Automatic generation of algorithms for optimization problems & Optimizing nutritional menus for healthy meals

par
Víctor Parada and Lorena Pradenas
Universidad de Santiago de Chile / Universidad de Concepción

Mercredi 21 Septembre 2016 à 14 h 30
LAAS-CNRS - Salle Feynman
Résumé de l'exposé

Automatic generation of algorithms for optimization problems
by Víctor Parada: The design of efficient algorithms for difficult
combinatorial optimization problems is still a challenging field. In fact,
designing an algorithm intended to solve an optimization problem is
also an optimization task in which the performance should be
optimized on a solution space composed by all possible algorithms
that solve such problem. Thus, by means of an appropriate
searching method, the best algorithm for the problem can be
determined, and consequently, the design of an algorithm is a task
that can be tackled by a computer. The search method in this case is
genetic programming that, from an initial set of potential components
of an algorithm, allows the evolution of new algorithms by gradually
assembling the components in a tree of instructions. In this talk a
procedure to automatically produce new algorithms for optimization
problems is described and algorithms generated in this way for the
binary knapsack, and travelling salesman problems are presented.

Optimizing nutritional menus for healthy meals by Lorena
Pradenas: The nutritional menu planning problem (NMPP) consists
of assigning meals to an established structure of mealtime and
dishes. The traditional menu must fulfill several requirements, such
as being inexpensive, meeting nutrient requirements, satisfying the
conditions of the food pyramid, and so on. In this study, a
multi-objective mathematical model for planning traditional menus for
several days is proposed. The objectives of this study are to improve
the minimum cost and adequacy of the menu. The model is tested
with an actual case containing 73 meals. The model is solved by
scaling through the ε-constraint method. The results present a Pareto efficient frontier. The strength of this approach is that the proposed model can be used for different types of patients and users, providing a tool for decision-making in the public health area.