping businesses or individuals make educated decisions.

9. **How Machine learning helps in recommending your favourite movie/web series at Online Media or suggesting your products online.**
   organization uses an **ML technology called a "recommendation engine"** to suggest shows and movies to you and other users. As the name suggests, a recommendation system recommends products and services to users based on available data.
10. **Discuss supervised learning with the help of an example.**

Supervised Learning is the process of making an algorithm to learn to map an input to a particular output. This is achieved using the labelled datasets that you have collected. If the mapping is correct, the algorithm has successfully learned. Else, you make the necessary changes to the algorithm so that it can learn correctly. Supervised Learning algorithms can help make predictions for new unseen data that we obtain later in the future.

This is similar to a teacher-student scenario. There is a teacher who guides the student to learn from books and other materials. The student is then tested and if correct, the student passes. Else, the teacher tunes the student and makes the student learn from the mistakes that he or she had made in the past. That is the basic principle of Supervised Learning.



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8 **marks**

1. **What is the role of charts in data analysis? Explain with examples.**

- A chart is a graphical representation of data, in which "the data is represented by symbols, such as bars in a bar chart, lines in a line chart, or slices in a pie chart".[1] A chart can represent tabular numeric data, functions or some kinds of quality structure and provides different info.
- A pie chart showing the composition of the 38th Parliament of Canada.
- The term "chart" as a graphical representation of data has multiple meanings:
- A data chart is a type of diagram or graph, that organizes and represents a set of numerical or qualitative data.
- Maps that are adorned with extra information (map surround) for a specific purpose are often known as charts, such as a nautical chart or aeronautical chart, typically spread over several map sheets.

2. **Name and discuss types of Machine Learning.**

There are four basic approaches:supervised learning, unsupervised learning, semi-supervised learning and reinforcement learning. The type of algorithm data scientists choose to use depends on what type of data they want to predict.

- **Supervised learning:** In this type of machine learning, data scientists supply algorithms with labeled training data and define the variables they want the algorithm to assess for correlations. Both the input and the output of the algorithm is specified.
- **Unsupervised learning:** This type of machine learning involves algorithms that train on unlabeled data. The algorithm scans through data sets looking for any meaningful connection. The data that algorithms train on as well as the predictions or recommendations they output are predetermined.

- **Semi-supervised learning:** This approach to machine learning involves a mix of the two preceding types. Data scientists may feed an algorithm mostly labeled training data, but the model is free to explore the data on its own and develop its own understanding of the data set.

- **Reinforcement learning:** Data scientists typically use reinforcement learning to teach a machine to complete a multi-step process for which there are clearly defined rules. Data scientists program an algorithm to complete a task and give it positive or negative cues as it works out how to complete a task. But for the most part, the algorithm decides on its own what steps to take along the way.

3. **Discuss the various trending applications that are immensely influenced by Machine Learning.**
    - Machine learning is widely used by various e-commerce and entertainment companies such as **Amazon**, **Netflix**, etc., for product recommendation to the user. Whenever we search for some product on Amazon, then we started getting an advertisement for the same product while internet surfing on the same browser and this is because of machine learning.
    - We have various virtual personal assistants such as **Google assistant**, **Alexa**, **Cortana**, **Siri**. As the name suggests, they help us in finding the information using our voice instruction. These assistants can help us in various ways just by our voice instructions such as Play music, call someone, Open an email, Scheduling an appointment, etc.

- Image recognition is one of the most common applications of machine learning. It is used to identify objects, persons, places, digital images, etc. The popular use case of image recognition and face detection is, **Automatic friend tagging suggestion**:
- Facebook provides us a feature of auto friend tagging suggestion. Whenever we upload a photo with our Facebook friends, then we automatically get a tagging suggestion with name, and the technology behind this is machine learning's **face detection** and **recognition algorithm**.

It is based on the Facebook project named "**Deep Face**," which is responsible for face recognition and person identification in the picture.

