

# Visual analysis to investigate the capability of ANFIS in modelling hydrological relationship using synthetic dataset

Ngahzaifa Ab Ghani<sup>1,4</sup>, Zuriani Mustaffa<sup>2,4</sup>, Zafril Rizal M Azmi<sup>3,4</sup>

Multimedia and Computer Vision Research Group (MCVis)<sup>1</sup>

Soft Computing & Intelligent System Research Group (SpInt)<sup>2</sup>

Systems Network & Security (SysNetS)<sup>3</sup>

Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Kuantan, Pahang<sup>4</sup>

Corresponding author Email: zaifa@ump.edu.my

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ANFIS (Adaptive Neuro Fuzzy Inference System), for its advantages of having linguistic representation of models has been the interests of both hydrological operational modellers and scientists/theorists. In hydrology especially, every process is unique and dependent on large number of natural factors hence modelling using machine learning algorithm without considering hydrological insight is very dangerous. In using most of the machine learning algorithms including ANFIS, to obtain the best model, the common and normal approach is always by comparing models of different parameter settings based on the goodness-of-fit statistical measures. This approach is not always accurate, as each statistical measure has its drawbacks in terms of how accurate it is presenting the model depending on the condition and complexity of the data involved. This research proposes the use of synthetic data in order to explore and understand the behaviour of ANFIS parameters on hydrological data, specifically hysteresis effect in sediment-discharge relationship, in order to improve the efficiency of the modelling process. The results of simulation on the synthetic datasets are then presented and analysed visually. The modelling process is then repeated on real datasets in order to validate the findings.

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