FEDER Fondo Europeo de Desarrollo Regional

OFICINA Acelera pyme

eurecat Centro Tecnológico

JORNADA:

Intel·ligència Artificial al sector agroalimentari: reptes i solucions

Dimarts 28 d'Abril | 11.30h

Presencial

FoodLab - Centre d'Innovació Gastronòmica Industrial (Riudellots)

Cofinanciado por la Unión Europea

MINISTERIO DE HACIENDA

Fondos Europeos

GOBIERNO DE ESPAÑA MINISTERIO PARA LA TRANSFORMACIÓN DIGITAL Y DE LA FUNCIÓN PÚBLICA SECRETARÍA DE ESTADO DE DIGITALIZACIÓN E INTELIGENCIA ARTIFICIAL

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Benvinguda i presentació

Lluís Surroca

Responsable de consultoria de transformació digital

Eurecat

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Intel·ligència Artificial al sector agroalimentari: reptes i solucions

AGENDA

11:30h – 12:00h: Café de Benvinguda i Registre

12:00h – 12:10h: Benvinguda a la sessió i presentació del programa Acelera Pyme.

A càrrec de **Lluís Surroca**, Responsable de consultoria de transformació digital a Eurecat

12:10h – 12:40h: Intel·ligència Artificial al sector agroalimentari: reptes i solucions

A càrrec de **Pol Torres,** Cap de la línea d' Intel•ligència Artificial Aplicada a agroalimentació i energia a Eurecat

12:40h – 12:55h: Cas d'èxit NOEL | La IA aplicada al procés de curació

A càrrec de **Jaume Planella**, Director corporatiu de R+D+I de NOEL

12:55h – 13:00h: Torn obert de preguntes

13:00h: Clausura de l'acte

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Oficina Acelera Pyme Girona

El teu punt de trobada amb la transformació digital

01. Com et podem ajudar?

Serveis 100% gratuïts per a pimes i autònoms de la província de Girona

SERVEIS

Primera orientació i ASSESSORAMENT
Resolt els teus dubtes sobre la digitalització i les ajudes

DIAGNÓSTICS general i d'especialització tecnològica
En quin punt ets? Quins són els propers passos?

- Ajudes i finançament, estratègia i governança de dades i IA, automatització i assistents IA, fabricació 3D, robòtica, ciberseguretat

MENTORIES
T'orientem per fer realitat la teva idea

RECURSOS

Programa de JORNADES
Jornades de difusió i promoció de l'ús de tecnologies

LABORATORI fabricació i impressió 3D
Assessorament i primera prova de concepte

BUTLLETINS vigilància tecnològica
Informació sobre tendències de tecnologies digitals i emergents

MAPA de proveïdors local
Coneix i accedeix als proveïdors tecnològics del teu entorn

02. Com ho fem?

Contacta amb nosaltres i dona-li un impuls a la teva pime

SCAN ME

Estàs a només un click del canvi!

Oficina Acelera Pyme Girona

Parc UdG, Edif. Giroemprèn

C/ Pic de Peguera, 11. Girona.

info.acelerapymegirona@eurecat.org

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Intel·ligència Artificial al sector agroalimentari: reptes i solucions

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AI IN THE AGRIFOOD SECTOR

Optimization of resources
- Stocks/storage management
- Management of work force

Fleet management
Supply chain management
Agricultural robotics

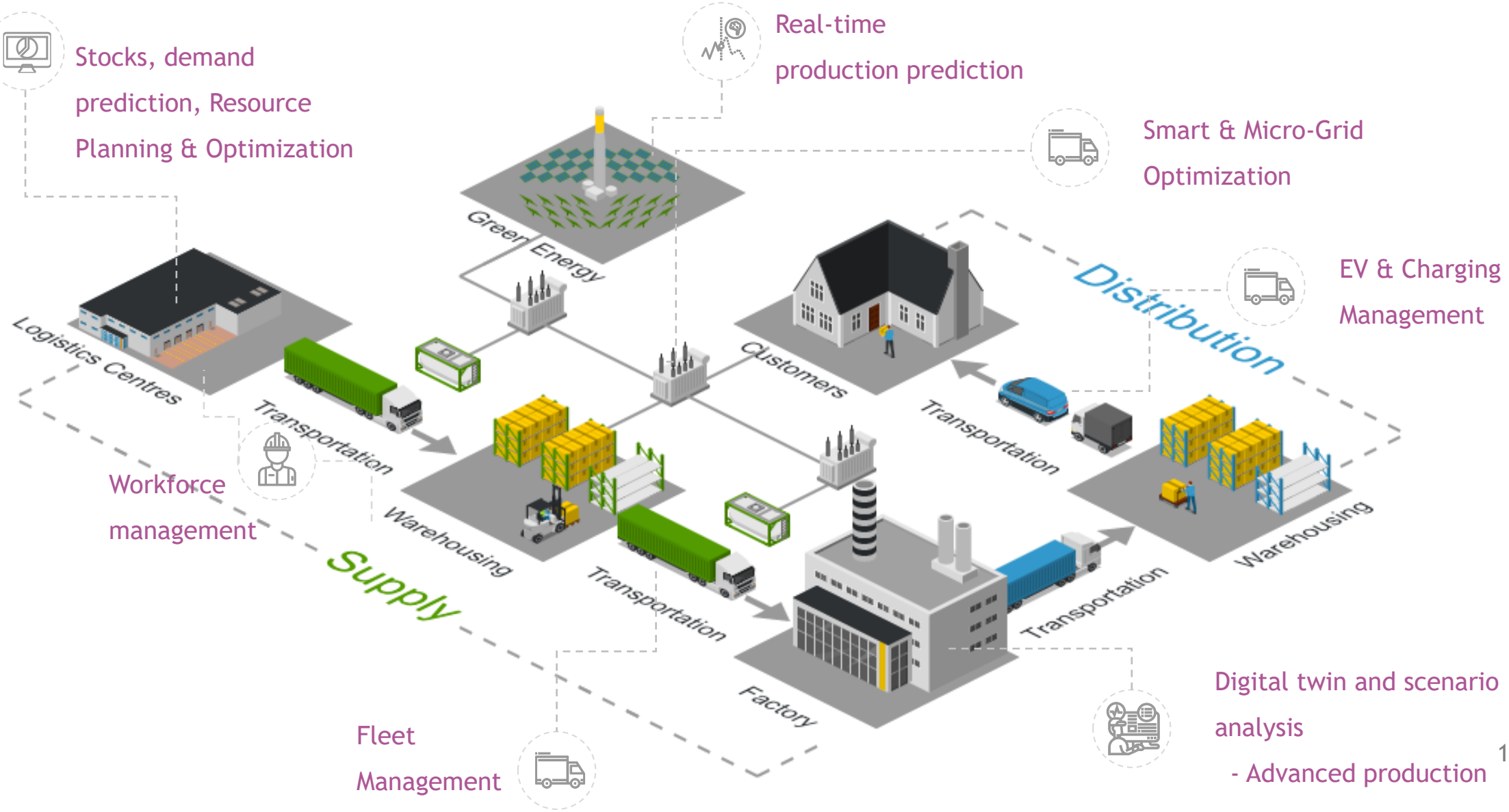
Precision agriculture
- Prediction of crop performance
- Better management of farms

Compliance and quality prediction
Traceability

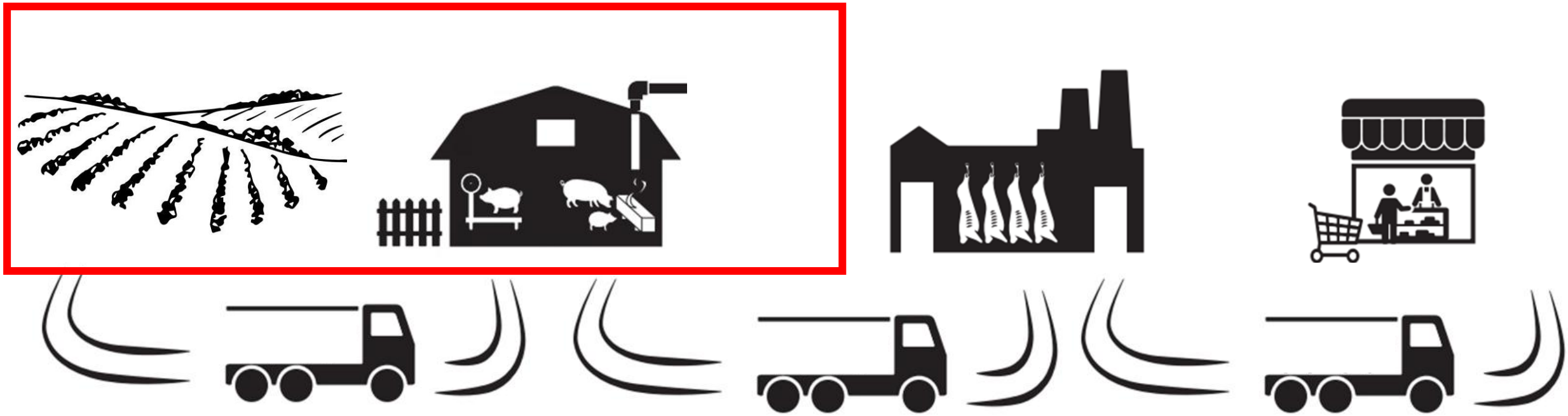
Early warnings: animal welfare, phenology, emissions, meteorology...

