TRINITY COLLEGE FOR WOMEN
NAMAKKAL
Department of Computer Science

DATA MINING AND WAREHOUSING

22UCA08 -ODD Semester

Presented by

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What is Data Mining

- Data mining is the process of finding anomalies, patterns and correlations within large data sets to predict outcomes.

- Data mining (knowledge discovery from data)
  Extraction of interesting (non-trivial, implicit, previously unknown and potentially useful) patterns or knowledge from huge amount of data.

Alternative names

Knowledge discovery (mining) in databases (KDD), knowledge extraction, data/pattern analysis, data archeology, data dredging, information harvesting, business intelligence, etc.

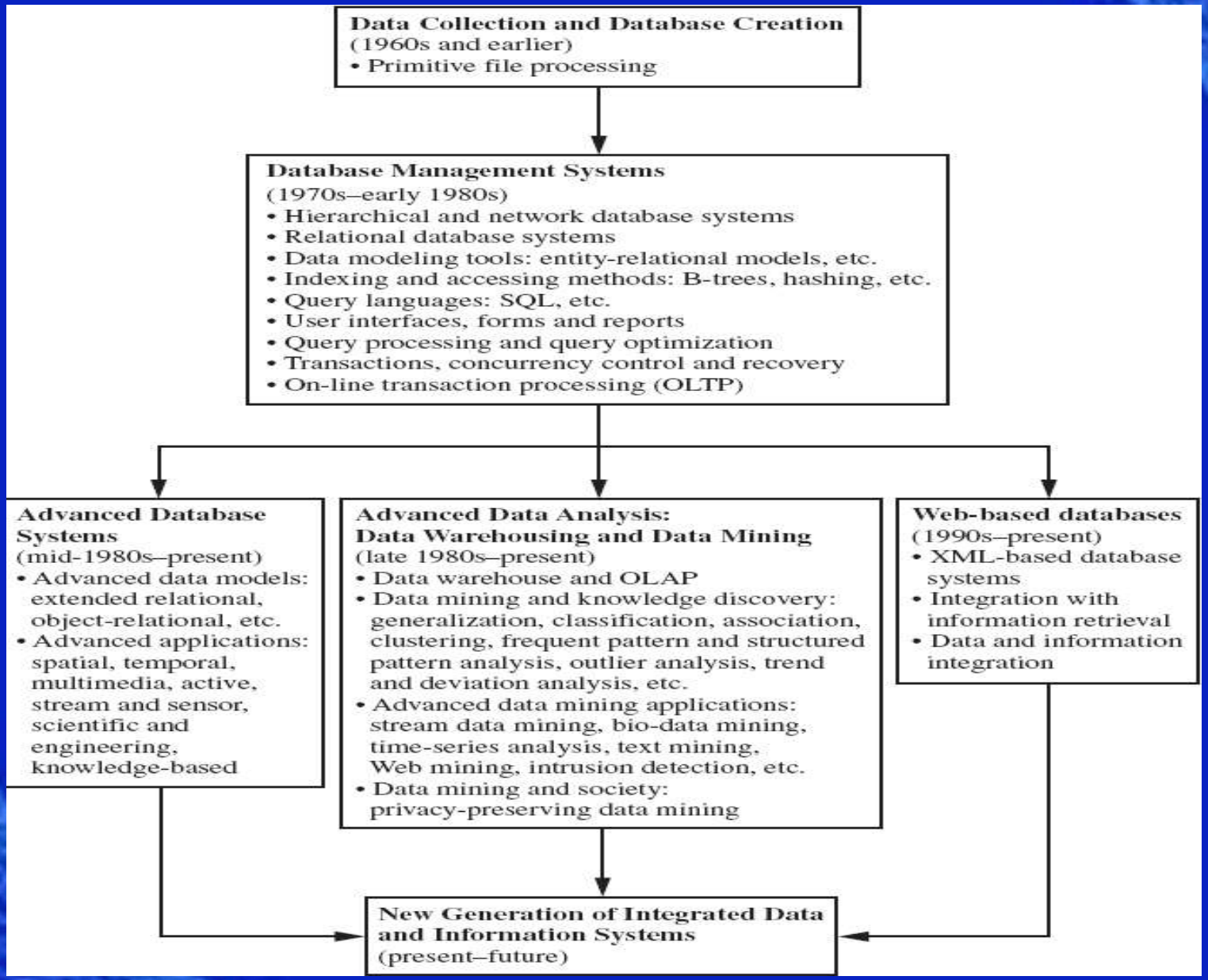
Why Data Mining?

