

# Water pipe condition assessment: a hierarchical beta process approach for sparse incident data

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**Abstract** Prediction of water pipe condition through statistical modelling is an important element for the risk management strategy of water distribution systems. In this work a hierarchical nonparametric model has been used to enhance the performance of pipe condition assessment. The main aims of this work are three-fold: (1) For sparse incident data, develop an efficient approximate inference based algorithm based on hierarchical beta process. (2) Apply the hierarchical beta process based method to water pipe condition assessment. (3) Interpret the outcomes in financial terms usable by the water utilities. The experimental results show superior performance of the proposed method compared to current best practice methods, leading to substantial savings on reactive repairs and maintenance, as well as improved prioritization for capital expenditure.

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