

Artificial Intelligence & Optimization Workshop

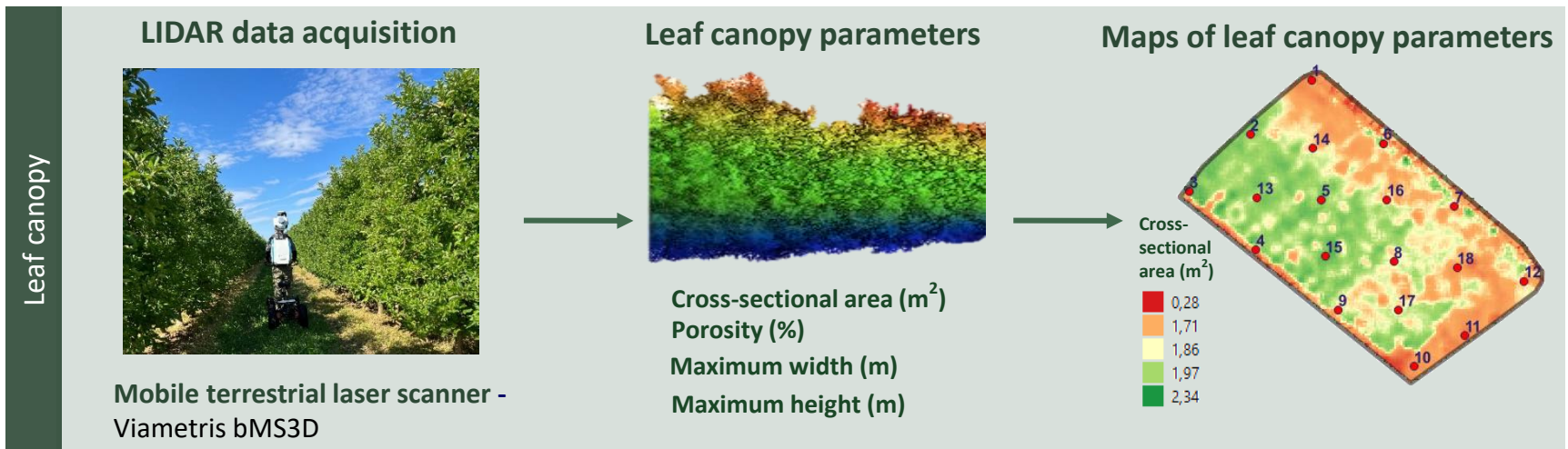
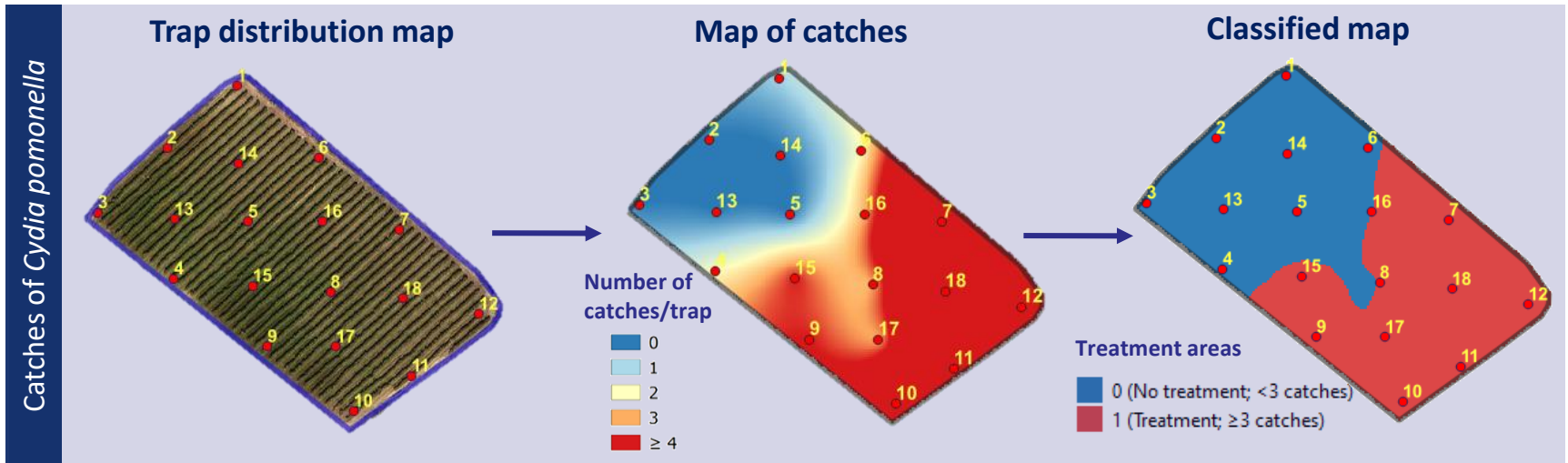
An empirical comparison of machine learning-based classification methods to identify pest hotspots in fruit orchards

