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Preview

Productive Crop Field Detection: A New Dataset and Deep Learning Benchmark Results

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In precision agriculture, detecting productive crop fields is an essential practice that allows the farmer to evaluate operating performance separately and compare different seed varieties, pesticides, and fertilizers. However, manually identifying productive fields is often a time-consuming and error-prone task. Previous studies explore different methods to detect crop fields using advanced achine learning algorithms, but they often lack good quality labeled data. In this context, we propose a high-quality dataset generated by machine operation combined with Sentinel-2 images tracked over time. As far as we know, it is the first one to overcome the lack of labeled samples by using this technique. In sequence, we apply a semi-supervised classification of unlabeled data and state-of-the-art supervised and self-supervised deep learning methods to detect productive crop fields automatically. Finally, the results demonstrate high accuracy in Positive Unlabeled learning, which perfectly fits the problem where we have high confidence in the positive samples. Best performances have been found in Triplet Loss Siamese given the existence of an accurate dataset and Contrastive Learning considering situations where we do not have a comprehensive labeled dataset available.

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