

Predictive *maintenance* in air conditioning systems

Smart OTEA SE-01

H2020 SOCIETAL CHALLENGES: Climate action, environment, resource efficiency and raw materials

PRODUCTIVE SECTOR: Energy and Environment

PROBLEM DESCRIPTION

Implement improvements in the OTEA platform, developing an algorithm which predicts incidence risk in the air-conditioning system, taking the machine's operating mode into account (cooling or heating).

CHALLENGES AND GOALS

Representation of the forecast of incidents on a map to create a heat map for air conditioning systems.

MATHEMATICAL AND COMPUTATIONAL METHODS

Proposed model

Use of the generalized additive models, GAM, to predict response variables from observations:

- As covariables, for modelling the cooling regime, the maximum daily ambient temperature of the previous day, the average daily climate consumption before opening and the member of the last days with incidents are included.
- The model for the heating regime includes the number of the last five days with incidents, the average daily temperature and the daily average climate consumption before the opening.



OTEA controls, monitors and manages energy, like a “business intelligence”

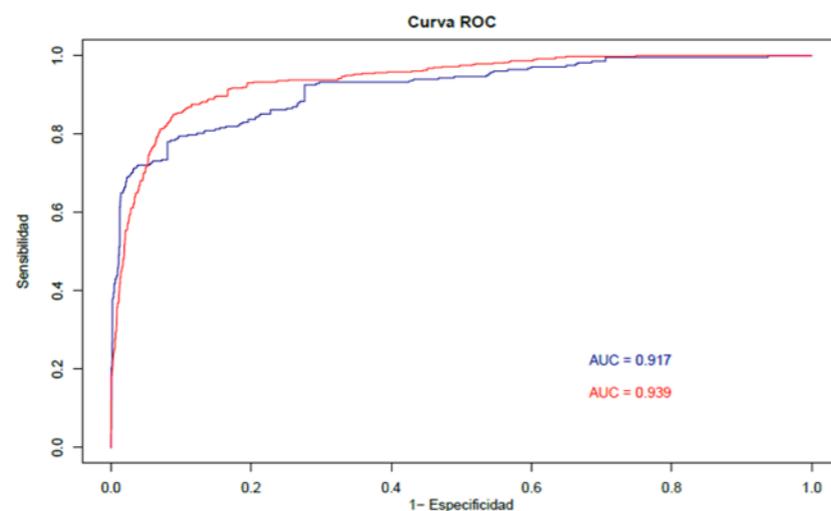
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Results and Benefits

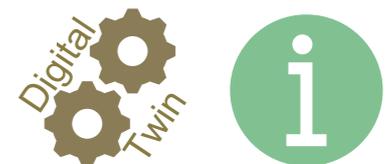
The knowledge foundation that has been created is exploited to represent on the map the geographical distribution of the incidents according to size.

It shows, with a high degree of reliability, which commercial premises could pose problems throughout the day. Through the forecasting of potential incidents, which can be obtained before opening hours, and taking into account the number of machines each shop is equipped with, a list of the stores that are most at serious risk are provided.



ROC curves for the cooling model (blue line) and for the heating model (Red line)

Reduction in corrective maintenance costs, which are directly related to failure forecasting in air-conditioning systems.



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Spanish Network for Mathematics & Industry (math-in)



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