- The Explosive Growth of Data: from terabytes(1000^4) to yottabytes(1000^8)
  - Data collection and data availability
    - Automated data collection tools, database systems, web
  - Major sources of abundant data
    - Business: Web, e-commerce, transactions, stocks, …
    - Science: bioinformatics, scientific simulation, medical research …
    - Society and everyone: news, digital cameras, …
- Data rich but information poor!
  - What does those data mean?
  - How to analyze data?
- Data mining — Automated analysis of massive data sets

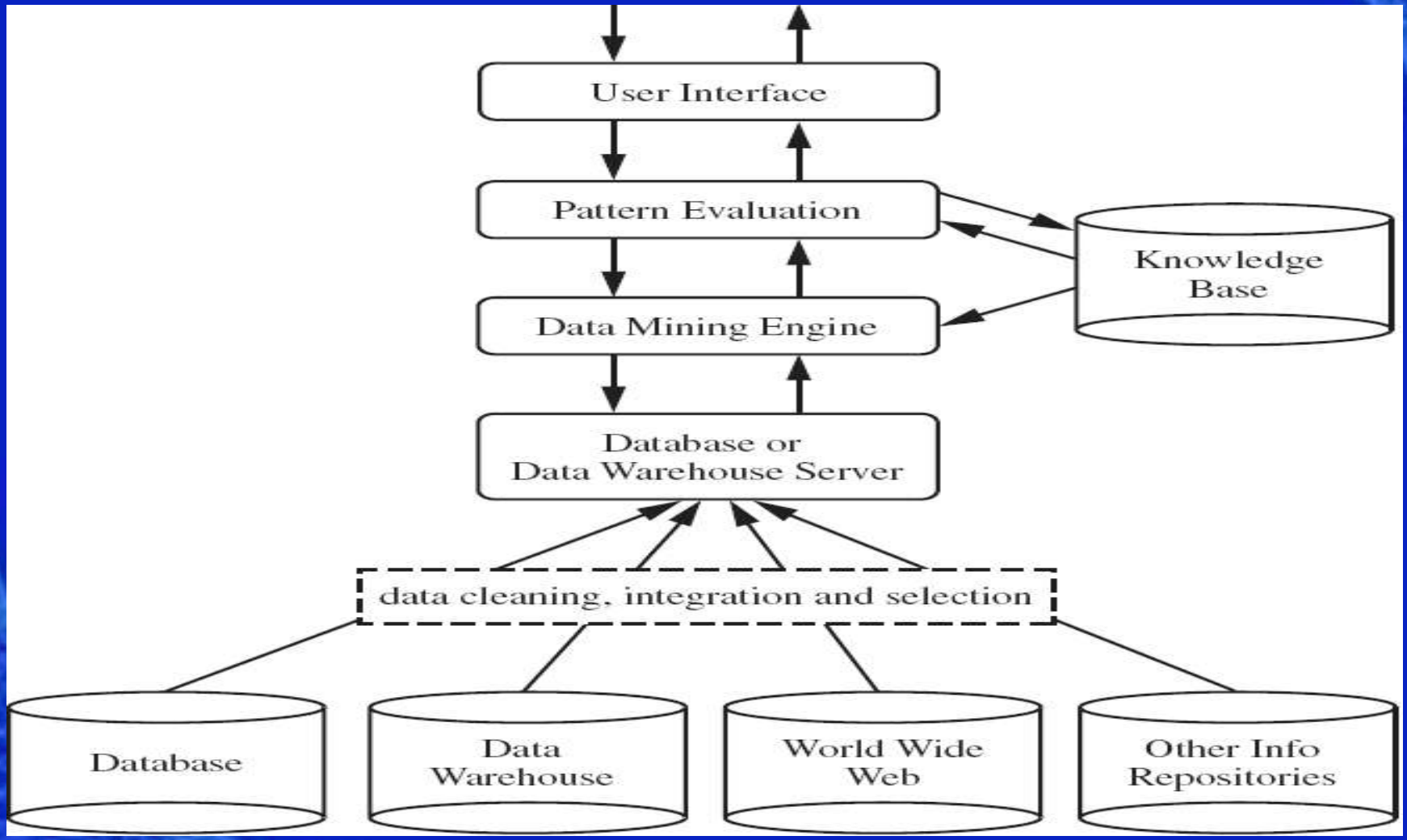
Potential Applications

- Data analysis and decision support
  - Market analysis and management
    - Target marketing, customer relationship management (CRM), market basket analysis, cross selling, market segmentation
  - Risk analysis and management
    - Forecasting, customer retention, improved underwriting, quality control, competitive analysis
  - Fraud detection and detection of unusual patterns (outliers)
- Other Applications
  - Text mining (news group, email, documents) and Web mining
  - Stream data mining
  - Bioinformatics and bio-data analysis

