Vinescale

Advanced UAV Monitoring of Multi-Scale Mediterranean Vineyards

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CHAMELEON

About us

Agrobit srl

Agrobit is an agritech startup that develops image-based digital agriculture solutions to help farmers and technicians make better data-driven decisions, reducing costs and optimizing resources.

Niccolò Bartoloni

COO – Agronomist

20+ years vineyard estate director

7+ years precision farming

Simone Kartsiotis

CEO/CTO – Aerospace Engineer

8+ years in industry

7+ years precision farming

Andrea Cruciani

CFO/CIO – ICT expert

CEO Agricolus srl & Team Dev srl

20+ years in ICT

Giuditta Bertani

Communication Manager

Antonio Donnangelo

R&D Project Manager

Gabriel Mucavero

Full Stack Developer

Francesco Manara

S&M Manager

1 Goals & Objectives

VINESCALE

Primary Goal:

- *Validate and test Chameleon's automatic drone data analysis tool*

Specific Objectives:

- *Automate vine plant detection*
- *Monitor growth using RGB data*
- *Detect vine water stress*
- *Analyze vine vigor via multispectral imaging*
- *Compare drone results to field data for validation*

2 Timeline

VINESCALE

VINESCALE

Gantt chart illustrating the sub-project timeline

Task duration
Deliverables

ACTIVITY	STARTING MONTH	DURATION (MONTHS)	MONTH 1	2	3	4	5	6
STAGE 1								
Planning	1	1						
Goals and expected impacts	1	1						
Main challenges and proposed approaches	1	1						
Detailed technical description	1	1						
Resource requirement assessment	1	1						
Key Performance Indicators (KPIs) definition	1	1						
Timeline development	1	1						
Preliminary plan for dissemination	1	1						
Deliverable 1	1	1						
STAGE 2								
Data collection and processing	2	1						
Continuous monitoring and adjustment	3	1						
Results analysis and reporting	4	1						
Deliverable 2	5	1						
STAGE 3								
Dissemination activities	6	1						
Exploitation of results	6	1						
Deliverable 3	6	1						

Test Vineyards

VINESCALE

Field Sites:

- 12 Vineyards across Italy

ID	Pilot Vineyards Locations	Ha	Drone/Sensor	Flight Parameters (Flight Height and Overlap)	GSD (cm/pixel)			Est. Data Storage	Flight Period	Addressed Boundles
					RGB	Multisp.	Thermal			
1	Nort Italy - Piedmont (Langhe)	6.8	DJI Mavic 3M - DJI Mavic 3T	50m, 80%	1.3	2.3	5	2233 images, 15GB	End of July	BC8, BC9, BC10
2	Nort Italy - West Piedmont (Tortona)	6.0	DJI Mavic 3M - DJI Mavic 3T	50m, 80%	1.3	2.3	5	2202 images, 14.7GB	End of July	BC8, BC9, BC10
3	Nort Italy - Emilia-Romagna (Bologna)	1.0	DJI Mavic 3M - DJI Mavic 3T	50m, 80%	1.3	2.3	5	1118 images, 7.2GB	End of July	BC8, BC9, BC10
4	Central Italy - Tuscany (Montalcino)	2.0	DJI Mavic 3M	70m, 80%	1.9	3.2	-	540 images, 4.9GB	July	BC8, BC10
5	Central Italy - Tuscany (Bagno a Ripoli)	10.2	DJI P4 Multispectral	50m, 80%	2	3.5	-	2874 images, 9.8GB	July	BC8, BC10
6	Central Italy - Tuscany (Siena)	5.8	DJI Mavic 3M - DJI Mavic 3T	50m, 80%	1.3	2.3	5	2533 images, 18GB	End of July	BC8, BC9, BC10
7	Central Italy - Tuscany (Chianti)	0.6	Flir Vue Pro R - Parrot Sequoia	60m, 80%	1.6	5	2.8	3000 images, 6GB	End of July	BC8, BC9, BC10
8	Central Italy - Tuscany (Gabbiano)	5.0	DJI Mavic 3M	70m, 80%	1.9	3.2	-	2500 images, 5.5GB	July	BC8, BC10
9	South Italy - South Puglia (Salento)	1.0	DJI P4 Multispectral	50m, 80%	2	3.5	-	2000 images, 2GB	July	BC8, BC10
10	South Italy - Campania (Salerno)	1.5	DJI P4 Multispectral	50m, 80%	2	3.5	-	952 images, 3.2GB	July	BC8, BC10
11	South Italy - West Sicily (Marsala)	3.6	Micasense Altum	30m, 80%	0.6	1.3	8	9044 images, 68GB	End of July	BC8, BC9, BC10
12	Central Italy - Umbria (Torre Bisenzio)	1.1	DJI P4 Multispectral	50m, 80%	2	3.5	-	864 images, 2.9GB	July	BC8, BC10