Digital twin and scenario analysis

INDUSTRY & LOGISTICS HOLISTIC APPROACH



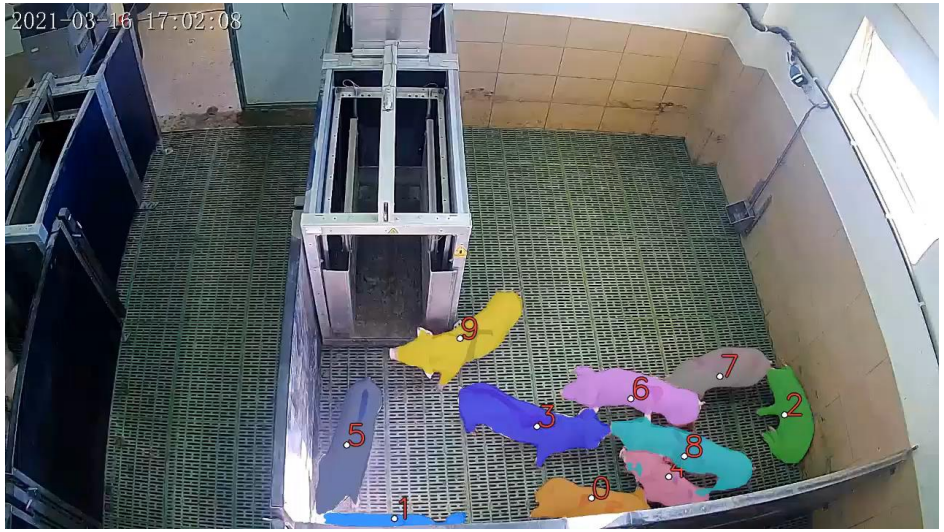
AI IN THE FARM

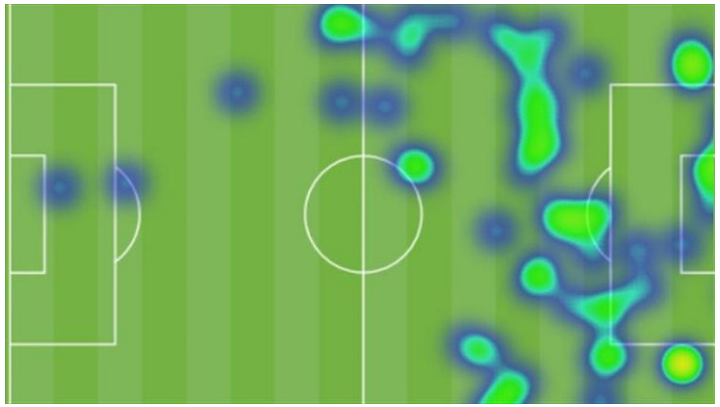


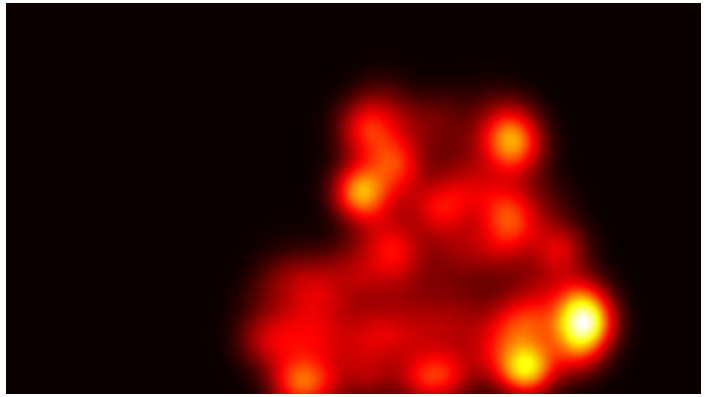
COMPUTER VISION

eurecat

Animal welfare







Centre de Visió per Computador

Centre d'Estudis Porcins

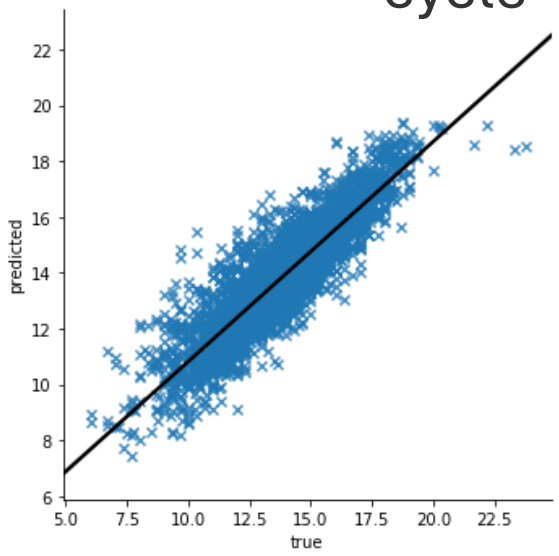
CIDAI Centre of Innovation for Data tech and Artificial Intelligence

PREDICTIVE MODELS

Sow farms productivity increase by creating a **ranking of sows by productivity** indexes and **recommending pig replacement** according to it.

Technologies

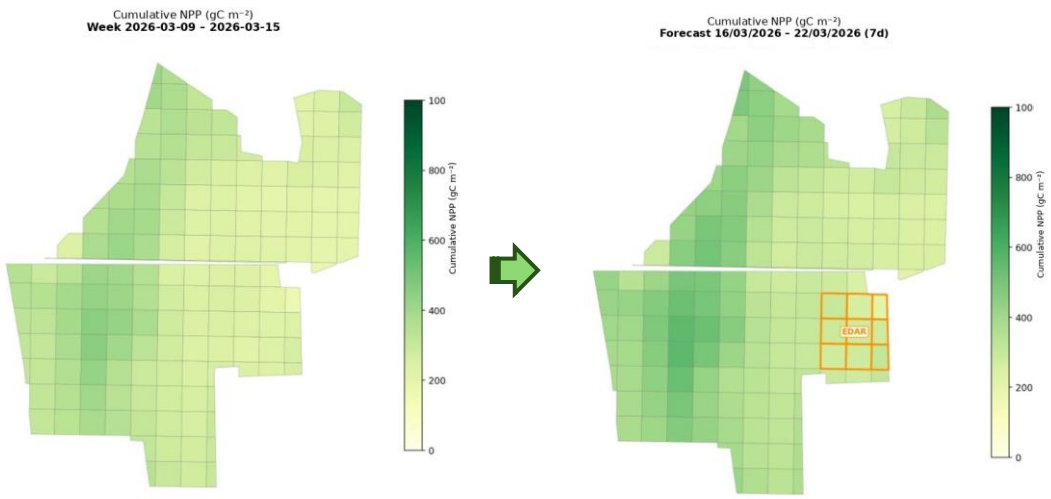
- Data analytics
- AI
  - Predictive algorithms
  - Clustering
  - Pattern recognition