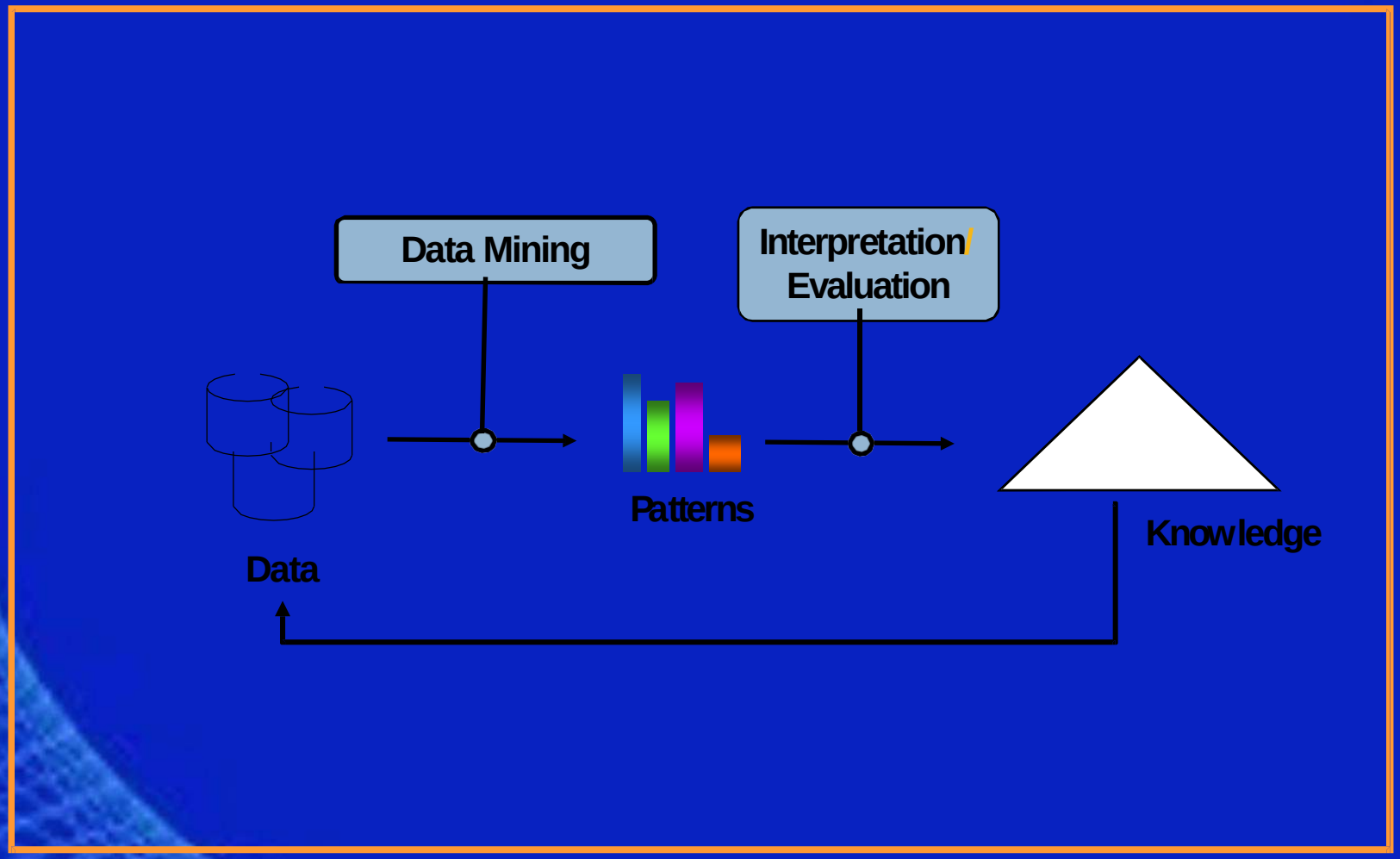
Evolution of Database Technology



A typical DM System Architecture



Knowledge Discovery in Data: Process



Knowledge Discovery in Data: Challenges

Data

Volume

- Big Data
- Small Data

Velocity

- Data Stream
- Static

Variety

- Transaction
- Temporal
- Spatial
- …

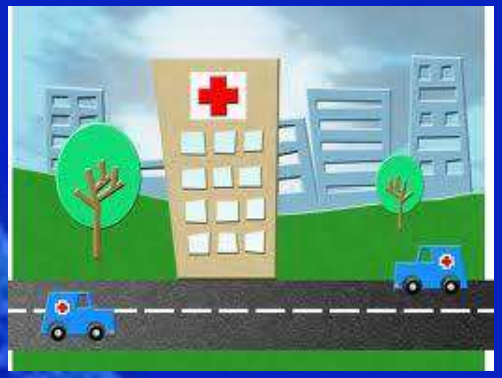
Data Come from Everywhere

Grocery Markets

E-Commerce

Stock Exchange

But, they have different form



Hospital

Weather Station

Social Media

What is Data?

- Collection of records and their attributes
- An attribute is a characteristic of an object
- A collection of attributes describe an object

