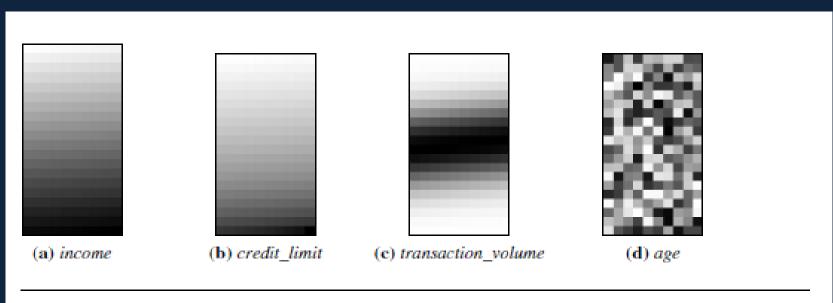# Module No : 02

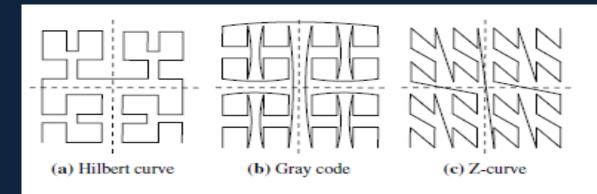## Introduction to data mining

☑ Data Visualization

- Data visualization aims to communicate data clearly and effectively through graphical representation.

- visualization techniques are used to discover data relationships that are otherwise not easily observable by looking at the raw data

- Data visualization techniques are divided into following types
    1. Pixel-Oriented Visualization Techniques
    2. Geometric Projection Visualization Techniques
    3. Icon-Based Visualization Techniques
    4. Hierarchical Visualization Techniques

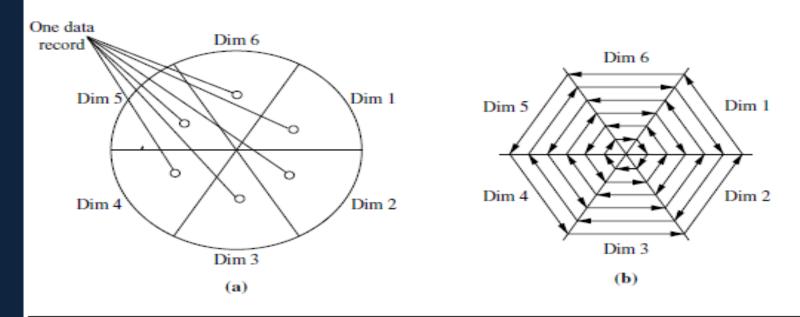## ⊘ Data Visualization: 1. Pixel-Oriented Visualization Techniques

- Using pixelbased visualization, we can easily observe the following: credit limit increases as income increases; customers whose income is in the middle range are more likely to purchase more; there is no clear correlation between income and age.

(a) *income* (b) *credit_limit* (c) *transaction_volume* (d) *age*

Pixel-oriented visualization of four attributes by sorting all customers in *income* ascending order.

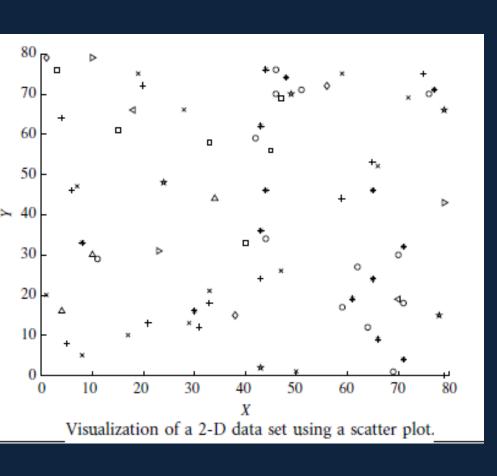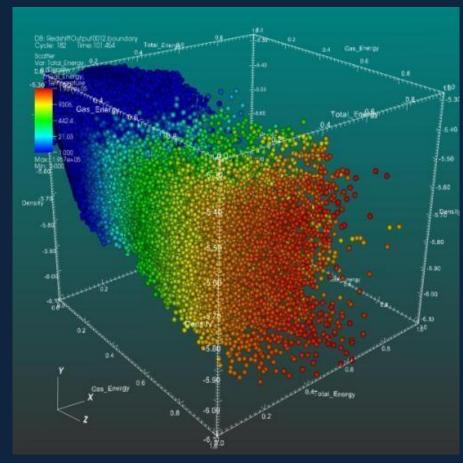**(a)** Hilbert curve **(b)** Gray code **(c)** Z-curve

