

Camera Align and Folder Drag are All You Need: Rapid Crop Lodging Aerial Assessment without Segmentation*

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Abstract: Typhoons and hurricanes frequently threaten global food security by causing widespread crop lodging, which can reduce grain yields by 15–40%. Rapid post-disaster assessment is crucial for timely food loss evaluation and accurate insurance claims. However, conventional aerial survey methods rely on photogrammetric reconstruction and segmentation, often requiring over half a day to generate digital orthomaps and several hours of labor-intensive segmentation model training for large areas. To accelerate this process, we propose a lightweight workflow that eliminates both dense reconstruction and segmentation annotation.

Our method uses only the tie point cloud generated after camera alignment, the first step in photogrammetric reconstruction, which takes just 12.77% of full pipeline time. We partition this tie point cloud into small grids (e.g., 10m×10m). For each grid, we employ backward-projection through EasyIDP to extract corresponding UAV image patches. These patches are then iteratively classified using multi-class classification algorithms by manually sorting them into different class folders to complete full-field lodging classification.

Field experiments on 47 ha rice lodging after typhoon events demonstrate that our method reduces assessments time from 4.5 hours to 1.3 hours while maintaining comparable accuracy. This pipeline utilizes only the initial stage of the reconstruction process and shifts from segmentation to classification, enabling timely agricultural monitoring during the critical early phase of disaster response.