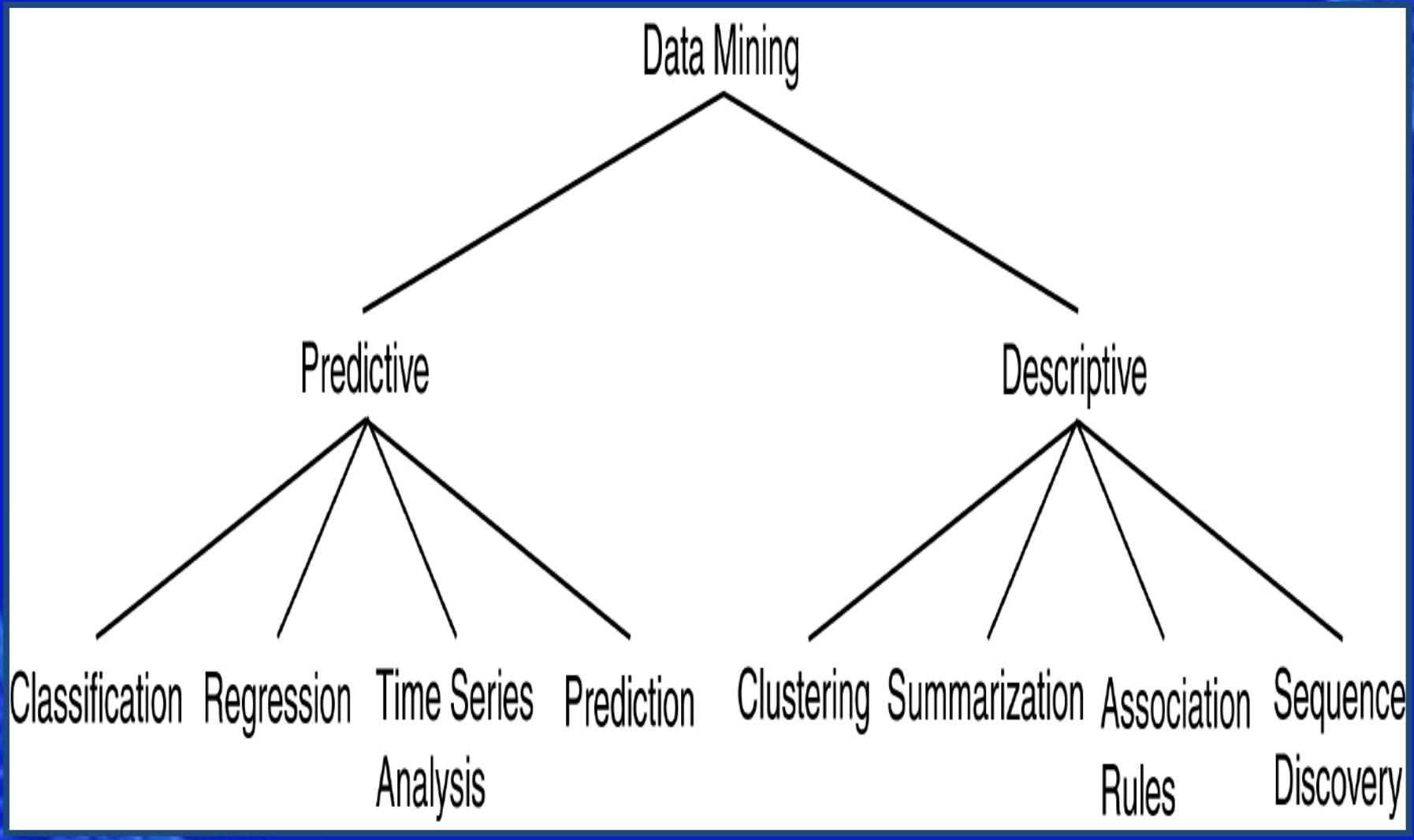
Objects

Tid	Refund	Marital Status	Taxable Income	Cheat
1	Yes	Single	125K	No
2	No	Married	100K	No
3	No	Single	70K	No
4	Yes	Married	120K	No
5	No	Divorced	95K	Yes
6	No	Married	60K	No
7	Yes	Divorced	220K	No
8	No	Single	85K	Yes
9	No	Married	75K	No
10	No	Single	90K	Yes

Typesof Data

- Record Data
  - Transactional Data
- Temporal Data
  - Time Series Data
  - Sequence Data
- Spatial & Spatial-Temporal Data
  - Spatial Data
  - Spatial-Temporal Data
- Graph Data
  - Transactional Data
- UnStructured Data
  - Twitter Status Message
  - Review, news article
- Semi-Structured Data
  - Paper Publications Data
  - XML format

