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A novel method to diagnose factors influencing in leakage in water distribution systems including extreme weather events

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During January 2016 and December 2020, eastern and southern China including Shanghai experienced a rapid drop in temperatures along with snow. This cold wave which also had a severe impact on water distribution networks. Leakage of pipe network causes serious economic loss and waste of water resources. Nonetheless, cold wave is not the only factor affecting leakage from a pipe network. There are also other factors including the burial depth of pipes, the materials of pipes, the diameters of pipes, break history and so on. In this work, we use machine learning method and Bayesian distribution regression to explore the relationship between pipe leaks and impact factors. Based on results, risk maps of water distribution networks are generated. This research indicated that which risk factors is important for leakage detection and water loss management of urban water supply network, which can be promising for wide practical applications due to rapid expansion of data.