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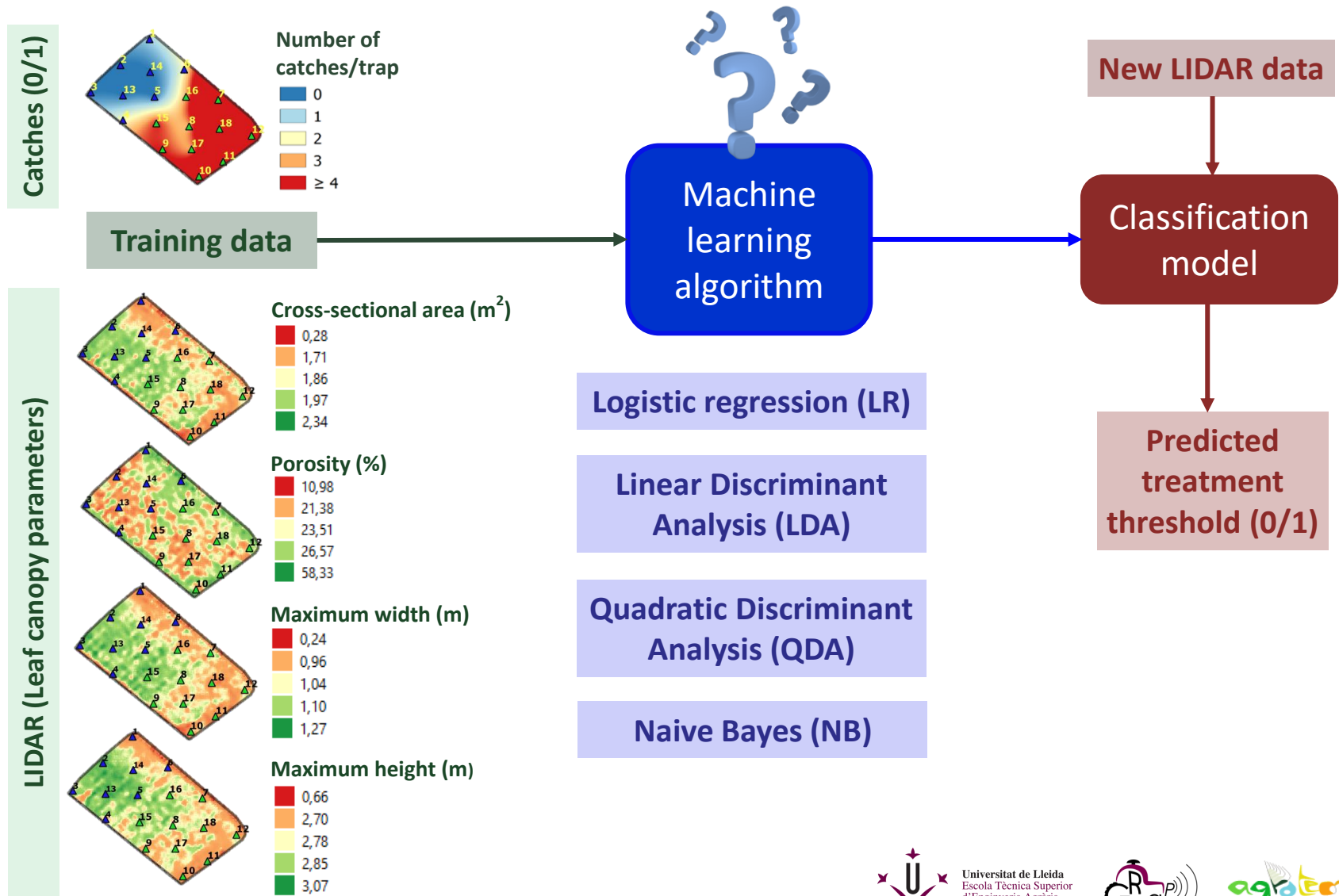
**Grup de recerca en AgròTICa i Agricultura de Precisió
(GRAP) - Universitat de Lleida / Agrotecnio-CERCA Center**

