Final Project for GIIE Course: 546U4030

SOFT COMPUTING METHODS AND APPLICATIONS

Report Due and Presentation Date: Jan. 18, 2021 (Mon.) **1:30 pm**

Soft Computing Application Project (2020)

Find an interesting application of soft computing techniques from the literature, go over the published paper (published not earlier than 2010), and repeat the implementation of the presented work. You are not allowed to select the topics that had been conducted by the previous students who took this course before. The forbidden topics are embedded in the reports of the previous work, which can be accessed from this site:

https://www.space.ntu.edu.tw/navigate/s/2536457BA5E94EB3BADED8C4098F02BCQQY

https://www.space.ntu.edu.tw/navigate/s/62A8071C899B4329B27D10ADE339EB20QQY

You need to double check whether your topic had been done in the previous work.

Soft computing techniques include fuzzy inference systems, meta heuristic algorithms for optimization problems, and neural network modeling techniques for data mining and AI applications. For examples, you may (1) explore and implement other meta heuristic algorithms that are not covered or implemented in the course, (2) apply learned methods to solve complex research problems; e.g., optimization problems of job scheduling, mechanical design, part assembly, …, (3) apply meta heuristic algorithm to build expert systems, such as GA-MusicComposer, GA-grader, GA-xx expert systems, (4) hybrid soft computing techniques to create intelligent systems for various purposes; or (5) invent your own soft computing techniques; e.g., intelligent systems, algorithms, neural networks with different training methods, etc.

You are encouraged to read related literature first to get familiar with the targeted problem and techniques presented before implementing your system. You should study the key reference paper (published not earlier than 2010) thoroughly to make sure you are fully confident with the system implementation. Then design the data structures required for the system by examining the presented mathematical model. Refer to the implementations of your previous assignments for constructing the desired system.

A 7-minute presentation will be scheduled for your project presentation and system demonstration. You are also asked to record a video clip to demonstrate the functionalities and execution of your system in solving the target problem or creating the intelligent systems. Submit the key reference paper in hard copy, which should have your commentary marked on it. In addition, submit a final project report in hard copy at the project presentation site.

Conduct your final project according to the following guidelines:

System Development:

Analyze system requirement before implementing your system, to figure out the required data structured and user interfaces. Try to exercise object-oriented programming techniques to implement the system. The presented soft computing system should have basic yet friendly user interfaces for problem specification and execution parameter setting. Providing visualization for the solution to the problem is strongly encouraged.

Final Report:

Project report should consist of the following sections and materials:

Section 1: Introduction → Objectives, Methodologies, Scope.

Section 2: Methods and Problems → Explains the methods used and the problems to be solved in details.

Section 3: Requirements and Functionality Implementation of the System → Present the data structures, algorithms, interface design, and functionalities of the software system that implements the method for the problems discussed.

Section 4: Numerical or Example Tests → Show the testing results of the benchmark or sample problems and compare the results between different methods if they are available.

Section 5: Conclusion and Discussion→ Discuss the method and the numerical results and make conclusive remarks.

System Presentation and Demonstration:

Project presentation will be held in **2021/01/18 (Mon.) 1:30-pm**, with a 7 min. presentation for each student. Prepare at most 10 slides to show the problem discussed in the referenced literature, your system design, and your implementation. You will have at most 5 min. to present your materials and 2 min. to demonstrate your system. Project grading includes paper reviews, system design, software programming, application functionalities, oral presentation, and the formal final report.

Material Submission:

Hard copies:

1. Key reference paper marked with your commentary notes.
2. Final report in hard copy, following the described format.

Soft copies:

1. Use PowerPoint 插入/螢幕錄製 command to make a demonstration video clip, introducing your system and run a few problems. The length should not exceed 10 min. Save the clip as an individual mp4 file submit it with your source code to the course web site.
2. Archive your report (if doc file is available), presentation slides (ppt), video clip (mp4), and all source code of your system into a compressed folder, named after your student IDs and name. Submit this archived file before due date.