Book of Abstracts

DIGITAL TECHNOLOGIES IN AGRICULTURE

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1. ISDTA & DIGITAGRA 2022
6 - 8 December
Osijek | Croatia

The ISDTA 2022
(1st International Symposium on Digital Technologies in Agriculture)

and

DIGITAGRA 2022
(1st Satellite Workshop – Digital Agriculture in Rural Area)

Organizer
Faculty of Agrobiotechnical Sciences

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Symposium Objectives

The 1st International Symposium on Digital Technologies in Agriculture will enhance the exchange and dissemination of knowledge, experience, ideas and results. The aim is to promote internationalization and friendships among researchers and professionals in all research fields associated with digital technologies in agriculture, with a focus on precision agriculture, agronomist education in digital agriculture, data collection and all the other aspects of digital technologies in agriculture.

The key topic of the 1st International Symposium on Digital Technologies in Agriculture is an interdisciplinary application of technologies toward sustainable digital agriculture.

Symposium Topics

- Data collection
- Precision crop production
- Decision support systems and models in digital agriculture
- Digital technologies in agriculture
- Digital agroeconomic and marketing
- Agronomist education in digital agriculture

DIGITAGRA 2022 Workshop Objectives

The main purpose of the 1st Satellite Workshop Digital Agriculture in Rural Area will be:

- Disseminate the idea, goals and methods of digital agriculture in the rural area
- Discuss the opportunities and challenges for small farmers in the transformation toward digital agriculture
- Connecting the stakeholders in the digitalization of agriculture at local and regional levels

Organizers

Faculty of Agrobiotechnical Sciences, Josip Juraj Strossmayer University of Osijek
Centre for Applied Life Science Healthy Food Chain Ltd. Osijek

and

Agricultural Institute Osijek, Croatia
Balkan Environmental Association (B.E.N.A.)
Croatian Agency for Agriculture and Food, Osijek
Faculty of Food Tecnology Osijek, Croatia
Faculty of Electrical Engineering, Computer Science and Information Technology Osijek
University of Zagreb Faculty of Agriculture Zagreb, Croatia
Faculty of Agricultural Sciences and Food, Skopje, North Macedonia
Faculty of Agriculture and Biotechnology, Bydgoszcz, Poland
Josip Juraj Strossmayer University of Osijek, Croatia

under the auspices of the

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Ministry of Science and Education of the Republic of Croatia

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Sadržaj

EVALUATION OF HEMP SEEDLING SIZE USING IMAGEJ SOFTWARE

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Abstract

In vitro hemp seed germination is crucial for investigating factors impacting production conditions. It is laborious and time-consuming to measure and evaluate the morphological traits of seedlings grown in vitro. One of the most well-known machine vision techniques is image processing, which offers detailed information and more reliability and accuracy than traditional counting and visual determination of seedlings.

The study aimed to determine if hypocotyl images obtained with semi-automatic processing through SmartRoot could be replaced with faster, automatic processing.

Seedlings were scanned in RGB color profile in 300 dpi, using an open lid flatbed scanner HP Scanjet G4050. The images were processed in ImageJ software. The steps in image processing are shown in figure 1.

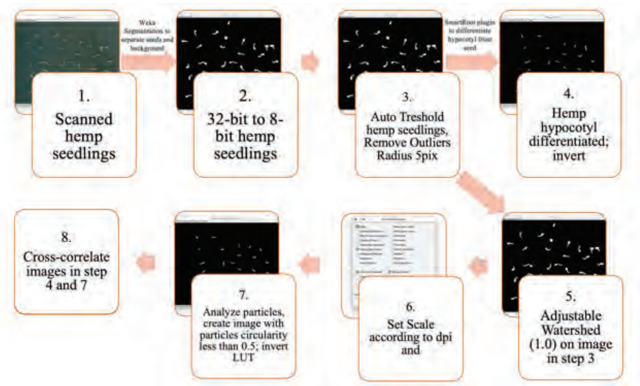

Figure 1: Steps from original (scanned) images to hemp hypocotyl images used for comparation.

One scanned image was used to create ARFF segmentation data from Weka Segmentation training. The images in step 8 obtained with SmartRoot were compared with images in step 7 using cross-correlation with Fast Fourier transform (figure 2).

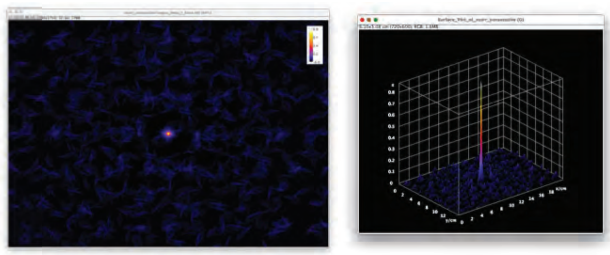

Figure 2: Function map and 3D surface plot of cross-correlation

The average cross-correlation coefficient between hypocotyl images was 0.86. The average diameter and length with the automatic process were 0.108 and 0.745, respectively, and with SmartRoot 0.104 and 0.759, respectively. Using a t-test it was concluded that the average length and diameter obtained with the two methods didn't show a statistically significant difference. Comparing length and diameter acquired from the two methods showed a correlation of 0.91 and 0.98, respectively. Results showed that hypocotyl images obtained with the automatic process can replace the ones with the SmartRoot process. Macro in ImageJ could be recorded, and images could be batch processed, reducing time for analysis.

Keywords: Image processing, SmartRoot, hypocotyl, length, diameter

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