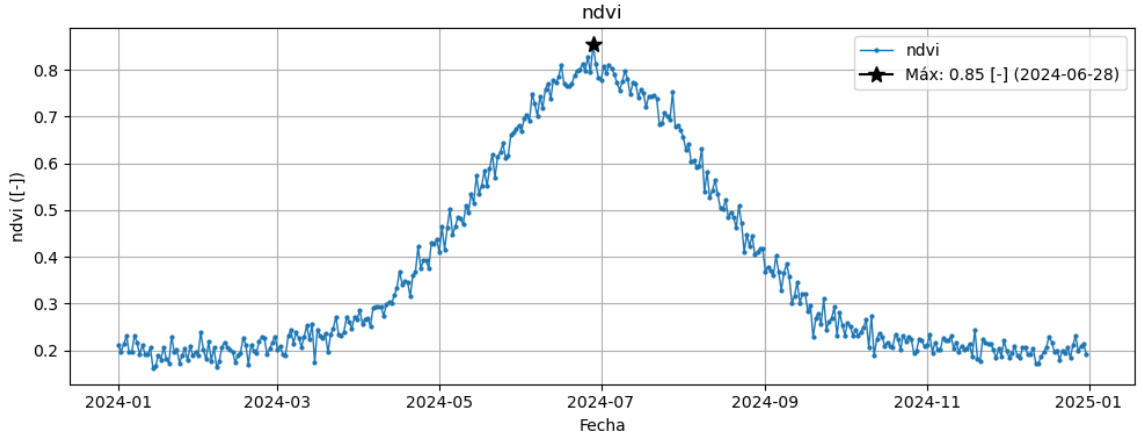


Prediction of a productivity index for next cycle

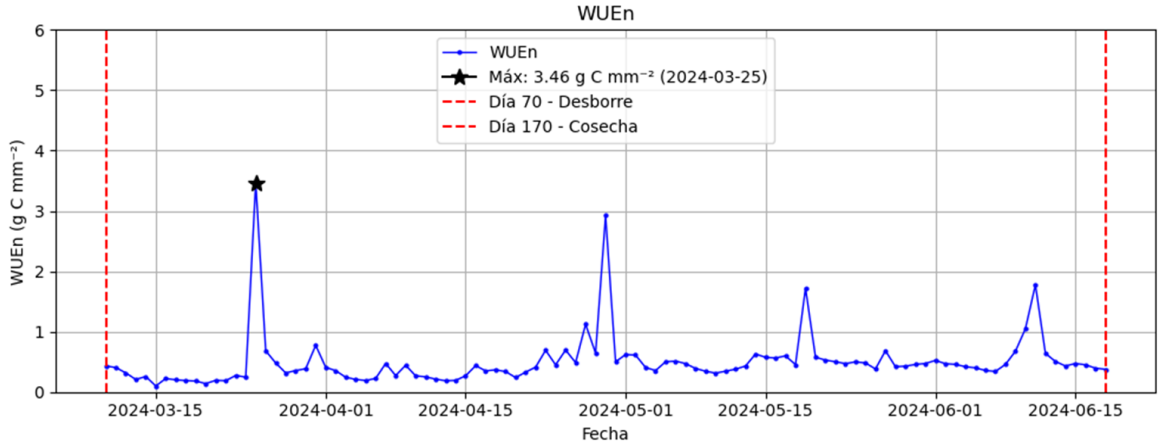
CROP INDICATORS

Advanced data tools to obtain NVDI, WUE, Soil erosion, Surface humidity, Net Primary Production





Normalized Difference Vegetation Index (NDVI) ≈ Concentration of chlorophyll on the top



Normalized Photosynthetic Water Use Efficiency = grams of fixed Carbon per crop, for each mm of water evapotranspiration

Tools:

- Earth observation (EO)
- Data analysis
- Deep learning

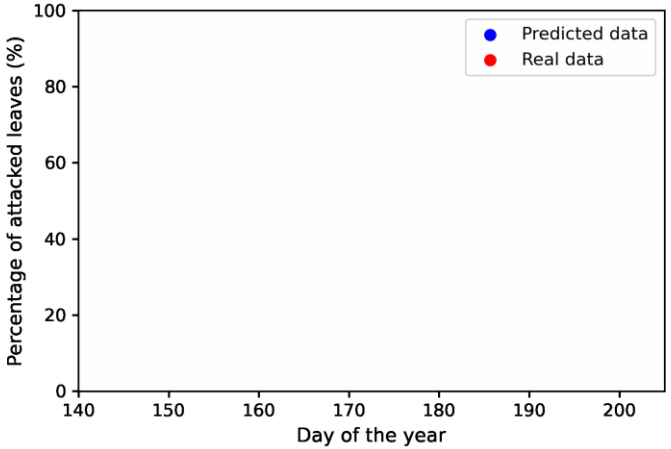
EARTH OBSERVATION AND DEEP LEARNING

Pest and disease prediction

Climate conditions

Vineyard status

Field observation

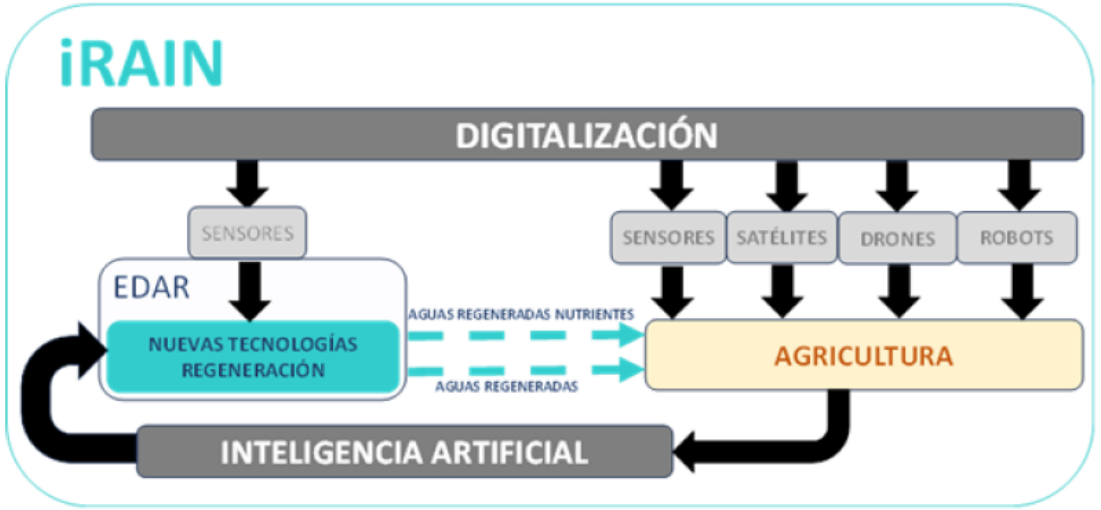


Pest risk index

Treatment recommendation

WATER USE OPTIMIZATION

Virtual sensors for monitoring and predicting effluent quality parameters (NO_3, NH_4, N_tot, P_tot, EC, flow) at d+7 and d+14 horizons, enabling anticipatory fertigation management. Real-time DSS coupling satellite-derived crop water demand with WWTP effluent quality, delivering weekly fertigation prescriptions per management zone.

