

## A new approach for plant phenotyping and image segmentation based on contextual information

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Plant phenotyping is an area that challenges the image processing field because the identification of plants into complex scenarios requires the use of specialized algorithms in order to prepare the recognition process and to decrease errors [1]. In this context, it is verified that image segmentation is one of the main tasks in image processing. It partitions an image into distinct regions, and the success of image analysis depends on reliability of segmentation which is a challenging problem [2]. This paper presents a new approach to deal with such problem that uses contextual and color information. Given a color image, the component in green tones was used and two regions, one associated with the object of interest ( $s$ ) and the other associated with the background of the image ( $t$ ) were selected. In addition, for each pixel the contribution of green tone ( $G_c$ ) was calculated considering its RGB composition. The graph  $g$  was used as an auxiliary structure to classify the pixels associated with  $s$ . In the structure, each pixel corresponded to one node and two virtual nodes,  $s$  and  $t$ , were added in  $g$ . The nodes were connected to each other by  $t$ - and  $n$ -links that carried the information of the degree of relationship between them, called capacity. The  $n$ -link capacity considered the contextual information of the pixel and its neighbors and the information of the local gradient. The  $t$ -link capacity was defined by means of the use of a Gaussian distribution and  $C_g$  was used as way to penalize edges with low contributions of green tone. Finally, the pixels associated with  $s$  were obtained by segmenting the image. In order to improve the results, the image was divided using windows. In conclusion, a new approach for plants segmentation based on the contextual and color information was presented. The results have indicated the establishment of a robust method for real applications. For future work, noise's treatment as well as the use of Graphics Processing Unit will be included.

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