

Master 2 Research internship at G-SCOP Laboratory – 6 months

Applied Artificial Intelligence and Industrial Engineering

Deadline for applications: 5 December 2024

Internship title: Configuration of an information retrieval system for quality management

Key words: Quality management, Information retrieval, Knowledge graph, Ontology, Machine learning, Recommendation system, Large Language Models

Laboratory: G-SCOP.

This internship is in collaboration with the company noet-ia, which is specialised in AI-assisted quality assurance.

Internship supervisors:

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Description du sujet:

In an industrial context where efficient data management is crucial, quality professionals need powerful tools to quickly access relevant information. The optimisation of an information retrieval system in terms of accuracy and speed is essential to improve decision-making processes, reduce the cognitive load on human resources and increase the competitiveness of industrial companies (e.g. Araymond, Radiall, etc.). In a context of vast amounts of heterogeneous data, the challenge is to be able to provide relevant and accurate information while minimising the time taken to process customer incidents. However, the aim is not simply to reduce the number of incidents or the time taken to resolve them, but to implement all the preventative activities needed to avoid incidents in the first place.

The aim of this internship is to propose an optimal configuration for an information retrieval system designed for quality management. The success criteria are the relevance and accuracy of the information, the speed of query processing, and the reduction of the human cognitive load.

As part of the research approach, the candidate will exploit a search system already in place at the industrial partner noet-ia and will perform experiments on knowledge representation models, information retrieval algorithms and machine learning algorithms. More specifically, the candidate will carry out the following tasks:

- Targeted literature analysis to identify relevant knowledge representation models, information retrieval algorithms and machine learning algorithms.
- Conducting several experiments (implementation plus performance evaluation) of different relevant knowledge representation models, information retrieval algorithms and machine learning algorithms. These experiments will be carried out on real industrial cases.

Expected results:

- A summary of the state of the art in the form of a short scientific article.
- A comparative analysis of the models and algorithms tested.

Prerequisites:

- Mandatory knowledge: Data modelling, Data analysis, Machine learning, Conceptual modelling (e.g. UML type), Python programming.
- Desired knowledge: Industrial engineering, in particular quality management, Automatic Language Processing, Big Data management tools, Information retrieval algorithms (TF-IDF, BM25, semantic models such as BERT, LLM).