**Prediction Analysis**

1. What is it?

Predictive analytics uses historical data to predict future events. Typically, historical data is used to build a mathematical model that captures important trends. That predictive model is then used on current data to predict what will happen next, or to suggest actions to take for optimal outcomes. By the article “Predictive Analytics 3 Things You Need to Know” on the site (https://www.mathworks.com).

1. Mains applications of this model?

Whereas some types of data analysis are only valuable in reviewing what has already happened, predictive analysis is all about making predictions. As a result, you can use predictive analysis whenever you feel the need to make predictions about the future.

Specifically, predictive analysis can be helpful when evaluating a business decision. This is because effective decision-making is all about understanding the consequences of decisions, based on predictions of how a venture, group, environment, or other entity will perform. By Thomas Bush on the site (https://pestleanalysis.com)

1. Strength and weakness?

Benefits and Advantages of Forecasting and Predictive Analytics: In its multiple forms—predictive modelling, decision analysis and optimization, transaction profiling, and predictive search—predictive analytics can be applied to a range of business strategies and has been a key player in search advertising and recommendation engines.3 These techniques can provide managers and executives with decision-making tools to influence upselling, sales and revenue forecasting, manufacturing optimization, and even new product development. Though beneficial, predictive analytics has notable disadvantages.

Drawbacks and Criticism of Predictive Analytics: A company that wishes to utilize data-driven decision-making needs to have access to substantial relevant data from a range of activities, and sometimes big data sets are hard to come by. Even if a company has sufficient data, critics argue that computers and algorithms fail to consider variables—from changing weather to moods to relationships—that might influence customer-purchasing patterns when anticipating human behaviour.

Time also plays a role in how well these techniques work. Though a model may be successful at one point in time, customer behaviour changes with time and therefore, a model must be updated. The 2008 financial crisis exemplifies how crucial time consideration is because invalid models were predicting the likelihood of mortgage customers repaying loans without considering the possibility that U.S. housing prices might drop.4

A thorough understanding of predictive analytics can help you with business forecasting, deciding when and when not to implement predictive methods into a technology management plan, and managing data scientists. As said the article “Pros and Cons of Predictive Analysis” on the site (https://scsonline.georgetown.edu).

**Clustering**

1. What is it?

As told Muller, Andreas and Guido, Sarah: “Clustering is the task of partitioning the dataset into groups, called clusters. The goal is to split up the data in such a way that points within a single cluster are very similar and points in different clusters are different. Similarly to classification algorithms, clustering algorithms assign (or predict) a number to each data point, indicating which cluster a particular point belongs to.”

1. Mains applications of this model?

Clustering has a large no. of applications spread across various domains. Some of the most popular applications of clustering are recommendation engines, market segmentation, social network analysis, search result grouping, medical imaging, image segmentation, anomaly detection. Cited by Sauravkaushik8 Kaushik in the site (http://www.analyticsvidhya.com).

1. Strength and weakness?

Easy to understand and easy to do…There are four types of clustering algorithms in widespread use: hierarchical clustering, k-means cluster analysis, latent class analysis, and self-organizing maps. The math of hierarchical clustering is the easiest to understand. It is also relatively straightforward to program. Its main output, the dendrogram, is also the most appealing of the outputs of these algorithms.

Arbitrary decisions: When using hierarchical clustering it is necessary to specify both the distance metric and the linkage criteria. There is rarely any strong theoretical basis for such decisions. A core principle of science is that findings are not the result of arbitrary decisions, which makes the technique of dubious relevance in modern research.

Missing data: Most hierarchical clustering software does not work with values are missing in the data.

Data types: With many types of data, it is difficult to determine how to compute a distance matrix. There is no straightforward formula that can compute a distance where the variables are both numeric and qualitative. For example, how can one compute the distance between a 45-year-old man, a 10-year-old-girl, and a 46-year-old woman? Formulas have been developed, but they involve arbitrary decisions. By Tim Bock, present on the site (https://www.displayr.com)

**Time series analysis**

1. What is it?

Time series analysis is a specific way of analyzing a sequence of data points collected over an interval of time. In time series analysis, analysts record data points at consistent intervals over a set period of time rather than just recording the data points intermittently or randomly. However, this type of analysis is not merely the act of collecting data over time. As said the article “Time Series Analysis: Definition, Types & Techniques | Tableau” on the site (https://www.tableau.com).

1. Mains applications of this model?

## Time series analysis helps organizations understand the underlying causes of trends or systemic patterns over time. Using data visualizations, business users can see seasonal trends and dig deeper into why these trends occur. With modern analytics platforms, these visualizations can go far beyond line graphs. As said the article “Why organizations use time series data analysis” on the site (https://www.tableau.com).

1. Strength and weakness?

# In other words mean that The strength of time series analysis is that it is a big effective method of forecasting because it makes use of the seasoned patterns. The weakness is that it is costly because some forecasts are based on the historical data patterns that are used to predict the future market behaviour. As said the article “Time Series Analysis Advantages and Disadvantages” on the site (https://www2.bartleby.com).