Comparative Study of Machine Learning Techniques for Land Cover Classification and Mapping

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ABSTRACT:
Precise and scalable predictions of land cover enable decision-makers to have a data-driven understanding of how land is used and how it may evolve, leading to better policies, strategic resource allocation, and sustainable development. In this proposal we aim to compare results of classifying land cover in geospatial images by using traditional machine learning, advanced neural network and transfer learning techniques.

KEYWORDS: Data Mining, Machine Learning, Transfer Learning

INTRODUCTION:

The rapid expansion of urban areas, agricultural activities, and environmental changes has made the need for accurate and efficient land cover classification more critical than ever. With the increasing availability of satellite imagery, accurately classifying land cover types has become achievable. Traditional machine learning, advanced deep learning and Transfer Learning methods have shown promising results in image classification tasks; however, they differ in computational requirements, interpretability, and accuracy.

The project proposes to conduct a comparative study of various image classification algorithms. This study has significant potential applications in fields such as urban planning, resource management, environmental monitoring, and geospatial analysis, enabling informed decision-making for sustainable development and effective resource allocation.

METHOD:

1. Data Pre-processing: Data regularization, normalization, dimensionality reduction, label encoding strategies need to be applied to improve model robustness and prevent overfitting. Moreover image reduction can be performed to reduce complexity of the data.
2. Feature Engineering & Model Training: The aim is to use traditional machine learning methods for image classification (like SVM, Random Forest), deep learning algorithms like CNNs for feature extraction and classification as well as Transfer Learning models.
3. Comparison of techniques: Comparing accuracies and performance of models on validation sets to analyze the best model for land cover classification.

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