Data Mining Models and Tasks

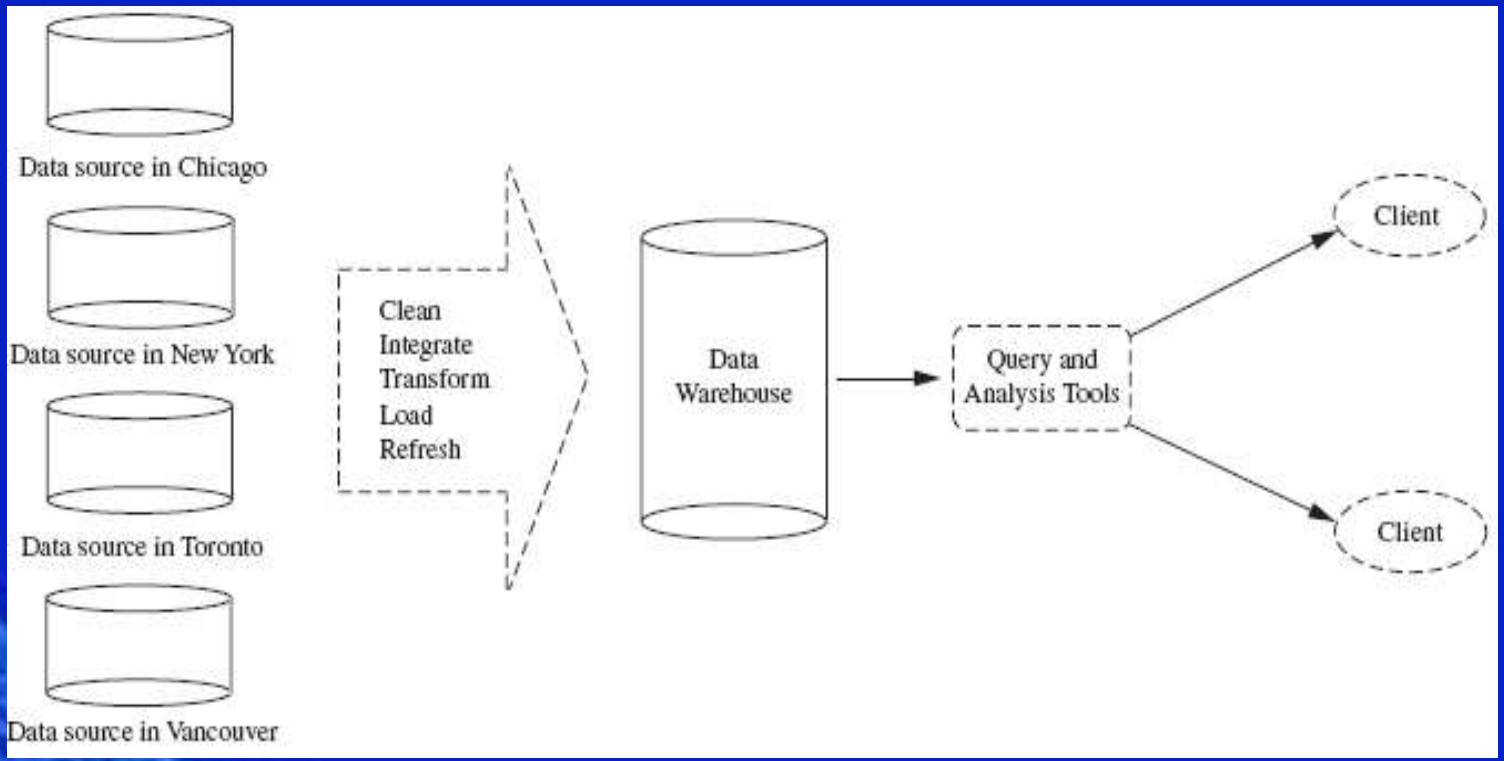


Decisions in Data Mining

- **Databases to be mined**
  - Relational, transactional, object-oriented, object-relational, active, spatial, time-series, text, multi-media, heterogeneous, legacy, WWW, etc.
- **Knowledge to be mined**
  - Characterization, discrimination, association, classification, clustering, trend, deviation and outlier analysis, etc.
  - Multiple/integrated functions and mining at multiple levels
- **Techniques utilized**
  - Database-oriented, data warehouse (OLAP), machine learning, statistics, visualization, neural network, etc.
- **Applications adapted**
  - Retail, telecommunication, banking, fraud analysis, DNA mining, stock market analysis, Web mining, Weblog analysis, etc.

Data Warehouses

- A repository of information collected from multiple sources, stored under a unified schema, and that usually resides at a single site.
- Constructed via a process of data cleaning, data integration, data transformation, data loading and periodic data refreshing.



THANK YOU

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