

ملخص البحث رقم (٢)

السيد الأستاذ الدكتور/ مقرر اللجنة العلمية الدائمة لترقية الأساتذة والأساتذة المساعدين للحاسبات والمعلومات

تحية طيبة وبعد - احيط سيادتكم علما بان البحث رقم ٢ بياناته كالتالي:
عنوان البحث باللغة الانجليزية:

Hybrid Predictive Model for Water Quality Monitoring Based on Sentinel-2A
L1C Data
مكان النشر وتاريخه:

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١. سواء المشاركين في البحث:

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ملخص البحث باللغة الانجليزية :

Monitoring water quality is an important challenge in both developed and developing countries. Remote sensing data can form a highly frequent dataset with acceptable spatial coverage that can be used to remotely monitor water quality. This paper presents a novel automated model for remotely monitoring water quality to address the problem of insufficient samples and save the time and cost of sample collection. The proposed model estimates both optical and non-optical water quality parameters via Sentinel-2A data. A bio-inspired hybrid model of a Binary Whale Optimization Algorithm (BWOA) and Artificial Neural Network (ANN) (BWOA-ANN) is applied to determine the relationship between extracted reflectance values from Sentinel-2A images and analyzed samples. The novelty of this model is to solve two main problems of remote water quality monitoring: poor applicability and low non-optical parameter estimation accuracy. For the first problem, a proposed fully automated model with band selection using the BWOA to automatically select the optimal features (Sentinel-2A bands) that are suitable for each water quality parameter. The second problem is addressed by automatically detecting the relationship between non-optical parameters, such as the total phosphorus, and optical parameters, such as chlorophyll-a. Three datasets with different locations, seasons, and parameters were selected to test the proposed BWOA-ANN. The experimental results demonstrated good regression with a mean R^2 value of 0.916 for optical parameters and 0.890 for non-optical parameters. The proposed model was found to outperform the ANN with an R^2 value higher by 40% and 52% for the optical and non-optical parameters, respectively.