Application of computer vision for rapid measurement of seed germination

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Abstract

Root is an important organ of plant that typically lies below the surface of the soil. Root surface determines the ability of plants to absorb nutrient and water from the surrounding soil. This study describes an application of image processing and computer vision which was implemented for rapid measurement of seed germination such as root length, surface area, average diameter, branching points of roots. A CCD camera was used to obtain RGB image of seed germination which have been planted by wet paper in a humidity chamber. Temperature was controlled at approximately 250C and 90% relative humidity. Pre-processing techniques such as color space, binarized image by customized threshold, removal noise, dilation, skeleton method were applied to the obtained images for root segmentation. The various morphological parameters of roots were estimated from a root skeleton image with the accuracy of 95% and the speed of within 10 seconds. These results demonstrated the high potential of computer vision technique for the measurement of seed germination.

Keywords

Computer vision, image processing, seed germination, rapid measurement

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