

Wissenschaftliches Kolloquium - Geilweilerhof/Siebeldingen - 26.01.2016



Sensortechniken und Feldroboter



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COALA - Competence in Applied Agricultural Engineering



Übersicht

Pflanzen, Sensoren und Roboter - draußen auf dem Feld

- *Technologie trifft Natur*
- *Innovative Technologien als Hilfsmittel für eine nachhaltige Landwirtschaft*

Sensorsysteme/Imaging: Schlüsseltechnologie für den Pflanzenbau

- *Nicht-bildgebende Sensorsysteme (Anwendungsbeispiel: Feuchtigkeitssensor für die Maisernte)*
- *Bildgebende Sensorsysteme (Anwendungsbeispiele: Qualitätskontrolle und Fahrerassistenz)*
- *Sensor- und Datenfusion (Anwendungsbeispiel: Pflanzenphänotypisierung)*

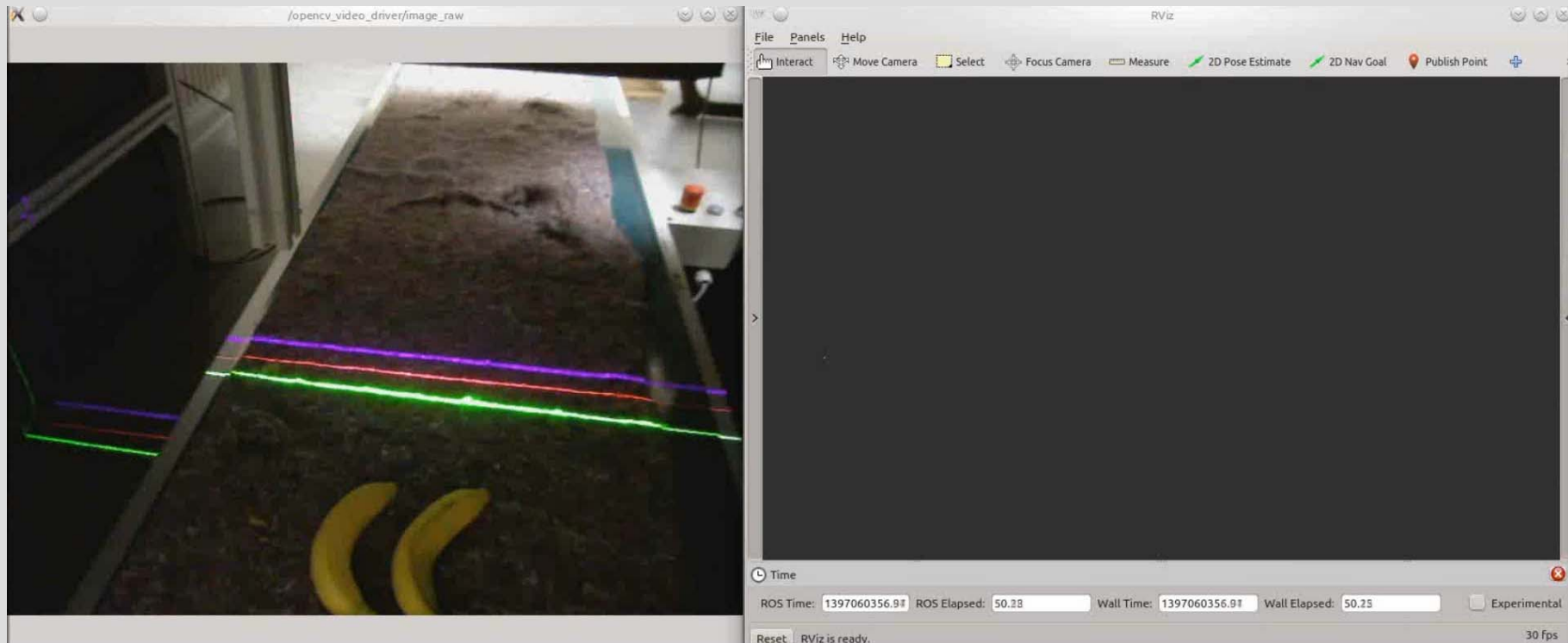
Feldrobotik: Alternative Ansätze für Agrarprozesse

- *Simulation und Realität*
- *“App-Konzept”*
- *Einzelpflanzen-Landwirtschaft*
- *RemoteFarming.1*

Ausblick (XXL oder xxs oder... ?)

- *Märkte für Feldroboter – die wollen doch nur spielen ?*
- *Sicherheit, Validierung, Akzeptanz ...*

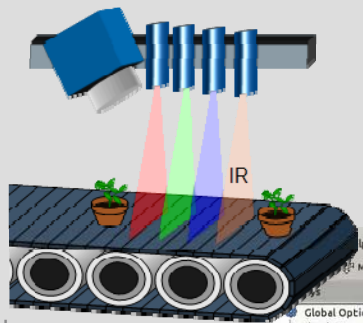
„Multiwavelength Laser Line Profile Sensing“ (2)



Movie

Field application: Multiwavelength Laser Line Profile Sensing (4)

3D-NDVI-Imaging



Global Options

- Fixed Frame: map
- Background Color: 48; 48; 48
- Frame Rate: 30
- Global Status: Ok
- Fixed Frame:
- Grid:
- PointCloud2:
- Status: Ok

Topic: /mwlp/visualization/mw...