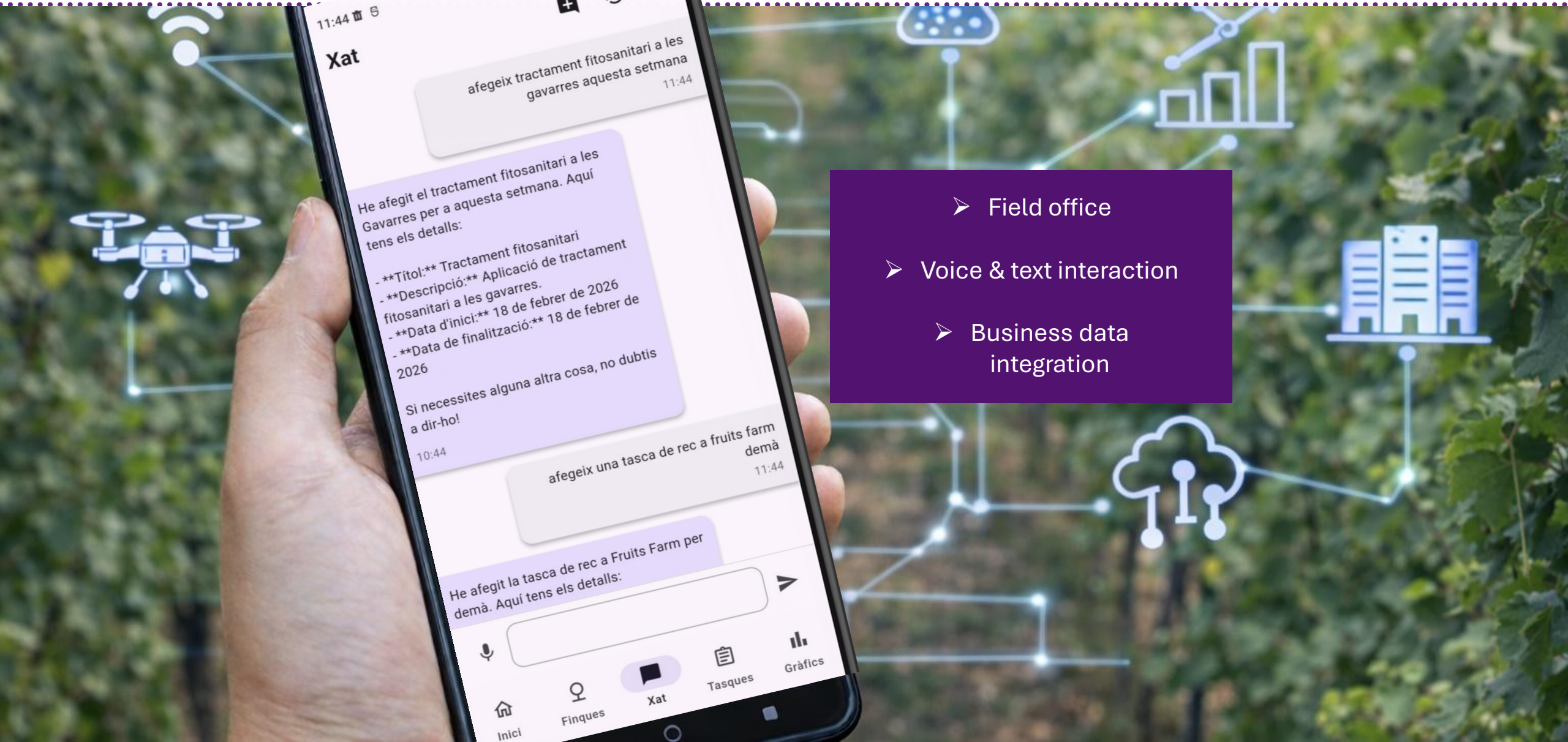


Tools:

Earth Observation (Sentinel-2 biophysical cascade: NDVI → fPAR → GPP → NPP → ETr → WUE) and ensemble ML (MLP, XGBoost, LightGBM) forecast crop demand at d+7 for both zones.

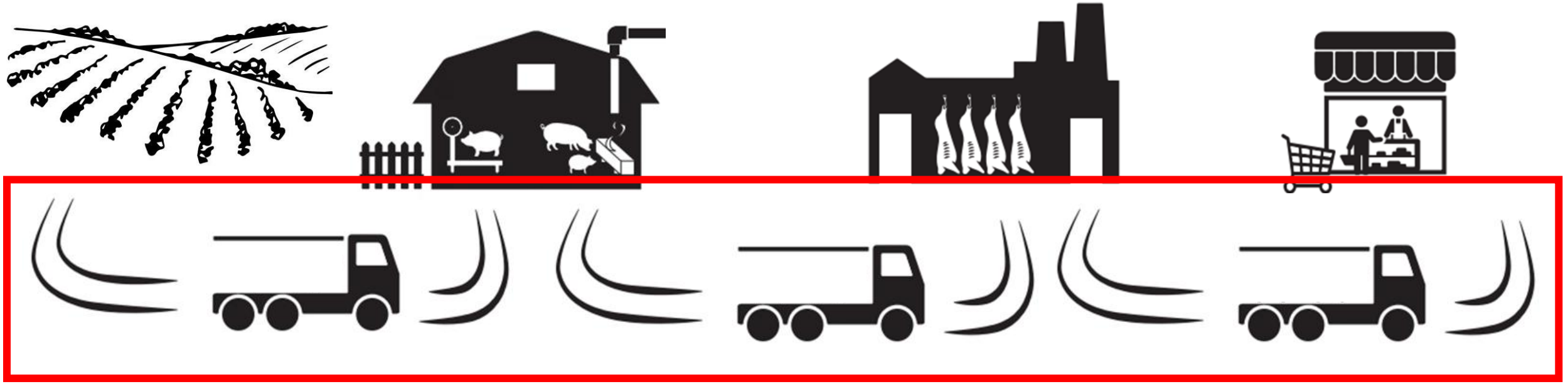
iRain
TransMisiones

AGENTIC-AI



- Field office
- Voice & text interaction
- Business data integration

AI IN LOGISTICS



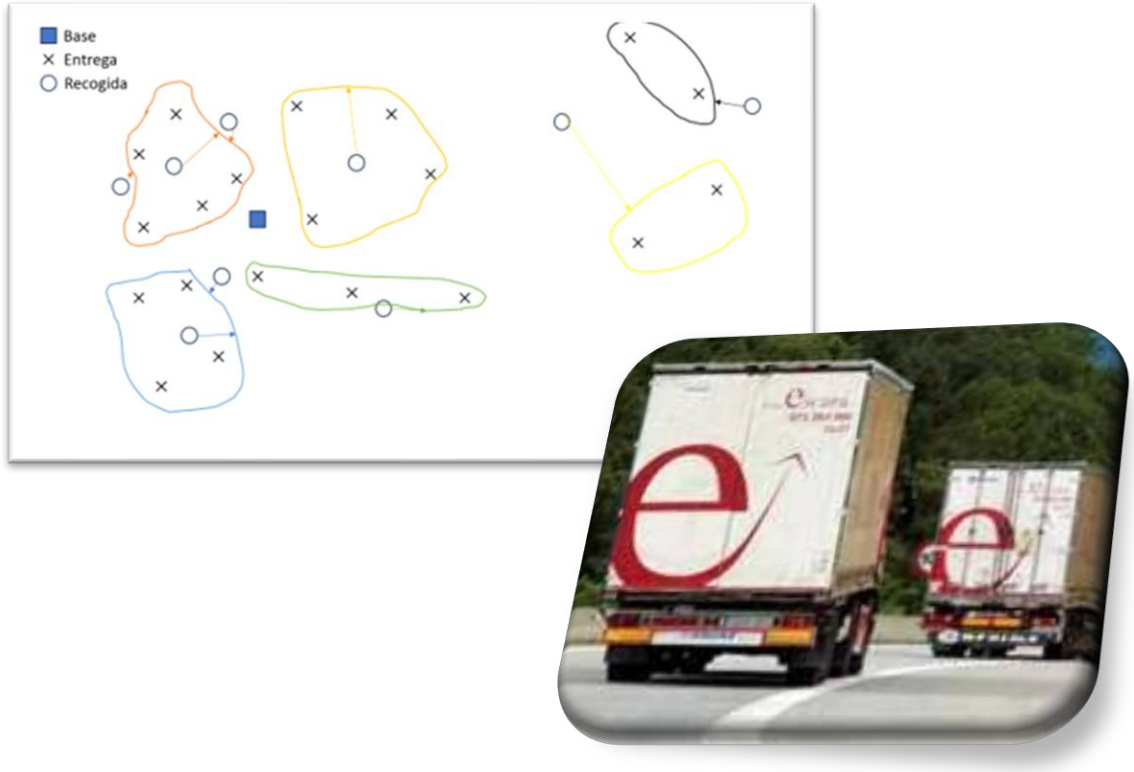
OPTIMIZATION FOR LOGISTICS

Intelligent tools to analyze data and propose a new global response to the challenges (stock reading, understanding of orders and weight of each customer in billing, optimization logistics...)

Use Case: Distribution of deliveries and collections between the vehicles of the fleet. Also, distribution of the vehicles in the warehouse's docks.

Technology:

- Data analytics
- Constrained Optimization

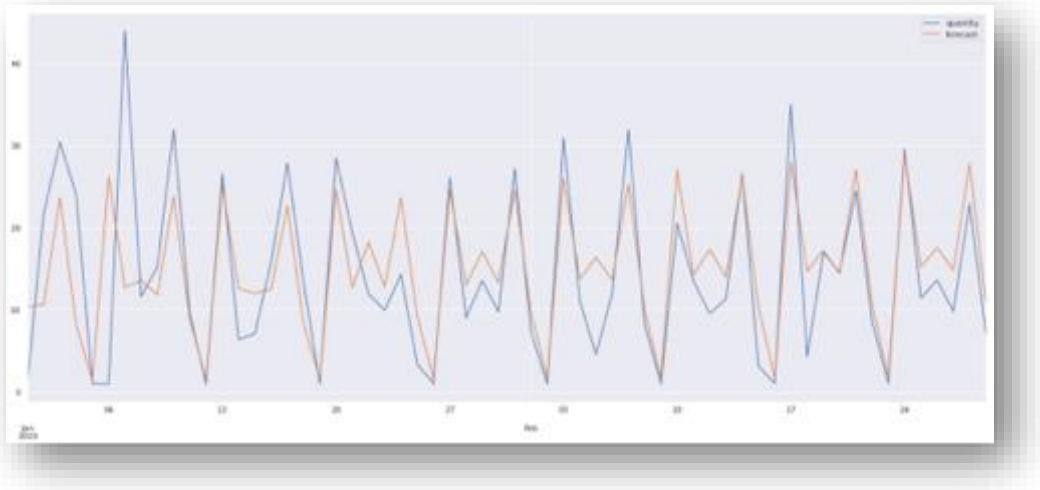


OPTIMIZATION – FOOD LOGISTICS

Correlation within the time series of the issued products, the anomalies analysis during their distribution and the observation of all their daily operations to provide an early warning system

- **Tasks**: Detection of anomalies before delivery, demand prediction system and study of daily operations for the implementation of an early warning system.

