Master 2 Internship Project in the
$\mathcal{LivE\,MUSIC}$ Project
$\mathcal{L}$iv ing-$\mathcal{E}$nvironment $\mathcal{M}$onitoring $\mathcal{U}$se $\mathcal{S}$cenario with $\mathcal{I}$ntelligent $\mathcal{C}$ontrol

Hassan Aït-Kaci

October 2014

Context

$\mathcal{LivE\,MUSIC}$ is a one-year project (January 15, 2015–January 14, 2016) to be led by Prof. Hassan Aït-Kaci, at the LIRIS, at Université Claude Bernard Lyon 1. This project will be part the *"Programme Avenir Lyon Saint-Etienne"* ($\mathcal{PALSE}$).[1] Its objective is to develop a convincing use case in intelligent living-environment monitoring. For this purpose, it will proceed by demonstrating how knowledge-representation and automated-reasoning technology can be put to use for the "smart" monitoring of living environments, focusing on urban and social milieux.

The project will consist in:

1. processing vast amounts of disparate raw data gathered from available sensing and measuring equipment as well as human input records into coherently formatted RDF tripletores with guaranteed data integrity;

2. analyzing this data formatted as massive RDF stores to extract its implicit knowledge structure as terminological properties using formats such as RDF Schema (RDFS), RDF with attributes (RDFa), and/or the Simple Knowledge Organization System (SKOS);

3. elaborating a realistic use scenario that leverages the extracted knowledge for the intelligent monitoring to applications for which the gathered data is relevant.

To ensure a realistic basis to our approach, we will exploit public data provided by the *Grand Lyon* through its platform SmartData.[2] We can thus have 378 datasets at our disposal. This data, mostly open data, are varied: *e.g.*, the number of kilometers of sidewalks, directory of ponds and wetlands, cycling stations (*vélo'v*),[3] *etc..*, . . . Thus, $\mathcal{LivE\,MUSIC}$ aims to facilitate the development and use of ontological knowledge about the essential nature and properties of such data, which come in massive amounts and disparate formats.

---

[1] http://imagine.universite-lyon.fr/programme-avenir-lyon-saint-etienne-/
[2] http://smartdata.grandlyon.com/
[3] http://www.velov.grandlyon.com/

Master topic

We are proposing the following Master 2 topic within the $\mathcal{Liv}\mathcal{E}\,\mathcal{MUSIC}$ project. It is to be addressed during a 6-month internship at the LIRIS to be spent during the year 2015; remuneration is a stipend of 550 €/month.

- **Derivation of ontologies from RDF triplestores**—This MSc topic concerns the analysis of RDF triplestores generated from raw sensor data in order to derive terminological schemas that the generated RDF triples abide by. The objective is to categorize these triplestore data using classes and attributes fitting their structure using Formal Concept Analysis (FCA).[4] The outcome is to constitute a terminological schema for this data that can be used for reasoning about such data.

Keywords:	Knowledge Extraction; Data Analytics; Automated Reasoning; Big Data; Environment Monitoring; Smart Cities.

Contact information: LIRIS - Département Informatique
Université Claude Bernard Lyon 1
43, boulevard du 11 Novembre 1918
69622 Villeurbanne cedex
France

Email: hassan.ait-kaci@univ-lyon1.fr
Phone: +33 (0)4 27 46 57 08

---

[4]http://en.wikipedia.org/wiki/Formal_concept_analysis