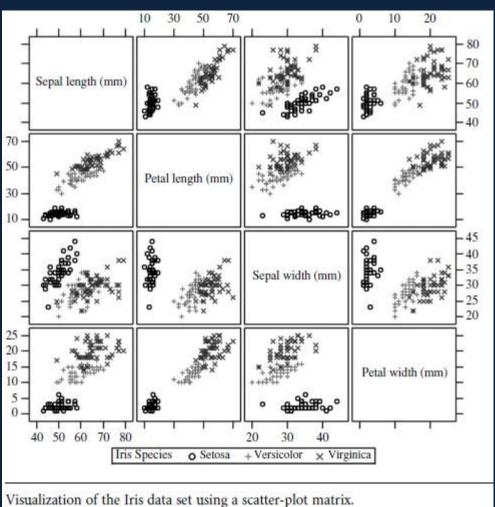Some frequently used 2-D space-filling curves.

(a)

(b)

The circle segment technique. (a) Representing a data record in circle segments. (b) Laying out pixels in circle segments.

4

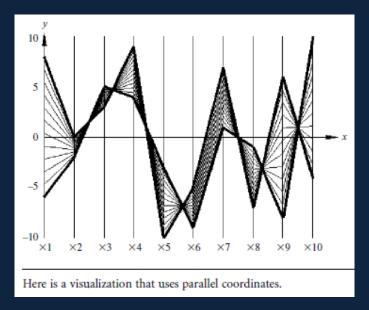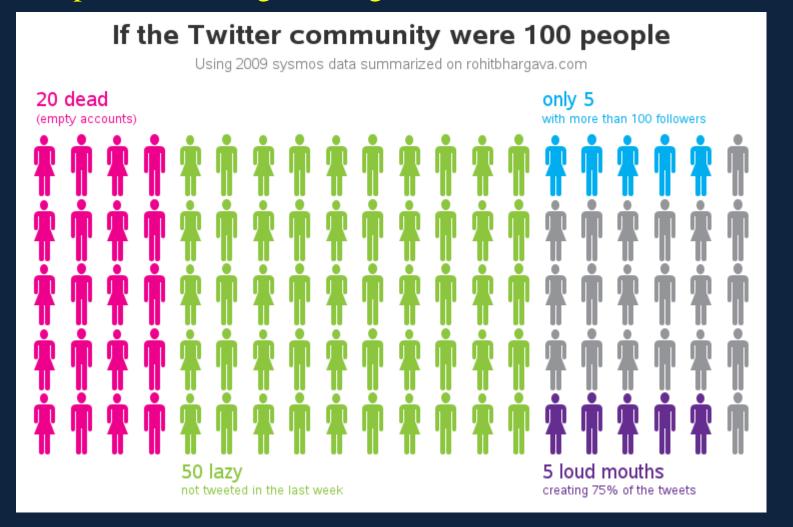# ⊘ **Data Visualization:2.Geometric Projection Visualization Techniques**

Visualization of a 2-D data set using a scatter plot.

Data Visualization:2.Geometric Projection Visualization Techniques

Visualization of the Iris data set using a scatter-plot matrix.

Here is a visualization that uses parallel coordinates.

⊘ **Data Visualization:** 3.Icon-Based Visualization Techniques

data represented using stick figures

If the Twitter community were 100 people

⊘ Data Visualization: 3.Icon-Based Visualization Techniques
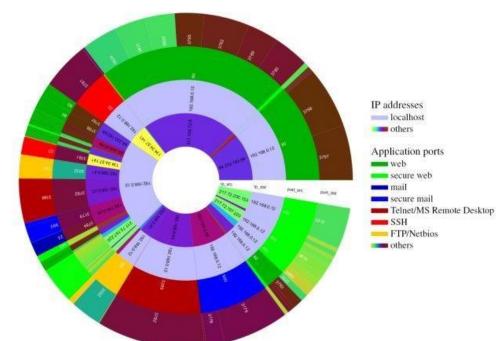
data represented using chernoff faces

Chernoff faces. Each face represents an n-dimensional data point ($n \leq 18$).

⊘ Data Visualization: 4. Hierarchical Visualization Techniques

Tree-maps display and Radial hierarchical visualization

⊘ **Data Visualization: 4.** Hierarchical Visualization Techniques

- Tag cloud Visualization : e.g. to visualize popular wbsite tags

⊘ Data Visualization: 4. Hierarchical Visualization Techniques

Tree-map e.g. to visualize Google news headline stories

Newsmap: Use of tree-maps to visualize Google news headline stories.

⊘ **Data Visualization: 4.** Hierarchical Visualization Techniques

- **Touch graph Visualization**