# Optimal variational mode decomposition and integrated extreme learning machine for network traffic prediction

## ABSTRACT

Network traffic prediction plays a vital role in effective network management, load evaluation and security warning. Extreme learning machine has the advantages of fast convergence speed and strong generalization ability. Also, it does not easily fall into local optima. The evolutionary algorithm can be used to optimize the number of its hidden layer nodes. However, most of the existing evolutionary algorithms have some adjustable parameters which depend on subjective experience or prior knowledge. Hence, this can affect the model prediction accuracy. Given this context, this paper proposes a network traffic prediction mechanism based on optimized Variational Mode Decomposition (VMD) and Integrated Extreme Learning Machine (ELM). A Scalable Artificial Bee Colony (SABC) algorithm which has fewer adjustable parameters and can thus guarantee the accuracy and stability of the prediction mechanism is also proposed. It can be used in the optimization selection of VMD, Phase Space Reconstruction (PSR) and ELM to achieve higher prediction performance. Finally, we utilize Mackey-Glass, Lorenz chaotic time series of recognized benchmark and a WIDE backbone actual network traffic data to prove the validity of the proposed network traffic prediction mechanism.