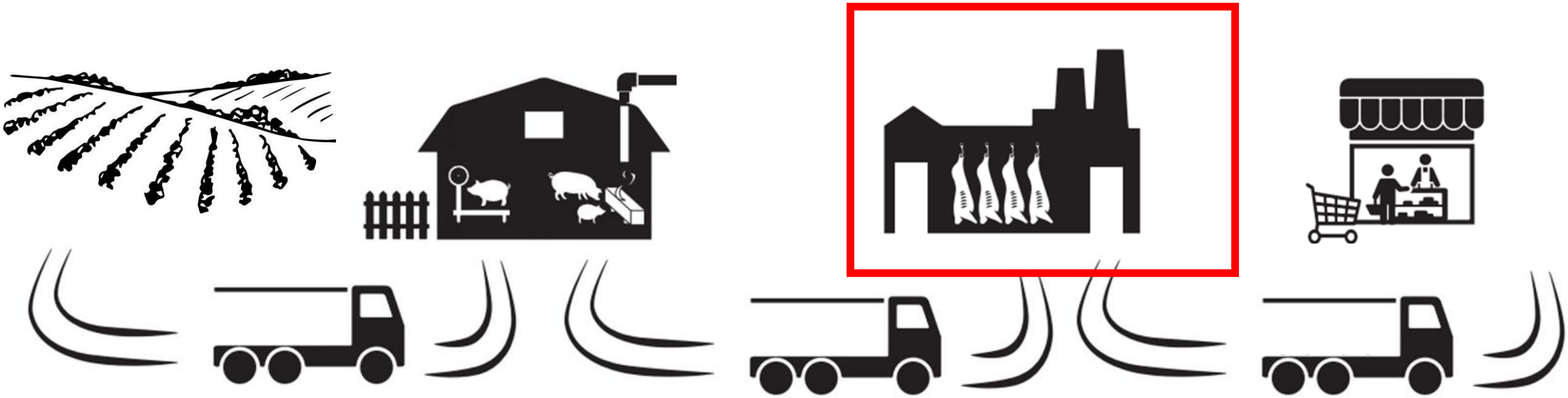
- **Benefits**:
  - **Detect the anomalous potential of an order** allowing to act and solve the problem in advance
  - Short and medium term **demand prediction** to optimize the warehouse content and transport needs
  - Provide **alerts of unforeseen events** on daily operations, allowing them to be managed or even prevented



Technologies:

- Multi-object demand forecasting with ARIMA, SVR, XGBoost and RecurrentNN adaptations
- Anomaly detection with Isolation Forest and logical rules for the detection of unexpected events.

AI IN THE FACTORY



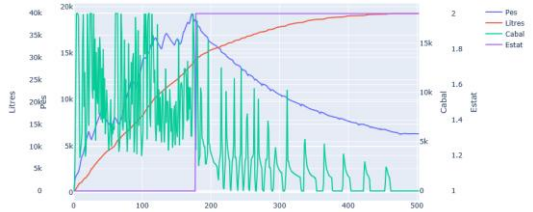
WINE PRESSING IMPROVEMENT

Physical world

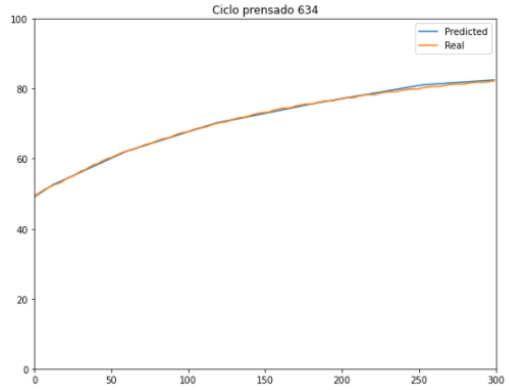
Digital world

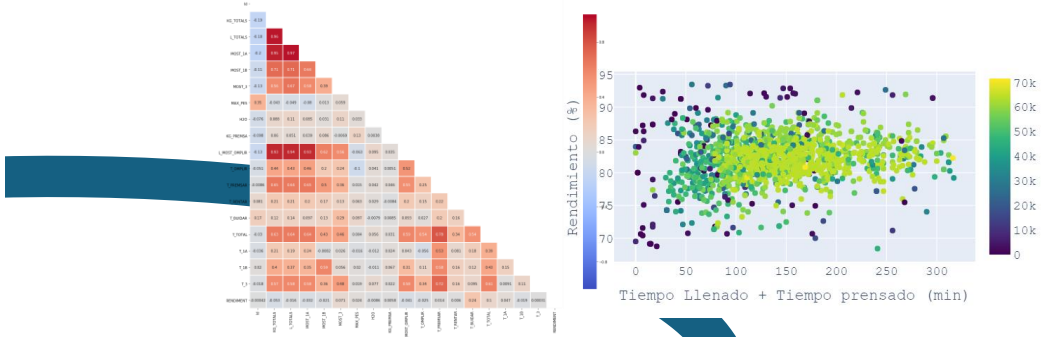
Reduction of 30% of pressing time, with an efficiency lost of only 2%

Historical data

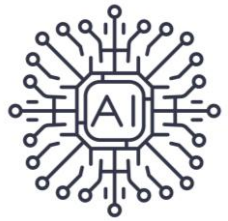


Prediction of the pressing performance curve





Analysis and data preprocessing



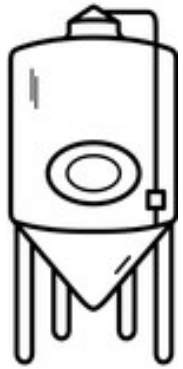
ANOMALY DETECTION AND VIRTUAL SENSORS

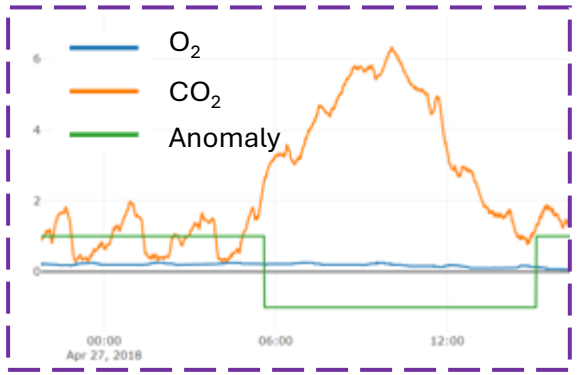
Detection of anomalous patterns in sensors and the use of virtual sensors to replace the erroneous value of a sensor in drift / failure to improve monitoring and decision-making in industrial environments.

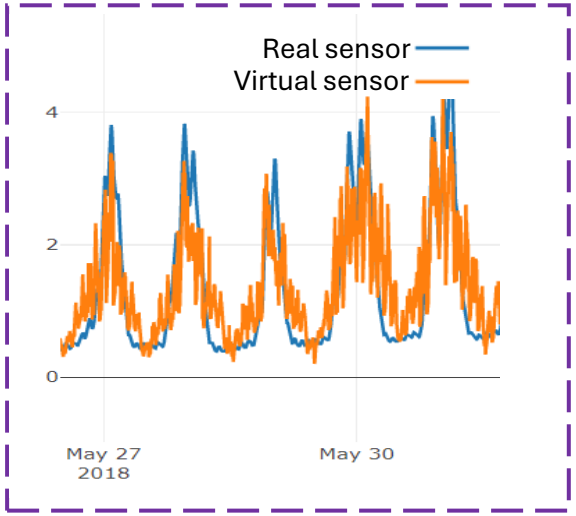
Use Case: Alert of anomalous behaviors to avoid incorrect decision making. Virtual sensors to replace erroneous values or replace a faulty sensor, improving decision making.

