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Enhancing land cover classification in remote sensing imagery using an optimal deep learning model
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Abstract
The land cover classification process, accomplished through Remote Sensing Imagery (RSI), exploits advanced Machine Learning (ML) approaches to classify different types of land cover within the geographical area, captured by the RS method. The model distinguishes various types of land cover under different classes, such as agricultural fields, water bodies, urban areas, forests, etc. based on the patterns present in these images. The application of Deep Learning (DL)-based land cover classification technique in RSI revolutionizes the accuracy and efficiency of land cover mapping. By leveraging the abilities of Deep Neural Networks (DNNs) namely, Convolutional Neural Networks (CNN) or Recurrent Neural Networks (RNN), the technology can autonomously learn spatial and spectral features inherent to the RSI. The current study presents an Improved Sand Cat Swarm Optimization with Deep Learning-based Land Cover Classification (ISCSODL-LCC) approach on the RSIs. The main objective of the proposed method is to efficiently classify the dissimilar land cover types within the geographical area, pictured by remote sensing models. The ISCSODL-LCC technique utilizes advanced machine learning methods by employing the Squeeze-Excitation ResNet (SE-ResNet) model for feature extraction and the Stacked Gated Recurrent Unit (SGRU) mechanism for land cover classification. Since 'manual hyperparameter tuning' is an erroneous and laborious task, the hyperparameter selection is accomplished with the help of the Reptile Search Algorithm (RSA). The simulation analysis was conducted upon the ISCSODL-LCC model using two benchmark datasets and the results established the superior performance of the proposed model. The simulation values infer better outcomes of the ISCSODL-LCC method over other techniques with the maximum accuracy values such as 97.92% and 99.14% under India Pines and Pavia University datasets, respectively.

Author Keywords
artificial intelligence; computer vision; land cover classification; parameter tuning; remote sensing images

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