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**Use Long Short-Term Memory to Enhance Internet of Things for Combined Sewer Overflow Monitoring**

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**Abstract:** Combined sewer overflow causes severe water pollution, urban flooding and reduced treatment plant efficiency. Understanding the behavior of CSO structures is vital for urban flooding prevention and overflow control. Neural networks have been extensively applied in water resource related fields. In this study, we collect data from an Internet of Things monitoring CSO structure and build different neural network models for simulating and predicting the water level of the CSO structure. Through a comparison of four different neural networks, namely multilayer perceptron (MLP), wavelet neural network (WNN), long short-term memory (LSTM) and gated recurrent unit (GRU), the LSTM and GRU present superior capabilities for multi-step-ahead time series prediction. Furthermore, GRU achieves prediction performances similar to LSTM with a quicker learning curve.

**Keywords:** Combined sewer overflow; Deep learning; Long short-term memory; Gated recurrent unit; Internet of Things

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