Monitoring Growth with RGB Data

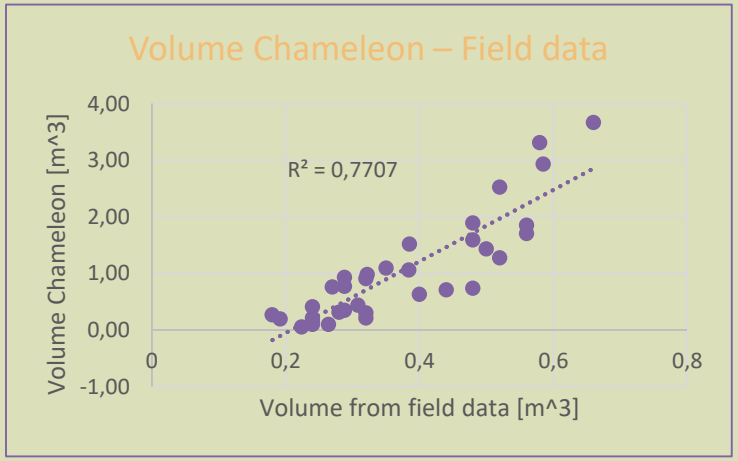
VINESCALE (BC8, BC10)

- *Method:*

Volume estimation from drone imagery

- *Results:*

1. *Good correlation with manual measurements*
2. *Enabled creation of detailed growth maps*



Detection of Vine Water Stress

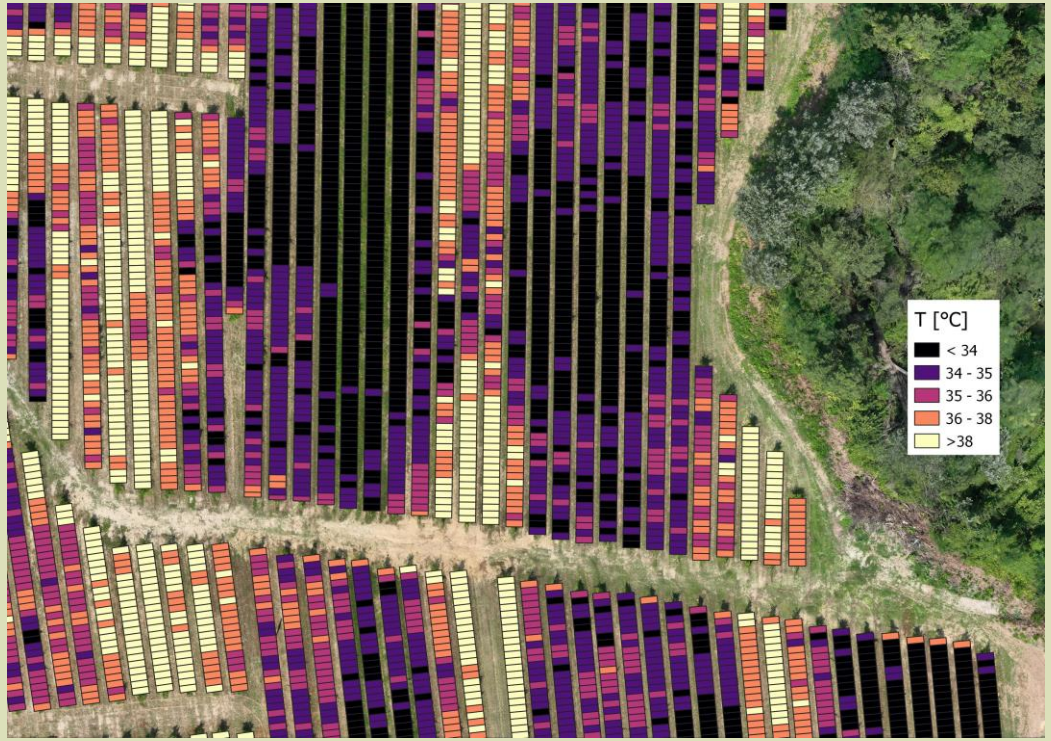
VINESCALE (BC8, BC9, BC10)

- *Method:*

Thermal imaging + CWSI calculation

- *Key Points:*

1. *Rapid detection of water stress*
2. *Data can be used for smarter irrigation strategies*



Vine Analysis from Multispectral Data

VINESCALE (BC8, BC10)

- *Method:*

NDVI and soil zoning maps

- *Results:*

1. *Positive correlation with physical soil sampling*
2. *Reliable vigor and zoning maps*

3 Results

VINESCALE

Successes:
• Effective tool for vineyard monitoring and management
• Faster, reliable data acquisition compared to manual methods
Challenges:
• Need for precise flight guidelines
Future Directions:
• Algorithm refinement
• Greater automation and sustainability in viticulture

Scope:
• 44.6 hectares surveyed
• 129,636 plants analyzed
Performance:
• 33,752 seconds (9 hours) of processing
Outputs:
• NDVI, CWSI, Canopy Volume, Temperature
Impact:
Days of manual labor saved;
high detail achieved

CHAMELEON

Thank you for your attention!
Do you have any questions?

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