DATA SCIENCE
& BIG DATA
RESEARCH LAB

Workshop online DL para TSF – 24 abril 2021

TSF mediante Transfer Learning.

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Outline

- Introducción: Objetivo y problemática
- Datos y ubicaciones
- Transfer Learning
- Metodología general
- Redes siamesas
- Resultados
- Conclusiones

Introducción

Modernización

Reciente y lento

Objetivo

- Mejora sostenibilidad
- Reducción pesticidas y abonos
- Reducción de costes

- Falta de histórico

Datos y ubicaciones

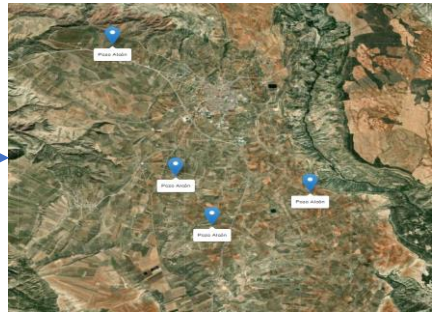
Objetivo

Predicción de la fenología de parcelas de olivar, especialmente en zonas con poca información para ayudar en la toma de decisiones

Datos

Imágenes satélite, clima y datos de muestreo de 16 parcelas

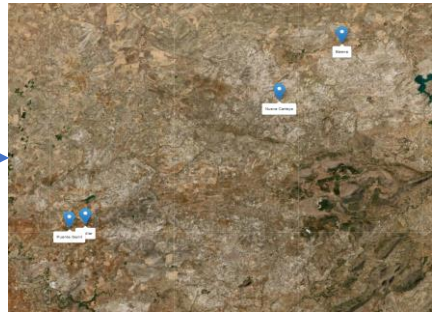