4. **Discuss different types of machine learning with examples.**

There are four basic approaches:supervised learning, unsupervised learning, semi-supervised learning and reinforcement learning. The type of algorithm data scientists choose to use depends on what type of data they want to predict.

- **Supervised learning:** In this type of machine learning, data scientists supply algorithms with labeled training data and define the variables they want the algorithm to assess for correlations. Both the input and the output of the algorithm is specified.

- **Example: Is it a cat or a dog?**
- Image classification is a popular problem in the computer vision field. Here, the goal is to predict what class an image belongs to. In this set of problems, we are interested in finding the class label of an image. More precisely: is the image of a car or a plane? A cat or a dog?

- **Unsupervised learning:** This type of machine learning involves algorithms that train on unlabeled data. The algorithm scans through data sets looking for any meaningful connection. The data that algorithms train on as well as the predictions or recommendations they output are predetermined.

- **Example:** Suppose the unsupervised learning algorithm is given an input dataset containing images of different types of cats and dogs. The algorithm is never trained upon the given dataset, which means it does not have any idea about the features of the dataset. The task of the unsupervised learning algorithm is to identify the image features on their own. Unsupervised learning algorithm will perform this task by clustering the image dataset into the groups according to similarities between images

- **Semi-supervised learning:** This approach to machine learning involves a mix of the two preceding types. Data scientists may feed an algorithm mostly labeled training data, but the model is free to explore the data on its own and develop its own understanding of the data set.

- A common example of an application of semi-supervised learning is a text document classifier. This is the type of situation where semi-supervised learning is ideal because it would be nearly impossible to find a large amount of labeled text documents. This is simply because it is not time efficient to have a person read through entire text documents just to assign it a simple classification.

- **Reinforcement learning:** Data scientists typically use reinforcement learning to teach a machine to complete a multi-step process for which there are clearly defined rules. Data scientists program an algorithm to complete a task and give it positive or negative cues as it works out how to complete a task. But for the most part, the algorithm decides on its own what steps to take along the way.

- Example: Chess game

5. **Describe what is the filter? Steps to use filters in excel. What is its purpose?**

Filters **can be used to narrow down the data in your worksheet and hide parts of it from view**. While it may sound a little like grouping, filtering is different because it allows you to qualify and display only the data that interests you.

Steps to use filters are:-

1. Select any cell within the range.
2. Select Data > Filter.
3. Select the column header arrow .
4. Select Text Filters or Number Filters, and then select a comparison, like Between.
5. Enter the filter criteria and select OK.

The FILTER function in Excel is **used to filter a range of data based on the criteria that you specify**. The function belongs to the category of Dynamic Arrays functions. The result is an array of values that automatically spills into a range of cells, starting from the cell where you enter a formula.

6. **What is reinforcement machine learning? Explain with the help of an example. List 2 area of applications.**

Reinforcement learning is an area of Machine Learning. It is about taking suitable action to maximize reward in a particular situation. It is employed by various software and machines to find the best possible behavior or path it should take in a specific situation.

- **Example:** Suppose there is an AI agent present within a maze environment, and his goal is to find the diamond. The agent interacts with the environment by performing some actions, and based on those actions, the state of the agent gets changed, and it also receives a reward or penalty as feedback.

- Applications in self-driving cars

Industry automation with Reinforcement Learning

7. **What are soring and filters? How sorting and filter are useful for AI?**

Sorting: To arrange your data in a particular order. E.g. Arranging a list on the alphabetical order, arranging your data on in increasing or decreasing order of numeric values.

Filtering: To filter out some data based on a condition. E.g. You may like to see list of students who have scored more than 80 percent from a list of all the students. In filtering some data rows gets hidden and some are visible which satisfies a condition.

It helps you find and organise the data you want quickly and effectively.

Imagine you have a database of hundreds and thousands of data entries (some companies have data in their millions, billions, and possibly trillions and they need specialist software to handle that sort of volume), it would take at least an entire working day to calculate and sort all of the data by hand. Using filtering and sorting, you can get the job done in a minute. That's a huge cost saving to the company, especially if you do that sort of work on a regular basis.