# Explain about the patterns mined in Data mining and also about the technologies used in data mining systems.

Data mining is the process of discovering patterns and insights from large datasets. There are several types of patterns that can be mined in data mining, including:

1. Frequent Patters
2. Association Patters
3. Correlations Patters Frequent Patters:

* Frequent patterns, as the name suggests, are patterns that occur frequently in data. There are many kinds of frequent patterns, including frequent itemsets, frequent subsequences (also known as sequential patterns), and frequent substructures.
* A frequent itemset typically refers to a set of items that often appear together in a transactional data set-for example, milk and bread, which are frequently bought together in grocery stores by many customers.
* A frequently occurring subsequence, such as the pattern that customers, tend to purchase first a laptop, followed by a digital camera, and then a memory card, is a (frequent) sequential pattern.
* A substructure can refer to different structural forms (e.g., graphs, trees, or lattices) that may be combined with itemsets or subsequences that may be combined w VISHWA VI AM.Online
* If a substructure occurs frequently, it is called a (frequent) structured pattern.
* Mining frequent patterns leads to the discovery of interesting associations and correlations within data.

Association Patters

* + Suppose that, as a marketing manager at AllElectronics, you want to know which items are frequently purchased together (i.e., within the same transaction).
  + An example of such a rule, mined from the AllElectronics transactional database, is buys(X, "computer") buys(X, "software") [support = 1%, confidence = 50%], where X is a variable representing a customer.
  + A confidence, or certainty, of 50% means that if a customer buys a computer, there is a 50% chance that she will buy software as well.
  + This association rule involves a single attribute or predicate (i.e., buys) that repeats. Association rules that contain a single predicate are referred to as single-dimensional association rules.
  + Suppose, instead, that we are given the All Electronics relational database related to purchases.

Correlations Patters:

* + Positive correlation patterns occur when two variables increase or decrease together. For example, the price of a product and the demand for that product might be positively correlated. As the price increases, the demand for the product decreases, and vice versa.
  + Negative correlation patterns occur when two variables move in opposite directions. For example, the price of a substitute product and the demand for a product might be negatively correlated. As the price of the substitute product increases, the demand for the original product increases, and vice versa.
  + Correlation patterns can be measured using correlation coefficients, such as Pearson’s correlation coefficient or Spearman’s rank correlation coefficient. These coefficients range from -1 to +1, where -1 indicates a perfect negative correlation, 0 indicates no correlation, and

+1 indicates a perfect positive correlation.

# Technologies used in data mining systems.

* Machine learning algorithms: These algorithms are used to analyze data and identify patterns. Some popular machine learning algorithms used in data mining include decision trees, neural networks, and support vector machines.
* Data warehousing: This involves storing large amounts of data in a centralized repository, which can then be queried and analyzed.
* Data visualization tools: These tools are used to create visual representations of data, which can help identify patterns and trends.
* Data preprocessing tools: These tools are used to clean and transform data before it is analyzed. This can involve removing duplicates, filling in missing values, and converting data to a more appropriate format.
* Big data technologies: These technologies are used to process and analyze large volumes of data. This can involve distributed processing frameworks like Hadoop and Spark, as well as NoSQL databases like Cassandra and MongoDB.
* Cloud computing: This technology allows data mining systems to be deployed and run on cloud-based platforms, such as Amazon Web Services (AWS) and Microsoft Azure. This provides greater flexibility and scalability, as well as lower costs.
* Natural Language Processing (NLP) tools: These tools are used to analyze and extract insights from unstructured data, such as text documents, emails, and social media posts.
* Web mining tools: These tools are used to extract insights from web- based data, such as website traffic and social media activity.
* Business intelligence (BI) tools: These tools are used to analyze and visualize data from various sources, including data warehouses and other data mining systems.