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PART A

1. What Is Predictive Analytics?

The term predictive analytics refers to the use of statistics and modeling techniques to make predictions about future outcomes and performance. Predictive analytics looks at current and historical data patterns to determine if those patterns are likely to emerge again. This allows businesses and investors to adjust where they use their resources to take advantage of possible future events. Predictive analysis can also be used to improve operational efficiencies and reduce risk

2. Understanding Predictive Analytics.

Predictive analytics is a form of technology that makes predictions about certain unknowns in the future. It draws on a series of techniques to make these determinations, including artificial intelligence (AI), data mining, machine learning, modeling, and statistics.[3] For instance, data mining involves the analysis of large sets of data to detect patterns from it. Text analysis does the same, except for large blocks of text

3. Predictive models are used for all kinds of applications, including:

- Weather forecasts
- Creating video games
- Translating voice to text for mobile phone messaging
- Customer service
- Investment portfolio development

All of these applications use descriptive statistical models of existing data to make predictions about future data

4. What is mean by Forecasting?
Forecasting is essential in manufacturing because it ensures the optimal utilization of resources in a supply chain. Critical spokes of the supply chain wheel, whether it is inventory management or the shop floor, require accurate forecasts for functioning.

Predictive modelling is often used to clean and optimize the quality of data used for such forecasts. Modelling ensures that more data can be ingested by the system, including from customer-facing operations, to ensure a more accurate forecast.

5. Define Credit.
Credit scoring makes extensive use of predictive analytics. When a consumer or business applies for credit, data on the applicant's credit history and the credit record of borrowers with similar characteristics are used to predict the risk that the applicant might fail to perform on any credit extended.

6. Define Underwriting.
Data and predictive analytics play an important role in underwriting. Insurance companies examine policy applicants to determine the likelihood of having to pay out for a

future claim based on the current risk pool of similar policyholders, as well as past events that have resulted in pay-outs. Predictive models that consider characteristics in comparison to data about past policyholders and claims are routinely used by actuaries.

7. What is mean by Marketing?
Individuals who work in this field look at how consumers have reacted to the overall economy when planning on a new campaign. They can use these shifts in demographics to determine if the current mix of products will entice consumers to make a purchase.

Active traders, meanwhile, look at a variety of metrics based on past events when deciding whether to buy or sell a security. Moving averages, bands, and breakpoints are based on historical data and are used to forecast future price movements

8. Predictive Analytics vs. Machine Learning

A common misconception is that predictive analytics and machine learning are the same things. Predictive analytics help us understand possible future occurrences by analyzing the past. At its core, predictive analytics includes a series of statistical techniques (including machine learning, predictive modelling, and data mining) and uses statistics (both historical and current) to estimate, or predict, future outcomes

9. What is the Decision Trees?
If you want to understand what leads to someone's decisions, then you may find decision trees useful. This type of model places data into different sections based on certain variables, such as price or market capitalization. Just as the name implies, it looks like a tree with individual branches and leaves. Branches indicate the choices available while individual leaves represent a particular decision.

Decision trees are the simplest models because they're easy to understand and dissect. They're also very useful when you need to make a decision in a short period of time

10. Define Regression.
This is the model that is used the most in statistical analysis. Use it when you want to determine patterns in large sets of data and when there's a linear relationship between the inputs. This method works by figuring out a formula, which represents the relationship between all the inputs found in the dataset. For example, you can use regression to figure out how price and other key factors can shape the performance of a security

11. Define Neural Networks.
Neural networks were developed as a form of predictive analytics by imitating the way the human brain works. This model can deal with complex data relationships using artificial intelligence and pattern recognition. Use it if you have several hurdles that you need to overcome like when you have too much data on hand, when you don't have the formula you need to help you find a relationship between the inputs and outputs in your dataset, or when you need to make predictions rather than come up with explanations.

