- An application combined with the environment needed to run it is referred to as virtual (**adjective**) appliance.
- We can virtualize (**verb**) the data center's resources and thus create a virtual cloud environment rather than a real one.
- Virtualization (**noun**) has revolutionized data center's technology through a set of techniques and tools that facilitate the providing and management of the dynamic data center's infrastructure.

Project. Write at least three more sentences using all family members of the word virtualize. You can get help from the text you read, the examples in the word magnifier box, or your dictionary.

Translation

The following text is about platform as a service. Firstly, discuss with your partner the uses of "as" in the text. Then, translate the text and see how they are translated into Persian.

In addition to infrastructure-oriented clouds that provide raw computing and storage services, another approach is to offer a higher level of abstraction to make a cloud easily programmable, known as Platform as

a Service (PaaS). A cloud platform offers an environment on which developers create and deploy applications and do not necessarily need to know how many processors or how much memory the applications will be using. In addition, multiple programming models and specialized services (e.g., data access, authentication, and payments) are offered as building blocks to new applications. Google AppEngine, an example of Platform as a Service, offers a scalable environment for developing and hosting Web applications, which should be written in specific programming languages such as Python or Java and use the servers' own proprietary structured object data store.

.....

Reading (Lesson 2, Part 2)

Before You Read

concept: the thing to be learned
instance: the thing that is to be classified; clustered, or associated
attribute: predefined features

1. What do you think a *concept* refers to?
2. What is an *instance* and how does it refer to a concept?
3. If instances provide input to machine learning schemes, don't you think they should be characterized by a set of values or attributes? if yes, then what is an *attribute*?

4. Take one minute to skim the headings of the following reading. What do you think the reading is about? Share your ideas with a partner.

Input: Concepts, Instances, and Attributes

main idea

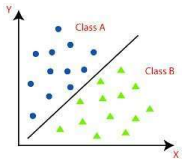
What is a concept?

Four basically (essentially) different styles of learning appear in data mining applications. In *classification learning*, the learning scheme (the design of a classifier) is presented with a set of classified examples from which it is expected to learn a way of classifying unseen examples. In *association learning*, any association (relation; connection) among features is sought, not just ones that predict a particular class value. In *clustering*, groups of examples that belong together (fit together) are sought. In *numeric prediction*, the outcome to predict is not a discrete (?) class but a numeric quantity. Regardless of the type of learning involved, we call the thing to be learned the *concept* and the output produced by a learning scheme the *concept description*.

main idea

Look back at the contact lens data in Table 2-1. It gives the conditions under which an optician might want to prescribe soft contact lenses, hard contact lenses, or no contact lenses at all. Each line of the table is one of the examples. The problem is to learn how to decide on (?) a lens

recommendation for a new patient -or more precisely to learn a way of summarizing the given data.

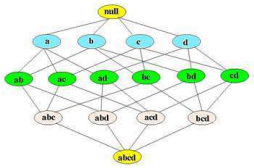


Classification learning is sometimes called supervised because, in a sense, the method operates under supervision by being provided with the actual outcome for the training example - the lens recommendation.

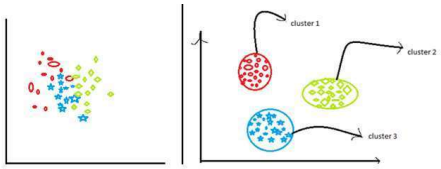
?

main idea

In association learning, the problem is to discover any structure in the data that is "interesting". Association rules differ from classification rules in two ways: they can "predict" any attribute, not just the class and they can predict more than one attribute's value at a time.



Clustering is also called segmentation. It is used to identify natural groupings of cases based on a set of attributes. Cases within the same group have more or less similar attribute values.



main idea

Figure 2-1 displays a simple customer dataset containing two attributes: age and income. The clustering algorithm groups the dataset into three segments based on these two attributes. Cluster 1 contains the younger population with a low income. Cluster 2 contains middle-aged customers with higher incomes. Cluster 3 is group of senior individuals with a relatively low income.

older

main idea

Numeric prediction is a variant of classification learning in which the

different form

outcome is a number value rather than a category. With numeric prediction as with other machine learning, situations, the predicted value for new instances is often of less interest than the structure of the description that is learned, expressed in terms of what the important

in relation to

attributes are and how they relate to the numeric outcome.

