

Post-doctoral or Research Engineer proposal

Research on semantic analysis of action traces for competences identification and capitalization from industrial practices.

Host laboratory: DISP (INSA Lyon)

Contact(s):

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Project description

In an industrial context characterized by a high complexity in business processes and proliferation of information systems, the company's actors implement many learnings and practices to overcome this complexity. These learnings and practices encompass implicit and explicit competences that we aim to extract, manage and connect to business processes and products/services to enhance the company's competences and capitalize their reuse.

The CaTCaP¹ project is a French multidisciplinary project in knowledge engineering that aims to extract the competences encompassed in current practices and learnings in order to manage the intellectual capital of a company by developing and/or by changing the existing competences and intelligently mobilizing the actors' competences by defining suitable practices to real competences.

It is about proposing methods allowing to:

- (1) observe and identify learning activities and situations: we propose a mixed approach characterized by the collection and analysis of traces resulting from human observation and activity analysis (video recordings, questionnaires, etc..) as well as operational traces existing in computer systems (log files, modeled traces, etc.).
- (2) extract competences from the analysis of operational traces: once the traces are collected, we identify the relevant links between these traces and competences, identified individually and collectively as relevant to carry out the project activities at Energy Pool. Synergies between these competences are also considered.

¹ Capture of the operational Traces of the company's actors to build human Capital and define the winning Processes. ANR-18-CE10-0011 project

- (3) formalize and represent identified competences considering their nature (soft or hard) and dimension (individual or collective). Respect the personal data confidentiality is considered during this phase. We represent the competences as a mapping that evolves dynamically and can be reconfigurable according to the exploitation's objectives.
- (4) identify and evaluate practices from the peers' point of view: in parallel with observations, interviews with project' members will make it possible to confront the observed people with the traces of their activities in order to reach the sense that they associate with their practices.
- (5) identify and deploy key success factors during teams' definition: we develop a correlation analysis between competences, resources, traces, and practices' evaluations in order to identify key factors that led to different performances.

These methods and mapping will be validated through two industrial cases and supported with a software demonstrator.

Missions

The first step of the project, which concerns obtaining the operational traces by observing and analyzing the industrial practices, is already done. The collected traces consist of a large volume of text that will be exploited by the postdoctoral researcher.

The first mission of the post-doc / research engineer is about exploiting the text corpus in order to:

- 1) Identify competences from traces using semantic analysis tools.
- 2) Formalize the identified competences using ontologies.
- 3) Instantiate the ontologies to propose a knowledge graph and explore this latter to infer new competences. The inferred competences will be evaluated and validated by the industrial partner involved in the project.

The second mission of the post-doc / research engineer concerns:

- 1) Enrich the knowledge graph by defining the performance. The idea is to study the different traces to identify the best practices. The evaluation of the results will be done in collaboration with the industrial partner (by interviewing the actors who participated in the observed projects).
- 2) Exploit the enriched knowledge graph and analyze the correlations between competences, resources, traces, and performances in order to propose recommendations that will be used when defining the project's tasks (best practices) and setting up the teams (which actor is most suitable to accomplish the task?).

Expected Profile

- Relevant skills in text mining, Natural language processing (NLP), knowledge graphs, and semantic reasoning.
- Experience in machine learning will be appreciated.

- Good programming skills (e.g. Python).
- Project Management and teamwork skills are highly appreciated for effective collaboration with the industrial partner involved in the project.

The Postdoctoral researcher will work within the project CATCAP at the DISP laboratory of INSA Lyon (Villeurbanne) under the supervision of Pr. Lilia Gzara and Dr. Linda Elmhadhbi.

The successful candidate may supervise internships in computer science.

Contract duration and remuneration

The employment contract will be for 10 months, starting as soon as possible, but not later than September 1st, 2023

Gross monthly salary of 2725€.

How to apply?

Please send an email to Pr. Lilia Gzara (lilia.gzara@insa-lyon.fr) and Dr. Linda Elmhadhbi (linda.elmhadhbi@insa-lyon.fr) (email object: "post-doc / RE application") attaching the following documents:

- A curriculum vitae with a detailed list of publications and achievements
- A cover letter
- Contact information of one or several references
- Thesis report

Deadline

The review of applications begins immediately and continues until May 30, 2023.