OMICS Group
Conferences
Accelerating Scientific Discovery

2nd International Conference on
Hydrology & Groundwater Expo

August 26-27, 2013   DoubleTree by Hilton, Raleigh, NC, USA

Development of stage-discharge relationship using simple rating curve, ANN and data transformation techniques

Ashu Jain and Harendra Kumar Gupta
Indian Institute of Technology Kanpur, India

Successful implementation of any hydrologic model relies on the availability of complete and good quality data. There are often missing data (called gaps) in hydrological records. While stage is measured directly, discharge value is calculated from measurements of flow velocity, depth and channel cross-section dimensions. Continuous measurement of flow past a river section is expensive as well as time consuming. The use of traditional methods of stage-discharge (SD) relationship is popular to fill the gaps in the streamflow data. This study is intended to investigate the applicability of Artificial Neural Networks (ANNs) and square root data transformation technique in modeling SD relationships. Three different techniques such as conventional rating curve (RC) method, feed forward neural networks trained using back-propagation (BP) algorithm and radial basis function (RBF) networks were used, where ANN models were developed on the raw and transformed data. The data from the basin of the Maneru River, a tributary of the Godavari River in Andhra Pradesh, India were employed. The SD relationships were developed considering long duration data sets and also considering short duration data sets. The results obtained from the SD relationships suggest that the ANN models developed on the transformed data performed better than the ANN models developed on the raw data. Among the three modeling techniques, RBF models were found to be better than the others. In some cases, models developed on the long duration data sets performed better and in some other cases, models developed on the short duration data sets performed better.

Biography

Ashu Jain is a Professor of civil engineering at IIT Kanpur. He obtained his doctorate from University of Kentucky in 1994. He is a recipient of Endeavour Executive Award 2009 by Ministry of Education, Australia, was awarded International Centre of Excellence in Water Resources Management Fellowship 2008 to visit University of Adelaide, Australia, and Royal Society Fellowship 2005-06 to visit University of Leeds, UK. He is a fellow of Indian Water Resources Society and Indian Society for Hydraulics. His research interests include modeling of hydrologic systems using conceptual and soft computing approaches, and knowledge extraction from trained ANN models.

ashujain@iitk.ac.in

Hydrol Current Res 2013
ISSN: 2157-7587, HYCR an open access journal

Hydrology-2013
August 26-27, 2013

Volume 4 Issue 2

Page 25