Jaén



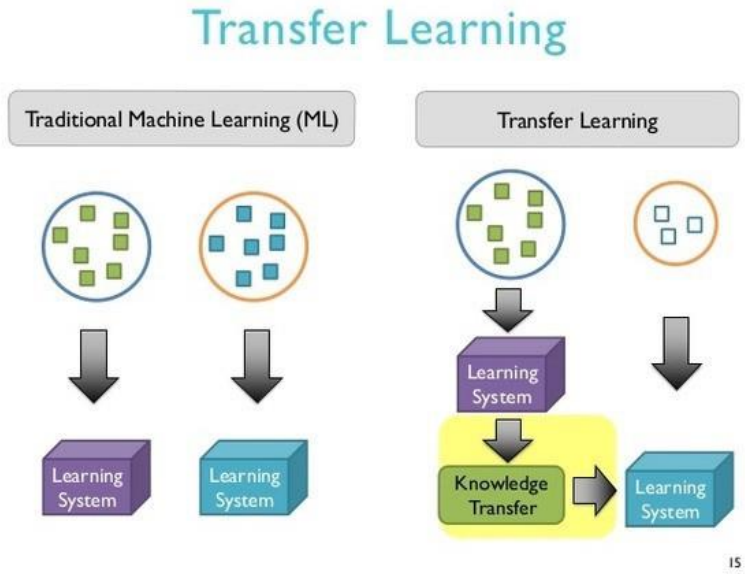
Cádiz

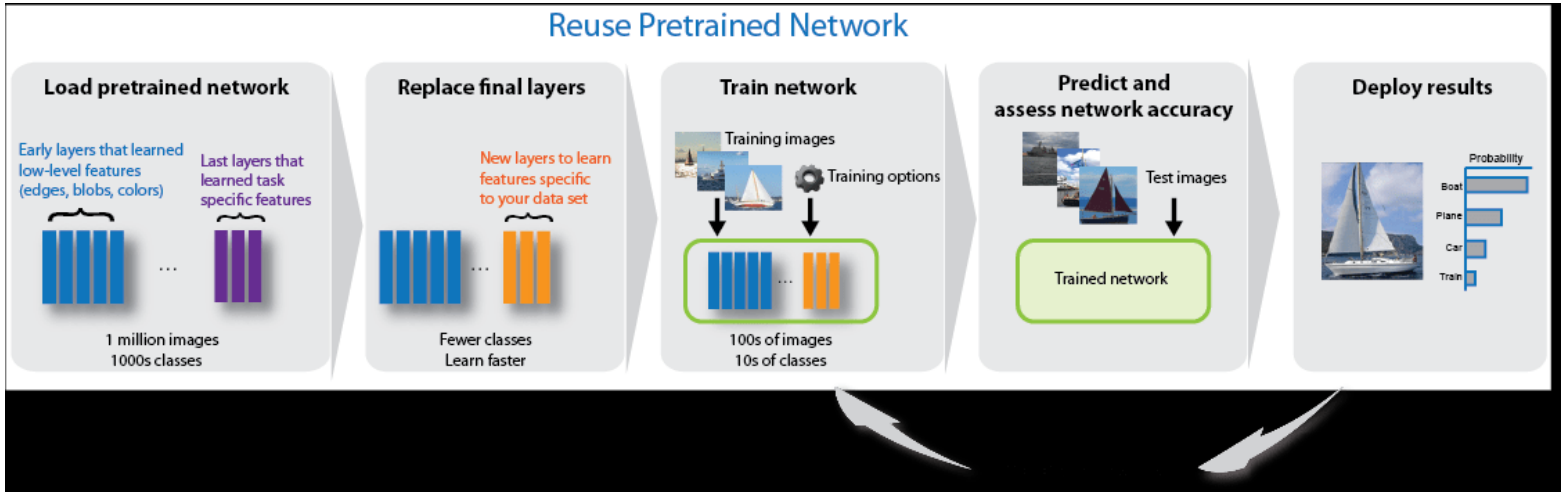
Sevilla

Córdoba

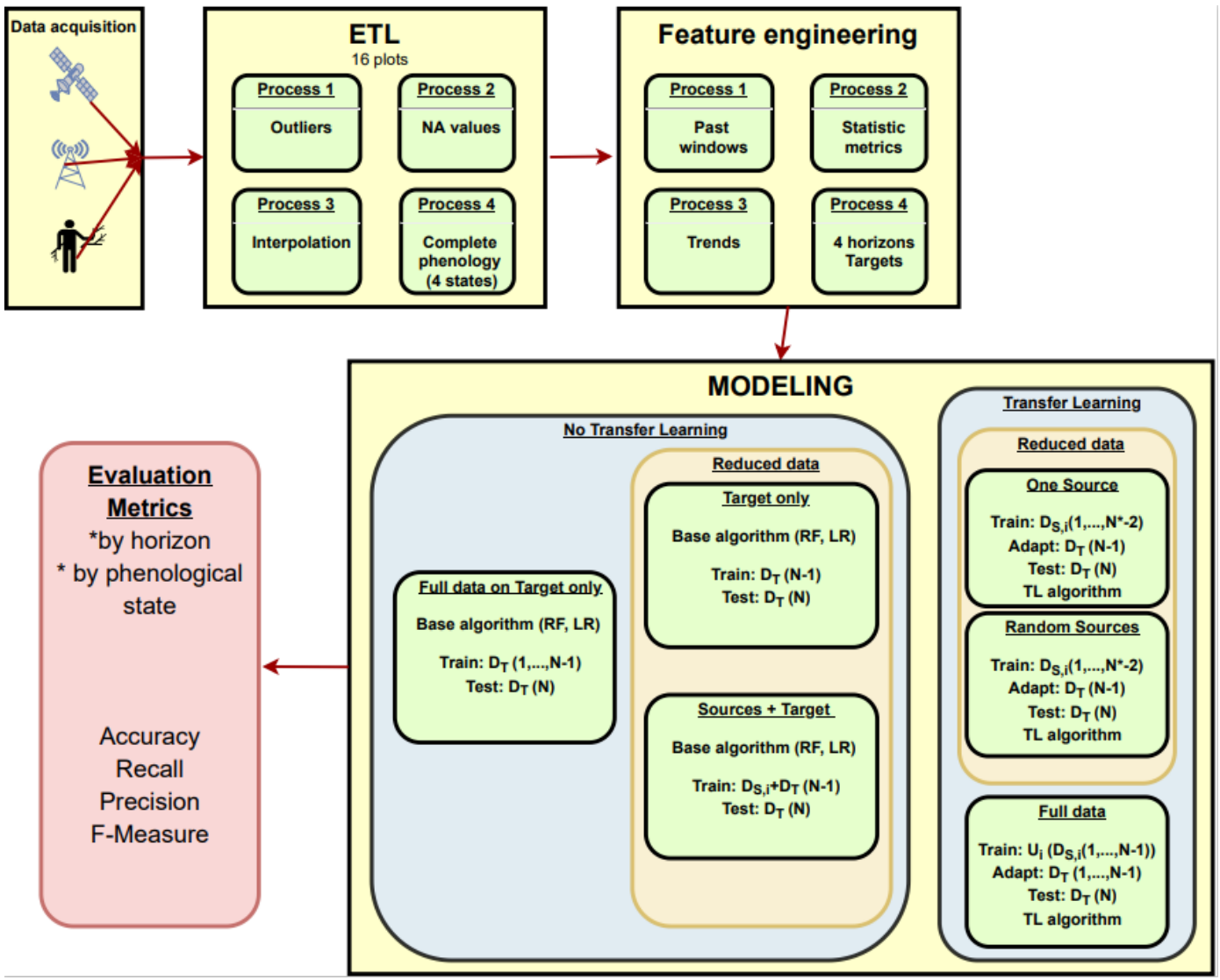


Transfer Learning

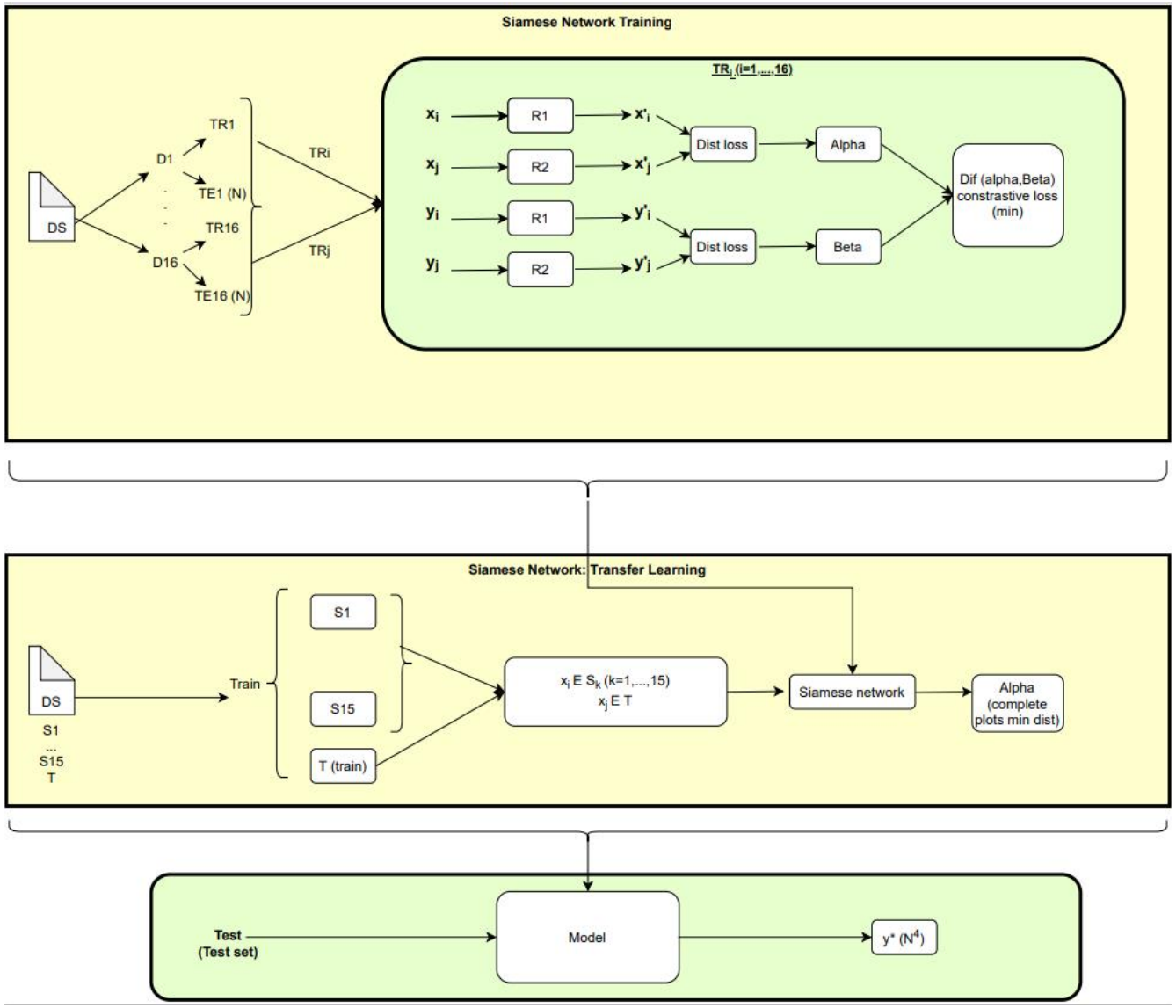




Metodología general



Redes siamesas



Resultados

BASE	TRANSFER	Acc	Recall	Prec	F1
None	STRUT	74.69%	48.65%	45.89%	47.23%
	SER	72.22%	45.90%	44.54%	45.21%
	MIX	73.53%	47.48%	44.61%	46.00%
	TreesMixedEntropy	74.54%	48.10%	46.18%	47.12%
	NaiveBiasRegularizator	59.50%	28.21%	21.51%	24.41%
	NaivePruningTree	79.69%	47.39%	46.63%	47.01%
	NaiveRelabelingTree	78.13%	45.80%	45.45%	45.62%
LR	(Only Target reduced - no TL	68.63%	43.82%	42.68%	43.24%
	(Only Target complete - no TL)	73.50%	55.62%	47.00%	50.95%
	(Source + Target complete - no TL)	75.18%	58.61%	49.19%	53.49%
