

DATA MINING APPLICATION IN REAL WORLD DATA

Why Data Mining?

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
- DNA and bio-data analysis

Source: Clifton, C. 2006. *Data Mining*. Purdue University

Market Analysis and Management

- Where does the data come from?
 - Credit card transactions, loyalty cards, discount coupons, customer complaint calls, plus (public) lifestyle studies
- Target marketing
 - Find clusters of “model” customers who share the same characteristics: interest, income level, spending habits, etc.
 - Determine customer purchasing patterns over time
- Cross-market analysis
 - Associations/co-relations between product sales, & prediction based on such association
- Customer profiling
 - What types of customers buy what products (clustering or classification)
- Customer requirement analysis
 - identifying the best products for different customers
 - predict what factors will attract new customers
- Provision of summary information
 - multidimensional summary reports
 - statistical summary information (data central tendency and variation)

Source: Clifton, C. 2006. *Data Mining*. Purdue University

Corporate Analysis & Risk Management

- Finance planning and asset evaluation
 - cash flow analysis and prediction
 - contingent claim analysis to evaluate assets
 - cross-sectional and time series analysis (financial-ratio, trend analysis, etc.)
- Resource planning
 - summarize and compare the resources and spending
- Competition
 - monitor competitors and market directions
 - group customers into classes and a class-based pricing procedure
 - set pricing strategy in a highly competitive market

Source: Clifton, C. 2006. *Data Mining*. Purdue University

Fraud Detection & Mining Unusual Patterns

- ❖ Approaches: Clustering & model construction for frauds, outlier analysis
- ❖ Applications: Health care, retail, credit card service, telecomm.
 - Auto insurance: ring of collisions
 - Money laundering: suspicious monetary transactions
 - Medical insurance
 - ✓ Professional patients, ring of doctors, and ring of references
 - ✓ Unnecessary or correlated screening tests
 - Telecommunications: phone-call fraud
 - ✓ Phone call model: destination of the call, duration, time of day or week. Analyze patterns that deviate from an expected norm
 - Retail industry
 - ✓ Analysts estimate that 38% of retail shrink is due to dishonest employees
 - Anti-terrorism

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Other Applications

- Sports
 - IBM Advanced Scout analyzed NBA game statistics (shots blocked, assists, and fouls) to gain competitive advantage for New York Knicks and Miami Heat
- Astronomy
 - JPL and the Palomar Observatory discovered 22 quasars with the help of data mining
- Internet Web Surf-Aid
 - IBM Surf-Aid applies data mining algorithms to Web access logs for market-related pages to discover customer preference and behavior pages, analyzing effectiveness of Web marketing, improving Web site organization, etc.

Source: Clifton, C. 2006. *Data Mining*. Purdue University

APPLICATIONS OF DATA MINING





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