

Title: Predicting Microbial Species in a River Based on Physicochemical Properties by Bio-Inspired Metaheuristic Optimized Machine Learning

Name: Billy Susilo
National Taiwan University of Science and Technology, Taipei, Taiwan

The main goal of the analysis of microbial ecology is to understand the relationship between Earth's microbial community and their functions in the environment. This paper presents a proof-of-concept research to develop a bioclimatic modeling approach that leverages artificial intelligence techniques to identify the microbial species in a river as a function of physicochemical parameters. Feature reduction and selection are both utilized in the data preprocessing owing to the scarce of available data points collected and missing values of physicochemical attributes from a river in Southeast China. A bio-inspired metaheuristic optimized machine learner, which supports the adjustment to the multiple-output prediction form, is used in bioclimatic modeling. The accuracy of prediction and applicability of the model can help microbiologists and ecologists in quantifying the predicted microbial species for further experimental planning with minimal expenditure, which is become one of the most serious issues when facing dramatic changes of environmental conditions caused by global warming. This work demonstrates a neoteric approach for potential use in predicting preliminary microbial structures in the environment.

Biography

Billy Susilo obtained his B.Eng in civil construction engineering and project management department at Petra Christian University, Surabaya, Indonesia. Afterwards, he received full scholarship from Taiwan government to pursue his master degree at National Taiwan University of Science and Technology, Taipei, Taiwan, and did research collaboration with environmental engineering department of National Taiwan University, Taipei, Taiwan. Besides graduated as best graduated student during his master degree period, he also receive awards as one of the best speaker for his research in 22nd Symposium on Construction Engineering and Management. His research focuses on engineering informatics, optimization on machine learning algorithm and metaheuristic artificial intelligence techniques. Currently, he is a data supervisor senior engineer in one the biggest geotechnical real-time monitoring construction company in Taiwan.

Presenting author details

Full name: Billy Susilo
Contact number: +886 905349260
Twitter account: billysusilo
Linked In account: Billy Susilo – 關華明
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