Technology:

- Isolation Forest for anomaly detection
- Ensembled methods for virtual sensors
- FIR and MAD filtering algorithms.







PREDICTIVE MAINTENANCE

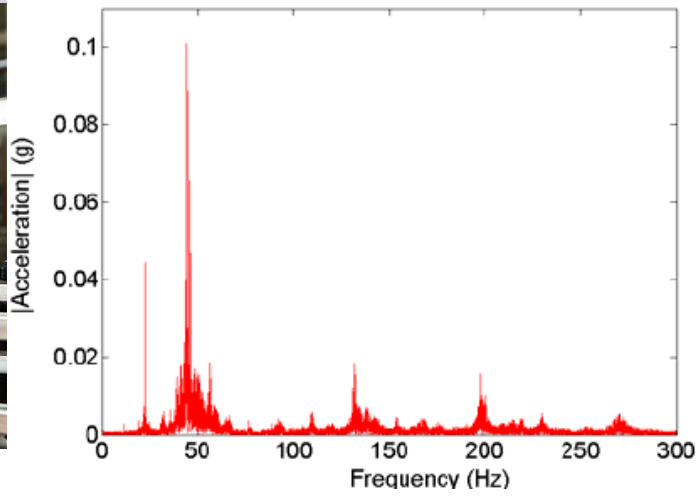
Predicting conveyor belt bearing wear by vibration analysis

Use Case: Increase the OEE of the production line by reducing the number of unexpected stoppages associated with bottle breakages.

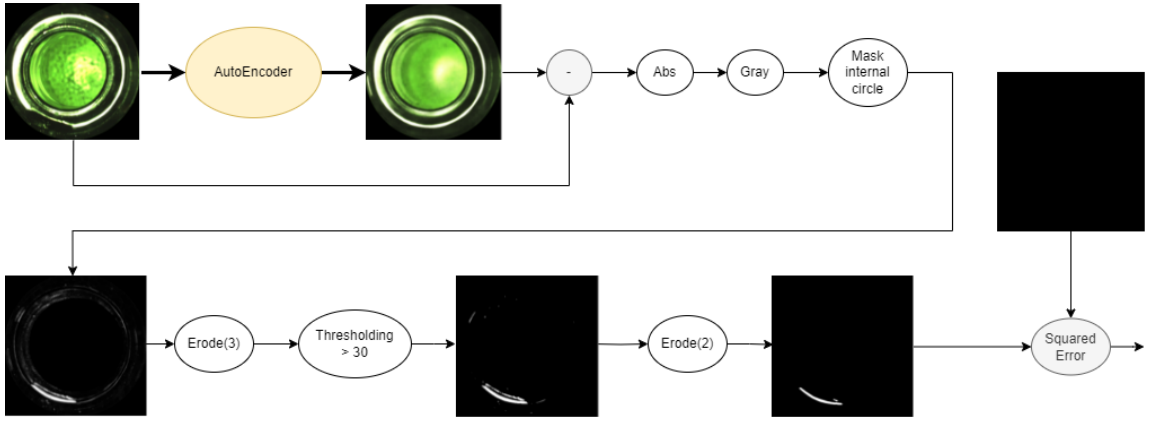
Technology:

- Anomaly & novelty detection
- Unsupervised ML
- Ensemble methods

- Signal processing
- Pattern recognition
- Anomaly & novelty detection
- Unsupervised ML
- Ensemble methods



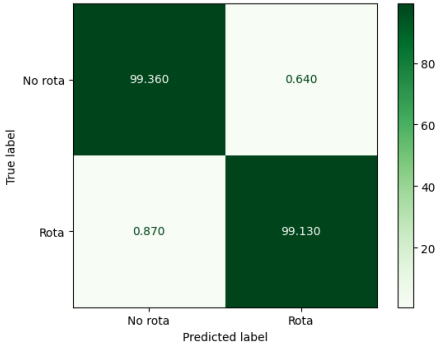
Detect breaks in the mouth of the bottle during the disgorging process



Use Case: Minimizing food safety risk by full inspection of all sparkling wine bottles.

Technology:

- Deep Learning: CNN

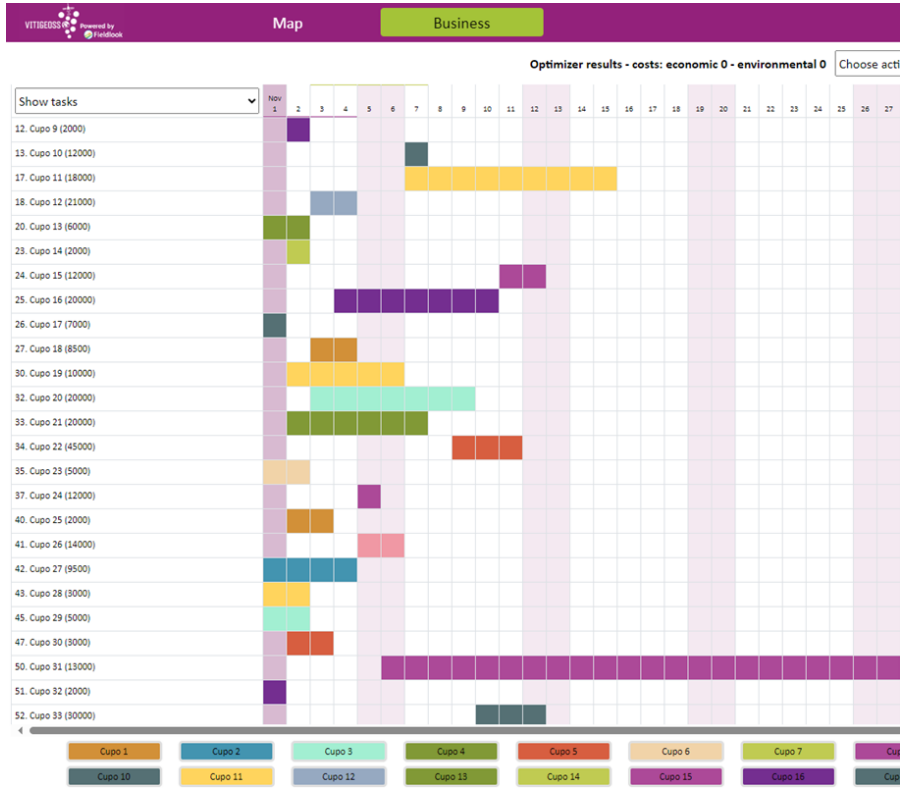


OPTIMAL MANAGEMENT OF RESOURCES

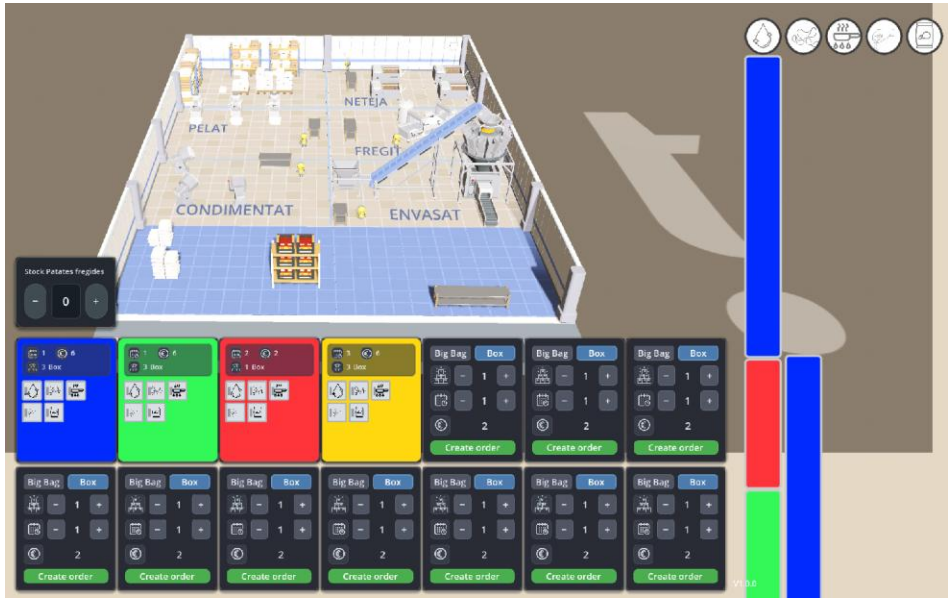
Resource optimization and sustainability indicators - Dynamic resource planification to improve operations, planning and resource requirements by reducing the use of raw materials.

