Curriculum Vitæ

1 Personal

Name	María Cristina Riff Rojas
Nationality	Chilean
Current Status	Professor
Professional Adress	Av. España 1680 Valparaíso, Chile Universidad Técnica Federico Santa María Computer Science Department
Web page	comet.informaticae.org
emails	mcriff@inf.utfsm.cl, maria.cristina.riff@gmail.com

2 Education

2014	**Habilitation à Diriger des Recherches - HDR** **Université d'Orsay - Paris Sud** **Paris, France**
1997	Docteur en Sciences mention Informatique et Mathématiques Ecole Nationale de Ponts et Chaussées INRIA Sophia-Antipolis, France.
1987	Ingeniero Civil en Informática Université Técnica Federico Santa María, Valparaíso, Chile.

DECIDE: Decision Making in the Digital Era

Combinatorial Optimisation Problems are found in many artificial intelligence applications and in many domains.

At DECIDE, operations research, machine learning and modern techniques are used concurrently with heuristics methods. Our goal is to develop and to promote methods based on metaheuristics for making decisions, such as Genetic and Evolutionary Algorithms, Simulated Annealing, Tabu Search, Ants Colonies and other hybrid algorithms, and its application for solving satisfaction and optimisation problems with constraints on finite domains. Given the nature of most applications under consideration, the research also covers certain aspects of parallelization. We are interested in solving complex constrained combinatorial problem as: Strip Packing, Time Tabling, Vehicule Routing, Travel Salesman, Motion Planning, Travel Tournament, Cryptography, Animations in Games

Permament Members:

Prof. HDR. Dr-Ing María Cristina Riff (Director)
Dr. Elizabeth Montero
Dr. Nicolás Rojas Morales

Students Member:

Andrés Navarro
Pablo Flores
Kevin Lagos
Felipe Dumont
Javier Maldonado

Designing Dynamic Evolutionary Algorithms: Learning from Calibrating

Research Subject

Recently many researchers are involved in to tackle the combinatorial optimisation problems when the parameter values of the objective function are unknown or partially known. For this, some approaches have been proposed for complete solvers, Wilder et al. (2019), Mandi et al. (2020), Elmachtoub and Grigas (2022). The general idea is to predict the parameter values from data and then solve the optimisation problem. From the evolutionary algorithm point of view when the parameter of the objective function changes, usually means that the evaluation function changes. If the evaluation function changes that could imply in the best case that we can use the evolutionary algorithm as it is, but we could also require to go forward to a new tuning process, or to include new components or to reduce or replace some components, or other design consequences. Because we have experience using Irace and EVOCA we will begin our work using these tuners. In this project we will begin using decision trees to obtain a surrogate model from the data generated by tuning. The use of decision trees for decision-making problems has seen increased attention in practice and recent literature due to their interpretability (Kallus, 2017; Elmachtoub et al., 2017; Ciocan Misic, 2018; Bertsimas et al., 2019; Aghaei et al., 2019; Aouad et al.,2019). Decision trees for decision-making are seen as interpretable since their splits which map features to decisions are easily visualized Elmachtoub et al. (2020). Moreover, we note that decision trees exhibit several desirable properties as estimators. Namely, they are nonparametric, allowing them to capture nonlinear relationships and interaction terms that is suitable in our case for designing dynamic evolutionary algorithm which components and parameters generally have unkown interactions. We will address the following two problems. The first problem is related to the components to provide the algorithm with a mechanism for short-term learning that allows it to effectively and efficiently solve instances of the problem. The second problem concerns the long-term learning by selecting strategies to allow the adaptation of the algorithm in order to be able either to solve new unknown instances or to manage new conditions of the problem. Another crucial aspect to be studied is to define when to stop this adaptation and to conduct a new design. This concerns the boundaries of the algorithm and its ability to still produce quality solutions of changing problems.

About Location: The Federico Santa María Technical University

In spanish: Universidad Técnica Federico Santa María, UTFSM, or simply Santa Maria University)is a Chilean university member of the Rector's Council, founded in 1926 in Valparaíso, Chile.

The university has campuses in Valparaiso, Viña del Mar, Santiago (Vitacura and San Joaquín). The Federico Santa María Technical University is the alma mater of several prominent businessmen, engineers and Chilean scientists. Its students and alumni are known as "Sansanos".

The UTFSM was the first Chilean university to confer a doctorate in engineering in 1962 and the first higher-education institution in Latin America to confer this degree. The UTFSM university radio is the oldest campus radio in Latin America.

The university admission is very competitive and, it is known for its rigorous study requirements, demanding study program. For the years 2011–2016, the UTFSM has an undergraduate retention rate of 82% by the first year of studies, and a 66% by the second year.Less than 1% of its students are international, and most of the available courses are imparted in Spanish.

The graduation date is held on the 20th of December every year, since it commemorates the anniversary of the death of the founder, Federico Santa Maria Carrera, on the 20th of December 1925.