



Multidimensional Databases

Overview



Course Information

- CSCI599- Multidimensional Databases
- Lecture Hours: Thursday 3:30-6:20pm
- Location: THH 116
- URL: <http://infolab.usc.edu/csci599/Fall2002/>



Instructor

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- Office Hours: Mon, Thu (1:30-2:30pm)



Course prerequisite:

CSCI585 or CSCI-599 (Spatial and Temporal Database)

Grading:

- Each student should present one (or more) paper and complete one implementation project related to the multidimensional databases.
- Presentation: 50%
- Project: 50 % (Suggested Projects)



Course Summary

- During the past decade, the multidimensional data model emerged for use when the objective is to analyze data rather than to perform online transactions.
- In contrast to previous technologies, these databases view data as multidimensional cubes that are particularly well suited for data analysis.
- Multidimensional data models have three important application areas within data analysis:
 - Data warehouses are large repositories that integrate data from several sources in an enterprise for analysis.
 - Online analytical processing (OLAP) systems provide fast answers for queries that aggregate large amounts of detail data to find overall trends.
 - Data mining applications seek to discover knowledge by searching semi-automatically for previously unknown patterns and relationships in multidimensional databases.

Reading List

We divide the topics of this seminar into seven parts:

- **Introduction**
- **OLAP**
- **Approximation**
- **Index Structures**
- **Space Transformation**
- **Dimension Reduction**
- **Multidimensional Data Mining.**



AIMS: An Immersidata Management System

With Immersive Environments, a user is immersed into an augmented or virtual reality environment in order to interact with people, objects, places, and databases. In order to facilitate a natural interaction (beyond keyboard and mouse), the users in typical immersive environments are traced and monitored through various sensory devices such as: tracking devices on their heads, hands, and legs, video cameras and haptic devices. We call this data type, *immersidata*, which is defined as the data acquired from a user's interactions with an immersive environment. Immersidata can be treated as multidimensional form of data.

Management of immersidata is challenging

- ❖ Multidimensional
- ❖ Spatio-Temporal
- ❖ Continuous Data Streams (CDS)
- ❖ Potentially large in size and bandwidth requirements
- ❖ Noisy

AIMS Subsystems

- ❖ **Basic Database Functionality for Immersidata**
Mehrdad Jahangiri (jahangir@usc.edu)
- ❖ **Immersidata Acquisition, Analysis, and Query**
Kiyoung Yang (kiyoungy@usc.edu)
- ❖ **Immersidata Modeling towards Data Mining**
Mehdi Sharifzadeh (sharifza@usc.edu)
- ❖ **Customized Querying and Rendering for Immersidata**
Yi-Shin Chen (yishinc@usc.edu)