- Selectable:
- Style: Points
- Size (Pixels): 2
- Alpha: 1
- Decay Time: 0
- Position Transfo...: XYZ
- Color Transformer: RGBB
- Queue Size: 10

PolygonMesh

- Status: Ok

CloudNormals

- Topic: /mwlp_normals_estima...
- Color: 200; 200; 200
- Alpha: 1
- History Length: 1
- Show each n-th...: 100
- Normals scale: 0,01

Topic: sensor_msgs/PointCloud2 topic to subscribe to.

Add Remove Rename

Time

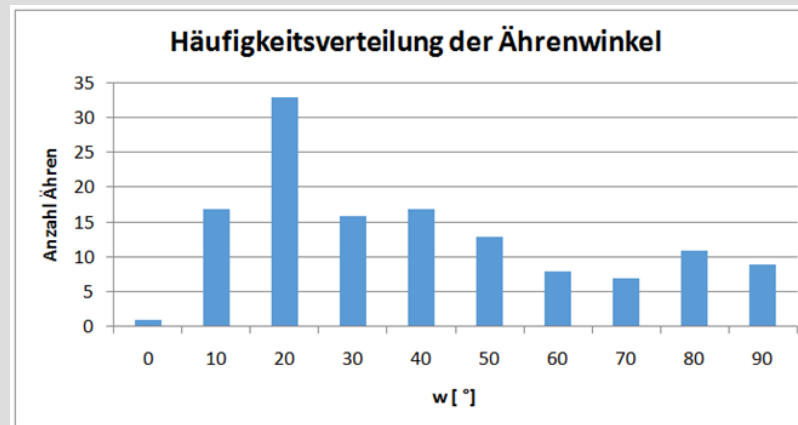
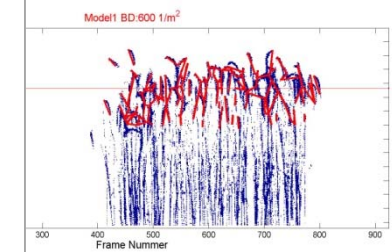
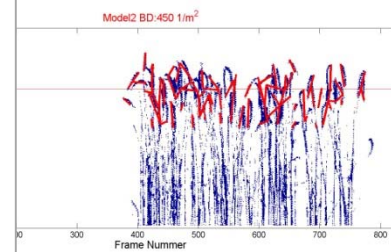
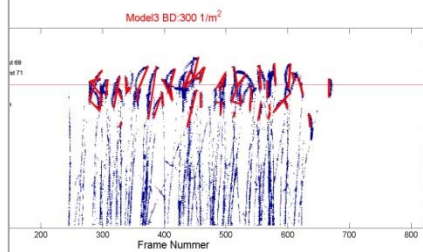
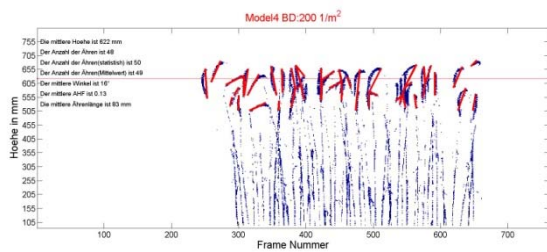
ROS Time: 1445263606.89 ROS Elapsed: 75.80 Wall Time: 1445590228.89 Wall Elapsed: 378.98

Reset:

```
INFO [1445590228.12940787, 1445263605.260013990]: Received image chunk
INFO [1445590228.378515841, 1445263606.480293164]: Trying to filter...
INFO [1445590227.177821880, 1445263606.430385260]: Publishing mwlp_image and cloud
INFO [1445590227.337182410, 1445263606.501270195]: Subs.in callback
INFO [1445590229.175262350, 1445263606.562037771]: Received image chunk
```

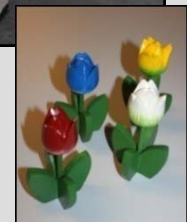
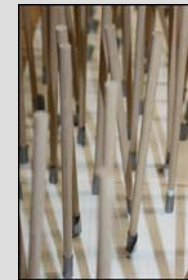
mwlp:roscore mwlp:tf_broadcaster subs_400_mm_s:roscap subs_400_mm_s:roslaunch

Pflanzensensoren: Beispiel „Schattensensoren“ (5)



Source: Ivana Kovacheva, University of Applied Sciences Osnabrück, Master Thesis (2013), CBA-Workshop (2014)

Teststände



Prozessablauf: RemoteFarming.1



Image capturing

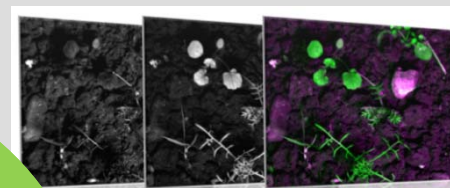


Image preprocessing

START

Cooperative
Process

(Human-Machine)



Reaction of
weeding tool



Remote worker
marks weed positions



Transfer of weed positions,
movement of manipulator to weed