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AgRA Webinar #20: PhenoBot: A Robot System for Phenotyping in the Greenhouse Using 3D Light-Field Technology

Marcel Bergerman <marcel@cmu.edu>: Aug 17 10:22PM -0400

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IEEE RAS TC on Agricultural Robotics and Automation Webinar #0 20
Date:

August 27th
at 10 am US Eastern time

Title: PhenoBot: A Robot System for Phenotyping in the Greenhouse Using 3D Light-Field Technology

*Speaker: *Gerrit Polder

,
Wageningen University and Research Centre, Netherlands

* *

*Abstract: *

Plant phenotyping is an emerging science that links genomics with functional plant characteristics. The recent availability of extremely fast high-throughput genotyping technologies has invoked high-throughput phenotyping to become a major bottleneck in the plant breeding programs. As a consequence new camera-based technologies to relieve the phenotyping bottleneck attract considerable attention.

A digital mobile phenotyping platform, coined PhenoBot will be presented. This robot has been developed to automatically measure features of tomato plants in the greenhouse. The system consists of a robotised trolley which autonomously can move over the heating pipes in the greenhouse.

A camera, based on light field technology is used for image recording. This single lens 3D camera is constructed by placing a micro lens array in front of the image sensor. This also allows the user to change the focus and the point of view after a picture has been taken. While the concept of such plenoptic cameras is known since 1908, only recently the increased computing power of low-cost hardware and the advances in micro lens array production, have made the application of plenoptic cameras feasible. First preliminary results will be presented and the performance of light field technology for plant phenotyping will be discussed.

Bio:

Gerrit Polder got his Electronic Engineering degree from HTS Arnhem in 1985 and Ph.D. from Delft University of Technology in 2004, on the topic of spectral imaging for measuring biochemicals in plant material. Since 2004 he works on machine vision and robotics applied to agricultural research.

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