VEOLIA

Recherche & Innovation

Machine learning internship

INFORMATIONS

ENTITY : Veolia Recherche & Innovation
SITE : Maisons-Laffitte
TUTOR: Yannick Deleuze - yannick.deleuze@veolia.com
INTERNSHIP : 6 months
WHEN : Early 2020
Provide CV and motivation letter.

VERI : Who are we ?

Veolia group is the global leader in optimized resource management. With nearly 169 000 employees worldwide, the Group designs and provides water, waste and energy management solutions that contribute to the sustainable development of communities and industries. Through its three complementary business activities, Veolia helps to develop access to resources, preserve available resources, and to replenish them.

Veolia Recherche et Innovation (VERI) has two research centers : Maisons-Laffitte et Limay.
In line with the Group's strategy , the R&I of Veolia relies on Scientific Excellence in its R&I programs to support the development of business, the improvement of performance and productivity, while preparing for a competitive edge for tomorrow.

Internship description

✓ **Mission & objectives**

For several decades, climate change together with a somehow uncontrolled industrialization of certain geographical areas have contributed to the scarcity of water resources. Scarcity of water has led to restrictions of use that are sometimes penalizing the countries concerned. In this context, the control of water leaks in the distribution networks and the management of the demand have become priorities. Moreover, as the pipes age, their mechanical characteristics deteriorate, resulting in an increase in the frequency and number of breaks. From an operational point of view, the breaks cause the loss of considerable volumes of water, particularly in the case where the leaks remain

undetected. If these leaks are not repaired, to reach the same demand for water, one must compensate for the loss of volume by increasing the volume of water distributed. Leakage in water distribution systems therefore represents a loss of millions of dollars globally, which could be mitigated if an efficient and early detection and localization of these leaks is used.
Among the various current leak detection methodologies, it is possible to use the data provided by the flow meters and pressure sensors installed on the network. In this context, using hydraulic simulation and mathematical modeling tools, your mission will be to study the technical and physical feasibility of using the sensor data to detect and locate leaks in the network.

✓ Main tasks

The Machine learning intern will be part of the Intelligent and Learning Systems team and will support the project team applying advanced statistical models to perform patterns identification and predictive modeling. This position will bring analytical rigor and statistical methods to create cutting edge data driven solutions. Responsibilities will include, but not limited to:

- Using innovative ideas to collect, curate or synthesize data
- Build and iterate on neural network architectures that effectively solve the problem using open libraries such as Keras, TensorFlow or Scikit-Learn;
- Benchmark, validate and test the solution for real-world environments in hydraulic network
- Optimize the solution for accuracy and performance

Who we are looking for

✓ Training

You are a Master student from university or engineering school (BAC+5 / Master 2) in Computer Science, Statistics, Mathematics, or other quantitative related field. You think that simulations and models are key tools in our day to day job. Exploring options and finding innovative answers motivate you.

✓ Skills

- Relevant work experience in including expertise and experience with statistical data analysis
- Applied knowledge of traditional machine learning algorithms and/or deep learning frameworks (Scikit-learn, tensorflow, keras,...)
- Strong capabilities in programming (Python, ...) , experience with statistical software (Pandas, R, ...) and data wrangling tools (SQL, csv, ...)
- Experience with source control and release management (Git)
- Excellent verbal and written communication skills. Fluency in English is required (writing technical reports and participation in technical or business meetings in an international context).
- Notions of modeling and simulation physical phenomenon.
- Notions of hydraulic phenomena in water networks

✓ **Qualities and self being**

You have fun thinking about the world in concepts and using equations and simulations to test ideas and solve concrete problems. You are curious and willing to learn when it comes to discovering new methods or new application fields. You are not shy to try. Your open mind will make it easy for you to integrate smoothly and contribute efficiently to multidisciplinary project teams. You are self-driven and a team player as you think that great ideas come where personal intuition meets group emulation.

VEOLIA Recherche & Innovation SNC - Centre de Recherche de Maisons-Laffitte
Chemin de la Digue
78600 MAISONS-LAFFITTE • France
Tél. + 33 (0)1 34 93 31 31 • Fax : + 33 (0)1 34 93 31 10 • www.veolia.com