UCLA ENGINEERING
B. John Garrick Institute for the Risk Sciences

Seminar Series: Spring 24'

Leak Detection in Water Distribution Networks Through Deep Learning

Thursday, April 11, 2024, 12-1 PM PT

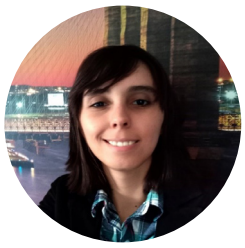
Location: Engineering 6 BLDG, Room 580B

Zoom: https://ucla.zoom.us/j/94778587870

Abstract

Loss control is one of the priorities for water supply companies around the world, given the scarcity of water resources. Leaks represent a large part of the lost volume of water, and the accurate and early detection of these anomalies in water supply networks is still a great challenge. Detection by inspection methods has high monetary costs, in addition to being a time-consuming and laborious activity. On the other hand, the detection approach using hydraulic models is difficult to implement due to the complex topology and the uncertainty in the hydraulic conditions of the water distribution networks. Machine learning is one of the techniques in the field of artificial intelligence, and along with other data-oriented approaches, it is becoming important and widespread in several areas of knowledge for two main reasons: the use of (statistical) models that capture the complex relationships between the data and scalable learning systems that learn the model of interest from large data sets. A few works have been developed in recent years, mainly in Brazil, with emphasis on water leak detection using machine-learning approach. In this context, based on field monitoring data, this project proposes the application of a Deep Learning algorithm to build a model for leak detection in water distribution networks: the Recurrent Neural Network, one of the architectures of Artificial Neural Networks. It is expected that the model using field data proves to be efficient for the construction of a fast, reliable, wide-ranging and low-cost leak detection method.

Mariana Guimarães Matias Pereira, MS Student



Civil Engineer in Bahia Water and Sanitation Company (EMBASA) and Master's Student in the Master's Degree Program in Environment, Water and Sanitation (MAASA) of Federal University of Bahia (UFBA). Member of the GAMMA Research Group (Growing with Applied Metrics and Mindful Analysis), which involves statistical and computational learning and data science in cooperative research projects with industries and in education. My experience regards in Civil and Sanitary Engineering with an emphasis on controlling and reducing water losses; water distribution systems; hydraulic modeling and geoprocessing. Furthermore, I have experience in statistical and machine learning, through Python programming language. Main research interests: statistical and machine learning applied to improving operational efficiency in water distribution systems.