MAT259 DATA VISUALIZATION COURSE Experimental Visualization Lab, Media Arts & Technology Offered online in Winter 2021

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This is an applied, hands-on, software programming class which explores the translation of **multidimensional numerical data into an interactive, 3D visualization**

Course prioritizes <u>data analytic techniques</u> for knowledge discovery and pattern recognition - <u>frequency mapping</u> - exploration of <u>algorithms for data clustering</u> - <u>visualizing data</u> - resulting in 3D interactive visualization projects in java-based Processing. The goal is to gain experience in the fundamentals of visual language to represent data

There are 3 projects to be realized during the 10 week winter course:

Project 1: Data Analytics, Knowledge Discovery, Content Analysis with MySQL *Goals*: Discover unexpected patterns, anomalies, etc. in a large multivariate dataset

Data Source: 97 million/15-year multi-dimensional datasets of library circulation

Project 2: 3D Interactive Visualization, Frequency Data Mapping - Visual Language Basics *Goals*: Acquire visual language basics, visualize data in java-based Processing and p5, design in 3D-interactive space/time, implement associative rule-mining and other algorithms

Data Source: 97 million/15-year multi-dimensional datasets of library circulation

Project 3: Student Defined Project

Goals: Student defines a project with their own data source, a project that builds on skills acquired through the two previous assignments

Data Source: Each student selects their own datasets

Knowledge acquired through the course:

- 1) Learn to explore and retrieve significant data from a dataset with MySQL
- 2) Develop skills in the fundamentals of visual language expressed through programming
- 3) Visualize abstract data to reveal patterns and relationships, or to explore visualization
- 4) Normalize data to enhance legibility and coherence
- 5) Implement interactivity within 3D volumetric visualization
- 6) Correlate various data sources through JSON and APIs

Links:

Prerequisite: Basic to medium computer programming experience

Previous Syllabus <u>http://www.mat.ucsb.edu/~g.legrady/academic/courses/19w259/19w259.html</u> Previous student projects <u>http://vislab.mat.ucsb.edu</u>