Lleida Tech 2024

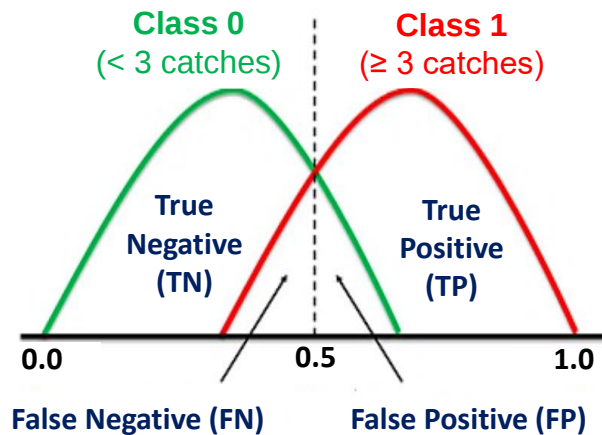
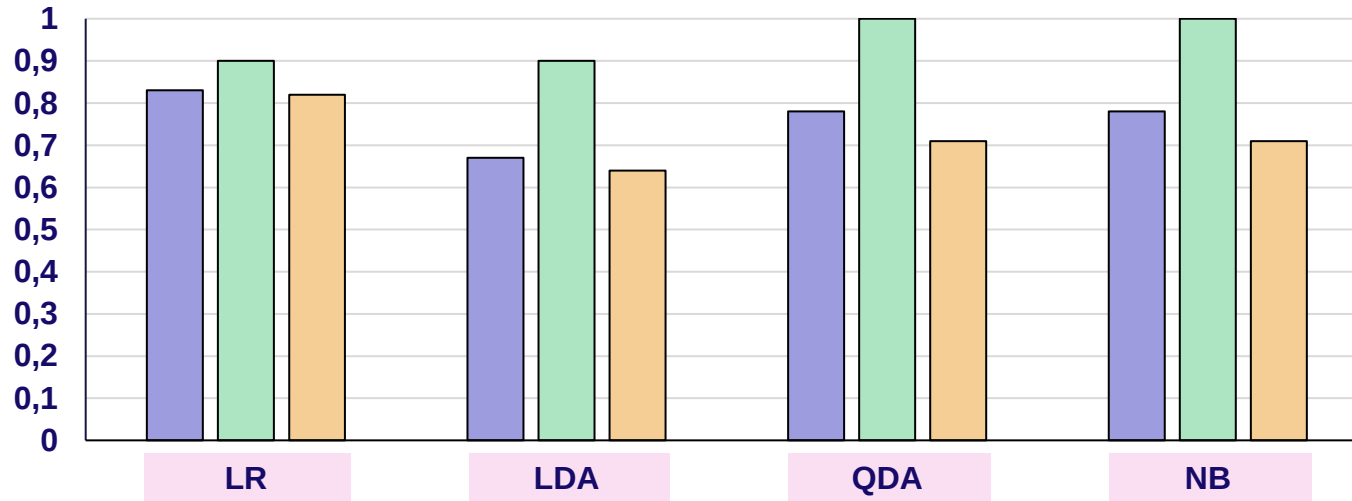
Leaf canopy-pest interaction



