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Assignment 2
Constraint Satisfaction For Decision Making (CE884-7-SP), 2011-12
Set by Edward Tsang, University of Essex

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1.   Introduction:

This is an assignment on problem solving. This assignment accounts for 10% of your total marks in this course. This assignment should be submitted electronically. The deadline of this assignment is ***11:59:59, Friday 23 March 2011***.

2.   Objective:

The objective of this assignment is to test your ability to solve a constrained optimization problem using stochastic search methods.

3.   The Constrained Portfolio Optimization Problem

Your job is to pick exactly 10 stocks from FTSE 350 (which comprises 350 stocks) to invest in. You must invest 10% of your capital in each of the stocks that you pick. Your objective is to maximize your performance according to a performance function that you are given. This function will return a value for any portfolio that you input to it. You should make no assumption of how this function computes the performance. You have to satisfy the following constraints: Each stock belongs to a sector. You are not allowed to invest more than 20% of your investment in any single sector.

4.   Your task:

(a) Design a hill-climbing algorithm for solving this problem.

(b) Evaluate the efficiency and effectiveness of the algorithm that you have designed. For example, does it have a good chance of finding good solutions?

(c) Propose a set of features for Guided Local Search to sit on your hill-climbing algorithm.

(d) Optional: implement your hill-climbing algorithm. If you decide to program, you may use Prolog, Lisp, C, C++, Java, C-Sharp, Basics or Matlab for implementation. Your program must run in at least one of our labs.

5.   Submission requirements:

Please submit electronically:

a)   A report of strictly no more than 1,000 words addressing the above points;
b)   Any programs that you may have constructed to illustrate your algorithm.

Write your name clearly on the first page of your report. Underline your surname.

6.   Assessment criteria for this assignment:

Clarity is essential for a pass mark (which is 50%). You must explain clearly how you represent solutions. You must describe your neighbourhood function and heuristic (if you propose any) clearly. Correctness is necessary (but not sufficient) for a distinction mark (which is 70%). Sound assessment of the algorithm's efficiency and effectiveness contributes to the award of distinction marks.

7.   Notes:

- Please be aware that the module supervisor may ask students for an interview to explain their submitted work.
- Please refer to the Student's handbook on the School's Policy on Plagiarism and Late Submission