Weeds Detection Using Semi-Supervised Learning For Precision Agriculture

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Abstract: *Farmers around the world are facing challenges of growing more food for the increasing world population. Especially facing problem in identifying weeds in the crops. Many ways to kill weeds by using traditional techniques but these techniques have disadvantages such as time consuming, manpower, spraying herbicides that can harm the real crops. By using Deep learning-based semi-supervised approach can detect weeds. An Autonomous robots using a Convolutional Neural Network (CNN) based unsupervised segmentation was used to capture the images of weeds and taken as dataset. A fine-tuned CNN(ResNet50) identifies weed infected region. With image-processing technique, the super pixels are extracted using the Simple Linear Iterative Clustering (SLIC) algorithm. A pre- trained ResNet50 used as a feature extractor that acts on classifiers such as SVM, Gaussian Naive Bayes, Neural Network, and Random Forest. Also trained U-Net model on the training split of the dataset. Major datasets like Crop Weed Field Image Dataset (CWFID) and Sugar Beets dataset are used in this approach. A Pre-trained ResNet50 eliminates the need for designing hand-crafted features for weeds detection. Once the weed-infested regions have been identified, the weed density can be computed with maximum accuracy. So, Weeds can be identified and eliminated from the main crop..*

Keywords: Weed detection, Image Processing, Deep learning, Semi-Supervised learning, Convolutional Neural Network (CNN), U-Net

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