Machine learning-based classification methods



Metrics for ML classifier - Results

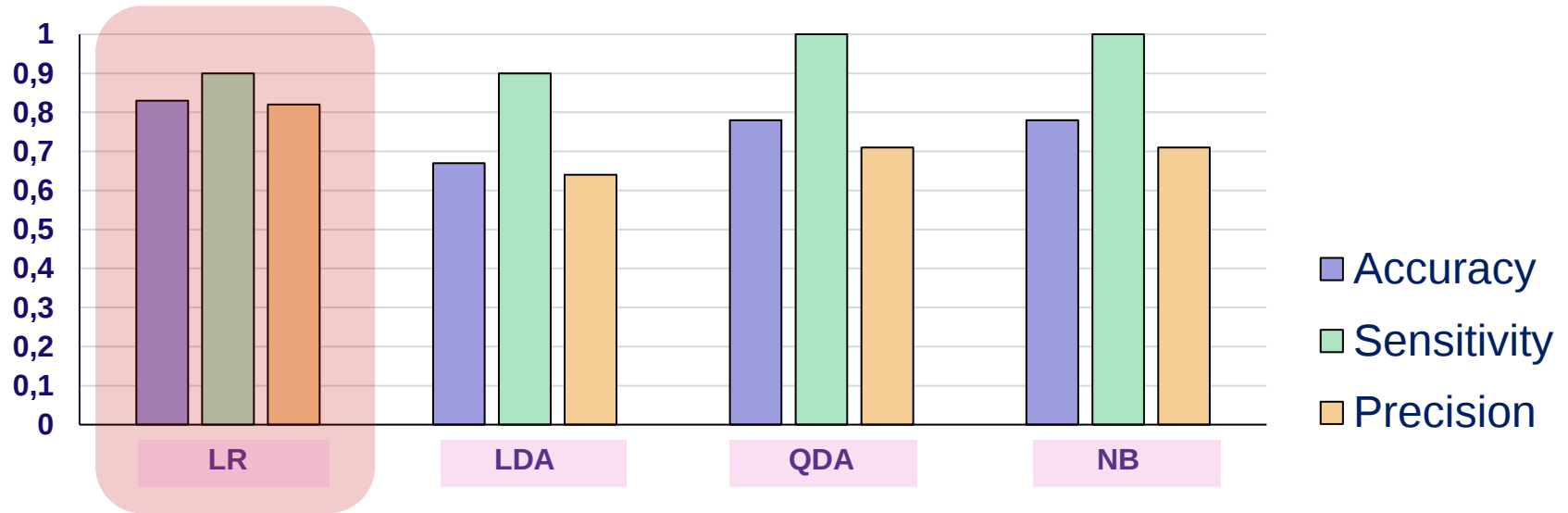


■ Accuracy $\rightarrow \frac{TP + TN}{TP + TN + FP + FN}$

■ Sensitivity $\rightarrow \frac{TP}{TP + FN}$

■ Precision $\rightarrow \frac{TP}{TP + FP}$

Metrics for ML classifier - Results



$$p(x) = \frac{e^{\beta_0 + \beta_0 \cdot X_0 + \dots + \beta_P \cdot X_P}}{1 + e^{\beta_0 + \beta_0 \cdot X_0 + \dots + \beta_P \cdot X_P}}$$

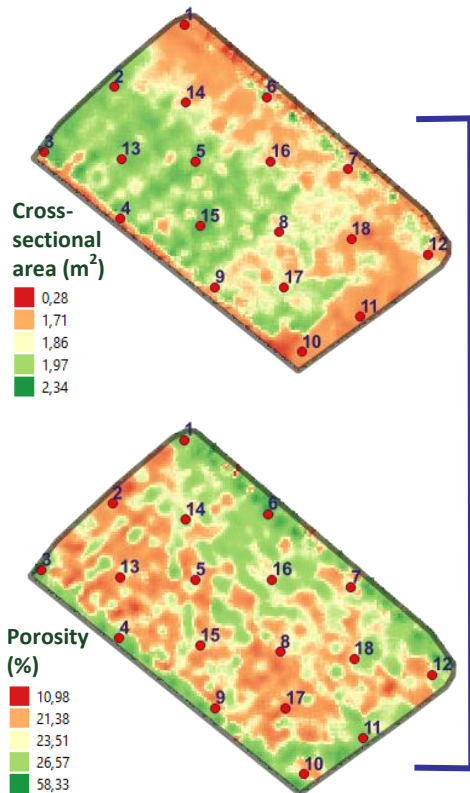
$X = (X_1, \dots, X_p)$ are p predictors.

$$p(x) = \frac{e^{25,30 - 8,55 \cdot S - 0,37 \cdot P}}{1 + e^{25,30 - 8,55 \cdot S - 0,37 \cdot P}}$$

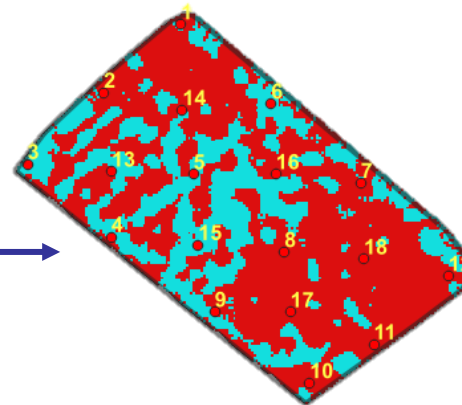
S = cross-sectional area (m^2).
 P = porosity (%).

Variable rate application (VRA) according to LR

Leaf canopy parameters

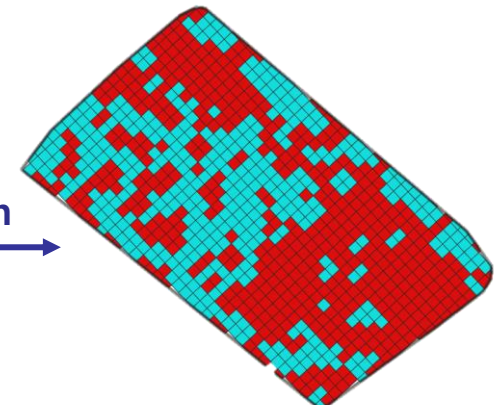


Classified map



 $p(x) < 0,5$
 $p(x) \geq 0,5$

Prescription map



 No Treatment (< 3 catches)
 Treatment (≥ 3 catches)

MOLTES GRÀCIES!

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