Machine learning for performance improvement in the context of complex data

Subject:

The company NEO-FUGU® is implementing innovative technological solutions for the needs of watchmaking, jewelry, and silversmithing workshops. In this framework, NEO-FUGU® aims to understand and reduce uncertainties related to manufacturing times of pieces using Machine Learning techniques. The project, in partnership with the LIMOS laboratory, involves studying a multivariate dataset containing, among other things, drawings, technical documents, CAD data, etc., and building a model to identify events that generate uncertainties. An uncertainty could, for example, correspond to a material defect, such as a porosity in metal (gold, silver, platinum). The final objective is to model the entire production chain, taking these uncertainties into account, in order to provide an estimate of the time required to construct a piece.

In this context, exploring neuro-symbolic approaches to enrich the machine learning process with domain knowledge is an interesting research direction.

Furthermore, questions related to data privacy prevent the construction of a central warehouse to integrate data from autonomous sources and analyze them. Federated learning approaches will need to be studied to enable the construction of collaborative learning models without pooling data from different sources.

Required profile and skills:

- Mathematics applied in computer science, statistics, data mining, machine learning methods
- programming (python)
- autonomy, ability to work in a team, interest in applied domain

Localization:

The thesis is a collaboration between NEO-FUGU® and the LIMOS. It will take place in the enterprise and the laboratory, which are both located in Clermont-Ferrand, France.

Contacts :

LIMOS : Violaine Antoine violaine.antoine@uca.fr et Farouk Toumani farouk.toumani@uca.fr
NEO-FUGU® : Thomas Lamy thomas.lamy@neo-logix.fr