What Is an Instance?

main idea

The input to a machine learning scheme is a set of instances. These instances are the things that are to be classified, associated, or clustered. Each instance is an individual example of the concept to be learned. In addition, each one is characterized by the values of a set of predetermined attributes. Each dataset is represented as a matrix of instances versus attributes, which in dataset terms is a single relation or

flat file

A data file that is not related to or does not contain any linkages to another file

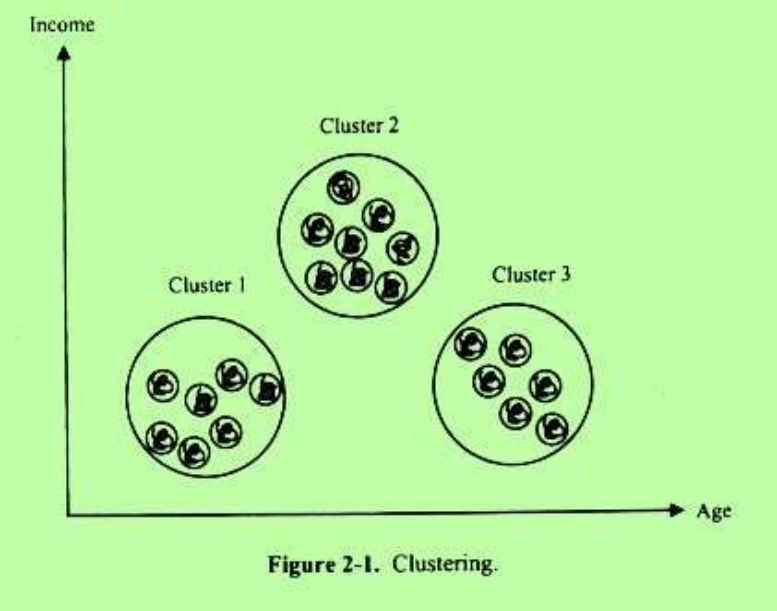


Figure 2-1. Clustering.

What is an attribute?


main idea

Each individual independent instance that provides the input to machine learning is characterized by its values on a fixed predefined set of features or attributes. The instances are the rows of the table that we have shown for the contact lens and the attributes are the columns.


main idea

The use of a fixed set of features imposes another restriction on the kinds
force
of problems generally considered in practical data mining. What if different instances have different attributes? If the instances were transportation vehicles, then number of wheels is a feature that applies to many vehicles but not to ships, for example, whereas number of masts might be a feature that applies to ships but not to land vehicles. The

standard workaround is to make each possible feature an attribute and
a method for overcoming a problem
to use a special "relevant value" flag to indicate that a particular attribute
special symbol used to mark unusual data
is not available for a particular case. A similar situation arises when the
appear; emerge
existence of one feature (say, spouse's name) depends on the value of
for example
another (married or single).

After You Read

Understanding the Text

True, False, or Impossible to know. Read the statements below and write T (true), F(false), or I (impossible).

..... 1. It can be concluded from the text that with machine learning as with any other software system, understanding what the inputs and outputs are is extremely important.

..... 2. The input takes the form of concepts, instances, and attributes.

..... 3. The concept description and the concept are two types of learning.

.....4. To get good results from the learning process, you should have an understanding of the idea of a concept.

…….. 5.Classification is also called "supervised" since it gives an objective measure on test data.

B. The reading presents four basic learning methods in data mining applications. Complete the following chart with the methods and their functions.

Method of learning	Function
1. classification learning 2. 3. 4.	1. learning scheme is classified into examples.

C. Answer the following questions.

1. How do association rules differ from classification rules?
2. How is an instance characterized?
3. what would the problem be with an instance characterized with a set of fixed attributes?

Translation

Translate the passage on pages 21-22 and see how the time clauses with 'when' and 'once' are translated into Persian.