Phenotyping on microscopic scale using DIC microscopy

Image analysis of Arabidopsis (*Arabidopsis thaliana*) plants is an important method for studying plant growth. Most work on automated analysis focuses on full rosette analysis, often in a high-throughput monitoring system. In this talk we propose a new workflow that analysis plant growth on a microscopic scale. This approach results in more detail than the common growth measurements, i.e. analysis of the number of cells, the average cell size, etc. The proposed workflow uses differential interference contrast (DIC) microscopy to visualise cells. DIC microscopy is preferred over fluorescence techniques because it provides a very fast methodology (i.e. image analysis is already possible after 1 day) and it also results in clear contrast in the samples. Although these images are easy to interpret by a human operator, they pose several challenges for automated computer vision methods. In our proposed talk we circumvent most of these challenges by combining multiple images, acquired with different microscopy settings. This approach allows us to automatically segment and analyse cells in the images. The proposed workflow enables a new form of automated phenotyping on microscopic scale.

Authors:
Jonas De Vylder[1]
Stijn Dhondt [2,3]
Hiep Q. Luong[1]
Dirk Inzé[2,3]
Wilfried Philips[1]

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[1] are with the dept. of Telecommunications and Information Processing, iMinds, IPI, Ghent University - jonas.devylder@telin.ugent.be
[2] are with the dept. of Plant Systems Biology, VIB, 9052 Gent, Belgium
[3] are with the dept. of Plant Biotechnology and Bioinformatics, Ghent University, 9052 Gent, Belgium