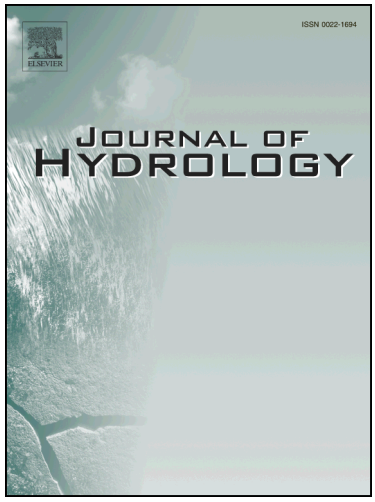
Accepted Manuscript



Research papers

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

Duo Zhang, Geir Lindholm, Harsha Ratnaweera

PII: S0022-1694(17)30772-2
DOI: https://doi.org/10.1016/j.jhydrol.2017.11.018
Reference: HYDROL 22376

To appear in: *Journal of Hydrology*

Received Date: 29 July 2017
Revised Date: 8 November 2017
Accepted Date: 10 November 2017

Please cite this article as: Zhang, D., Lindholm, G., Ratnaweera, H., Use Long Short-Term Memory to Enhance Internet of Things for Combined Sewer Overflow Monitoring, *Journal of Hydrology* (2017), doi: https://doi.org/10.1016/j.jhydrol.2017.11.018

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

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

Duo Zhang[1]; Geir Lindholm[2]; Harsha Ratnaweera[1]

1. Faculty of Sciences and Technology, Norwegian University of Life Sciences, 1432, Ås, Norway
2. Rosim AS, Brobekkveien 80, 0582, Oslo, Norway

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

Author names and affiliations:

Duo Zhang (corresponding author):

Ph.D. candidate, Faculty of Science and Technology, Norwegian University of Life Sciences, 1432, Ås, Norway.

Email: Duo.Zhang@nmbu.no

Geir Lindholm:

CEO, Rosim Company, Brobekkveien 80, 0582, Oslo, Norway.

Email: geir@rosim.no

Harsha Ratnaweera:

Professor, Faculty of Science and Technology, Norwegian University of Life Sciences, 1432, Ås, Norway.

Email: Harsha.Ratnaweera@nmbu.no

Download English Version:

https://daneshyari.com/en/article/8895139

Download Persian Version:

https://daneshyari.com/article/8895139

Daneshyari.com