

Estimation of Oregano Samples Purity

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Challenge

Commercially available kitchen herbs such as Oregano are distributed at different purity.

Using a <u>Headwall MV.X</u> VNIR Hyperspectral System running <u>perClass Mira</u> Runtime software on the processors embedded in the *MV.X* system, purity of different Oregano packages is estimated.











Test Setup

- MV.X Hyperspectral Imaging System VNIR: 400 – 1000nm, 16mm lens
- Headwall lab kit halogen light
- Mini conveyor belt
- perClass Mira Analysis and Runtime Software
- Commercially available samples of dried oregano of different purity: 10-15%, 50%, 99%



Model Build in *perClass Mira* Analysis Software (a) Labeling True Oregano Leaves







Model Build in *perClass Mira* Analysis Software (b) Labeling Non-Oregano Leaves in 10-15% Probe







Classification of Training Samples





Cla	asses		
0	Unknown		
1	background		11
2	Oregano 99%	F	
3	non-Oregano	F	



Test of 50% Sample

Test Sample 50%





Training Sample 99%





Quantitive Analysis

Detection Rate Oregano







Test Samples







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Conclusion

- Difference between samples of different purity could be clearly differentiated according to expectation
- To improve results, labelling should be repeated with 100% identified oregano and non-oregano leaves as ground truth probes
- Not optimized processing speed: ca. 330 lines/s of 1020 pixel with 340 spectral resolution



MV.X Data Sheet







Wavelength Range	400 – 1000 nm
Spatial Pixel	1020
Spectral Bands	340
Spectral Sampling	1.75 nm/pixel
Spectral FWHM	6 nm
System F/#	f/2.5
Optical Design	Abberation-corrected concentric
Field of View	Angular
24mm lens	14.2°
16mm lens	21.16°
Bit Depth	12 bit
Sensor Technology	CMOS
Memeroy Storage	8GB RAM, 128GB SSD
Integrated Prcessors	GPU, CPU

Interfaces	Gen <i>Cam MQTT RS232/422* 5V TTL*</i>
Ports	RJ45 (GigE) x2 D-Sub 26 pin (GPIO)
Software	WebInterface, on-board classification module available
Memeroy Storage	8GB RAM, 128GB SSD
Input Voltage	12-30V DC
Max Power Consumption	< 42 W
Dimensions (LxWxH)	255 x 136 x 136 mm
Weight incl. 24mm lens	3 kg
IP Rating	IP66 / IP67
Operating Temperature	0 – 50°C
Storage Temperature	-10 – 60°C

* in development



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