

Soft Computing

Fall, 2007

Prerequisites: Experience in programming or permission by instructor.**Instructor:** Chien-Chung Chan**Office:** A680 Tel: (03)341-2500 ext. 6258e-mail: chan@knu.edu.tw

Home Page:

Office Hours: R: 1:00 - 3:00 p.m., F: 3:00 - 6:00 p.m. or by appointment**Textbook:**

Reprints of journal articles, conference proceedings and online resources.

References:

Mitchell, Tom M. (1997), Machine Learning. The McGraw-Hill Companies, Inc., New York, ISBN: 0-07-042807-7.

Gen, Mitsuo (2007), Evolutionary Technique and Applications. Presentation PDF files of short course offered at Kainan University, September 10 – 16, 2007.

Breiman, L., Friedman, J.H., Olshen, R.A. and Stone, P.J. (1984). Classification and Regression Trees. Belmont, CA: Wadsworth International Group.

Quinlan, J.R. (1993), C4.5: Programs for Machine Learning. San Mateo, CA: Morgan Kaufmann.

Witten, Ian H. and Eibe Frank (2000). Data Mining: Practical Machine Learning Tools and Techniques with Java Implementations. Morgan Kaufman Publishers, San Francisco, ISBN: 1-55860-552-5.

Course Objectives:

Soft computing is the study of theories and mechanisms for computing approximations and for making decisions and reasoning with uncertain and incomplete information.

In this course, we will study some well-known theories such as rough sets, fuzzy sets, and Bayesian belief functions.

We will study popular machine learning algorithms for learning rules and decision trees. Genetic algorithms for learning.

Finally, we would like to develop projects by combining genetic and rough set approaches to learning. The projects will be implemented using Open Source C++ GA library.

Project Assignments: There will be team programming projects. Programs will be developed and run on PC or Linux workstations.



Penalty for late project submissions is 10% per day contingency on the availability of the system.

Project Presentations and Reports: Each team will present the stages of their project including formulation, design, development, and testing.

Each presentation will be 20 minutes. The final presentation will start in the last week of the semester including the final exam day.

Midterm Exam: there will be one mid-term exam. Scope and date of mid-term exam will be announced one week in advance.

Grades: the following is the weights for computing final grades.

Exam: 30 % Presentation report: 30% Programs: 40 %

All work turned in for a grade is to be exclusively the work of the student whose name appears on the work. Any questions involving plagiarism will be handled as violations of the student honor code.

Course Topics

- Rough Set Theory
- C++ Library for Genetic Algorithms (GALib)
- Bayesian Belief Functions
- Flow Graphs
- Fuzzy Set Theory
- Machine Learning Systems
- Genetic Algorithms
- Learning Decision Trees
- Learning Rules From Examples
- GA + Rough Set Approach to Learning
- Fuzzy Rule-Based systems