	CORAL	69.77%	48.22%	43.97%	46.00%
	KMM	70.36%	48.31%	43.77%	45.93%
	TCA	47.12%	26.19%	26.91%	26.54%
	ConsensusRegularization	67.74%	41.37%	40.77%	41.07%
	FEDA	57.23%	34.09%	34.17%	34.13%
	TrBagg	63.41%	39.76%	38.29%	39.01%
	TrAdaBoost	59.68%	41.16%	36.46%	38.67%
	SIAMESA	**85.73%**	**69.82%**	**61.89%**	**65.62%**
RF	(Only Target reduced - no TL)	78.44%	47.26%	46.74%	47.00%
	(Only Target complete - no TL)	87.25%	63.55%	61.10%	62.30%
	(Source + Target complete - no TL)	88.51%	63.47%	64.58%	64.02%
	CORAL	83.12%	54.91%	54.75%	54.83%
	KMM	86.24%	57.24%	56.87%	57.05%
	TCA	52.51%	26.88%	27.91%	27.39%
	ConsensusRegularization	81.44%	47.82%	50.78%	49.26%
	FEDA	85.22%	53.56%	56.41%	54.95%
	TrBagg	85.28%	53.89%	54.37%	54.13%
	TrAdaBoost	86.40%	58.17%	58.10%	58.13%
	SIAMESA	**90.19%**	**67.76%**	**70.75%**	**69.22%**

Conclusiones

- Las técnicas de Transfer Learning mejoran la predictibilidad de los modelos.
- Las redes siamesas es una herramienta útil que mejora los resultados con la metodología tradicional de Transfer Learning.
- Esto permite extender la inteligencia artificial a campos donde el histórico de datos todavía no es amplio.

Referencias

- Zhuang, F., Qi, Z., Duan, K., Xi, D., Zhu, Y., Zhu, H., ... & He, Q. (2020). A comprehensive survey on transfer learning. Proceedings of the IEEE, 109(1), 43-76.

- M. Á. Molina, G. AsencioCortés, J. C. Riquelme, and F. Martínez-Álvarez. ‘A preliminary study on Deep Transfer Learning applied to image classification for small datasets’. SOCO 2020

THANKS FOR YOUR ATTENTION

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