Business Intelligence and Data Mining

Course Objectives

This course provides a comprehensive introduction to Business Intelligence (BI) and Data Mining (DM) problems and tools to enhance managerial decision making at all levels of the organization and across business units. We discuss scenarios from a variety of business disciplines, including the use of data mining to support customer relationship management (CRM) decisions, decisions in select industries.

Syllabus

Overview and concepts Data Warehousing (DW) and Business Intelligence (BI), The Architecture of BI and Introduction to data mining (DM), Concept Description and Association Rule Mining, Classification and Prediction and Web mining and Data Mining for Business Intelligence Applications.

Expected Outcomes

Upon completion of this course, the students will be able to:

1. Use a variety of BI systems and technologies to support decision making in modern organizations

2. Explain key concepts, techniques, and current practices related to business intelligence, data warehousing, and data mining,

3. Apply the concepts and techniques to solving real-world BI problems,

4. Appreciate the value of BI systems and technologies to modern organizations, and

5. Understand the societal impacts and ethical dimensions of BI systems and technologies.

References

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12. Yudho Giri Sucahyo, Introduction to Data Mining and Business Intelligence, http://ocw.ui.ac.id/materials/12.01_FASILKOM/IKI83403T_-_Data_Mining_and_Business_Intelligence/Lect1_-_Intro_to_DMBI.pdf

COURSE PLAN

1 Overview and concepts Data Warehousing (DW) and Business Intelligence (BI) Analyzing data, Raw data to valuable information-Lifecycle of Data - What is Business Intelligence - BI and DW in today's perspective - What is data warehousing - The building Blocks: Defining Features - Data warehouses and data marts, Virtual Warehouses - Overview of the components - Metadata in the data warehouse - Need for data warehousing - Basic elements of data warehousing, Architectures, OLAP and OLAP Servers – recent trends in data warehousing, Dynamic Warehousing.

2 The Architecture of BI and Introduction to data mining (DM) BI and DW architectures and its types - Relation between BI and Data Mining.

Motivation for Data Mining - Data Mining-Definition and Functionalities – Classification of DM Systems – DM task primitives - Integration of a Data Mining system with a Database or a Data Warehouse - Issues in DM – KDD Process- Various Models and their significance.

First Internal Examination

3 Concept Description and Association Rule Mining

Concept description - Data Generalization and summarization-based characterization - Attribute relevance - class comparisons Association Rule Mining: Market basket analysis - basic concepts - Finding frequent item sets: Apriori algorithm - generating rules – Improved Apriori algorithms, FP Growth Algorithm – Incremental ARM – Associative Classification – Rule Mining, ARCS.

4 Classification and Prediction

Issues regarding Classification and prediction; Various Classifiers and Classification methods - Decision tree, Bayesian Classification, Rule Based Classifiers, CART, Neural Network, Nearest Neighbour, Case Based Reasoning, Rough Set Approach. The role of Genetic Algorithm and fuzzy logic; Prediction methods - Linear and non linear regression, Logistic Regression.

Second Internal Examination

5 Web mining and Data Mining for Business Intelligence Applications

Web Mining - Web mining introduction, Web Content Mining, Web Structure Mining, Web Usage mining, Automatic Classification of web Documents.

Data Mining for Business Intelligence Applications - Data mining for business Applications like Balanced Scorecard, Fraud Detection, Clickstream Mining, Market Segmentation, retail industry, telecommunications industry, banking & finance and CRM

Final Examination