Technology:

- Data: Open data, historical data
- Models: Linear optimization
- Architecture: Field repository, internal server, Docker, API REST.
- Interoperability (API Service Store)



Pabellón 5 – Nivel 0 – Calle D – Stand 4



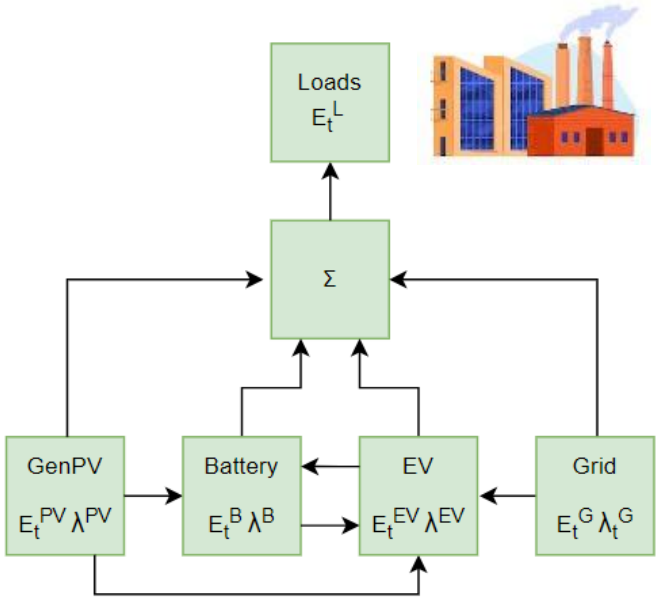
ENERGY OPTIMIZATION

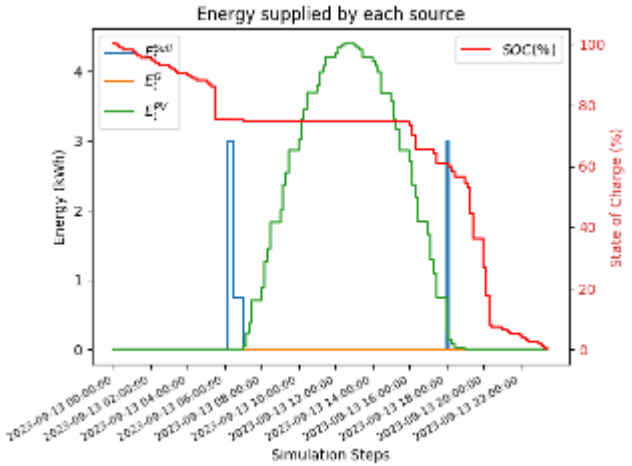
Smart energy management: loads, sources, storage, EV, grid

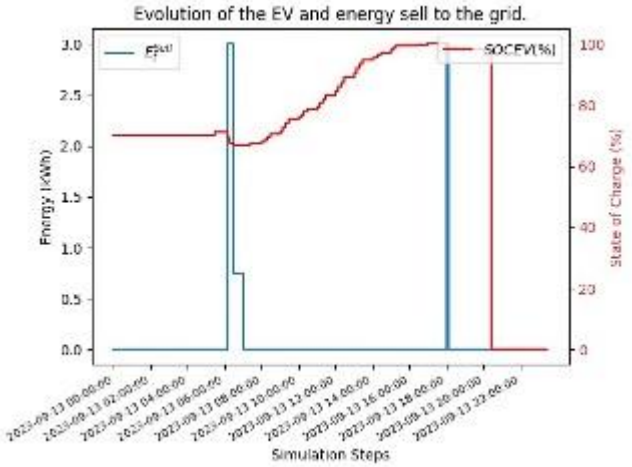
Use Case: Optimize the distribution of energy among different elements such as consumers, grid, EV, batteries and RESs in a residential house or building.

Technology:

MILP model for EMS in conjunction of ML models to predict the prices of electricity and energy generation from the RES.

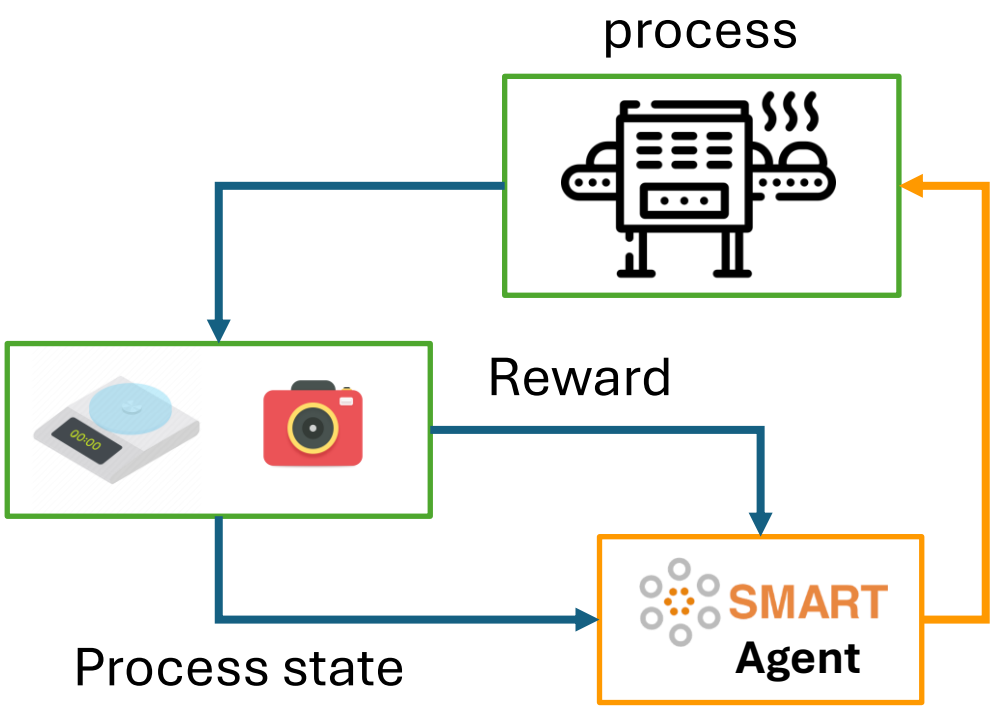




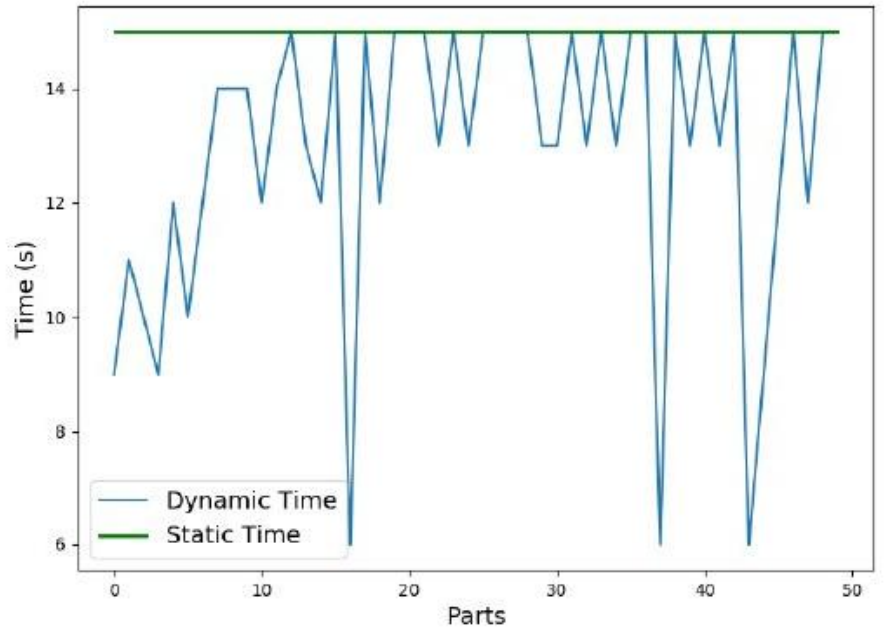


MILP - Mixed Integer Lineal Programming
RES - Renewable Energy Sources
EV - Electric Vehicle
EMS – Energy Manage System

