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Comparison of Classical Computer Vision vs. Convolutional Neural Networks Approaches for Weed Mapping in Aerial Images

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Abstract : In this paper, we present a comparison between convolutional neural networks and classical computer vision approaches, for the specific precision agriculture problem of weed mapping on sugarcane fields aerial images. A systematic literature review was conducted to find which computer vision methods are being used on this specific problem. The most cited methods were implemented, as well as four models of convolutional neural networks. All implemented approaches were tested using the same dataset, and their results were quantitatively and qualitatively analyzed. The obtained results were compared to a human expert made ground truth for validation. The results indicate that the convolutional neural networks present better precision and generalize better than the classical models.

Keywords : convolutional neural networks, deep learning, digital image processing, precision agriculture, semantic segmentation, unmanned aerial vehicles
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