The PhD student will be localized in Bordeaux and will be co-supervised by Olivier Beaumont. We have an associated team in Brazil through which we collaborate with Artur Pessoa and Eduardo Uchoa (Universidade Federal Fluminense) and Marcus Poggi (PUC-Rio). Our Industrial partners are Pascale Bendetti and Marc Porcheron (EDF, R&D Dpt OSI/RIS), and Fabien Rodes (Société Beeo Solutions).

Research themes

Our project brings together complementary expertise in combinatorial optimization : Mixed Integer Programming (Polyhedral, Lagrangian and decomposition approaches, Branch-and-Price-and-Cut Algorithms), Quadratic programming (semi-definite-programming), and Graph Theory (for induced properties and implicit representation of solutions). We develop approximate solutions for large scale problems through mathematical programming based primal heuristics.

International and industrial relations

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Assignment

Recently, several frameworks such as TensorFlow [1] and PyTorch [2] emerged and represent the DL network as a directed graph whose nodes represent convolution operations and edges represent data dependencies between them. The goal of this PhD thesis is to work on how to allocate the convolution operations and how to schedule them to achieve a better efficiency, typically in the context of platforms consisting of heterogeneous resources such as GPUs and multicore nodes.

The goal of this PhD Thesis is to improve the scheduling and resource allocation strategies along several directions. First, the resource allocation algorithm does not take into account the specificities of the application. Indeed, it is for instance close to the default StarPU scheduling algorithm [3] used for general task graphs.

The keys to success

Technical skills and level required: The candidate will be required to have a solid background in Combinatorial Optimization (scheduling, resource allocation, online algorithms) and/or in Deep Learning (TensorFlow, PyTorch) and a taste for both research areas. The PhD student will be localized in Bordeaux and will be co-supervised by Olivier Beaumont.
(RealOpt) and Alexis Joly (Zenith), in close collaboration with Guillaume Charpiat (Tao) and Samuel Thibault (Storm). Several stays (1 week) in Saclay and Montpellier will be scheduled during the PhD Thesis.

Benefits package

- Subsidised catering service
- Partially-reimbursed public transport

Remuneration

1982€ / month (before tax) during the first 2 years, 2085€ / month (before tax) during the third year.