PROCESS MODELLING AND CONTROL

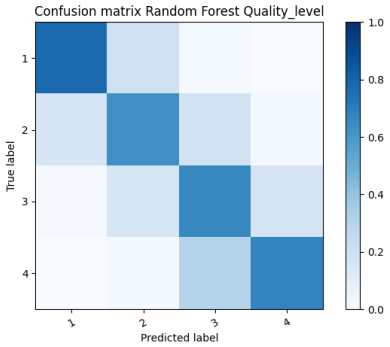


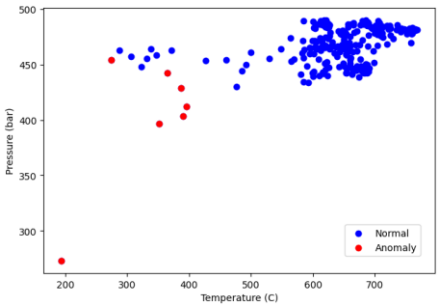
Dynamic optimization and in real time with reinforcement learning (RL) → AUTONOMOUS PLANT CONTROL

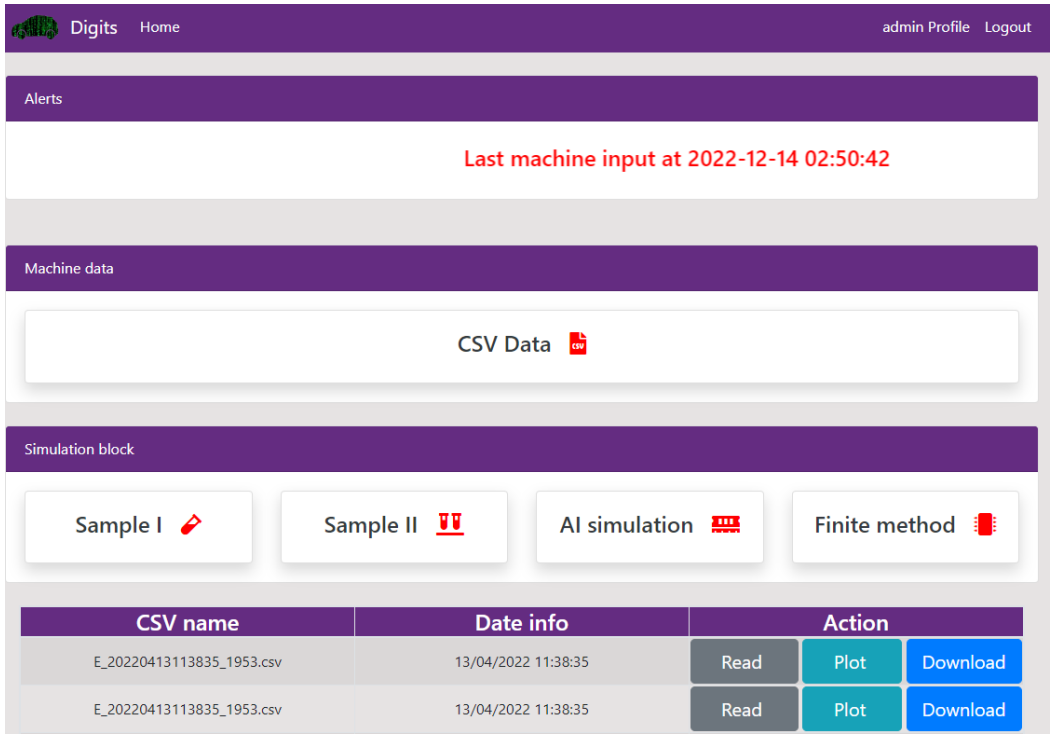


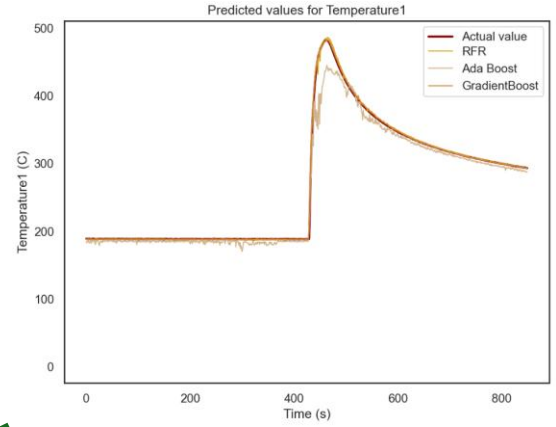
DIGITAL TWINS

User in the loop









CSV name	Date info	Anomaly	Check Quality	Action
E_20220413113835_1953.csv	13/04/2022 11:38:35	⚠	The predicted quality is 3 Accuracy of 75%	Temp VS / 4D plot (P) / 4D plot (T)
E_20220413111935_1942.csv	13/04/2022 11:19:35	✓	The predicted quality is 3 Accuracy of 75%	Temp VS / 4D plot (P) / 4D plot (T)

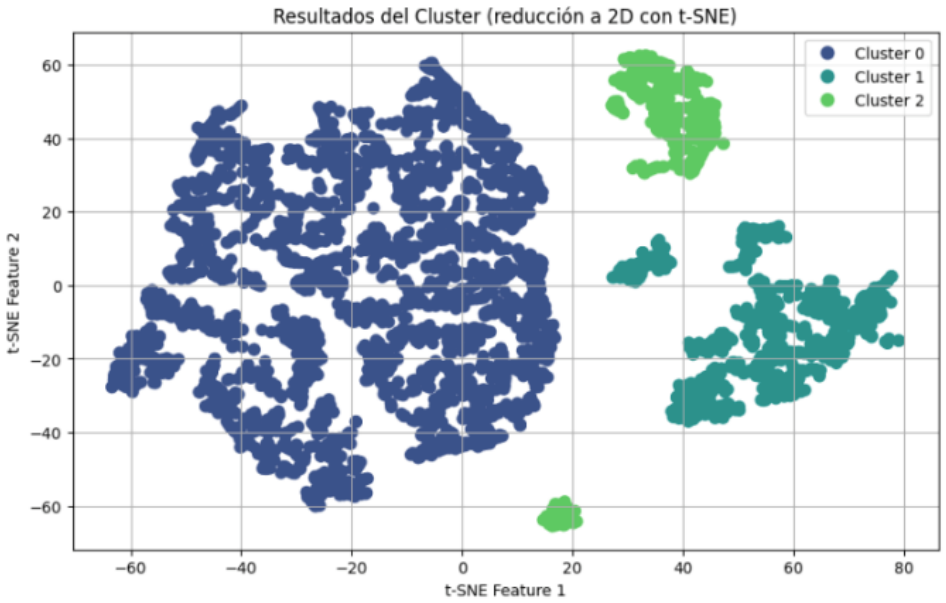
AI FOR END USERS

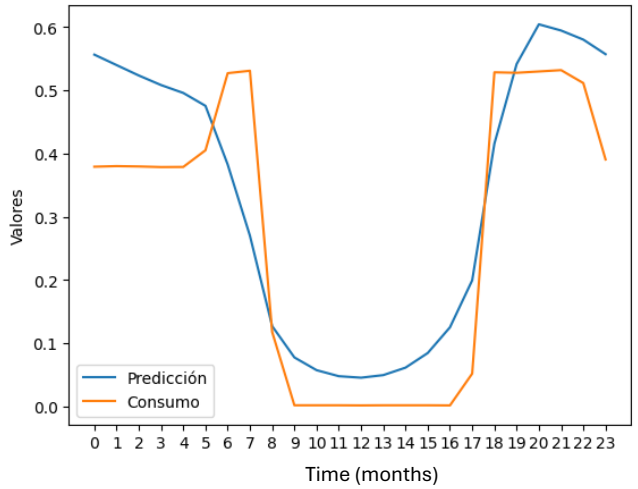
CLIENT SEGMENTATION

Identify consumption patterns and classify behaviors for a more accurate representation of the clients

Technology:

- Data analytics, Data fusion & Feature engineering
- Time series analysis
- Optimization
- Supervised ML





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JORNADA:

Intel·ligència Artificial al sector agroalimentari: reptes i solucions

Dimarts 28 d'Abril | 11.30h

Presencial

FoodLab - Centre d'Innovació Gastronòmica Industrial (Riudellots)

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CAS D'ÈXIT: NOEL
La IA aplicada al procés de curació

Jaume Planella
Director corporatiu de R+D+I
NOEL

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Consulta la programació de jornades a:
https://acelerapymegirona.eurecat.org/ca/jornades/

Contacta amb nosaltres i dona-li un impuls a la teva pime

Oficina Acelera Pyme Girona

Parc UdG, Edif. Giroemprèn

C/ Pic de Peguera, 11. Girona.

info.acelerapymegirona@eurecat.org

Estàs a només un click del canvi!

SCAN ME

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Gràcies!

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