

Final Report: Internship Cenaero

Company introduction:

Cenaero is a Belgium company founded in March 2002 in Gosselies by both industrial and academic stakeholders. It is a research center in Simulation, modeling and optimization. Most of its customers are from the aerospace industry. The company counts more than 70 employees whom 50 highly skilled engineers and PhD's specialized in numerical methods, materials, structures and processes modeling, computational fluid dynamics, physics and applied mathematics. Cenaero is also hosting a High Performance Computing (HPC) center of more than 11 000 processors.

Work as intern:

The internship scheme was a study of correlated responses in a surrogate based framework. Cenaero owns an optimization software called Minamo. This software is composed of 3 main stages. First the design of experiments, second the metamodels construction and last the optimization of the metamodels. Taking into account correlation between responses of the system can have several objectives. For example, it can increase the accuracy of the optimum. Or it can decrease the computational cost of the metamodels construction. A survey of correlated responses into surrogate system has been written. Then one of the most promising method has been implemented inside Minamo software.

Environment:

The main topics related to the internship were machine learning, surrogate model and correlation. A consequent number of articles have been read to write the survey. Then c++ and python programming languages have been used to implement the method into the Minamo software. Most of the employees could speak French. A part of them were from France, another part from Belgium and the last part from all around the world. So the communication between colleagues was mainly in French. However, the articles and the written survey were in English.

Practical tips:

The company is located in Gosselies, right next to Brussels-south airport. Even if it is called Brussels-south airport, it is quite far away from Brussels (+- 50 km). I'll then strongly advise to take an accommodation in Charleroi (the nearest big city) to avoid several hours of public transport every day. In addition, Charleroi is cheaper for accommodation than Brussels. The company is based in an industrial zone where there are not that many places to eat lunch without taking a car. However the company has 2 kitchens which can be used to prepare food at lunch or fridge to store eventual food you will bring.

The dress code of the company is not really strict, we are free to come with a t-shirt but we can not come with a short, has to be a pants.

In term of working hours, the intern and the employee should arrive before 9:30, leave after 16:40 and works around 40 hours a week.

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