Application of Image Texture Feature Distribution on Agriculture Field Type Classification

Abstract

Identifying farmland use has long been crucial in large-scale agricultural production management. This study utilized multi-temporal visible RGB images, captured by UAVs over agricultural areas in Taiwan, to develop a model for classifying field types. We combined color and texture features to extract more information from the RGB images. Instead of the common Haralick feature, we employed the vectorized gray-level co-occurrence matrix (GLCMv) as the texture feature to enhance classification accuracy. The Extreme Gradient Boosting (XGBoost) algorithm was selected to build the classifier. The results showed that the highest overall accuracy reached 82%, and the best balanced accuracy across categories reached 97%. Our comparison revealed that color features provide the most information for the classification model and yield the most accurate classifier. When combined with GLCMv, accuracy improved by about 3%. In contrast, the Haralick feature did not enhance accuracy, indicating that GLCMv contains more useful information for prediction.

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RESEARCH AREAS AND EXPERTISE

- General area: Agricultural Statistics
- Specific area: Image analyses; crop modeling

SELECTED AWARDS AND RECOGNITION

- Outstanding Teaching Award, National Taiwan University, 2019

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