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

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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 triple-tores 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.

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[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 $\mathcal{LivE\,MUSIC}$ 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.

- **Use of terminological knowledge for monitoring applications**—This topic's objective is to develop a use case exploiting terminological knowledge over monitoring data with reasoning based on Order-Sorted Feature constraint logic for smart information retrieval, data analytics, and query processing.[4] The object is to demonstrate how to leverage the capabilities brought by knowledge-based processing of monitoring data for intelligent applications with a convincing use case based on actual gathered data.

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

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[4]Using the technology developed as part if the CEDAR project: cedar.liris.cnrs.fr.