CIS 4930/6930 – Special Topics in Visualization – Spring 08

Instructor: Alireza Entezari (entezari@cise.ufl.edu) E434

Description of Topics

Visualization deals with all aspects that are connected with the visual representation of data sets from scientific experiments, simulations, medical scanners, databases and the like in order to achieve a deeper understanding or a simpler representation of complex phenomena. To obtain this goal, both well-known techniques from the field of interactive computer graphics and completely new methods are applied. The objective of the course is to provide knowledge about visualization algorithms and data structures as well as acquaintance with practical applications of visualization. Through several projects the student is expected to learn methods to explore and visualize different kinds of data sets.

Outline of Topics

- Introduction, historical remarks, visualization pipeline
- Data acquisition and representation (sampling and reconstruction; grids and data structures)
- Human visual perception
- Basic mapping concepts
- Visualization of scalar fields (isosurface extraction, volume rendering)
- Visualization of vector fields (particle tracing, texture-based methods, vector field topology)
- Tensor fields, multi-attribute data, multi-field visualization
- Information visualization

Prerequisites

Basic graphics knowledge is recommended (such as CAP4730). Advanced graphics knowledge would be even better. Some basic algebra/numerical concepts are necessary. Signal Processing background is helpful as well.