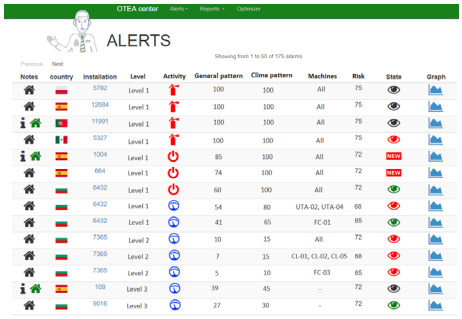
Fortissimo Success Story

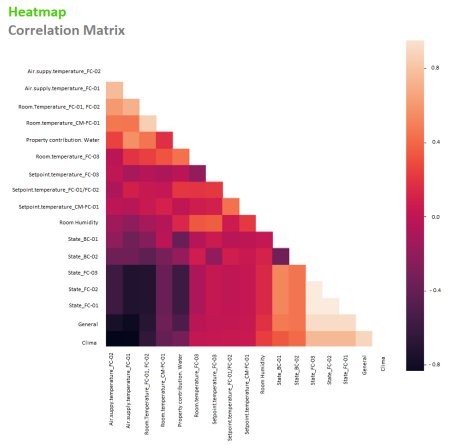
FORTISSIMO

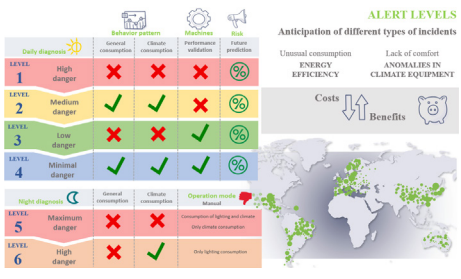
Improvement of the remote expert system based on software OTEA

Fortissimo Experiment Facts:

- Industry Sector: **Energy**
- Country: **Spain**
- Software Used: **Cassandra, R, In house code**







ORGANISATIONS INVOLVED

EcoMT (End User), Spain, is an ICT company that develops and integrates remote control and monitoring of facilities.

CESGA (HPC Expert), Spain, is the centre for computing, high performance communications systems and advanced services.

GOMPUTE (HPC Provider), Sweden, a leading simulation and HPC solution provider.

ITMATI (Application Expert), Spain, is a Technological Institute for Industrial Mathematics that provides advanced solutions for businesses and collaborates with the Galician University of Vigo, which participated as an expert in statistical methods and algorithms.

THE CHALLENGE

Heating and cooling account for a half of the EU's energy demand. In order to fulfil its climate and energy goals, this sector must significantly reduce its energy consumption.

New facilities with a growing number of Heating, Ventilation and Air-conditioning (HVAC) machines producing huge amounts of data now operate in a regime where Machine Learning (ML) models and statistical techniques may be applied.

Before this experiment, a deterministic system with brute force conditions was applied to detect comfort anomalies in more than 3,000 installations worldwide, with 600,000 variables monitored resulting in 3 trillion records for 5 years. The challenge of this experiment was to replace the brute force solution with a superior MLmodel. Like the brute force model the ML model is numerically intensive and needs the use of HPC.

THE SOLUTION

EcoMT´s intention is to address maintenance management by using ML and statistical techniques, to create mathematical models through the analysis and processing of data from hundreds of devices and field sensors. This enables the anticipation of failures and the scheduling of predictive maintenance. These lead to the optimization of processes, the minimisation of downtime and costs and the more efficient use of energy. Due to these needs, the OTEA remote expert system (OTEAres) was developed as an expert remote management system with an aim for energy optimization through the premature detection of incidents based on historical records. HPC infrastructures offer the required capabilities to support these services and to provide scalable resources when required.

BUSINESS IMPACT

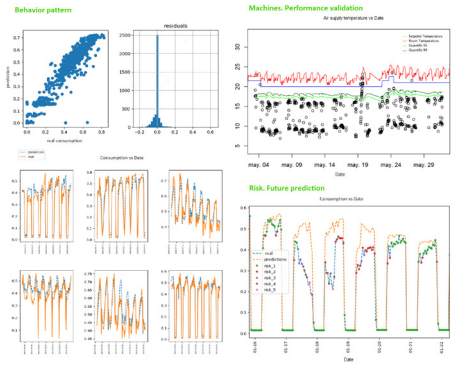
The savings of clients connected to the OTEAres platform operated by EcoMT, would be immediate using ML algorithms and HPC which is essential for real-time operations. OTEAres enables decision support in real time offering a 24/7 service through its control centre, which is the department in charge of controlling the proper functioning of the installations, remotely resolving incidents in the shortest time possible.

Fortissimo Experiment Partners:

- **EcoMT** (End User)
- **CESGA** (HPC Expert)
- **ITMATI** (Application Expert)
- **Gompute** (HPC Provider)

More Information:

www.fortissimo-project-eu
info@fortissimo-project.eu



Some of the most important results obtained are:

- The update of the deterministic previous version into a new ML model capable of predicting and organising a wider range of incidents.
- A reliable tool for preventing equipment failure situations that might compromise business activities.
- It is estimated an energy saving of 7% per installation, a reduction of 30% in preventive maintenance visits and a reduction of 20% in corrective maintenance.

As a direct consequence, commercial benefits are obtained:

- More than 20% of the incidents registered could be corrected remotely without the need for a technician.
- EcoMT customers can boast a Corporate Social Responsibility Plan and improve their trade image.
- Predictive maintenance will prolong the life of customers' HVAC machines and reduce the number that need to be replaced.
- It is estimated that OTEAres will drive a progressive implementation of electrical panels with enhanced features that will enable remote control. 50% of the facilities are not yet adapted for control. It is estimated that 20% of these facilities will be adapted in 1 year and 50% of these facilities in 3 years, with their subsequent management by EcoMT A A 1-year growth of 20% in EcoMT sales of electrical panels up to 50% over the next 3 years is anticipated.
- EcoMT expects to double the number of controlled facilities in the short term by extending this service to all actual connected installations and to quadruple this number in the long term, with an estimation to produce 1 million euros of total annual revenue.
- Knowledge about the practical performance and usefulness of the predictive models developed by ITMATI/UVigo in real industrial problems.
- Experience in the implementation of mathematical technologies in an energy efficiency context for ITMATI/UVigo.

BENEFITS

- EcoMT clients can expect to save up to 7% on their electricity bills due by using the monitoring system.
- More focus can be put on the implementation of control panels in facilities not yet monitored, with an estimation of € 15M of revenue for EcoMT in 5 years including sales of equipment, monitoring and incidence management.
- Managing current installations with OTEAres doubles the annual income to EcoMT, reaching €600.000 per year.

THE FORTISSIMO PROJECT

Fortissimo is a collaborative project that enables European SMEs to be more competitive globally through the use of simulation services running on a High Performance Computing cloud infrastructure. The project is coordinated by the University of Edinburgh and involves more than 100 partners including Manufacturing Companies, Application Developers, Domain Experts, IT Solution Providers and HPC Cloud Service Providers from 14 countries. These partners are engaged in over 90 experiments (case studies) where business relevant simulations of industrial processes are implemented and evaluated. The project is funded by the European Commission within the 7th Framework Programme and Horizon 2020 and is part of the I4MS Initiative.

I4MS Fortissimo is part of I4MS ICT Innovation for Manufacturing SMEs: www.i4ms.eu

This project has received funding from the European Union Seventh Framework Programme under grant agreement No 609029 and from the European European Union's Horizon 2020 research and innovation programme under grant agreement No 680481.