12. What are the Benefits of Predictive Analytics?

There are numerous benefits to using predictive analysis. As mentioned above, using this type of analysis can help entities when you need to make predictions about outcomes when there are no other (and obvious) answers available.[9]

Investors, financial professionals, and business leaders are able to use models to help reduce risk. For instance, an investor and their advisor can use certain models to help craft an investment portfolio with minimal risk to the investor by taking certain factors into consideration, such as age, capital, and goals.[9]

There is a significant impact to cost reduction when models are used. Businesses can determine the likelihood of success or failure of a product before it launches. Or they can set aside capital for production improvements by using predictive techniques before the manufacturing process begins

13. Criticism of Predictive Analytics.

The use of predictive analytics has been criticized and, in some cases, legally restricted due to perceived inequities in its outcomes. Most commonly, this involves predictive models that result in statistical discrimination against racial or ethnic groups in areas such as credit scoring, home lending, employment, or risk of criminal behaviour.

A famous example of this is the (now illegal) practice of redlining in home lending by banks. Regardless of whether the predictions drawn from the use of such analytics are accurate, their use is generally frowned upon, and data that explicitly include information such as a person's race are now often excluded from predictive analytics.

14. How Does Netflix Use Predictive Analytics?
Data collection is very important to a company like Netflix. It collects data from its customers based on their behaviour and past viewing patterns. It uses information and makes predictions based to make recommendations based on their preferences. This is the basis behind the "Because you watched..." lists you'll find on your subscription.

15. What Is Data Analytics?

Data analytics is the science of analysing raw data to make conclusions about that information. Many of the techniques and processes of data analytics have been automated into mechanical processes and algorithms that work over raw data for human consumption

16. What are the various steps of Data Analysis?
The process involved in data analysis involves several different steps:

1. The first step is to determine the data requirements or how the data is grouped. Data may be separated by age, demographic, income, or gender. Data values may be numerical or be divided by category.
2. The second step in data analytics is the process of collecting it. This can be done through a variety of sources such as computers, online sources, cameras, environmental sources, or through personnel.
3. Once the data is collected, it must be organized so it can be analyzed. This may take place on a spreadsheet or other form of software that can take statistical data.
4. The data is then cleaned up before analysis. This means it is scrubbed and checked to ensure there is no duplication or error, and that it is not incomplete. This step helps correct any errors before it goes on to a data analyst to be analyzed

PART B

1. How do you solve the least square problem in Python? What is least square method in Python?

2. What is the goodness-of-fit test?

Employers want to know which days of the week employees are absent in a five-day work week. Most employers would like to believe that employees are absent equally during the week. Suppose a random sample of 60 managers were asked on which day of the week they had the highest number of employee absences. The results were distributed as in the table below. For the population of employees, do the days for the highest number of absences occur with equal frequencies during a five-day work week? Test at a 5% significance level.

Day of the Week Employees were Most Absent

	Monday	**Tuesday**	**Wednesday**
Number of Absences	15	12	9

3. One study indicates that the number of televisions that American families have is distributed (this is the **given** distribution for the American population) as in the table.

Number of Televisions	**Percent**
	10
1	16
2	55
3	11
4+	8

The table contains expected (*E*) percents.

A random sample of 600 families in the far western United States resulted in the data in this table.

Number of Televisions	**Frequency**
0	66

Number of Televisions	Frequency
1	119
2	340
3	60
4+	15 *Total = 600*

The table contains observed (*O*) frequency values.

At the 1% significance level, does it appear that the distribution "number of televisions" of far western United States families is different from the distribution for the American population as a whole?
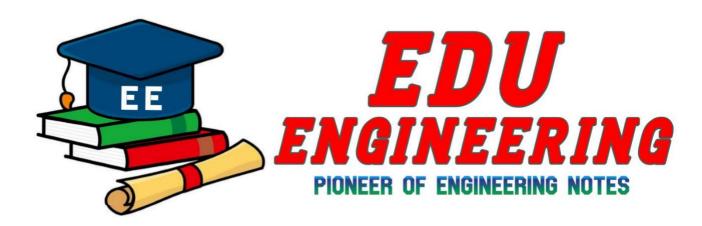
4. Explain in detail about time series analysis with example.

5. Describe Regression using Stats Models.

6. Explain multiple regression with an example.

7. What is the nonlinear relationships and types .Difference between linear and non linear relationship

8. Describe logistic regression in detail.

9. Explain in detail serial correlation and autocorrelation.

https://www.investopedia.com/terms/s/serial-

correlation.asp#:~:text=Serial%20correlation%20is%20the%20relationship,it%20may%20not%20be%20random.

https://corporatefinanceinstitute.com/resources/data-science/autocorrelation/

10) Describe in detail Introduction to survival analysis.

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