CSCI/ENGR-8940: Computational Intelligence
(Some Programming Required)

Description (GA/SA Portion: Heuristic Search)
Genetic Algorithms are heuristic search routines that are guided by a model of Darwin’s theory of natural selection or the survival of the fittest. The basic idea behind the genetic search strategy is to generate solutions that converge on the global maximum (i.e., the best solution in the search space) regardless of the "terrain" of the search space. The basic operations involved in a genetic algorithm are: 1) mate selection, 2) crossover, and 3) mutation. Typically, the major data structure is a binary string representing the possible solutions.

Simulated Annealing on the other hand is a heuristic search technique based on a model of the annealing process in metalwork. More specifically, the analogy is with thermodynamics and how metals cool and anneal. Slow cooling causes the atoms to reach a low energy state (all lined up so to speak). This results in a less brittle final product; an important feature to folks going off to fight in the Crusades back in the 1100’s.

Instructor: Don Potter (Professor Ron McClendon will handle the neural networks portion of the class)
Office: GSRC-113 (enter through 111)
Phone: 542-0361
Hours: By Appointment, Drop In, or ________________
Notes: If you stop by or call and I’m NOT available, then be sure to leave a note (I’ll be glad to call you back).

Text
Computational Intelligence - Concepts to Implementations by Eberhart & Shi

References (typical GA related texts):
1) Introduction to Genetic Algorithms
   by Melanie Mitchell
2) Handbook of Genetic Algorithms
   by Davis
3) Genetic Algorithms + Data Structures = Evolution Programs (3rd, revised and extended edition)
   by Zbigniew Michalewicz
4) Genetic Algorithms in Search, Optimization, and Machine Learning
   by Goldberg

Current literature and other items. Start by reading the tutorials on the web page and Robert Smith’s GA introduction paper. There should be a loaner copy on the loaner shelf. Of course, don't keep the loaner copy, go to the library and make your own copy.

Grading (GA/SA Portion)

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<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>55%</td>
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<tr>
<td>Midterm Exam</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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(All grades are based on reports, projects, and presentations)

Policies

Each student is expected to do his/her own work. Any evidence of academic dishonesty will not be tolerated, and will be subject to disciplinary action. Be sure you are familiar with the University's academic honesty policy as well as the CS departmental policy (attached).

NOTE: The course syllabus provides a general plan for the course; deviations may be necessary.
The Computer Science Department recognizes honesty and integrity as necessary to the academic function of the University. Therefore all students are reminded that the CS faculty requires compliance with the conduct regulations found in the University of Georgia Student Handbook. Academic honesty means that any work you submit is your own work.

Common forms of academic dishonesty against which students should guard are:

1. Copying from another student's test paper or laboratory report, or allowing another student to copy from you;
2. Fabricating data (computer, statistical) for an assignment;
3. Helping another student to write a laboratory report or computer software code that the student will present as his own work, or accepting such help and presenting the work as your own;
4. Turning in material from a public source such as a book or the Internet as your own work.

Three steps to help prevent academic dishonesty are:

1. Familiarize yourself with the regulations.
2. If you have any doubt about what constitutes academic dishonesty, ask your instructor or a staff member at the Office of Judicial Programs.
3. Refuse to assist students who want to cheat.

All faculty, staff and students are encouraged to report all suspected cases of academic dishonesty. All cases of suspected academic dishonesty (cheating) will be referred to the Office of Judicial Programs. Penalties imposed by the Office of Judicial Programs may include a failing grade in the course and a notation on the student’s transcript. Repeated violations are punishable by expulsion from the University. For further information please refer to the UGA Code of Conduct, available at the URL below.

http://www.uga.edu/deanofstudents/judicial/downloads/conduct0304.doc